"An intelligent guide through the maze of natural approaches to women's health."
—SUSAN LOVE, M.D., AUTHOR OF *DR. SUSAN LOVE'S BREAST BOOK*

WOMEN'S ENCYCLOPEDIA *of* NATURAL MEDICINE

Alternative Therapies and Integrative Medicine for Total Health and Wellness

REVISED AND UPDATED

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Author of WOMEN'S BODIES, WOMEN'S WISDOM

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Alternative Therapies and Integrative Medicine for Total Health and Wellness

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To:

The women who have sought my advice as a naturopathic physician and lent me their trust and confidence

The women in medicine

The women who have made a difference in my life

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FOREWORD

I've long been a fan of the work of Dr. Tori Hudson, the foremost national leader in naturopathic and botanical medicine specifically for women. And unbeknownst to her, Dr. Hudson has been a guiding light for me in using botanical and naturopathic approaches to women's health problems for many years. Long before herbal medicine enjoyed its current mainstream acceptance, my patients who were interested in natural approaches to their gynecologic problems brought me copies of Dr. Hudson's articles and even the text that she wrote for her students to fill in the information gap about gynecology and natural medicines that existed in the naturopathic training program where she teaches. In this text, entitled *Gynecology and Naturopathic Medicine: A Treatment Manual*, Dr. Hudson set down natural treatment protocols that she had used effectively for years to treat the kind of women's health problems that I was seeing every day, ranging from irregular periods and menstrual cramps to hot flashes. As a conventionally trained allopathic gynecologist, I was gratified to learn about and help my patients apply some of Dr. Hudson's gentle, natural, and plant-based approaches. They were an excellent complement to the standard gynecologic care I was already practicing.

So when Dr. Hudson called and told me about her new book, I was delighted. Here in one volume is everything a woman needs to know to begin applying gentle, natural, naturopathic solutions to her health problems on her own, along with guidance about when she needs to seek professional help. Many of these solutions are available at your local natural food store. Some are even available in your own kitchen. Many naturopathic approaches stand alone as a viable, safe, and effective treatment option. Others can be used in an integrative approach along with conventional medicine. Some women and situations will require the most conventional of medical treatments. Dr. Hudson's book helps to sort through these options. In general, the naturopathic treatments outlined in this book offer safer and gentler solutions to many women's health problems that can be applied to help rebalance the body and restore it to health long before more serious conditions develop.

Women have used the healing power of plants since the beginning of time. Now Dr. Hudson brings her years of scientific and clinical expertise to the field of natural, plant-based healing and helps make it safer and more effective for women than ever before. This is a book that should be in every woman's health library and every alternative practitioner's library, and it is a resource for the new breed of conventional practitioners open to a more integrative health-care system.

—Christiane Northrup, M.D., author of *Women's Bodies, Women's Wisdom* and *The Wisdom of Menopause*

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Throughout the course of writing the original book, and now the second edition, I have had overwhelming moments of gratitude for all the people that have helped.

I have reflected on those who helped me with the first edition: Norman Goldfind, the original publisher. Dr. Susanna Reid, who worked with me from almost the very beginning when she was still a student at the National College of Naturopathic Medicine. If it were not for her, I would not have learned to use a computer. Thanks to her weekly tutoring, I finally achieved at least a functional level of competence. Susanna was critically involved in the research of information for the first edition of the book and in planning its organization and format. I also want to thank Dr. Sandoval Melin for his expertise in the area of exercise. Sandoval has elevated the role of exercise therapeutics in the first edition of the book and is responsible for its inclusion.

I would also like to thank my editor of the second edition, Deborah Brody. She graciously accommodated my need for additional time and distinctly improved the feel and readability of each chapter.

Dr. Elizabeth Newhall generously gave of her time and expertise as an obstetrician and gynecologist for the first edition. If it were not for her generous sharing of her conventional medical knowledge over the last 14 years, my expertise in women's health would not have been complete.

I am fortunate to have a very talented and supportive sister, Karen Hudson. Not many women have the good fortune to have a sister that knows everything they do not know. Being in business together at our clinic, A Woman's Time, is the perfect blend of what we each do best. Our joint commitment of delivering healthcare options to women is our work and our play.

My family has been very supportive throughout my entire career. My mother, Pat Lawrence, has provided me with lifelong love, support, and trust and has always made it clear that I am worthy and special. She's also the one that keeps me in touch with what the media are communicating about alternative medicine. Not everyone has her own clipping service from all the popular magazines and regular updates on what's happening on "Oprah," "20/20," and the rest. Her husband, Dick, who has now passed on, was my special project man. All the things I haven't had time for—hanging the Christmas lights, cleaning the gutters, staining the deck—what a guy! My real father, Ken Guenther, made it possible for me to go back to school and receive an education in naturopathic medicine, and I thank him for providing the support and resources that allowed me to pursue a career as a naturopathic physician. My stepdad, Jack Hudson, who passed away at too young an age, gave me the gift of learning and doing all the things normally reserved for boys. My niece, Jana, delights me with her spirit and resilience.

Sometimes I cannot believe my good fortune to have Doug Stapf in my life—trusted business partner at Vitanica, easygoing Texan friend, fellow basketball fan, the most excellent of men one could hope to know and work with.

Having become a naturopathic physician in 1984, I am honored to be an alumna and faculty member of the National College of Naturopathic Medicine (NCNM) these last 24 years. The National College of Naturopathic Medicine is the oldest college of naturopathic medicine in the United States, and the expertise and experience of its faculty in the field of natural medicine are exceeded by no other college in the country. I honor the faculty, administration, and employees of NCNM for their commitment and vision.

My naturopathic colleagues as a whole, and particularly the members of the American Association of Naturopathic Physicians, are an incredible community of individuals with an extraordinary commitment to living on this planet in a respectful, mindful way and healing the humans of this planet in gentle ways that utilize the medicines of Mother Nature.

I could not have succeeded in the generation and manifestation of two important projects (the Institute of Women's Health and Integrative Medicine and the Naturopathic Education and Residency Consortium) without the years of support, trust, and guidance from three individuals and companies: Wally Simons, R.Ph., of Women's International Pharmacy; David Shefrin, N.D., of Bezwecken; and Sharon McFarland of Transitions for Health/Emerita.

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I have a special place in my heart for the daily privilege I have in working with my associates at A Woman's Time. This group of women practitioners are extraordinary in their work and truly an incredible pleasure to work with. I am grateful for their camaraderie and collaboration in all that we do together: Barbara McDonald, N.D., L.Ac.; Stephanie Kaplan, N.D.; Leigh Kochan, N.D., L.Ac.; Wendy Vannoy, N.D.; Moira Fitzpatrick, Ph.D., N.D.; Michelle Rogers, N.D.; Karen Hudson, M.P., H.C.; Theresa Baisley, LMT; and Mari Greenly, L.Ac.

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I also want to thank all the women I have treated over these last 24-plus years. I am a better teacher, better physician, and better person because of you.

For those with whom I've played, worked, nourished, and loved, you have brought about my evolution as a human being.

Finally, we all owe our gratitude to the women who seek safe, effective, respectful medicine and choices in their health care. You have changed history on more than one occasion and protected our humanness.

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CONTRIBUTORS

The second edition of *Women's Encyclopedia of Natural Medicine* would not have been possible without the studious help of two colleagues in particular: Leigh Kochan, N.D., L.Ac., and Randi Ledbetter, M.D. Dr. Kochan is a former resident and now an associate at our clinic, A Woman's Time, in Portland, Oregon. She has spent countless weeks and months assisting me in compiling the scientific literature of the last seven years, particularly for updated research in herbal and nutritional therapies. Her efforts have kept me from feeling overwhelmed and made this daunting project of updating the book a real possibility. Dr. Randi Ledbetter is a gynecologist practicing in Portland, Oregon, at The Menopause Clinic. She has generously offered her gynecological expertise to me and other alternative practitioners these past many years and now has extended that to helping me to rewrite and update the sections on conventional medicine. I consider these sections of the book vital in the education of patients and fellow practitioners.

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The following additional practitioners have made selected contributions in different sections of the book, reviewing, editing, and contributing their expertise:

Sandoval Melin, N.D., Ph.D.	Exercise therapeutics
Elizabeth Newhall, M.D.	Obstetrics, gynecology
Nina Davis, M.D.	Urology
Katherine Hill, N.P.	Infertility
Susanna Reid, Ph.D., N.D.	First edition research assistant
Judy Fulop, N.D.	First edition research assistant, endometriosis

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INTRODUCTION

I've spent the last 28 years studying, practicing, teaching, and evolving as a naturopathic physician. Two themes have been consistent: natural medicine and the health care of women.

Alternative medicine has come to be the popular term used to distinguish natural, noninvasive therapies from conventional medicine. Whether the terms *alternative medicine*, *complementary medicine*, *natural medicine*, or *holistic medicine* are used, they all reflect the transformation that is occurring in health care: a focus on disease prevention, the promotion of healthy lifestyle habits, and the treatment of disease with natural, nontoxic, and less invasive therapies. At the center of this transformation is a distinct system called naturopathic medicine.

The roots of naturopathic medicine are seen in the healing traditions of Egypt, India, China, Greece, Germany, South and Central America, Africa, and native North America. The European hydrotherapy tradition had a strong influence on the development of naturopathy, and by the end of the nineteenth century, Benedict Lust, a physician trained in the water-cure methods of Europe, came to America and began using the term *naturopathy* to describe an eclectic combination of natural healing principles and methods.

The first college of naturopathic medicine in the United States opened in New York City in 1902. It taught a system of medicine that included nutritional therapy, natural dietetics, herbal medicine, homeopathy, manipulation, exercise therapy, hydrotherapy, electrotherapy, and stress reduction techniques.

Naturopathic medicine grew and flourished from the early 1900s until the mid-1930s. At that point in history, the conventional medical profession began to influence the health-care system in several ways. It abandoned some of its barbaric bloodletting therapies and toxic mercury dosing and replaced them with more effective and less toxic treatments. With therapies more acceptable to the public, subsidies from wealthy foundations, the support of the developing pharmaceutical industry, and political savvy and legislation in its favor, conventional medicine was able to restrict the use of unorthodox doctors, midwives, herbalists, and others and gain a virtual monopoly on the health-care system.

Fortunately, alternative medicine and naturopathic medicine have seen a rebirth in the last 15 to 20 years, and especially in the last 5. A public hungry for choices in their health care, an increased awareness about the role of diet and lifestyle in cancer and chronic disease, the aging of the baby boomer generation, and the failures of certain aspects of modern conventional medicine and the health insurance industry to deal with people and their health problems respectfully, carefully, fairly, and effectively have been responsible for this resurgence. Conventional medicine has brought great insights, successes, and miracles of what human intelligence can accomplish. Natural medicine has matured, particularly in the areas of scientific research, educational institutions, number of licensed practitioners, and professionalism and is now poised to serve those who seek its gentle ways.

Naturopathic medicine is its own distinct healing art and is best defined by its principles and therapies. Simply put in modern terms, naturopathic physicians are primary health-care providers, family physicians who specialize in natural medicine. The following seven principles are the foundation for naturopathic medicine:

1. The healing power of nature (*vis medicatrix naturae*). The body has the inherent ability

to establish, maintain, and restore health. The physician's role is to facilitate and augment this process with the aid of natural, nontoxic therapies; to act to identify and remove obstacles to health and recovery; and to support the creation of a healthy internal and external environment.

2. First, do no harm (*primum no nocere*). Naturopathic physicians seek to do no harm with medical treatment by employing safe, effective, less invasive, and natural therapies.

3. Identify and treat the cause (*tolle causam*). Naturopathic physicians are not only trained to investigate and diagnose diseases, they are also trained to view things more holistically and look for an underlying cause, be it physical, mental, or emotional. Symptoms are viewed as expressions of the body's attempt to heal but are not the cause of disease. The physician must evaluate fundamental underlying causes on all levels, using treatment that includes addressing the root cause rather than just suppressing symptoms.

4. Treat the whole person. Health and disease are conditions of the whole organism, involving a complex interaction of physical, spiritual, mental, emotional, genetic, environmental, and social/cultural/economic factors. The physician must treat the whole person by taking all of these factors into account. Homeostasis and harmony of functions of all aspects of the individual are essential to recovery from disease, prevention of future health problems, and maintenance of wellness.

5. Physician as teacher (*docere*). The naturopathic physician's major role is to educate, empower, and motivate the patient to take responsibility for his or her own health. The physician educates about risk factors, hereditary susceptibility, lifestyle habits, and preventive measures and makes recommendations on how to avoid or minimize future chronic health problems. A healthy attitude, diet, exercise, and other lifestyle habits serve as the cornerstone of our recommendations.

6. Prevention is the best cure. The ultimate goal of naturopathic medicine is prevention. This is accomplished through education and promotion of lifestyle habits and through natural therapeutic recommendations. The emphasis is on building health rather than on fighting disease.

7. Establish health and wellness. The primary goals of naturopathic physicians are to establish and maintain optimum health and to promote wellness. They strive to increase the patient's level of wellness, characterized by a positive emotional state, regardless of the level of health or disease.

In addition to these seven principles, there are two principles that I believe are fundamental not only to natural medicine, but to good medicine in general: the principle of resonance and the principle of choice. Let me explain. Resonance is basically an issue of compatibility. What approach, what therapy, what herb, or what of any substance is compatible with this particular patient in this particular moment and set of life circumstances? The selection of the therapeutic approach that is resonant with the individual is the therapy that will create the most healing momentum. Picture a child on a swing. You stand behind the child pushing her forward so she can achieve the most momentum, and her swinging becomes effortless. If you push her at the right moment, your force is perfectly timed with her body motion and the rhythm of the swing. The perfect timing sends her smoothly and easily higher, and with the slightest effort she can keep swinging forever. If you push her at the wrong moment, the swinging becomes jerky, she loses speed and height, and the rhythm is disrupted. It then takes a great deal of effort to regain momentum. The perfect effortless swing comes from the perfect timing and perfect forcefulness of the "push." This is resonance. The person with the health problem is the child on the swing. The person who pushes the swing is

the physician and the therapy she uses. Any medicine, natural or pharmaceutical, can be resonant. The art of medicine is to know when to use what, for whom, and for how long. I believe the most profound healing principle in the practice of medicine is the principle of resonance, not whether the medicine is natural or synthetic, alternative or conventional, or a naturopathic philosophy versus conventional allopathic philosophy. The healing method is the medicine that is right for that person. The true goal of a physician is to perceive what is resonant with that individual.

Dr. John Bastyr was considered by most naturopathic physicians to be the modern patriarch of naturopathic medicine. A whole new generation of naturopaths looked to him for their wisdom as the holder of true naturopathic medicine. The story goes, a young naturopathic medical student asked Dr. Bastyr, "How are we supposed to know what therapy to choose when there are so many different medicines and systems to choose from?" Dr. Bastyr calmly and quickly responded, "Choose what works." Another question was posed to Dr. Bastyr: "How can you tell an excellent physician from a good physician?" Dr. Bastyr's answer: "The results."

My second guiding principle is that of choice. Each patient chooses what is right for her. The doctor's role is to educate about the health problem, about the options, including their pros and cons, and to share resources. The goal is to provide the context in which the patient can make an informed decision. The physician must be perceptive and must listen, investigate, evaluate, educate, offer recommendations, and then create an environment where the individual can make a decision for herself. The individual seeking my help gets to choose. It may be black cohosh, or it may be estrogen. It may be a rigorous naturopathic health regimen, or it may be surgery. It may be an integrated combination, a "complementary" approach using the best of two worlds. Choice is a powerful force—the force of individual responsibility, empowerment, and self-direction. Choice fosters will, desire, discipline, and motivation. Freedom of choice occurs in an environment of equality and respect between physician and patient.

These two principles, resonance and choice, are what motivates me toward the vision of an integrative health-care model. I no longer believe in a fractionated approach to health and healing where alternative medicine is on one side and conventional medicine is on the other. There is a spectrum of options that go from simple to complex, from the least intervention to the most aggressive intervention, and from the most natural therapy to the most synthetic or technological. We need all of it. Human intelligence has created incredible tools and techniques. The physician who is educated and aware of all the options and learns to understand how and when to best use all these choices on behalf of someone who is ill and suffering is the true physician in my book. An integrative model incorporates the natural/naturopathic perspective and the conventional perspective and knows the strengths and weaknesses of each in different circumstances. When we can do something effectively and safely with nontoxic, natural medicines with far fewer side effects, then what would stop us? If we can't, or it's too risky to wait and find out, then let's move up the ladder to more invasive, riskier medicines with more side effects that may work better or be a more appropriate choice because the risk of the disease is greater than the risks of the treatment.

Naturopathic and other alternative medicine disciplines have their strengths and their weaknesses. Conventional medicine has its strengths and its weaknesses. I encourage consumer and practitioner alike to advocate for practitioners of all disciplines to integrate their intelligence, experience, and energies to build cooperative working relationships with each other so that they can truly help people to choose what works best for them.

In addition to recommendations on lifestyle, diet, and exercise, naturopathic physicians utilize

a vast array of therapeutic tools to promote health and treat illnesses. Naturopathic physicians are trained in what is called the eclectic tradition. They have a broad range of therapies and tend to use a selected mixture of these therapies when treating their patients. Naturopathic therapies include dietary and lifestyle changes, clinical nutrition (nutritional supplementation), botanical medicine (herbs), homeopathy, Chinese medicine and acupuncture, hydrotherapy, manipulation, physical therapies, psychotherapy, and minor surgery. We also recognize the judicious use of prescription medications when the benefits exceed the risks, integrated into a comprehensive naturopathic health-care plan. Some naturopathic physicians receive extra training and licensure to practice obstetrics and natural childbirth.

And now for the second consistent theme in my life: the delivery of health care to women. Modern women are the first women in history to enjoy the luxury of anticipating that their lives will be healthy, long, and self-directed. This awareness of opportunities and choices is leading them today to seek the benefits of natural medicine in ever-increasing numbers. More dominant and discriminating consumers of health care than men or children, and quicker to grasp the advantages of a vitalistic, holistic healing art, their innate wisdom has already led to many significant changes in conventional medicine in recent years. Women insisted on natural childbirth, and now it is the goal of most pregnant women and available everywhere. They have too long felt the restrictions of paternalistic conventional medicine with its uniformity and lack of individualization of healing approaches and are therefore more than ready to embrace the natural principle of treating the individual. Moreover, the success of natural treatments in relieving disease and suffering has done much to promote their popularity. The now well-recognized neglect of women in allopathic conventional research and the failure to prioritize women's health in general have left a profound gap in health care that alternative medicine is well poised to fill.

Women want safe, effective, affordable medicine. Women want to be educated about their bodies and their health. Women want to make choices in their health care that they have determined are right for them. By philosophy, by design, and by commitment, alternative healing systems have the package to offer women what they want.

Beginning with the AMA's exclusion of women in the late 1800s, orthodox medicine's lack of respect for women both as healers and patients has been all too obvious. Today, significantly more empowered women have come to reject the dictums of orthodox medicine in greater numbers. Women intuit the limitations of the biomechanical model to completely explain physiological processes. Despite the orthodox physician's uniform advocacy for menopausal hormone replacement therapy (HRT) for all, only a fraction, less than 20 percent of women, comply; 90 percent of the women who begin HRT stop within the first year of use. Partially a failure of access, it is also a profound testimonial to their lack of trust in conventional medicine's safety, efficacy, and commitment to their well-being.

The creation of synthetic hormones in the 1950s and 1960s was unquestionably revolutionary for women in that it suddenly allowed personal life autonomy through successful fertility control and the elimination of the hot flashes and mood swings of menopause. Women's lives were changed forever. However, with hormones coming as they did on the heels of the "miracle medicine era" in which antibiotics and vaccines led the general public to believe medicine could do no wrong, the consequences of hormone excess and side effects were not anticipated or quickly recognized and dealt with. Up until 2002, most conventional practitioners recommended a postmenopausal lifetime on HRT. This has recently changed, and the data have begun to show that the risk of breast cancer increases after five years of use. Consequently, many women distrust and fear hormonal medi-

cine and their conventional physicians. Unfortunately, this fear and mistrust may lead to the refusal of a medicine that in some cases may achieve more benefit than risk. Here's where the integrated wisdom and approach come in. While clearly not a panacea, hormones are not all bad and have important uses for selected individuals. We can also use hormones in a form that may enhance their benefits and minimize their risks, or use a combination of a reduced dose of hormones along with soy and herbal medicines to bring about the most benefit with the least risk.

Women today are insisting on participating in their health-care decisions in a way conventional medicine is just beginning to recognize. I believe that the baby boomer menopausal woman is having and will continue to have a more significant impact on our health-care model than any other previous group of health-care consumers. Menopausal women today reject the notion of a single therapeutic modality being essential for all women undergoing a natural process. They reject the notion of taking a drug for the rest of their lives, especially if they have other options, especially if they can do other things to help prevent osteoporosis and heart disease, and especially if that drug increases their risk of a life-threatening disease.

Women are the biggest consumers of health care in America. A menopause supplement to *OB-GYN*, the journal of the American College of Ob-Gyn, states, "Focus groups, involving women age 40 to 60, reveal that women know more about herbal medicines than about estrogen." That seems an impressive testimonial to the power of alternative medicine in its alliance with the natural wisdom of women to define their own health-care standards. It is an invitation to alternative medicine to continue to provide women with the wider, healthier options they seek. Fifty percent of American women will be menopausal by the year 2015, and they will provide alternative medicine the greatest opportunity yet to serve our communities.

In addition to practitioner-delivered natural health care, natural medicine offers safe and effective self-care options for many common conditions such as vaginitis, PMS, fibrocystic breasts, menstrual cramps, menopause symptoms, bladder infections, and more, further expanding women's health-care autonomy.

I support the self-care approach to healing. Much of the practice of medicine is not particularly difficult or complex. Education and resources can provide a lot of very practical information. One of the things I've tried to do in this book is not only to provide some self-care treatments for common female disorders but also to provide guidelines about when self-care is not appropriate. Health care is a team approach: the patient, the practitioner, the therapies. The team can include both the alternative and the conventional practitioner—and, better still, those that talk to each other on behalf of the patient.

Choice in doctors and medical approaches, involvement in the health-care process, healthy lifestyles, and safer, nontoxic natural therapies are recognized by today's women as essential to health and well-being. Women highly value the longer time spent in discussion with their alternative provider as well as the careful, complete, and respectful collection of their history. They value processing their options thoroughly and individually. This unique quality of alternative health-care systems is rare in conventional medicine and is one of the chief reasons women seek alternative care.

Naturopathic physicians and other providers of alternative medicine must seek to verify the "scientific" truth of their medicines whenever possible—by research and by modifying the mechanistic model when necessary to suit their vitalistic philosophy. They must continue to stand by their tradition of resonance between patient and therapy, ever seeking the resonance for a particular woman with a particular problem at a particular time in her life.

Last, alternative medicine must recognize that conventional medicine, while inadequate alone, is

here to stay and offers important options and life-saving measures. Likewise, conventional medicine must recognize that natural therapies are a fundamental healing tradition of all cultures and that modern alternative medicine is also here to stay. The more practitioners make themselves aware of these options, the better they can guide women in selecting from all options, both naturopathic and conventional. A combined, well-thought-out cooperative and integrative approach is often the best that medicine has to offer. Our open-mindedness will be rewarded manyfold by the improved health of women and their increased satisfaction and trust in their health-care providers.

WOMEN'S ENCYCLOPEDIA *of* NATURAL MEDICINE

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ABNORMAL UTERINE BLEEDING

CHAPTER 1

OVERVIEW

Changes in the amount of menstrual blood flow, duration, and pattern are among the most common health concerns that women face. Although these changes cause a lot of anxiety for women and do warrant a medical evaluation, most cases of abnormal bleeding are due to benign and easily addressed conditions. Whether alternative or conventional treatments are used for intervention, prompt evaluation is highly recommended.

There are many causes of abnormal bleeding, but our main purpose in this chapter is to discuss a benign hormonal cause of bleeding called dysfunctional uterine bleeding (DUB), abnormal uterine bleeding without any demonstrable organic cause. First, we need a little background and overview on abnormal bleeding in general.

A wide variety of clinical disorders can manifest as abnormal bleeding from the vagina. What is considered abnormal bleeding depends on the age of the patient. The bleeding can take many forms, including heavy and/or prolonged menses (*menorrhagia*), intermenstrual bleeding (*metrorrhagia*), frequent menses (*polymenorrhea*), infrequent menses (*oligomenorrhea*), heavy and irregular intermenstrual bleeding (*menometrorrhagia*), or postmenopausal bleeding. Normal menses are defined as vaginal bleeding that occurs approximately every 28 days (with a range of 21 to 35 days) and lasts for 4 to 7 days. Abnormal bleeding is bleeding that occurs more frequently than every 21 days, less frequently than every 35 days, lasts more than 7 days, is unusually heavy or light, or occurs after menopause. In addition, vaginal bleeding is considered heavy if a woman loses more than 80 ml of blood per cycle (normal is 30 to 35 ml).

Benign Abnormal Bleeding

The causes of abnormal bleeding can be benign, premalignant, or malignant. Benign causes can be further subdivided as either organic or hormonal. Organic disorders are all benign causes of bleeding that are not hormonal. This may include systemic health problems, abnormal pregnancy, foreign bodies, trauma, infections, and growths.

Systemic diseases that are associated with problems in how the blood clots are called coagulopathies and can cause heavy vaginal bleeding. Heavy bleeding in a teenage girl may be caused by a coagulopathy called von Willebrand's disease. In fact, 20 percent of teenage girls with severe menorrhagia have a significant coagulation problem. A decrease in the number of blood platelets (thrombocytopenia) can also cause abnormal bleeding. Other systemic diseases, such as hypothyroidism and severe liver diseases, can also cause prolonged menses, heavy menses, or intermenstrual bleeding.

An abnormal pregnancy is the most common cause of abnormal vaginal bleeding in women who are of reproductive age. Any type of miscarriage can present with abnormal bleeding that is also often associated with cramping pains. Women with an ectopic pregnancy (a pregnancy in the fallopian tubes rather than the uterus) can present with abnormal bleeding, as can those with a molar pregnancy (an abnormality of the placenta caused by a problem when the egg and sperm join together at fertilization).

Abnormal bleeding in children can be caused by foreign bodies that they may have placed in their vaginas while playing. The most common foreign body in women of reproductive age is an IUD, or intrauterine birth control device.

Women with IUDs will tend to have heavier menses and sometimes intermenstrual bleeding.

Trauma during intercourse can cause vaginal bleeding, for example in postmenopausal women who may have a dry vagina with thinning vaginal tissue. Just the friction of normal vaginal penetration during sex may be traumatic to this sensitive tissue. Trauma may also be experienced in a violent situation such as sexual abuse and rape. In children or adolescents, sexual abuse must be considered in cases of traumatic vaginal bleeding. Traumatic bleeding may also occur after gynecological procedures such as biopsies and instrumentation.

Occasionally, a uterine infection called chronic endometritis can present with abnormal vaginal bleeding or spotting. Other symptoms often associated with this infection include a vaginal discharge, fever, abdominal/pelvic pain, or lower back pain.

Of the most common causes of abnormal bleeding are growths known as myomas, more commonly referred to as uterine fibroids. These tend to be more common in women over the age of 30, particularly women in their 40s. Different kinds of fibroids are discussed in Chapter 19, but submucous fibroids tend to be the most troublesome in terms of heavy bleeding. Fortunately, they represent only about 5 to 10 percent of all fibroids.

Endometrial polyps can also cause abnormal bleeding, but the bleeding is usually not heavy. Adenomyosis, a variant of endometriosis, may result in very heavy bleeding associated with menstrual cramping. Endometriosis itself can cause irregular changes in the menstrual cycle, but not typically heavy menses. Finally, bleeding may result from cervical polyps or a simple inflammation of the cervix called cervicitis. Cervical polyps and cervicitis tend to present with intermenstrual bleeding or spotting after intercourse.

Malignant Abnormal Bleeding

Now let us look at the premalignant and malignant causes of uterine bleeding. Vaginal cancer accounts for only 2 percent of malignancies of the female genital tract. Eighty-five percent of the primary vaginal cancers are squamous cell (a particular cell type) carcinoma. The most common symptoms of invasive squamous cell cancer include vaginal bleeding or foul-smelling discharge. Pain is usually a late symptom.

The tragedy of another cancer, cervical cancer, is that it is a preventable disease. It is preceded by a prolonged precancerous state in almost all cases and can be detected at its early precancerous states by annual Pap smears. These earlier states of abnormal cells and cervical dysplasias are easily treatable conditions. Cervical cancer accounts for approximately 18 percent of female genital cancer in the United States. The peak incidence of cervical cancer is from 35 to 39 and 60 to 64 years of age. Vaginal bleeding after vaginal sexual activity is the most common symptom occurring in cancer of the cervix. In women with advanced disease, a foul-smelling discharge may be present.

Endometrial hyperplasia is an increased growth of the lining of the uterus (endometrium) and a subsequent thickening. Most cases of endometrial hyperplasia revert to normal, either spontaneously or with hormonal treatment. Some may persist, and others can progress to endometrial cancer. Endometrial hyperplasia may occur in any age group but is most commonly seen in older women. Chronic lack of ovulation, as seen in the teenage years, after menopause, and as a result of polycystic ovary disease, is a condition where we may see endometrial hyperplasia. Endometrial hyperplasia can be simple or complex, and either atypical, which is precancerous, or without atypia. These distinctions are very important when it comes to treatment and management and can best be made with a procedure called an endometrial biopsy. Pelvic ultrasound has improved to the point where it can detect thickening of the endometrium. Once thickening is observed, a biopsy will probably be recommended to further evaluate the situation.

Some endometrial hyperplasias will progress to cancer of the endometrium, i.e., uterine

cancer. As in cervical dysplasia and cervical cancer, endometrial hyperplasia is the precancerous state; its adequate treatment will prevent the development of endometrial cancer. Endometrial cancer is the most common malignancy of the female genital tract and accounts for approximately 7 percent of all cancers in women. The average age of patients with endometrial cancer is 59 years; the highest range for the incidence is age 50 to 59 years in postmenopausal women. The most common symptom associated with endometrial cancer is abnormal uterine bleeding. Typically, the bleeding is in the form of spotting, especially in postmenopausal women.

Dysfunctional Uterine Bleeding (DUB)

DUB can occur at any age but is most common at either end of the reproductive age span. One uses the term *DUB* when other causes for abnormal bleeding have been excluded (fibroids, polyps, and endocrine or other disorders). Adolescents account for about 20 percent of DUB cases after the first menstrual cycle. These cases are due to the immature endocrine system, particularly the immature function of the hypothalamus. Perimenopausal women account for approximately 50 percent of DUB cases due to waning ovarian function. As the ovary ages, it becomes less efficient in completing the ovulatory process. Initially there is a decrease in progesterone production, which causes shorter cycles. As the aging process progresses, ovulation becomes less frequent, resulting in a variable length of the menstrual cycle and a variation in the duration of the flow. Eventually, the lack of ovulation puts women in an estrogen-dominant state in the presence of too little progesterone because ovulation must occur in order to produce progesterone. Women who are in a state of chronic anovulation tend to have an excess of estrogen in the body. This excess estrogen is what disrupts the normal pattern of menstruation.

The remaining 30 percent of cases of DUB occur among women age 20 to 40, generally as a result of polycystic ovarian syndrome, elevated prolactin levels, emotional stress, obesity, weight loss due to anorexia, or athletic training.

The actual cause of DUB is not completely clear. One theory is that the fluctuating estrogen levels seen in chronic lack of ovulation can cause intermittent estrogen withdrawal bleeding. Another theory is that the continuous estrogen stimulation leads to a thickening of the endometrium, which needs more estrogen in order to maintain itself. Eventually, the need for estrogen surpasses the production and breakthrough bleeding results. Another theory is that some areas of the endometrium outgrow their blood supply, and subsequent bleeding occurs because of the lack of progesterone.

There are also cases of DUB that are not due to anovulation but rather occur even though there is regular monthly ovulation. Ovulatory DUB is defined as heavy menses in women who ovulate and who do not have a coagulopathy or any uterine abnormality. The cause of this form of DUB is not clear.

DIAGNOSIS

The key to accurate diagnosis of abnormal bleeding is the woman's medical history. Several pertinent pieces of information will facilitate diagnosis:

- Previous menstrual patterns for the last three months
- The presence or absence of pain along with the bleeding
- Heaviness of the flow (number of pads or tampons per day and how often they are changed when saturated)
- Contraceptive methods, if any
- Symptoms of pregnancy
- Dates and histories of past pregnancies
- Premenstrual symptoms
- Recent abdominal, pelvic, or vaginal trauma
- Clotting problems
- Easy bruising or bleeding
- Symptoms of systemic diseases

- History of taking estrogens without adequate progesterone/progestins
- History of sexually transmitted diseases
- Past gynecologic history

A physical exam will involve visualizing the cervix, feeling the contour and size of the uterus, and general palpation of the pelvic area. Laboratory testing may include:

- Pap smear
- Thyroid function tests
- Pregnancy test
- Complete blood count to rule out anemia
- Follicle-stimulating hormone (FSH)/luteinizing hormone (LH)
- Liver function tests
- Prolactin levels
- Adrenal function studies
- Pelvic ultrasound to identify uterine fibroids or measure endometrial thickness
- Pelvic saline infusion sonohystogram
- Testing for sexually transmitted diseases
- Endometrial biopsy

An endometrial biopsy may be recommended to test the tissue itself. This is a simple procedure done in the practitioner's office in which the clinician inserts a small narrow plastic instrument called a pipelle into the uterine cavity to extract a small sample of tissue. It only takes about 30 to 60 seconds, but women can experience mild to significant cramping during that time. A local anesthetic is usually not required, and the cramping generally subsides very quickly once the procedure is over. Endometrial pipelle biopsies can determine the presence of endometrial hyperplasia, uterine cancer, infection (endometritis), a disrupted hormonal effect, a lack of estrogen as is seen in postmenopausal women, or a uterine polyp.

If an endometrial biopsy is done at the right time, it can also be used to verify ovulation. If the biopsy shows that the endometrium has proliferated, when the woman's next bleeding episode occurs within 10 to 12 days, it generally indicates a lack of ovulation. Tests such as saline infusion sonohysterography (SIS—an ultrasound procedure that gives a three-dimensional view so as not to miss any portion of the uterine cavity), hysteroscopy (a procedure that involves dilating the cervix so that a small lighted scope can be inserted to visualize the intrauterine cavity), or a dilation and curettage (D&C) may be recommended in addition to or instead of the pelvic ultrasound and the pipelle biopsy in selected cases to improve accuracy of the results.

KEY CONCEPTS

- Seek and utilize a health-care practitioner who will distinguish DUB from benign, premalignant, and malignant causes. If benign, is the cause organic or hormonal?
- Workup will include a medical history and may include a physical exam and further laboratory tests, pelvic imaging, and/or endometrial biopsy.
- Do not self-treat unless assured that the cause is DUB.
- Practitioners can often presume a diagnosis of DUB temporarily and recommend a further workup depending on response to the treatment.

PREVENTION

- Reduce stress.
- Avoid taking any form of estrogen without adequate progesterone or progestins.
- Engage in healthy lifestyle habits.
- Protect yourself against sexually transmitted diseases.
- Use well-tolerated forms of contraception.
- Have regular medical visits, including an annual physical exam.
- Maintain optimal body weight.

OVERVIEW OF ALTERNATIVE TREATMENTS

The goals of alternative treatment for DUB are the same as the goals of conventional treatment: con-

trol the bleeding, prevent and treat anemia, restore an acceptable menstrual pattern, and prevent endometrial hyperplasia/endometrial cancer.

Repeated episodes of heavier and prolonged bleeding should be distinguished from acute hemorrhage. My general guidelines are as follows: If a woman is saturating a super tampon or heavy pad every hour for six to eight hours or more she will often need some form of prescription hormone intervention. Herbal/nutritional interventions can be tried, but if there is no change within two to four hours, then hormonal therapies should be utilized. Even heavier bleeding (i.e., saturating pads every half hour or less) will most likely require surgical intervention. Monitoring physical symptoms, blood pressure, pulse, and hemoglobin and hematocrit levels will help to determine management of these more semi-urgent and urgent cases. Use of high-dose oral bio-identical estrogens (estradiol) and bio-identical progesterone (oral micronized progesterone) may be substituted in some cases of heavier semi-acute bleeding, although the net effect is the same as when using conventional hormones. In most states, licensed naturopathic physicians can prescribe bio-identical hormones and conventional hormones. They would approach these dramatic situations with the same high degree of concern and astuteness as would a conventional practitioner and may integrate acute antihemorrhagic botanicals or nutrients in combination with the hormonal therapies.

Less dramatic cases that still involve heavy menstrual flow will be best managed with both an immediate plan for the semi-acute bleeding episode, which should slow down within a few hours to 48 hours, and a comprehensive plan that should bring results with no further episodes in one to four months. A comprehensive plan may include the use of soy and flax products to regulate the menstrual cycle, herbal extracts to address immediate bleeding episodes, nutrients such as bioflavonoids and bromelain for their natural anti-inflammatory effect, herbal extracts for their ability to bring about ovulation and orderly stimulation of ovarian function, and herbs for their tonifying and astringent effects.

The concept of tissue tonification is a key feature of the philosophy of herbal medicine. It is thought that gynecological conditions associated with bleeding may occur as a result of poor tissue tone of the mucous membranes, poor uterine tone, and a constitutional weakness of the tissues that presents as generalized lack of tissue integrity, in this case the uterus. The astringents (herbs that slow the loss of body fluids, i.e., menstrual bleeding) are the herbs most likely to affect tissue tone, while the uterine tonics and the emmenagogues (herbs to promote menses) are most likely to affect uterine tone. Traditionally, the ability of an astringent herb to stop bleeding has been attributed to the tannin content of the plants. Uterine tone is related to the ability of the uterus to function as a smooth muscle. When the uterine tone is normal, there is a normalization of menstrual flow. A hypertonic uterus can be associated with a delayed menses and cramping uterine pains. A hypotonic uterus is frequently accompanied by heavy bleeding and a feeling of pelvic congestion.

Stress reduction has an underappreciated but significant influence on irregular menses and DUB. A disruption in the messages between the hypothalamus (which produces gonadotropin-releasing hormones) and the anterior pituitary (which releases FSH and LH, follicle-stimulating and luteinizing hormones) brings about a mis-timing of the release of these hormones and a subsequent lack of ovulation and/or estrogen and progesterone production by the ovaries. The timing of the release of these pituitary hormones, as well as of estrogen and progesterone, is what determines a normal, regular menstrual cycle. This timing can be adversely affected by stress, and by the same token, the timing can be improved by stress reduction. A third hormone produced by the pituitary, prolactin, also plays an important role in the menstrual cycle. Increased

production of prolactin can inhibit the maturation of ovarian follicles and induce menstrual abnormalities and sterility. Prolactin release is often stress related.

Nutrition

Consume a whole foods diet rich in whole grains, fruits, vegetables, legumes, quality cooking oils (canola and olive), nuts, and seeds. Emphasize fish high in omega-3 oils (salmon, tuna, sardines, halibut, mackerel, herring) and reduce saturated animal fats (beef, chicken, butter, cheese) to promote the preferred prostaglandin pathways that are discussed in Chapters 9 and 13 (in the discussions of heart disease and menstrual cramps). These preferred prostaglandins will reduce inflammation and may thereby help to reduce heavy and profuse menstrual flows.

Foods high in iron in particular should be incorporated into the general diet when heavy blood loss persists on a monthly basis. Refined breads and cereals are the single greatest nutritional contributor to iron-deficiency anemia. Although we do have iron "enriched" flour, it has only about one-third the iron content of whole wheat flour. Brewer's yeast and wheat germ are both excellent sources of iron, supplying about 18 and 8 mg respectively per half cup. Blackstrap molasses is not only one of the richest sources of iron but also of many other minerals. It supplies about 9 mg of iron per tablespoon; dark unrefined molasses contains 1.5 mg of iron per tablespoon, and sugar, none. Single foods high in iron probably cannot surpass the amount found in liver and kidneys. However, I do not recommend these because it is very difficult to get organic products, and these organs accumulate many metabolic wastes. Apricots and eggs are also rather high in iron. We often think of dark green leafy vegetables as high in iron, but iron is difficult to absorb in this form. Foods such as yogurt that contain *Lactobacillus acidophilus* and sour fruits and citrus juices aid in the absorption of iron because of their high vitamin C content. Two foods stand out in their ability to regulate the menstrual cycle: flaxseed and soy protein. Flaxseed contains a group of phytoestrogens called lignans that have been shown to have weakly estrogenic and antiestrogenic properties. Two specific lignans, enterodiol and enterolactone, are absorbed after formation in the intestinal tract from plant precursors particularly abundant in flaxseed.

The ingestion of flaxseed powder and its effect on the menstrual cycle was studied in 18 normally cycling women.[1] Each woman consumed her usual omnivorous, low-fiber diet for three cycles and her usual diet supplemented with 10 grams per day of flaxseed for another three cycles. All women were instructed to avoid soy foods. The second and third flax cycles were compared to the second and third control diet cycles. Three nonovulatory cycles occurred among the 18 women during the control diet (36 total cycles) compared to none during the 36 flaxseed cycles. The ovulatory flax cycles were consistently associated with about one more day in the luteal phase (second half of the cycle) when compared to the ovulatory non-flax cycles. Only one day longer before you bleed and a slight increase in the number of ovulations may not seem like much. However, over a period of months and years, the cumulative effect not only has implications for regulating the menstrual cycle but may also play a positive role in reducing the risk of breast and other hormonally dependent cancers.

The influence of a diet containing soy protein on the length of the menstrual cycle in premenopausal women has also been studied.[2] Sixty grams of soy protein containing 45 mg of isoflavones (a phytoestrogen compound found in high amounts in soy; see Table 1.1) was given daily for one month in a study lasting nine months. A significant increase in the length of the follicular phase (first half of the menstrual cycle) by an average of 2.5 days and/or delayed menstruation was observed in the six women who consumed the soy protein. Again, as with

Table 1.1 Isoflavone Content of Soybeans

Food	Serving Size	Isoflavones (mg)
Textured soy protein granules	¼ cup	62
Nutlettes breakfast cereal	¼ cup	61
Roasted soy nuts	¼ cup	60
Tempeh	½ cup	35
Tofu, low-fat and regular	½ cup	35
Soy beverage powders (varies with manufacturer)	1–2 scoops	20–50
Regular soy milk	1 cup	30
Low-fat soy milk	1 cup	20
Roasted soy butter	2 tbsp	17

flaxseed, soy protein has a role not only in contributing to the regularity and lengthening of the menstrual cycle, but adding 2.5 days per month and lengthening the number of days from one menses to another may in part contribute to a lower incidence of breast cancer.[3]

Nutritional Supplements

Vitamin A. A deficiency of vitamin A may contribute to menorrhagia in adult women. Vitamin A deficiency impairs enzyme activity and hormone production in the ovaries of animals,[4] and serum levels of vitamin A have been found to be lower in women with menorrhagia than in healthy women.[5] In the latter study, vitamin A was used as a treatment in 40 women who had diagnosed menorrhagia as a result of a diverse array of causes. In the group who received 60,000 IU of vitamin A for 35 days, menstruation returned to normal in 23 women (57.5 percent) for a period of at least three months. A significant decrease in the amount of blood or a reduction in the duration of the menses or both was obtained in 14 women (35 percent). The vitamin A was ineffective in 3 of the 40 women (7.5 percent). The overall result with vitamin A therapy showed that 92.5 percent of the 40 cases of menorrhagia were cured or alleviated.

It is important to understand that 60,000 IU of vitamin A given for long periods of time could lead to vitamin A toxicity, but generally this would only occur if doses in excess of 50,000 IU were used for several years. Smaller doses may produce toxicity symptoms if there are problems in storage and transport of vitamin A. These problems are generally found only in people with cirrhosis of the liver, hepatitis, or malnutrition and in children and adolescents. However, for a period of only one month, as in this study, vitamin A toxicity is of virtually no concern, and I would not hesitate to use it for this amount of time, or up to three months. Using lower doses of 25,000 IU for longer periods of time should be considered in those cases where ongoing treatment is necessary to control menorrhagia.

Vitamin A

60,000 IU per day for 1–3 months
10,000–25,000 IU ongoing, if necessary, but be aware of potential increase in urinary calcium loss

Note: Vitamin E improves vitamin A storage and utilization, and zinc is required to mobilize vitamin A. A deficiency of zinc, vitamin C, protein, or thyroid hormone may impair the conversion of carotenes to vitamin A. Provitamin A carotenes such as beta-carotene require these nutrients for their conversion to vitamin A.

B Complex. There may be a correlation between a nutritional deficiency of vitamin B complex and menorrhagia and metrorrhagia. It has been shown that the liver loses its ability to inactivate estrogen in vitamin B-complex deficiency. We know that some cases of heavy menses and intermenstrual bleeding are due to an excess of estrogen. Therefore, supplementing with a complex of B vitamins may restore the proper metabolism of estrogen and thus have a role in treating DUB. A study done over 50 years ago

was undertaken to determine if the B-complex vitamins were effective in the treatment of these menstrual conditions. Although the study, done in the 1940s, was not up to today's scientific standards, a series of consecutive cases showed that a B-complex preparation was effective in "prompt" improvement in both menorrhagia and metrorrhagia.[6] The B-complex preparations used orally in the study were usually given in daily doses providing 3 to 9 mg of thiamin, 4.5 to 9 mg of riboflavin, and up to 60 mg of niacin.

Vitamin B-100 Complex

1–2 capsules daily of a B-100 combination

Vitamin K. Vitamin K deficiency is pretty rare, but its role in the manufacture of clotting factors like prothrombin and clotting factors VII, IX, and X has obvious implications for women with heavy or prolonged menses.[7] Even when the cause of the excessive bleeding is not a clotting disorder, it may be prudent to use vitamin K as part of a comprehensive treatment plan. Fat-soluble chlorophyll is a good source of vitamin K and is found in fresh green juices. Consider increasing the intake of green leafy vegetables and/or supplementing with 150 to 500 mcg per day of vitamin K.

Vitamin K

150–500 mcg per day

Vitamin C. Vitamin C helps to reduce heavy bleeding by strengthening the capillaries. In at least one study, vitamin C was able to reduce heavy bleeding in 87 percent of the women.[8] Vitamin C also is an important supplement for women who have acquired iron-deficiency anemia from menstrual blood loss. It helps to increase iron absorption and can be used to prevent anemia as well as to treat it.

Vitamin C

2,000–4,000 mg per day

Bioflavonoids. Like vitamin C, bioflavonoids have demonstrated a significant ability to reduce heavy menstrual bleeding by strengthening the vessel walls of the capillaries in women with menorrhagia.[8] Bioflavonoids also can have an antiestrogen effect on the uterus by occupying the estrogen receptor sites and thus limiting the estrogen-stimulating effect on the endometrium. This can help to reduce bleeding. Just as conventional medicine prescribes nonsteroidal anti-inflammatories to reduce heavy bleeding, alternative medicine has natural anti-inflammatories such as bioflavonoids that can be used for the same purpose. Foods high in bioflavonoids (and vitamin C) include grape skins, cherries, blackberries, blueberries, and the pulp and white rind of citrus fruits.

Bioflavonoids

1,000–2,000 mg per day

Botanicals

Chaste Tree (*Vitex Agnus Castus*). Chaste tree is probably the best-known herb in all of Europe for hormonal imbalances in women. Since at least the time of the Greeks, chaste tree has been used for the full scope of menstrual disorders: heavy menses, lack of ovulation, frequent and infrequent menses, irregular menses, and a complete lack of menses. Chaste tree has been repeatedly studied in Germany. Although the fruit was used traditionally, it is the seeds that are mainly used for medicine in Europe and in this country. Consequently, most of the testing has been done on the seeds. Chaste tree acts on the hypothalamus and pituitary glands. It increases LH production and mildly inhibits the release of FSH. The result is a shift in the ratio of estrogen to progesterone and consequently a "progesterone-like" effect.[9] The ability of chaste tree to raise progesterone levels is an indirect effect and not a direct hormonal action.[10] Chaste tree has also been shown to inhibit prolactin release by the pituitary gland, particularly under stress.[11]

The first major study on chaste tree was published in 1954,[12] proving the herb's effectiveness for patients with cystic hyperplasia (excessive proliferation of the endometrium). Although this condition is not technically DUB, it is impressive that chaste tree was able to bring about enough of a progesterone effect to reduce the hyperplasia. In a separate study, 126 women with menstrual disorders took 15 drops of a chaste tree liquid extract three times daily over several menstrual cycles.[13] In 33 women who had frequent menses (polymenorrhea), the duration between periods lengthened from an average of 20.1 days to 26.3 days. In 58 patients with excessive bleeding (menorrhagia), the number of heavy bleeding days was decreased.

As mentioned earlier, chaste tree has an ability to inhibit prolactin production. A double-blind, placebo-controlled study done in 2005 was able to examine the effect of a chaste tree preparation on 52 women with luteal phase defects due to elevated prolactin levels.[14] The dose given was 20 mg chaste tree extract daily for three months. After three months of treatment, prolactin release was significantly reduced in those taking chaste tree. The shortened luteal phase was normalized as was the decrease in progesterone production. In another study examining the pharmacology of vitex (another term for chaste tree), serum prolactin levels were reduced via vitex's natural prolactin-suppressive compounds, namely diterpenes. These diterpenes have dopaminergic properties and bind to the DA2-receptor protein, which, in turn, suppressed prolactin release.[15]

Chaste tree is the most important herb to normalize and regulate the menstrual cycle. Chaste tree is not a fast-acting herb; do not hesitate to use it over a long period of time. In fact, results may not be achieved until after four to six months. It is not an herb to be relied on for immediate relief, and it will not be effective in reducing semi-acute bleeding episodes. Human and animal studies have determined chaste tree to be safe for most menstruating women. It is not recommended during pregnancy, although this is not an absolute contraindication, and women should not worry if they become pregnant while taking chaste tree for the first trimester. Chaste tree is completely safe during lactation, and there are no known interactions with other drugs, but theoretically, it might interfere with dopaminergic antagonists. Minimal, reversible side effects have included itching, occasional rash, nausea, headache, gastrointestinal disturbance, menstrual disorders, acne, and possibly a lowered libido.[16]

Note: Aucubin and agnuside are different marker compounds found in chaste tree, used to standardize the product to assure an effective dose.

Chaste Tree

30–60 drops liquid extract or 215 mg .6% aucubin standardized extract or 175 mg .75% agnuside standardized extract per day

Ginger (*Zingiber Officinale*). Ginger has been shown to inhibit prostaglandin synthetase[17] and cyclooxygenase-2 (COX-2)[18] enzymes believed to be related to the altered prostaglandin-2 ratio associated with excessive menstrual loss.[19] Prostaglandins are hormone-like substances, and an excess of prostaglandin 2s can cause increased pain and inflammation. The most potent constituent appears to be gingerol, the pungent ingredient in the ginger. Inhibition of prostaglandin and leukotriene formation could explain ginger's traditional use as an anti-inflammatory agent, and anti-inflammatories are effective in reducing the flow from heavy and protracted menses.

Ginger

1–4 g dry powder per day for semi-acute blood loss or ginger root extract (5%) gingerols 100 mg per day

Dietary Kelp or Bladderwrack (*Fucus Vesiculosus*). A very small study of three women demonstrated that dietary kelp may be effective in normalizing DUB by decreasing 17 beta-estradiol (one of the estrogens the body naturally produces) and increasing progesterone. These pilot data sug-

gest that dietary bladderwrack may prolong the length of the menstrual cycle and exert anti-estrogenic effects in premenopausal women.[20]

Traditional Astringent Herbs. Astringent herbs form a large category of tannin-containing plants that are used to reduce blood loss from the reproductive tract as well as from the bowel, stomach, respiratory tract, and skin. In the reproductive tract, the astringent herbs are used to correct uterine or cervical bleeding. The astringents most effective in uterine blood loss are often high in tannins, but other constituents also explain their mechanism of action. The following herbs are the major astringent and hemostatic herbs used in gynecological problems:

With Tannins
- Yarrow (*Achillea millefolium*)
- Ladies' mantle (*Alchemilla vulgaris*)
- Cranesbill (*Geranium maculatum*)
- Beth root (*Trillium erectum*)
- Greater periwinkle (*Vinca major*)

Cranesbill. This astringent herb, high in tannic acid, was relied on by early American Indians to treat diarrhea, dysentery, leukorrhea, and chronic menorrhagia, especially cases of prolonged bleeding. Cranesbill was used by early practitioners of natural medicine (the eclectic physicians) to achieve prompt and predictable results in cases of menorrhagia without any unpleasant side effects.

Without Tannins
- Horsetail (*Equisetum arvense*)
- Goldenseal (*Hydrastis canadensis*)
- Shepherd's purse (*Capsella bursa-pastoris*)

Shepherd's Purse. Shepherd's purse is a mild astringent that contains saponins, choline, acetylcholine, and tyramine, all likely to be helpful in female reproductive health.[21] Chemical analysis shows that it can coagulate blood.[22] Its best use is in combination with other astringent and hemostatic herbs for uterine bleeding, particularly when there is extremely heavy flow. Shepherd's purse is a good choice for both semi-acute situations and chronic recurring episodes of DUB.

Uterine Tonics. In traditional herbal medicine, uterine tone determines the ease of menstrual flow. If the uterus is hypertonic, then it may be difficult to initiate menses in a timely manner. If the uterus is hypotonic, there may be heavy bleeding. In either case, improving uterine tone will tend to normalize and regulate menstrual bleeding. Two categories of herbs are said to have the most effect on uterine tone and therefore bleeding.

Tonics That Regulate Uterine Tone. The following are uterine tonics or amphoterics that regulate tone (both reduce excess tone and increase tone in states of laxity):

- Dong quai (*Angelica sinensis*): potent anticoagulant and hemostatic effects via platelet aggregation[23]
- Blue cohosh (*Caulophyllum thalictroides*)
- Helonias (*Chamaelirium luteum*)
- Squaw vine (*Mitchella repens*)
- Raspberry leaves (*Rubus idaeus*)
- Life root (*Senecio aureus*)

Life root, also known as ragwort, is a time-honored "female regulator" that has been used consistently in traditional herbal medicine for menstrual cramps, menorrhagia, suppressed menstruation, and other disturbances of the reproductive tract. It is a classic uterine tonic that has been used to tonify a soft, less-than-firm uterus, including laxity of the uterine ligaments. It adds tone and structure to the nervous and muscular structures of the reproductive female organs and regulates the quantity of the monthly flow.

Tonics That Stimulate Menstrual Flow. The following are uterine stimulants or emmenagogues (agents that stimulate menstrual flow) that increase tone or muscular activity and serve to initiate the onset of menses:

- Squaw vine (*Mitchella repens*)
- Yarrow (*Achillea millefolium*)

- Chaste tree (*Vitex agnus castus*)
- Pennyroyal* (*Mentha pulegium*)
- Mugwort (*Artemisia vulgaris*)
- Blue cohosh (*Caulophyllum thalictroides*)

Blue cohosh is a perennial herb that grows all over the United States, and it is the root or rhizome that is used medicinally. The chemical constituents include alkaloids, saponins, phytosterols, and many minerals. As an emmenagogue that promotes the onset of menstrual flow, it would seem odd to use it as a treatment for menorrhagia. Yet, traditionally, blue cohosh, when used with other astringent herbs, acts as a uterine tonic and in fact helps to regulate the menses and the amount of flow.

Astringent and uterine tonic herbs can be used in combination formulations and used for weeks to several months. Use as a tea, liquid extract, or powdered capsule.

Traditional Herbs for Semi-Acute and Acute Blood Loss

- Cinnamon* (*Cinnamomum verum*)
- Life root (*Senecio aureus*)
- Canadian fleabane* (*Erigeron canadensis*)
- Greater periwinkle (*Vinca major*)
- Shepherd's purse (*Capsella bursa-pastoris*)
- Yarrow (*Achillea millefolium*)
- Savin (*Sabina officinalis*)

Bio-Identical Hormones

Bio-identical hormones are made in a manufacturing laboratory and are derived from a compound found in either Mexican wild yam root or soybeans. The diosgenin plant compound from Mexican wild yam or beta-sitosterol from soybeans is extracted from the plant and then used to make a hormone, in this case progesterone, that is biochemically identical to the progesterone in a woman's body. Sometimes these are called natural hormones, and other times they are called bio-identical hormones.

*May be toxic if given in inappropriate doses. See the dosage guidelines in this section.

Dosage for Botanicals

The herbs listed in the text with an asterisk (*) may be toxic if given in inappropriate doses, so correct dosing is very important. Use a botanical reference to assure safe dosage.

Essential oil of cinnamon: 1–5 drops every 3–4 hours

Other herbs: Do not exceed 20 drops every 2 hours or 1 capsule every 4 hours if using a single herb. Several herbs may be used in combination, and in these cases it is important to consult a reference book or an herbal practitioner to know the dose limitations.

Natural Progesterone. Cyclic bio-identical or natural progesterone that is given 12 days out of the month (usually day 15 of the cycle to day 26) can be used to correct infrequent menses, heavy menses, and sometimes intermenstrual bleeding. This therapy substitutes for what the body is not producing due to the lack of ovulation. A woman must ovulate in order to produce adequate levels of progesterone. Because natural progesterone is biochemically identical to human

Natural Bio-Identical Progesterone

A dose of 200 mg is thought to be adequate to regulate abnormal bleeding. Natural progesterone is several times less potent than a progestin (a synthetic substance). Even 400 mg per day of oral micronized progesterone may not work as well as 10 mg of medroxyprogesterone acetate (Provera).

Oral dosage: 100–200 mg twice daily, given 7 to 12 days per month for infrequent menses, menorrhagia, and, occasionally, intermenstrual bleeding

Cream dosage: (product that contains at least 400 mg progesterone per ounce) ¼–½ tsp twice daily for 12 to 21 days per month for cases of mild menorrhagia, infrequent menses, and, occasionally, intermenstrual bleeding

Sublingual tablets: 50–75 mg twice daily for 12 to 21 days per month for cases of mild menorrhagia

Sample Treatment Plans for Abnormal Uterine Bleeding

See the Resources section for formulation sources.

Chronic Recurring Menorrhagia

- Bioflavonoids: 1,000 mg twice per day
- Vitamin A: 60,000 IU per day up to 3 months
- Chaste tree (standardized extract): 175 mg per day, or 1 tsp daily
- Combination herbal product using astringents and uterine tonics; sample herbal tincture:

  Yarrow: 2 oz
  Helonias: 2 oz
  Squaw vine: 2 oz
  Life root: 2 oz
  1 tsp twice daily
- Consider natural progesterone cream, ¼–½ tsp twice daily, days 15–26 (day 1 is the first day of your menses)

Semi-Acute Menorrhagia

- Bioflavonoids: 1,000 mg 2–3 times daily
- Combination herbal products using astringents and uterine tonics; sample herbal tincture:

  Yarrow: 2 oz
  Greater periwinkle: 2 oz
  Shepherd's purse: 2 oz
  Life root: 2 oz
  20–30 drops every 2–3 hours

  If you choose to use one of the more toxic herbs, such as cinnamon or beth root, be sure not to exceed recommended doses.
- Essential oil of cinnamon: 1–5 drops every 3–4 hours
- Oral micronized progesterone: 200–400 mg per day for 7–12 days, followed by a cyclic hormone product for 21 days on and 7 days off
- If there is no change in 24 to 48 hours, high-dose estrogens may be needed to stop the immediate bleeding, followed by a progesterone regimen.

Oligomenorrhea (Infrequent Menses)

- Chaste tree: .6–.75% standardized extract, one 175–215 mg capsule daily; or liquid extract, 1 tsp daily
- Combination herbal emmenagogue:

  Squaw vine: 1½ oz
  Yarrow: 1 oz
  Blue cohosh: 1 oz
  Pennyroyal: ½ oz
  20 drops every 2–3 hours
- Natural progesterone cream

  Apply ¼ tsp 1–2 times daily, days 7–14 of cycle
  Apply ½ tsp 1–2 times daily, days 15–26

Polymenorrhea (Frequent Menses)

- Chaste tree: .6–.75% standardized extract, one 175–215 mg capsule daily; or liquid extract, 1 tsp daily
- Natural progesterone cream: ¼–½ tsp twice daily, 21 days on, 7 days off (during menstrual flow)
- Some cases may require higher doses of oral micronized progesterone.
- Some cases may require a natural estrogen/natural progesterone formulation that requires more individualized dosing.

progesterone, it is generally very well tolerated by women. One study found that while traditional progestin treatments such as norethindrone can decrease estradiol, follicle-stimulating hormone, luteinizing hormone, sex-hormone-binding globulin, and high-density lipoprotein cholesterol, bio-identical progesterone offers the hormonal benefits without these side effects and is a viable alternative therapy in premenopausal bleeding disorders.[24] You may want to read much more on bio-identical hormones in Chapter 12.

The disadvantages to the natural hormone include a short half-life (three to six hours) that requires giving it two to three times a day. Natural progesterone can be delivered by injection, sublingual tablets, rectal or vaginal suppositories, oral

capsules or tablets, and topical creams. Dosing is dependent on the delivery system and the characteristic bleeding problems. When treating women with DUB, the amount of progesterone given must be adequate to convert the endometrium for complete sloughing to avoid endometrial hyperplasia. Continuous progesterone can be effective in controlling menorrhagia.

Natural Estradiol. To control an acute bleeding episode, the use of natural estradiol should be just as effective as one of the dosing regimens of conjugated estrogens. These hormones are prescription items and should be administered by a practitioner qualified to use them. One high-dose regimen would be 2 mg of estradiol every four hours for 24 hours, a single daily dose for 7 to 10 days, followed by oral micronized progesterone, 200 mg per day for 7 to 12 days.

CONVENTIONAL MEDICINE APPROACH

The goals of conventional treatment for abnormal uterine bleeding are to control bleeding, prevent endometrial hyperplasia or cancer, prevent or treat anemia, and restore quality of life. When the diagnosis is definitely DUB, it is preferable to use medical, not surgical, treatments.

To control an acute bleeding episode, 10 mg of oral conjugated estrogens (or the equivalent) administered daily as 2.5 mg four times per day are usually effective. If bleeding is not controlled within the first 24 hours, higher doses (20 mg) may be effective. Once the bleeding has stopped, oral estrogen therapy is continued at the same dosage for a total of 21 days; the addition of a progestin, such as medroxyprogesterone acetate (MPA), 10 mg daily, should be added for the last 7 to 10 days of those 21 days. Alternatively, 200 to 400 mg daily of progesterone may be substituted for the MPA. At the end of 21 days, both hormones are stopped, at which time the patient should expect a light "withdrawal" bleed. At this time, a strategy for long-term management should be developed.

Oral contraceptives containing estrogen and progestin are also used to stop acute bleeding, although they may not be as effective as the high doses of estrogen alone. Three tablets of an oral contraceptive containing a progestin plus 35 mcg of estrogen taken every 24 hours (one tablet every eight hours) will usually provide sufficient estrogen to stop acute bleeding while simultaneously providing progestin. Treatment is continued for at least one week after the bleeding stops. The practitioner can choose from a variety of equally effective treatment regimens.

The treatment of choice for chronic, stable anovulatory bleeding is a progestogen medication. Use either MPA or norethindrone (NE) in doses of 5 to 10 mg daily or oral micronized progesterone (either compounded or Prometrium) 200 to 400 mg daily for 14 days starting on day 14 of the menstrual cycle. The patient can stop the medications if she has begun menstruating before the end of her progestogen.

Nonsteroidal anti-inflammatory drugs (NSAIDs) are also used to reduce blood loss, especially in women who have DUB but still have normal ovulation. When NSAIDs are taken during the episode of menorrhagia, the effect is a 20 to 50 percent reduction in blood loss. The following anti-inflammatories are usually given for the first three days of menses, or throughout the menstrual flow, and seem to have similar effects:

1. Ibuprofen: 600 mg every 6–8 hours
2. Naproxen sodium: 550 mg every 6–8 hours
3. Mefenamic acid: 500 mg first dose, then 250 mg every 8 hours
4. Meclofenamate sodium: 100 mg every 8 hours
5. Naproxen: 500 mg every 12 hours

NSAIDs may be used alone in some cases or combined with an oral contraceptive or progestogen. Other, more sophisticated medical regimens may be used to intervene, including GnRH agonists (Lupron), androgenic steroids (danazol),

or an antifibrinolytic agent. However, these options have significant side effects, and their use is limited to women who fail to respond to other methods of drug management and who do not want surgery.

Progesterone-releasing IUDs (Mirena) are gaining interest because of their lack of systemic side effects, duration of action of five years, and 60 to 80 percent reduction in menstrual blood flow. They also can suppress the growth of the endometrium in oligo-ovulatory patients, thereby preventing hyperplasia or uterine cancer.

There are basically three surgical options that may be considered in individual cases: dilation and curettage (D&C), endometrial ablation, or hysterectomy.

1. Dilation and curettage (D&C) can be both diagnostic and therapeutic. A D&C is the quickest way to stop bleeding; therefore, it is a treatment of choice in women with DUB who suffer from anemia due to heavy menstrual blood loss or who are acutely unstable. The problem with a D&C is that it is only temporary in most cases and does not cure the problem the majority of the time. One advantage, though, is that it can give the doctor tissue for diagnosis.

2. Endometrial ablation is a procedure to destroy the endometrial tissue. It is highly popular because of the ease of treatment, the success, and the low incidence of complications. There are several types of ablations now: the original roller ball or loop unipolar resection, a bipolar electrical vaporization method, a bipolar electrical mesh, a balloon filled with dextrose water that is heated to 200 degrees Fahrenheit, free-flowing hot water, and a microwave and cryo probe technology as well. The method used depends on practitioner preference and select uterine characteristics. All ablations require IV sedation or general anesthesia and may not be well tolerated in an office setting because of the pain of the procedure. Ablation technology continues to advance with the hopes of developing a procedure that can be done in the office.

3. Hysterectomy, surgical removal of the uterus, should be reserved for the woman with other indications for hysterectomy such as uterine fibroids, uterine prolapse, or atypical hyperplasia. When a hysterectomy is done for bleeding problems there is usually no need to remove the ovaries.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

Changes in the pattern or amount of menstrual blood flow is one of the most common health concerns of women. Even though many of these cases are of no serious concern, a woman with abnormal bleeding distinctly different from her familiar history should do the cautious thing and be seen by a licensed health-care practitioner such as a naturopathic doctor (N.D.), medical doctor (M.D.), osteopathic doctor (D.O.), nurse-practitioner (N.P.), or physician's assistant (P.A.). After a thorough medical history is taken, a physical exam and further laboratory testing and imaging may be requested not only to adequately diagnose the cause of the problem but also to determine if excessive blood loss has caused an anemic state.

The most worrisome situation is an acute bleeding episode. As stated earlier, bleeding that meets or exceeds saturation of a super tampon or heavy pad every hour for six to eight hours or more requires medical intervention. Bleeding that is even more severe will require immediate medical attention to assess the need for a surgical intervention and management of the dangers of acute blood loss.

A licensed naturopathic physician may work in tandem with conventional medical colleagues to cooperate on an integrated approach to optimize the patient outcome.

AMENORRHEA

CHAPTER 2

OVERVIEW

Traditionally, amenorrhea (absence of menstrual bleeding) has been classified as either primary or secondary. Primary amenorrhea means that no vaginal bleeding has ever occurred by the time of expected initial onset (usually age 16). Secondary amenorrhea means that vaginal bleeding has previously occurred but has now ceased—for three months in a woman with a history of regular cyclic bleeding or for six months in a woman with a history of irregular periods. In the United States, females normally experience the onset of their first menstrual period between the ages of 9 and 18. It has been estimated that the prevalence of amenorrhea in the general U.S. female population during the reproductive years is 1.8 to 3 percent, the prevalence in college-aged women is 2.6 to 5 percent, and amenorrhea may be seen in 20 percent of women reporting infertility.

Determining the cause of amenorrhea is one of the most challenging tasks in gynecology. Causes of amenorrhea can be organized into four classifications: disorders of the vagina or uterus, disorders of the ovary, disorders of the anterior pituitary gland, and disorders of the central nervous system. The causes of primary amenorrhea are often very complex, and approximately 40 percent of all cases are due to a chromosomal defect. Absence of a vagina is the second-most-common cause, followed by testicular feminization syndrome. Other causes of primary and secondary amenorrhea are often overlapping.

The majority of amenorrheic young women have very low levels of estrogen, and a minority will have subnormal, noncyclic estrogen levels without progesterone due to a lack of ovulation. This distinction is important in considering the long-term implications of amenorrhea. Amenorrhea caused by low levels of estrogen, or hypoestrogenic amenorrhea, is associated with loss of bone mineral density and an increased risk later in life of osteoporosis and fractures. Lipid levels in the bloodstream are also negatively affected by prolonged hypoestrogenic states, and this is associated with an increased risk of cardiovascular disease. Amenorrhea without ovulation is associated with an increased risk of endometrial hyperplasia and uterine cancer because of the lack of progesterone and the presence of what is called an "unopposed" estrogen state. Polycystic ovarian syndrome (PCOS) is an example of this type of amenorrhea. Characteristics of PCOS include obesity, hirsutism (abnormal hair growth), acne, infertility, hypertension, and diabetes.

Evaluating and managing amenorrhea is best addressed with the medical knowledge of a qualified primary care practitioner. Sometimes a specialist in endocrinology is necessary, to rule out or consider an array of potential diseases and disorders of the hypothalamus, pituitary gland, ovaries, thyroid, and/or uterus.

THE NORMAL MENSTRUAL CYCLE

Normal menstruation results from a complex chain of events initiated in the central nervous system:

1. The hypothalamus secretes gonadotropin-releasing hormone (GnRH) that regulates pituitary function.
2. The anterior pituitary produces luteinizing hormone (LH) and follicle-stimulating hormone (FSH) that govern ovarian function. The main action of LH is to stimulate synthesis of androgens by the theca cells in the ovary and progesterone synthesis by the corpus luteum. LH also induces ovulation,

which leaves behind the corpus luteum. The primary action of FSH is to stimulate the granulosa cells in the ovary to produce estrogen. Both the theca cells and the granulosa cells are sources of androgens (such as testosterone) and estrogen.

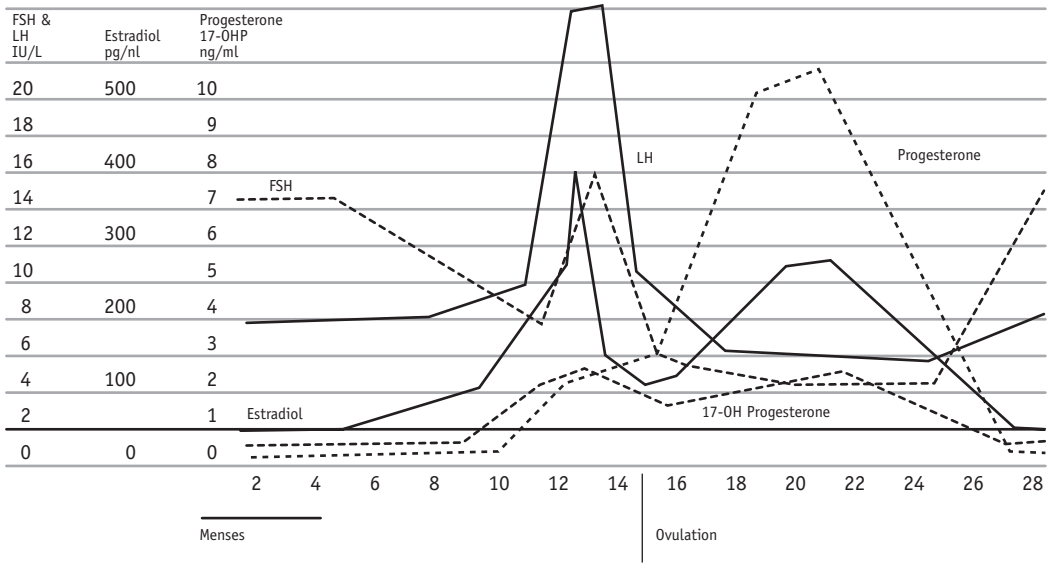
3. The ovaries respond to these gonadotropins by synthesizing the steroid hormones estradiol and progesterone that affect uterine function.
4. The uterus has a cavity capable of endometrial thickening and shedding according to the levels of ovarian hormones in the blood (estrogen and progesterone), and an outflow tract (vagina) to allow the emptying of menstrual flow.

Phases of the Menstrual Cycle

The menstrual cycle can best be broken into three phases.

1. **Menstrual phase (menstruation):** days 1–5
   - Estrogen and progesterone withdrawn before onset of menstrual flow
   - Shedding of endometrial lining
2. **Proliferative (follicular) phase:** days 6–14
   - Regrowth of endometrial tissue
   - Secretion of FSH by the pituitary gland
   - Development in ovary of a mature graafian follicle containing a mature egg
   - Secretion of increasing amounts of estrogen by graafian follicle
   - Suppression of FSH when estrogen level becomes high, leading to secretion of LH by pituitary gland
3. **Secretory (luteal) phase:** days 15–28
   - Rupture of graafian follicle releasing egg (ovulation) starts the secretory phase
   - Movement of egg through fallopian tube to uterus
   - Formation of corpus luteum at site of ruptured follicle
   - Production of progesterone by corpus luteum
   - Stimulation by progesterone of endometrial cell growth
   - Significant decrease in progesterone level if implantation does not occur; menstrual phase then begins again

Figure 2.1 **Normal Menstrual Cycle**



DIAGNOSING AND EVALUATING AMENORRHEA

A good history is the most important part of the medical evaluation to diagnose amenorrhea. The history will include evaluating for pregnancy, menstrual history, emotional stress, weight gain or loss, alcohol use or abuse, dietary habits, exercise habits, medications, narcotics, drug abuse, acute or chronic illnesses, accidents or injuries, infertility, metabolic disease, immune system abnormalities, tuberculosis, hot flashes, breast discharge, headaches, and family history.

A physical and pelvic exam will confirm the most likely causes as suggested by the history. During the pelvic exam, the practitioner will attempt to determine if there is an adequate estrogen effect on the cervix and vagina, check for the size of the ovaries, assure the normalcy of the uterus and vagina, and observe for the presence or absence of secondary sex characteristics (such as breasts and pubic hair). The thyroid gland will also be checked, and laboratory tests will be chosen selectively to document the suspected diagnosis.

Due to the complexity of amenorrhea and the diverse array of causes, it is impossible to address each potential cause in this chapter. The guiding rule in the management of amenorrhea is to diagnose before treating. The appropriate management depends not only on the diagnosis but also on the presenting problem. Each woman must then be treated according to the specific causative factors involved. Consequently, in the discussion of alternative treatment, we will largely focus on four of the most common causes of amenorrhea:

1. **Hypergonadotropic hypogonadism.** The pituitary secretes elevated amounts of its hormones, but the ovary does not respond. Example: premature ovarian failure.
2. **Hyperprolactinemia.** The pituitary secretes too much prolactin. Examples: certain drugs, pituitary tumors, hypothyroid disease.
3. **Hypogonadotropic hypogonadism.** Reduced secretion of FSH and LH that results in failure of the ovarian follicle to develop and,

KEY CONCEPTS

- Successful management of amenorrhea depends on an accurate diagnosis.
- Amenorrhea is a symptom, not a diagnosis.
- The absence of menses in itself has no deleterious effect on health, but it may be a presenting symptom of an underlying disorder that requires treatment.
- A licensed primary health-care practitioner is needed to conduct a careful history, examination, and indicated tests.
- The most common cause of secondary amenorrhea is pregnancy.
- Prolonged amenorrhea that is hypoestrogenic (hypergonadotropic hypogonadism or hypogonadotropic hypogonadism) prior to menopause is a risk factor for osteoporosis.

PREVENTION

- Have adequate calories in the diet.
- Include adequate levels of dietary fat.
- Keep regular daily eating habits.
- Avoid being underweight.
- Avoid obesity.
- Avoid excessive exercise.
- Practice stress reduction and management.
- Women with hypoestrogenic amenorrhea must be vigilant about prevention of osteoporosis and coronary artery disease.
- Women with anovulatory amenorrhea must be monitored for endometrial thickening and the development of endometrial hyperplasia, a precancerous state, and endometrial cancer.
- Women who have been diagnosed with polycystic ovarian syndrome (PCOS), the normogonadotropic anovulation state, must not only be treated for current problems related to the PCOS, but they need assertive prevention for diseases for which they are at higher risk, including type 2 diabetes, high blood pressure, heart disease, endometrial cancer, and possibly breast cancer.

hence, a lack of secretion of estradiol by the ovaries. Examples: psychological stress, weight loss, genetic diseases.

4. Normogonadotropic anovulation. Normal FSH and LH, but the cyclic nature of the pulsed secretions is disrupted. The ovarian follicles develop and estrogen is produced, but at some stage the follicles do not fully mature. Thus, there is no ovulation but there is no sign of estrogen deficiency; rather, there is a progesterone deficiency. Example: polycystic ovary syndrome.

OVERVIEW OF ALTERNATIVE TREATMENTS

A licensed alternative primary care practitioner such as a naturopathic physician must first make an accurate diagnosis as to the cause of the amenorrhea, utilizing a medical history, physical exam, and possible laboratory testing. Naturopathic physicians often see patients who are on extreme diets due to some other health concern; sometimes these diets are inappropriate for that individual and are the cause of the amenorrhea. Insufficient calories and insufficient dietary fat and cholesterol may be the culprit in some of these cases. Other health-conscious individuals may have become too thin with a combination of diet and exercise, and they may have acquired amenorrhea because they have too little body fat. It is unlikely that overexercise alone will cause amenorrhea; it usually takes a combination of low body fat and heavy exercise to induce amenorrhea.

In other cases such as polycystic ovarian syndrome (PCOS), about 50 to 60 percent of women will be overweight. In these cases, a 10 percent weight loss can lead to ovulation and also decrease insulin resistance. A diet lower in starchy carbs and higher in healthy protein is an important strategy for women with PCOS, whether they are overweight or not.

A holistic approach to treatment requires exploring the mental, spiritual, emotional, and physical aspects of the patient integrated with a meticulous medical approach employing mind-body-oriented perspectives. Specific dietary counseling may be warranted, and practitioners may find themselves in the unusual position of advocating an increase in cholesterol and other fats in the diet and counseling patients to gain weight or exercise less. Because stress disrupts the menstrual cycle, it is also important to provide guidance about stress reduction.

The goal of a natural therapeutic treatment plan for amenorrhea is to address the specific underlying cause as would conventional medicine, while also taking a more constitutional and holistic approach to treatment. Even in cases where something specific such as an elevated prolactin level may be the cause, the practitioner would want to address the mental and emotional component, support the digestion, provide tonifying and nutritive support to the reproductive system in general, and more. This organ-specific as well as constitutional approach is a common theme in many alternative medicine disciplines, and especially naturopathic medicine.

The natural therapies presented in this chapter deal with these four general states:

1. Premature ovarian failure (See Chapter 12 for more in-depth information and treatment.)
2. Hyperprolactinemia
3. Inadequate estrogen production
4. Chronic lack of ovulation, including polycystic ovary syndrome (PCOS)

Keep in mind that causes such as thyroid disorders, tumors, systemic diseases, genetic disorders, and others will require therapies to specifically address those underlying problems, which are beyond the scope of this book.

Nutrition

Both weight loss and obesity can be associated with amenorrhea. A range of weight-loss problems are associated with amenorrhea, including crash diets, malnutrition, and life-threatening

anorexia nervosa. Anorexia nervosa occurs primarily in young white middle- to upper-class women under age 25, yet has also been known to occur in young men and middle-aged women. The family situation of a young woman with anorexia is very often success-achievement-appearance oriented. The pattern usually starts with a diet to control weight and a fear of excess weight when in fact the weight being gained is due to normal maturing. There is often a preoccupation with food that may manifest itself by large intakes of lettuce, raw vegetables, and other low-calorie foods. Other manifestations may be chaotic eating habits and eating times, radical diets, missed meals, and bingeing episodes.

Bulimia is a syndrome of episodic and secretive binge eating followed by self-induced vomiting, fasting, or the use of laxatives and diuretics. Bulimic behavior is frequently seen in about half of women with anorexia nervosa. Body weight in "pure" bulimics fluctuates but does not fall to the low levels seen in anorexics.

Teenagers with low body weight, amenorrhea, and overachievement (excellent grades and many extracurricular activities) need astute evaluation for an eating disorder. Psychological counseling, consistent support, and monitoring for calorie intake will be needed to break the established patterns. The earlier the recognition of the problem, the more successful the intervention. Family members, friends, and health-care practitioners should pay particular attention to weight and diet in young women with amenorrhea.

Obese women exhibit several abnormalities in their hormone profile. Elevated serum concentrations of androstenedione, testosterone, and DHEA-sulfate are associated more closely with the pattern of fat distribution (abdominal vs. hips, in particular) than to the body fat mass.[1] High levels of these hormones, called androgens, are known to be a cause of menstrual irregularities including amenorrhea, hirsutism (abnormal body hair growth), and other metabolic disturbances. In addition, type 2 diabetes, elevated insulin, and glucose intolerance, conditions that often co-occur with obesity and polycystic ovarian syndrome, are associated with amenorrhea and oligomenorrhea (infrequent menses).[2, 3] Usually, oligomenorrhea and chronic anovulation caused by hormonal abnormalities is the cause of the menstrual irregularity in women with significant amounts of excess body fat.[2] A reduction in body weight by reducing calories, increasing physical exercise, and possibly other weight-management interventions will result in beneficial changes in the hormonal profile, including a marked reduction of androgenic hormones and their effects.[1] A reduction of weight by even as little as 5 to 10 percent can not only restore regular menses, but also improve fertility.[4]

Some women may have low body weight but do not have an eating disorder or exercise-induced amenorrhea. This may be a metabolism issue, a hereditary factor, or a diet that is extremely low in fat although not low in calories. Women who take in insufficient calories, such as strict vegetarians who eat no animal products or others with extreme diets, may have insufficient dietary fat and low cholesterol. Adequate cholesterol is needed to manufacture hormones. If no cholesterol is found in the diet and the liver is not manufacturing adequate cholesterol, these women may have amenorrhea due to insufficient hormone levels. Measuring the cholesterol level can be telling in such cases. If cholesterol is low (below 120), a change in vegetarian philosophy will probably be necessary so that some animal products can be included in the diet in order to raise the cholesterol levels.

Sometimes it is difficult to find the best nutritional program for one's body type and lifestyle. In these cases, nutritional counseling and nutritional analysis with a qualified practitioner can be very helpful. No one diet plan is right for everyone. Not everyone needs to eat from all the food groups, not everyone can be a vegetarian, and not everyone responds well to a high-protein or high–complex carbohydrate diet.

In addition to proper food choices, another basic general principle for good nutrition is regularity. Just as going to bed and rising at regular times with a certain amount of sleep assures adequate energy and vitality, regular mealtimes and consistency in eating habits lead to good digestion and absorption of nutrients necessary for normal physiology.

Not all advice on nutritional habits for women with amenorrhea is related to dietary fat, calories, body weight, or eating disorders. Some nutritional guidance is relevant to the prevention of osteoporosis, a potential consequence of amenorrhea. Please see Chapter 14 for more information on preventing osteoporosis.

Supplements

Vitamin A and the Carotenes. Carotenemia, an abnormal elevation of plasma carotene levels, may result from an excessive ingestion of carotene-rich vegetables, anorexia, and impaired ability of the body to metabolize carotenes.[5–7] Carotenemia has been linked with menstrual dysfunction and amenorrhea in some women, generally in association with weight loss. In 1968, elevated carotene levels were observed in 9 of 12 women with anorexia nervosa who did not ingest excessive amounts of carotenes.[8] An additional study also found that patients with amenorrhea and weight loss had carotenemia.[9] Another group of researchers found elevated serum carotene levels in women with anorexia nervosa, but not in women with normal or abnormal menstrual function.[7] It is thought that mobilization of fat stores secondary to weight loss might be responsible for hypercarotenemia in women with anorexia nervosa.

In 1971, a small study examined six women with elevated serum carotene levels who had excessive intake of carrots or pumpkins.[10] The researcher described what he called "golden ovaries" and noted that amenorrhea developed in the two younger patients and irregular menstrual bleeding in the four older patients. For some time it was thought that exercise-induced amenorrhea in long-distance runners was associated with hypercarotenemia, but that association was disproved, and no difference in carotene levels was observed.[11]

I found no reference to amenorrhea or menstrual irregularities associated with taking carotene supplements, and, as of this writing, I don't believe amenorrhea has been reported as a side effect of beta-carotene ingestion. However, I will probably encourage women who are experiencing significant weight loss and amenorrhea to eat lesser amounts of carotene foods for the time being. I would also be inclined to reduce their vitamin A and carotene supplementation if they were on high doses for some other medical reason.

Calcium. One of the serious long-term consequences of amenorrhea due to premature ovarian failure or lower production of estrogen (hypothalamic amenorrhea) is a lower bone density and an increased risk for osteoporosis and fractures later in life. Even when calcium intake is the same between amenorrheic women and women who menstruate normally, there is a decrease in calcium absorption and an increase in calcium excretion in estrogen-deficient women. There is ample evidence that a lack of estrogen increases the daily calcium requirement.[12] As a result, I recommend a higher-than-normal daily intake (1,200 to 1,500 mg per day) of either calcium carbonate or calcium citrate to maintain calcium balance in low-estrogen states in women of reproductive age. (For more information on osteoporosis, please see Chapter 14.)

Calcium Carbonate or Calcium Citrate or Combination

1,200–1,500 mg per day

Additional Vitamins and Minerals. Many other minerals and nutrients affect bone density and are relevant to the prevention of osteoporosis in amenorrheic women. Magnesium, manganese, zinc, copper, boron, vitamin K, vitamin

D, and other nutrients determine bone health, each in their own way. In Chapter 14, I discuss this in detail.

Botanicals

Chaste Tree (*Vitex Agnus Castus*). Chaste tree is probably the best-known herb in all of Europe for hormonal imbalances in women. Since at least the time of the Greeks, chaste tree has been used for the full scope of menstrual disorders, including amenorrhea. Chaste tree acts on the hypothalamus and pituitary glands by increasing LH production and mildly inhibiting the release of FSH. The result is a shift in the ratio of estrogen to progesterone, in favor of progesterone.[13] Chaste tree stimulates ovulation, which in turn produces progesterone. Thus, chaste tree indirectly raises progesterone levels,[14] an effective treatment for some cases of amenorrhea.

If we were to give progesterone hormone for several days, stop, and then a menses occurs, this indicates an intact reproductive system that lacks cyclicity and ovulation, or at least regular cyclic ovulation. It suggests that the body is producing enough FSH to stimulate the ovaries and that the ovaries can develop follicles. Furthermore, it indicates that follicular production of estrogen is sufficient to cause the lining of the uterus (endometrium) to grow and that the sloughed endometrium is able to pass through the cervical opening and the vagina. This tells us that the problem most likely is a dysfunction in the hypothalamus or pituitary. The ability of chaste tree to modulate the hypothalamus or pituitary then makes this herb an obvious choice.

The first major study on chaste tree was published in 1954.[15] Subsequent studies have continued to prove its effectiveness. In a study published in 1990, 20 women with secondary amenorrhea were admitted to a six-month study using chaste tree liquid extract at 40 drops daily.[16] At the end of the six-month study, 10 out of the 15 women had menstrual cycles. Testing showed that values for progesterone and LH increased, and FSH values either did not change or decreased slightly.

Chaste tree also inhibits prolactin release by the pituitary gland, particularly when elevated prolactin is caused by stress, by binding dopamine receptors and then inhibiting prolactin release in the pituitary.[17, 18] Since elevated prolactin levels cause some cases of amenorrhea, chaste tree is also indicated for these cases. A double-blind, placebo-controlled study examined the effect of a chaste tree (vitex) preparation on 52 women with luteal phase defects due to hyperprolactinemia (elevated prolactin levels).[19] The daily dose of the extract was 20 mg, and the study lasted for three months. Prolactin release was significantly reduced in the vitex group. The short luteal phase (second half of the cycle) was normalized, and the decreased progesterone production was normalized. No side effects were noted, and two women became pregnant.

When using chaste tree, don't expect immediate results. It's not the same as giving progesterone, even natural progesterone. Chaste tree is more of a medium-range plan; usually it begins to take effect after three or four months when given daily.

Chaste Tree

40 drops tincture or 175 mg .6% aucubin standardized extract per day

Black Cohosh (*Cimifuga Racemosa*). Black cohosh has become one of the most significant women's herbs in all of botanical medicine. Also known as snakeroot or rattleroot, this plant belongs to the buttercup family and is indigenous to the eastern part of North America. The native peoples of Canada and America used black cohosh for many different indications, such as uterine pains during menses and childbirth, rheumatism, rattlesnake bites, and general malaise. Black cohosh was introduced to Western gynecology in the middle of the eighteenth century in the treatment of menopausal symptoms.[20]

The exact mechanism of how black cohosh works has yet to be elucidated. We attribute most of its gynecological effects to its "estrogen-like" action, yet recent research has shown that black cohosh does not contain phytoestrogens, nor does it change hormone levels such as estradiol, LH, FSH or prolactin.[21–23] The primary constituents in black cohosh extract are glycosides, particularly the triterpene glycosides, mainly cimicifugoside and actein, which are assumed to interfere with pituitary gland receptors and the hypothalamus. Other characteristic constituents are the flavonoids, resins, volatile oils, fatty acids, tannins, alkaloids, cimicifugin, and salicylic acid. Although the constituents in black cohosh may be able to bind to receptors in the pituitary or hypothalamus, these constituents do not seem to be able to bind to receptors in target organs. Older research showed the effects of a black cohosh preparation on LH and FSH secretion in menopausal women. After a treatment of two months, LH (but not FSH) levels were significantly reduced in the black cohosh–treated group.[24]

There have been many studies using black cohosh preparations in menopausal women. These studies and the further use of this plant in menopausal women will be discussed in much detail in Chapter 12. For women who have amenorrhea due to hypoestrogenic states, a state similar to menopause, black cohosh will be important in relieving some symptoms. Recent studies even indicate that black cohosh may decrease risk factors associated with menopause such as osteoporosis and cardiovascular disease and may even be effective in preventing bone loss.[25–27]

Black Cohosh

40–80 mg standardized extract twice daily

Rhodiola. Rhodiola, also called golden root, has enjoyed centuries of use in Eastern Europe, Scandinavia, and Asia. Traditionally, this herb was used in folk medicine to increase physical endurance, work productivity, longevity, resistance to high altitude sickness, fatigue, depression, anemia, impotence, gastrointestinal ailments, infections, and disorders of the nervous system. The folklore surrounding rhodiola led to the first investigations in its phytochemistry in the early 1960s, when scientists identified adaptogenic compounds in its roots. These adaptogens, believed to help the body adapt to stress by supporting the adrenal glands and endocrine system, as well as the antioxidant and stimulating compounds that were later discovered in rhodiola, are responsible for its medicinal properties.

Animal studies looking at the effect of rhodiola on thyroid function, adrenal function, and ovarian egg maturation have raised interest in rhodiola for endocrine problems in humans. Forty women suffering from amenorrhea (loss of menstrual cycles) were given 100 mg of rhodiola twice daily for two weeks or an injection for 10 days. Remarkably, normal menses were restored in 25 women, 11 of whom became pregnant.[28] Physicians have reported cases of women who had failed to conceive with standard fertility drugs, who then became pregnant within several months of beginning *Rhodiola rosea* extract. For treatment, look for extracts that are standardized to contain 3 percent rosavin.

Rhodiola (3% Rosavin)

200 mg per day (or 100 mg twice daily)

Maca (*Lepidium Peruvianum*). Maca is a root vegetable, in the same family as turnips and broccoli, which grows at high elevations, native to the high Andean plateaus of Peru. It has been used traditionally by native Peruvians as both a food and medicine. It has historically been used for a variety of purposes, including hormone balancing, thyroid function, sexual function, PMS, menopause, and as a tonic for healthy aging.

A recent study proved maca's effectiveness in treating women with amenorrhea due to hypoestrogenic states, and especially premature ovarian failure. In a study of 20 healthy menopausal

women in the early phase of their menopause, maca (2,000 mg per day) was given for up to eight months and was shown to lower follicle-stimulating hormone (FSH) (higher levels of FSH are a measure of low estrogen production from the ovaries) and increase luteinizing hormone (LH) (elevated LH is necessary to stimulate ovulation), resulting in increases in both estrogen levels and progesterone levels.[29] These results would seem to suggest that maca, depending on the length of use, could act as a hormonal toner and stimulate the production of estrogen and progesterone.

Maca

Four 500-mg capsules (2,000 mg) per day

Traditional Herbs

Uterine Stimulants. Uterine stimulants or emmenagogues increase tone or muscular activity and serve to initiate the onset of menses and stimulate reproductive function. Most important are the herbs that cause shedding of the endometrium and stimulate normal menstrual cycles in the absence of pregnancy.

- Squaw vine/partridgeberry (*Mitchella repens*)
- Yarrow (*Achillea millefolium*)
- Chaste tree (*Vitex agnus castus*)
- Pennyroyal* (*Mentha pulegium*)
- Mugwort (*Artemisia vulgaris*)
- Water pepper (*Polygonum hydropiper*)

Water Pepper.[30] In a medical journal of 1846, Dr. Thomas Ogier, a surgeon and obstetrician, published an herbal approach for amenorrhea.[31] He maintained that administering a tincture of water pepper successfully treated a case of obstinate amenorrhea. Exactly how the water pepper works is not known.

*__Important caution:__ Do not use essential oil of pennyroyal internally in any situation.

Phytoestrogens. Phytoestrogens are by and large nonsteroidal hormone-like constituents found in over 300 medicinal and edible plants. With the currently available evidence, soybeans are probably the richest edible source of phytoestrogens. Some plant compounds, such as lignans, found in flaxseed, are not phytoestrogens but are converted to estrogens in the intestines. There are many herbs that contain phytoestrogen compounds and have a role in amenorrhea. They support the reproductive cycle and relieve menopausal symptoms in women who are appropriately menopausal (see Chapter 12) as well as women who are amenorrheic and prematurely menopausal. These herbs include:

- Alfalfa (*Medicago sativa*)
- Dong quai (*Angelica sinensis*)
- Flaxseed (*Linum usitatissimum*)
- Ginseng (*Panax ginseng*)
- Hops (*Humulus lupulus*)
- Licorice (*Glycyrrhiza glabra*)
- Red clover (*Trifolium pratense*)

Progesterone Precursors. Diosgenin and sarsasapogenin can be converted in the laboratory to various hormones, including progesterone, which in turn can be converted to adrenal steroids and then to testosterone or estrogens. Even though diosgenin from plants is used by pharmaceutical companies to synthesize various hormones, there is very little scientific information on diosgenin-containing plants and their relationship to human metabolism. A number of herbs contain diosgenin or sarsasapogenin:

- Bloodroot (*Sanguinaria canadensis*)
- Blue cohosh (*Caulophyllum thalictroides*)
- Fenugreek (*Trigonella foenumgraecum*)
- Sarsaparilla (*Smilax officinalis*)
- Wild yam (*Dioscorea spp*)
- Yucca (*Yucca spp*)

Special Herbal and Supplemental Considerations for Polycystic Ovarian Syndrome. For PCOS, include herbs that will increase

sex-hormone-binding globulin. This will bind up some of the excess androgens secreted by the ovarian follicles.

- Nettle root
- Green tea
- Soy
- Flaxseed

Other herbs and nutrients can improve insulin sensitivity and PCOS:

- Chromium
- Fenugreek powder
- Vitamin C
- Bitter melon

Licorice can lower serum testosterone in women and saw palmetto can inhibit the conversion of testosterone to dihydrotestosterone (a stronger form of testosterone). By inhibiting this conversion, we can maybe modestly decrease testosterone-induced hair loss and acne.

- Licorice
- Saw palmetto

Bio-Identical Hormones

Bio-identical, also known as natural, progesterone can be used for both diagnosis and treatment of amenorrhea. Progesterone-induced menses indicates that there are adequate estrogen levels and that anatomical problems causing obstruction of the outflow of blood are not present. In these instances, the progesterone challenge is an effective means of diagnosis.

The progesterone challenge test is considered positive if uterine bleeding (even a few days of spotting) occurs and correlates with a serum estradiol level of 40 g/mL or higher. Onset of menstruation after intramuscular injection of 150 mg of progesterone in oil suggests that anovulation is the most likely explanation of the amenorrhea. Oral micronized progesterone (OMP) (also called oral natural progesterone) administered for seven days at 400 mg per day will induce complete secretory changes in the endometrium and induce a menses in a woman whose uterus has been adequately stimulated by estrogen. Lack of vaginal bleeding after the progesterone challenge suggests either inadequate priming of the endometrial lining, absence of an endometrial cavity, or some kind of obstruction.

If no withdrawal bleeding occurs after the progesterone challenge, then it is important to use a birth control pill—generally one that contains at least 30 mcg of ethinyl estradiol, for 21 days. At the end of these 21 days, withdrawal bleeding should occur within 14 days; even spotting is sufficient to count as withdrawal bleeding. Absence of uterine bleeding under these circumstances indicates uterine end-organ failure that may result from congenital malformation of the uterus and vagina or from distortion of the endometrial cavity by intrauterine adhesions due to tuberculous endometritis, also called Asherman's syndrome. If bleeding does occur after the oral contraceptive pill, then the likely diagnosis is hypothalamic amenorrhea, after excluding a pituitary tumor.

The woman who is hypoestrogenic and is not a candidate for induction of ovulation requires hormone replacement therapy. In young women, especially those in their 20s and 30s, the best approach is most likely to take oral contraceptives (OCs). Hormone replacement therapy, whether bio-identical hormones or conventional hormone replacement, could potentially be used in the usual doses for normal-aged menopausal women. However, these doses are considerably lower than the body's normal level in a young reproductive-aged woman and considerably lower than the dose of hormones in oral contraceptives. As these lower doses may not be adequate for bone protection at this young age, my recommendation is to use a 20 to 30 mcg oral contraceptive pill for women in their 20s and 30s who have hypothalamic amenorrhea or premature ovarian failure. (Smokers older than 35 will need to consider other options, most preferably to stop smoking.)

Younger women who insist on using alternative medicine need to fully understand their risks in premature states of insufficient hormone production. If the herbal, nutritional, and lifestyle interventions are not sufficient to stimulate the menstrual cycle, they must understand that bone loss in amenorrheic women shows the same pattern over time as that seen in postmenopausal women.[32] The loss is most rapid in the first few years, emphasizing the need for early treatment.

If bio-identical hormones are your choice as an alternative to OCs, then the following prescription, called bi-est (for bi-estrogen), would be considered a higher-than-average hormone replacement dose for menopausal women: estriol 2 mg/estradiol 0.5mg/progesterone 100 mg; one pill twice daily, for three weeks on and one week off. Beginning medication on the first of every month establishes an easily remembered routine. Some practitioners use a tri-estrogen formulation instead of the bi-estrogen formulation. In this case, the formula would be estriol 2 mg/estradiol 0.250 mg/estrone 0.250 mg/progesterone 100 mg; one pill twice daily, for three weeks on and one week off.

Menstruation generally occurs within three days after the last pills, the 28th day of each month. Bleeding that occurs at any other time may indicate that the body's own function has returned. The natural hormone replacement program should then be discontinued and the patient monitored for the return of ovulation.

Natural progesterone creams may be used in selected cases to help maintain a monthly cycle in women with anovulatory amenorrhea. Some women only need this monthly lower-dose hormone support during the second half of a monthly cycle. The typical dosing recommendations are from one-quarter to one-half teaspoon applied to the palms, inner forearms, and chest twice daily from day 15 to day 26. This cycle can be repeated. In the event that menstruation does not occur, it may be necessary to return to the estrogen/progesterone plan and/or herbal/nutritional therapies that induce ovulation such as chaste tree extract.

Exercise

Amenorrhea in the female athlete is associated with reduced caloric intake and strenuous exercise, which leads to low estrogen and is associated with stress fractures, osteoporosis, and a potential increase in the risk of premature cardiovascular disease.[33]

Most cross-sectional studies suggest that female competitive athletes, whether runners[34–39] or bodybuilders,[40, 41] have increased incidence of menstrual cycle disturbance, shorter luteal phases, and amenorrhea than do sedentary controls. Because of subject self-selection and consequent oversampling, results of these studies must be interpreted with caution.[42] Prospective studies have found no hormonal changes in women following one year of endurance training[43] and, up to 1994, had not detected induction of secondary amenorrhea by exercise alone.[42]

In her excellent review, Bonen states that secondary amenorrhea "is difficult to induce by exercise alone."[42] She concludes that some of the factors thought to be associated with exercise-induced amenorrhea—type, duration, intensity of exercise, age of menarche, training before menarche, and training history—remain speculative and that, in fact, little is known about the true incidence of secondary amenorrhea in athletic populations.

The higher incidence of secondary amenorrhea detected in competitive athletes appears related to metabolic factors. In weight lifters and bodybuilders, the appearance of luteal-phase disturbances and oligo- or amenorrhea is directly related to drastic reduction in caloric intake prior to competition combined with increases in strenuous exercise. For example, Sandoval found that female bodybuilders, examined for a period of 48 hours before competition, achieved a degree of leanness similar to their male counterparts.[44] Kleiner found in female bodybuilders, competing at the 1988 National Physique Committee's Junior USA

Bodybuilding Championships, a 9.8 percent body fat (males, 6.0 percent).[45] In a group of female bodybuilders studied for one month pre- and post-competition, Walberg-Rankin detected a twofold increase in caloric intake and a tenfold increase in fat intake postevent as compared to pre-event.[41] Furthermore, these unhealthy practices are followed by college-age women who compete in bodybuilding events.[46] In this context, it is not surprising that in Walberg's study, 86 percent of female competitive bodybuilders not on birth control pills reported menstrual dysfunction, and in Kleiner's, 81 percent of female elite bodybuilders had contest-related amenorrhea for one or two months precontest.

The picture is similar for competitive female runners whose caloric intake is inadequate or falls below the constant energy demanded by their sports. Time and again, menstrual cycle disturbances in these populations have been shown to be related to inadequate caloric intake combined with strenuous, abrupt increases in running distances.[34, 42, 47–49] Amenorrhea usually is not seen in athletes with a high percentage of body fat.[49] Since the cause of amenorrhea and other menstrual disturbances is linked to energy deficiency, there is no justification for fears that exercise itself is unhealthy for women.[50]

As mentioned earlier, amenorrheic athletes show dangerous reductions in mean trabecular bone density as compared to eumenorrheic counterparts (42 percent).[51] Exercise may intensify these effects[48] as well as low calorie intake itself. The effects of insufficient caloric intake on bone mineral density likely represents an estrogen-independent mechanism for bone loss; exercise-associated amenorrhea alters additional hormones that play an important role in modulating bone turnover and bone mineral density in these women.[52] A study of amenorrheic ballet dancers treated with estrogen plus progesterone replacement demonstrated that there was no significant improvement in bone mineral density even in those that resumed menses.[53]

The hypoestrogenic state that predisposes postmenopausal women to cardiovascular disease is similar to that of the amenorrheic athlete and, therefore, so is the cardiovascular risk. Specifically, amenorrheic athletes have been shown to have elevated LDL and total cholesterol, impaired endothelial function, and increased lipid peroxidation.[54, 55] Though this phenomenon warrants further study, present data suggests that the risk of premature cardiovascular disease deserves attention in monitoring and treatment of these women.

Finally, as shown by Bonen, menstrual disturbances are quite common in the general population of sedentary women. Different factors—weight change, starvation, crowding, travel, communal living, exercise, and severe stress of any kind—have been implicated in altered menstrual cyclicity.[42] Ronkainen and colleagues found increased abnormalities in the menstrual cycles of women during the short sunlight days of fall.[56] Thus, amenorrhea appears to have multiple etiologic relationships. Inappropriate exercise is only one of them.

Exercise Recommendations. If a woman has documented secondary amenorrhea not due to pregnancy, a careful history of eating and exercising habits is critical. In addition, her body weight and percentage body fat should be ascertained and compared to the normal ranges for her body build and age. For those women with amenorrhea due to hypoestrogenic states, a bone densitometry test, called a DEXA scan, particularly of the lumbar spine and proximal femur, is highly desirable.

In cases where the history and tests recommended indicate inadequate calorie consumption, a bone mass density below normal range, and body fat less than 15 percent, the recommended course is as follows:

- Adapt diet to individual needs; particularly emphasize protein, calcium, magnesium, vitamin D, zinc, copper, and chromium.[57]

- Reduce or stop intensive training, particularly running, until cycling resumes.
- Modify type of exercise. Instead of running, do moderate walking (30 minutes per day) and add a regular program of moderate weight lifting for 30 minutes, three times per week.
- Avoid competition in sports, on the job, and elsewhere.

For those women who have PCOS and are overweight, regular and preferably almost daily aerobic exercise in the range of two and a half to five hours per week is necessary to improve insulin resistance and lose weight.

CONVENTIONAL MEDICINE APPROACH

Successful management of amenorrhea depends on an accurate diagnosis. A careful history and examination and simple laboratory investigations will most likely yield a diagnosis that allows one to offer appropriate treatment in the majority of cases. A physical exam should assess the signs of secondary sexual characteristics (such as breast development and the presence or absence of normal or abnormal

Sample Treatment Plans for Amenorrhea

See the Resources section for formulation sources.

Premature Ovarian Failure

Diet: A whole foods diet using plenty of grains, beans (especially soybeans), fruits, vegetables (especially dark leafy greens), nuts and seeds (especially flaxseed), and fish (salmon, tuna, halibut, sardines)

Exercise: Regular aerobic and weight-bearing exercise 30 to 60 minutes, 4 to 7 days per week; weight/strength training 2 days per week

Mineral supplementation: Calcium/magnesium/boron/vitamin D/other trace minerals and nutrients (see Chapter 14)

Consider oral contraceptives with 30 mcg of ethinyl estradiol: Estriol 2 mg/estradiol 0.5 mg/OMP 200 mg; 1 pill twice daily, 3 weeks on and 1 week off

Consider bio-identical hormones: Estriol 2 mg/estradiol 0.5 mg/progesterone 100 mg; 1 pill twice daily, 3 weeks on and 1 week off

Consider short-term trial (less than 6 months):

Black cohosh extract: standardized extract, 40–80 mg twice daily

Maca: 2,000 mg per day

Rhodiola: 3% rosavin, 200 mg per day

Polyglandular products: To stimulate the hypothalamus/pituitary/ovarian feedback mechanisms, use bovine extracts of combinations of pituitary, thyroid, adrenal, and ovarian tissue. (Each woman is unique and requires an individualized approach.)

Hyperprolactinemia

Diet: A whole foods diet using plenty of grains, beans (especially soybeans), fruits, vegetables (especially dark leafy greens), nuts and seeds (especially flaxseed), and fish (salmon, tuna, halibut, sardines)

Exercise: Moderate exercise 150 minutes per week

Chaste tree extract: 40 drops or 175 mg .6% aucubin standardized extract per day

Hypoestrogenic States (Hypothalamic Amenorrhea)

These states are often associated with weight loss, psychological states, and anorexia nervosa.

Diet:

Increase calories, dietary protein, fat, and carbohydrates.
Consume regular meals using whole foods.
Avoid extreme dieting.
Increase soy foods and flaxseed.

Lifestyle:

Counseling (for eating disorders)
Stress management counseling and practices
Reduce exercise from excessive to moderate

(*continued*)

Sample Treatment Plans for Amenorrhea (*continued*)

Mineral supplementation: Calcium/magnesium/boron/vitamin D/other trace minerals and nutrients (see Chapter 14)

Oral contraceptives with 30 mcg of ethinyl estradiol

Consider bio-identical hormones: Estriol 2 mg/estradiol 0.5 mg/OMP 100 mg (not 200 mg); 1 pill twice daily, 3 weeks on and 1 week off

Consider short-term trial (less than 6 months):

- **Black cohosh extract:** standardized extract, 40–80 mg twice daily
- **Maca:** 2,000 mg per day
- **Rhodiola:** 3% rosavin, 200 mg per day

Polyglandular products: To stimulate the hypothalamus/pituitary/ovarian feedback mechanisms, use bovine extracts of combinations of pituitary, thyroid, adrenal, and ovarian tissue. (Each woman is unique and requires an individualized approach.)

Chronic Anovulation Due to PCOS

Diet: Reduce carbohydrates (80 g per day) and increase protein in the diet (60 mg or more per day). Diets such as the Zone Diet can be very helpful in this situation to reduce the hyperinsulinemia and provide better weight management. Increase soy foods and flaxseed. Emphasize whole grains, fruits, vegetables, nuts, seeds, fish (salmon, tuna, sardines, halibut), organic low-fat meats (chicken, turkey, beef, buffalo, elk, deer), low-fat dairy products, eggs, and beans.

Chaste tree extract: 40 drops or 175 mg .6% aucubin standardized extract per day

Rhodiola: 3% rosavin, 200 mg per day

Green tea extract: 500 mg per day

Nettles root: 600 mg per day

Saw palmetto extract: 400 mg per day

Soy isoflavones: 50–100 mg per day

Flaxseed: 1–2 tbsp per day

Chromium: 500–1,000 mcg per day

Fenugreek powder: 24 g per day

Oral micronized natural progesterone: 200–400 mg per day for 12 days per month

Natural progesterone cream (20 mg per ¼ tsp): ¼–½ tsp twice daily, days 16–25. Or ¼ tsp 1 or 2 times daily, days 7–14; ¼–½ tsp twice daily, days 15–26

body hair). Pelvic ultrasound might be helpful in determining whether the ovaries are enlarged with small, peripherally located follicular cysts indicative of polycystic ovary syndrome (PCOS). Blood tests to measure FSH, LH, prolactin, estradiol, testosterone, and thyroid function may be used to help determine the diagnosis.

On the basis of this information, women with amenorrhea can be classified into the four groups mentioned earlier in this chapter, with treatments as follows:

1. Hypergonadotropic hypogonadism. Hormone therapy with estrogen will induce secondary sexual characteristics in girls with primary amenorrhea. Estrogen in combination with cyclic progestins will prevent osteoporosis, endometrial hyperplasia, or cancer. The hormone therapy medications and regimens are discussed earlier in this chapter and also in Chapter 12. Oral contraceptives may also be used and may even be an optimal choice because of the higher dose of estrogen for relieving symptoms, ease and cost, or coverage for contraception in case the amenorrhea is temporary and the women wants pregnancy protection.

2. Hyperprolactinemia. Treatment with dopamine agonists (bromocriptine, cabergoline, quinagolide) leads to reduction in prolactin secretion by the pituitary gland. When prolactin is elevated, a CT or MRI should be done to distinguish between overactive pituitary production by a microadenoma versus an actual tumor (macroadenoma). The large tumor can be associated with headaches or vision changes and requires surgical resection, but it is very rare.

Once a tumor is excluded, medical therapy to decrease prolactin is mainly used to achieve pregnancy, and it is not required in an asymptomatic patient who is not seeking fertility.

3. Hypogonadotropic hypogonadism. In the majority of women with this classification, no organic disease can be identified in the hypothalamus, anterior pituitary, or ovary. Management of hypothalamic amenorrhea associated with weight loss must focus primarily on trying to correct the underlying cause of the weight loss. Amenorrhea from anorexia, bulimia, and exercise-induced weight loss requires prompt diagnosis and treatment. Some women will require hospitalization in a controlled environment for their malnutrition. Dietary counseling, psychological counseling, and advice about exercise could all help to correct the problem and restore ovarian function.

If amenorrhea persists for more than 12 months, then osteoporosis should be excluded with bone density testing, or some form of estrogen therapy should be considered to prevent bone loss. Women with hypothalamic amenorrhea who wish to become pregnant are treated by administering GnRH medications in a pulsatile manner via a portable programmable pump that releases the medication every one to two hours, simulating the body's pulsatile secretions. Women with rare disorders such as the pituitary disease Sheehan's syndrome are given hormones FSH and LH.

4. Chronic anovulation and polycystic ovary syndrome. About 30 percent of women with secondary amenorrhea have concentrations of FSH, LH, and estrogen within the normal range. Polycystic ovarian syndrome is a common cause of this type of amenorrhea. Many women with this type of amenorrhea actually present with irregular menstrual patterns more often than amenorrhea. These women do not have estrogen deficiency, but rather experience problems related to continued exposure to estrogen unopposed by progesterone. The buildup of the uterine lining caused by the continuous estrogen can cause endometrial hyperplasia or cancer.

Polycystic ovary syndrome is associated with clinical symptoms such as obesity, hirsutism, anovulation, and irregular bleeding. The range of problems that women with polycystic ovary syndrome have varies greatly from woman to woman. There are significant differences in terms of the amount of acne, hair growth, menstrual irregularity, infertility, hypertension, and diabetes. There is no current known treatment for the disease, so treatment by conventional medicine is aimed at individual patient goals and symptom relief. Obviously, the health concerns of hypertension, hyperlipidemia, and diabetes need to be addressed in terms of lifestyle changes and periodic monitoring of blood pressure, lipids, and blood sugar. For the woman who has very infrequent menses, the prevention of uterine hyperplasia or cancer is most important. However, most women with PCOS have uncomfortable side effects that can be improved.

If a woman has very infrequent menstruation, she should either use birth control pills for regular menstrual withdrawal or at least quarterly progestogens that cause withdrawal bleeding. The progestogens that have been used include Provera or Cycrin (medroxyprogesterone), 10 mg daily for seven days; Prometrium (oral micronized progesterone) or compounded oral micronized progesterone, 400 mg daily for seven days; Aygestin (norethindrone acetate), 5 mg daily for seven days; and Megace (megestrol), 20 mg daily for seven days. Most of the progestogens have similar symptoms of nausea, bloating, moodiness, and oily skin in varying degrees, but they are usually tolerable for a few days or a week.

Hirsutism can be with treated topically with Vaniqa, which reduces the transformation of testosterone to dihydrotesterone at the hair follicle, reducing the growth, or at least the size and color, of the hair. This product needs to be applied once to twice daily in the areas of hair

growth and works while it is being used. There is no permanent effect, so it has to be used daily. Also, electrolysis and laser hair removal are very effective permanent hair removal treatment.

Spironolactone, an antiandrogen medication with minimal side effects, can reduce acne and hair growth. The recommended does is 50 to 200 mg once daily. There has been some concern of very rare cases of hyperkalemia (abnormally high potassium levels) with this product, so patients need to be warned of cardiac arrhythmias and muscle cramping.

Metformin, an insulin-receptor-improving medication used for diabetes, has been touted to decrease weight gain and stimulate ovulation in women with PCOS. However, many studies have shown minimal effect on weight gain, and it has significant side effects of nausea, vomiting, and diarrhea, as well as uncommon but serious liver enzyme problems. Most practitioners use only it for treatment of diabetes or as an adjunct in infertility. Metformin usage, along with clomiphene and/or Pergonal, seems to improve ovary receptiveness and ovulation. Encouraging weight loss can help the situation tremendously, but women with polycystic ovary syndrome and obesity seem to be very resistant to standard weight-loss programs. It is possible to lose weight, but they need to be persistent and have a good support system, possibly even some help from bariatric medicine (obesity doctors).

The treatment that achieves the best symptom control is oral contraceptives. Oral contraceptives can reduce hair growth, reduce acne, cause regular menstrual sloughing, suppress luteinizing hormone (LH) and ovarian cyst production, and are very widely prescribed for women who also need contraception.

Antiestrogens such as clomiphene are sometimes given to induce ovulation and may restore fertility in women seeking pregnancy. However, PCOS can be resistant to normal ovulation induction and often requires the help of an infertility specialist. Sometimes metformin is added to help aid clomiphene in induction of ovulation, or the patient is given more intense ovulation induction medications such as Pergonal.

Probably the most important treatment of polycystic ovary syndrome is recognition of the problem. When counseling the patient, the focus should be on the management of her lifelong symptoms. We need to inform women that this disease comes in all shades and that there will be different treatment regimens for different women rather than one treatment for all.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

All women with amenorrhea should be evaluated by a licensed primary care practitioner (naturopathic doctor, medical doctor, osteopathic doctor, nurse-practitioner, or physician's assistant) because of the diverse array of potential diseases and disorders. Some of these conditions are rare, such as Asherman's syndrome, Cushing's disease, Sheehan's syndrome, and pituitary-secreting tumors. Other causes are more common but can be complex, such as malnutrition, anorexia nervosa, hyperthyroidism, polycystic ovary syndrome, and pituitary disorders. Other causes are rather straightforward; for example, hypothyroidism, strenuous exercise, pregnancy, and stress-related amenorrhea.

Fortunately, most women with amenorrhea have relatively simple problems that can be managed easily by primary care physicians, whether they are alternative medicine practitioners, conventional practitioners, or a team approach using the best choices of each. After an evaluation has been done and a cause diagnosed, natural therapies can be administered as the primary therapy or integrated with the conventional treatment. Conventional treatments may be necessary in many cases of amenorrhea, but dosing regimens may be lower when natural therapies are used as part of an integrated plan.

CERVICAL DYSPLASIA

CHAPTER 3

OVERVIEW

Over the past four decades, cervical cancer rates have dropped dramatically in most developed countries. This improvement in our health is attributable to the commonly available Pap smear, whereby early premalignant lesions can be found and treated, most often with fairly simple office techniques. Cervical cancer presently ranks third in cancer deaths of American women, although it remains the leading cause of death from cancer among women in developing countries who do not enjoy the same access to diagnosis and early treatment.[1] In the United States, approximately 9,710 cases of cervical cancer were diagnosed in 2006 and about 3,700 women died from it. Worldwide, human papilloma infection causes almost 500,000 cases of cervical cancer and 280,000 deaths each year.

Squamous cell cervical cancer is virtually always preceded by cervical dysplasia, which is 100 percent treatable in its noninvasive stage. (Cervical cancer of the glandular cells, adenocarcinoma, is more problematic and requires more aggressive treatment.) Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States,[2] and about 75 percent of the U.S. adult population has been exposed to HPV.[3] Fortunately, the majority of genital HPV infections don't cause any symptoms and go away on their own. The others go on to cause abnormal cells, including cervical dysplasia and/or cervical cancer.

Cervical cancer and dysplasia, genital warts, and condyloma are caused by the human papillomavirus, which is sexually transmitted. Virtually 100 percent of cervical dysplasias and cervical cancer is caused by HPV. This association is reflected in a simple rating system, in use since 1988, of low- and high-grade (precancerous) lesions or, more specifically, low-grade squamous intraepithelial lesions (SIL) and high-grade SIL, also referred to as LSIL and HSIL, respectively. In the new terminology, *low-grade SIL* replaces the former terms *mild dysplasia* and *CIN 1* (cervical intraepithelial neoplasia) and includes changes of simple infection with the human papillomavirus. *High-grade SIL* includes moderate and severe dysplasia, formerly classified as *CIN 2* and *CIN 3*. Both the newer and traditional terms are used in this chapter and in the medical literature.

What exactly is dysplasia? The mucous membrane that covers the cervix changes in adolescence from more bumpy columnar cells, like those that also line the uterus, to squamous cells, like those that line the mouth, through a normal process called metaplasia. Squamous cells make up all of our external body surfaces that are characteristically smooth, like our skin, for example. Where these two types of cells meet is called the squamocolumnar junction—and it is here that our cells are most susceptible to premalignant transformation. The Pap smear samples cells from this area to examine microscopically.

The very bottom layer of squamous cells are called basal cells. They are the largest and roundest with the biggest nuclei. As the cells progress toward the surface, they become smaller, flatter, and ultimately lose their nuclei before they get to the top. In mild dysplasia, the basal cell layer is thicker, up to one-third the total thickness of the tissue; in moderate dysplasia, they occupy the bottom and into the middle third; in severe dysplasia, they extend to the top third. Carcinoma "in situ" is not an invasive malignancy, but rather the extension of the immature basal cells to the

very top of the tissue thickness. While it does carry a higher risk of conversion to true cancer, it too is completely treatable.

The possibility of progression to cervical cancer increases with the severity of the dysplasia. Mostly, though, it is a slow process, occurring over about 10 to 15 years in most women who are untreated. Currently, more than 100 HPV subtypes have been identified, numbered, and categorized. More than 30 types can infect the genital area. The progression of dysplasia to cancer varies according to which HPV subtype one is infected with. The low-risk types (6 and 11) are generally associated with external genital warts but do not cause cervical cancer. The most aggressive or high-risk types are HPV 16, 18, 26, 31, 33, 35, 39, 45, 51, 51, 56, 58, 59, 66, 68, 73, and 82. These can transform susceptible tissue into cancer in about 18 months, but this is the exception rather than the norm, and dysplasia typically takes more than 10 years to progress to cervical cancer. In the United States, HPV 16 accounts for more than 50 to 60 percent of cervical cancer cases, followed by HPV 18 (10 to 12 percent) and HPV 31 and 45 (4 to 5 percent each).

A recent study confirmed that lesions of the cervix persist longer and progress more quickly in women with the aforementioned oncogenic HPV types, known as the higher risk types, than in women with nononcogenic types or without HPV.[4] However, it is important to remember that most women with the human papillomavirus never get dysplasia at all. On the other hand, some women with normal Pap smears, but showing inflammation, may indeed harbor the oncogenic HPV types 16 and 18,[5] suggesting women with chronic inflammation may benefit from high-risk HPV screening. Some estimate that as many as 70 percent of women are or have been infected in their lifetime. On the other hand, only about 10 women per 100,000 get cervical cancer.

In addition to eliminating dysplasia through treatment, there can be a significant amount of spontaneous regression of even the most severe forms, thanks to our well-functioning immune systems. Spontaneous regression of CIN 1 and CIN 2 has been documented to be as high as 50 percent to 40 percent respectively, with numbers improving the longer women are followed (usually one to three years). Almost 70 percent resolution of HPV alone was observed.[6]

Other studies confirm this, and the majority of untreated mild dysplasias were shown to regress to normal within two years. A critical review of the literature on the natural history of CIN was done over a span of over 40 years.[7] The author concluded that approximately 60 percent of CIN 1 regressed to normal, 30 percent persisted, 10 percent progressed to CIN 3 (a high-grade lesion), and only about 1 percent progressed to cervical cancer. CIN 2 regressed in 40 percent of the cases, persisted in 40 percent, progressed to CIN 3 in 20 percent, and progressed to cervical cancer in less than 5 percent of cases. CIN 3 regressed in 33 percent of the cases and progressed to cervical cancer in more than 12 percent.

A recent study demonstrates that the risk of progression from mild to severe dysplasia or frank cervical cancer was only 1 percent per year, but the risk of progression from moderate dysplasia was 16 percent within two years and 25 percent within five years.[8]

Mild dysplasia is detected in about 1 percent of women visiting their private gynecologist and about 14 percent of women who visited designated sexually transmitted disease clinics.[6] Besides HPV, other risks include early age at first intercourse, giving birth before age 22, cigarette smoking, low socioeconomic status, number of lifetime partners, and possibly, although not conclusively, oral contraceptive use. Women with five or fewer lifetime heterosexual partners had higher rates of regression of untreated CIN 1 and CIN 2 than did women with more than five partners, independent of barrier contraception method use (condoms or diaphragms).[9] It is difficult to separate out the effects of sexual activity without barrier protection from that conferred

by ingesting hormonal contraception. For whatever reason, women who used these barrier methods had less dysplasia. In fact, condom use was associated with higher rates of CIN regression and clearance of cervical HPV infection in women as well as protection from genital warts and invasive cervical cancer.[10–12]

Evaluation of an abnormal Pap smear result is done by a method called colposcopy, which is a lot like using binoculars to view the cervix. The colposcope magnifies the cervix, and white vinegar is applied to make the abnormal areas show up. Tiny biopsies are taken of these areas, a few millimeters at most. These are examined by the pathologist and graded into mild, moderate, or severe as described previously.

One of the most important points I am sure to explain to my clients is that cervical cancer is a sexually transmitted disease, greatly promoted by smoking, but one that usually grows slowly over years from its precursor, dysplasia, and is treatable in all of its earliest forms.

Atypia

Another possible Pap smear result is atypia—which is really a kind of fence-sitting cell. The cells are not changed enough to warrant being labeled as abnormal, but they are not quite normal either. Usually atypia is either an early abnormal change or evidence of tissue repairing itself, for example following a birth or vaginal infection. These Pap tests are usually just repeated, but if atypia persists, the woman should be evaluated.

Atypical Glandular Cells of Undetermined Significance (AGUS). AGUS may be the most difficult diagnostic challenge of all the Pap smear abnormalities. AGUS represents a significantly greater risk of cervical cancer than atypical squamous cells of undetermined significance (ASC-US, discussed later in this chapter) or low-grade squamous intraepithelial lesions. The good news is that AGUS is not a common diagnosis and only represents 0.13 to 0.8 percent of all Pap smears.

Fortunately, there are benign changes that result in an AGUS Pap smear. These include chronic endocervicitis, microglandular hyperplasia of the endocervix, or ciliated cell metaplasia of the endocervix, which is often seen in women who have IUDs. Some women with AGUS have high-grade (precancerous) squamous cells. The complicating problem is that AGUS cells may also come from the upper genital tract, such as tubal or ovarian cells, or even metastasis from the pelvis.

Risk Factors for Cervical Dysplasia and Cervical Cancer

- **Smoking.** Women who smoke are about twice as likely to develop cervical cancer.
- **Human immunodeficiency virus (HIV) infection.** Immunocompromise results in increased risk for HPV infections.
- **Chlamydia infection.** Recent or past positive test results for chlamydia may lead to greater risk for cervical cancer.
- **Poor nutrition.** Diets low in fruits and vegetables may increase the risk for cervical cancer.
- **Multiple heterosexual partners.** Having three or more partners in a lifetime increases risk of cervical cancer.
- **Obesity.** Overweight women are more likely to develop cervical cancer.
- **Oral contraceptives.** Although the research is mixed, long-term use of oral contraceptives may increase the risk of cervical cancer.
- **Low socioeconomic status.** Poor access to adequate health care, including Pap tests and treatment of precancerous lesions, leads to higher risk for cervical cancer.
- **Family history of cervical cancer.** Recent studies suggest that women with a mother or sister with cervical cancer are at higher risk for developing cervical cancer.
- **First intercourse.** Women at highest risk of testing positive for HPV are those in the first few years after first intercourse.
- **Age.** HPV risk prevalence declines with age.

When the report says AGUS "favor neoplasia," this is of great concern, because 50 to 100 percent of patients with this test result have a significant cervical lesion. These could include a high-grade CIN, adenoma carcinoma in situ, or adenocarcinoma. Even though more than 50 percent of women with AGUS will be found to be normal, we cannot predict this, and a normal follow-up Pap smear may be falsely normal, or what is called a false negative. Therefore, a practitioner must carefully evaluate AGUS.

Evaluation may include colposcopy, biopsy, endocervical curettage and endometrial biopsy, in some cases dilation and curettage or hysteroscopy, and in some cases a conization. If there is adenomacarcinoma in situ on biopsy, a cervical conization is recommended. Cervical conization for any woman with AGUS "favor neoplasia," adenocarcinoma in situ, or adenocarcinoma is recommended for most women. If there is frank invasion detected by biopsy, more extensive surgery is recommended.

A Note About New Technologies

Most women are familiar with the Pap smear. Cells are scraped from the cervix and placed on a slide for examination in a laboratory. There is now a new liquid-based technique in which the cervical cells collected by scraping the cervix are placed in liquid. In the laboratory much of the mucus, blood, and inflammatory cells are removed from the cell sample. Liquid-based methods are more expensive than conventional Pap tests but have a higher sensitivity for detection of lower-grade squamous cell lesions and can be used to test for HPV types in women with atypical squamous cells of undetermined significance (ASC-US) Pap results. The FDA has approved two liquid-based cytology methods: the Sure-Path system and the ThinPrep Pap test.

Reporting of Abnormal Pap Results

About 5 to 10 percent of Pap tests performed in the United States each year are abnormal. Abnormal cells include the following:

- ASC-US: atypical squamous cells of undetermined significance. This is considered a mild abnormality. ASC-US is often then tested for HPV types.
- ASC-H: atypical squamous cells, cannot rule out high-grade (precancerous) lesions. Women with ASC-H are at greater risk for CIN 2 or CIN 3. For this reason, and because detection of high-risk types of HPV is much more common with ASC-H, the recommendation is that these women get colposcopy and biopsies.
- LSIL: low-grade squamous intraepithelial lesion—early changes in the size, shape, and number of abnormal cells. Lesion refers to an area of abnormal tissue, and intraepithelial means that the abnormal cells are present in the surface layer of cells, not the deeper glandular layer. This is considered a mild abnormality. Colposcopy and biopsies are recommended.
- HSIL: high-grade squamous intraepithelial lesions. There may be a few, or there may be many. This is obviously more severe and serious and has a higher likelihood of progressing to cervical cancer. Colposcopy and biopsies are recommended.
- ASC-US and ASC-H: HPV testing is recommended.
- LSIL and HSIL: These are generally not tested for HPV typing, as it does not alter the course of treatment.

If the results of the Pap smear are ASC-H, LSIL, or HSIL, the clinician should perform or recommend a colposcopy and biopsies. This is the only certain way to evaluate the abnormal cells and determine the appropriate course of treatment.

OVERVIEW OF ALTERNATIVE TREATMENTS

Cervical dysplasia is an excellent example of what preventive medicine can accomplish because, in almost all cases, it is a preventable disease. Through

Recommendations for Pap Smear Testing

- For women up to age 29: annual Pap with conventional smear, or every two years using liquid-based smear
- For women 30 years and older: if three consecutive normal Paps, may go to every two to three years unless history of DES or HIV or immunocompromised

Note: Despite these recommendations, consider that all women should have annual Paps; this is to ensure that they also get an annual exam. Begin Pap smear testing approximately three years after onset of vaginal intercourse, no later than 21 years of age.

- Stop screening: for women 70 years or older who have had three or more consecutive normal Paps after age 60
- Women with ASC-US and ASC-H can receive HPV testing to determine low-risk or high-risk HPV subtypes
- Women with ASC-H, LSIL, and HSIL should get a colposcopy and biopsies

KEY CONCEPTS

- Cervical dysplasia is a sexually transmitted disease transmitted through skin-to-skin contact. Condoms do not fully protect because HPV extends onto skin beyond the condom, but they may impart some protection and may enhance possibility of regression of low-grade lesions to normal.
- The human papillomavirus (HPV) causes virtually all cases of cervical dysplasia, although most women exposed to HPV actually never get dysplasia.
- Cervical dysplasia is classified as either low-grade or high-grade and, if left untreated or if the body is not able to reverse it on its own, can progress to cervical cancer, especially if a person is infected with the oncogenic strains of HPV.
- Cervical cancer of squamous cells is a preventable disease.
- Pap smears are screening tests, not diagnostic tests.

PREVENTION

- Annual Pap smears are the single most important factor in preventing cervical cancer and in detecting earlier grades of cervical dysplasia.
- The use of condoms during intercourse is a significant tool in preventing exposure to HPV, reducing the risk of chlamydia and HIV, and reducing the risk of cervical dysplasia.
- Reduce sexual risk factors: multiple partners, sexual exposure to men who have genital warts, sexual exposure to men sexually exposed to women with genital warts or cervical dysplasia, and intercourse prior to age 18.
- Avoid smoking.
- Eat a healthy whole foods diet rich in green, yellow, orange vegetables and lignans.
- Use folic acid supplementation if using oral contraceptives.
- HIV-positive women and women who are immunosuppressed because of kidney dialysis or immunosuppressive medications are at higher risk for cervical dysplasia and cervical cancer and need more frequent screening.
- Consider contraceptive options other than oral contraceptives.

lifestyle habits, dietary factors, nutritional supplementation, and regular Pap smears, most cases of cervical dysplasia and its consequence, cervical cancer, could be avoided.

Natural medicine perspectives on cervical dysplasia are consistent with conventional medicine's understanding that the human papillomavirus causes virtually all cases and that this virus is sexually transmitted. Many cofactors serve as cocarcinogens in the development of cervical dysplasia, including smoking, nutrient deficiencies, immune deficiency, and possibly oral contraceptives. Where natural medicine diverges in its approach is in advising patients what they can do about these cofactors. In addition, there are nutrients that can be used in supplement form both to prevent the progression of cervical dysplasia to cervical cancer and to reverse some cases of dysplasia.

Cervical dysplasia is both a local problem involving the cervical tissue immunity and health and a systemic problem involving general immune health and resistance to viral exposure. The overriding goals of natural treatments are to reduce exposure to the human papillomavirus, reduce cofactors, correct nutrient insufficiencies, improve local immune response, strengthen general immune health, and prevent the progression to cervical cancer.

NUTRITION

Cervical cancer has been studied in relationship to many dietary factors. In general, diets high in vitamin C, carotenoids, vitamin E, selenium, and other substances found in fruits and vegetables have been found to be protective in at least some studies.[13–17] A recent study found that higher levels of vegetable consumption were associated with a 54 percent decrease in risk of HPV persistence. Also, a 56 percent reduction in the persistence of the virus was observed in women with the highest plasma cis-lycopene concentrations compared with women with the lowest plasma cis-lycopene concentrations. These results suggest that vegetable consumption and circulating cis-lycopene may be protective against HPV persistence.[18] Another report revealed that the risk of chronic HPV infection was lower among women reporting higher intake of the following foods: carotenes such as beta-cryptoxanthin (found in eggs, yellow and orange fruits and vegetables), lutein and zeaxanthin (eggs, dark green vegetables), vitamin C, and, specifically, papaya.[19]

In the treatment sections of this chapter, I emphasize a vegetarian diet, one that is high in fruits and vegetables, especially yellow-orange ones like carrots, yellow squash, cantaloupe, peaches, and corn. In China, consumption of both animal foods (including meat, eggs, and fish) and green vegetables was significantly correlated with a lower death rate from cervical cancer.[20] One study among white women showed that risk of cervical dysplasia and cervical cancer was not affected by increased consumption of vegetables, yellow-orange vegetables, fruits, or legumes.[21] Nonetheless, there is enough evidence to support a diet rich in beneficial vegetables.

Phytoestrogens may also play a role in lowering premalignancies of the cervix. A recent study demonstrated that plasma levels of equol and enterodiol, two isoflavonoids, were positively associated with a lower cervical dysplasia risk, and in addition found a nonsignificant positive association with enterolactone, a lignan. Consistent with these results, dietary sources of lignans, including garlic, onions, grapefruit, seeds, seaweed, and taro, were positively associated with lowered CIN risk.[22]

Indole-3-carbinol, found in cruciferous vegetables such as broccoli, cabbage, brussels sprouts, cauliflower, and kale, has the potential to prevent and treat several cancers. Eating these foods alters estrogen metabolism in such a way as to reduce the carcinogenic metabolites of estrogen metabolism. Women with CIN 1 or 2 have altered estrogen metabolism and have higher 16-alpha hydroxyestrone, a potent carcinogen, and fewer 2-hydroxyestrogen metabolites than women with no abnormal cells of the cervix.[23]

Nutritional Supplements

Carotenes. Carotenes include beta-carotene, alpha-carotene, cryptoxanthin, gamma-carotene, zeaxanthin, lutein, and lycopene. Studies have shown that beta-carotene deficiency in the cervical cells plays an etiologic role in the development of cervical dysplasia.[24] In addition, a significant decrease in plasma beta-carotene levels is found in women with either cervical dysplasia or cancer of the cervix.[25]

It has been suspected that carotenes like lycopene, found in tomatoes, are more responsible for an improvement in dysplasia than is beta-carotene or the other carotenes.[26] In fact, recent studies have found that high serum levels of lycopene and alpha-carotene are associated with a decreased risk of cervical dysplasia,[27] and increasing serum levels of lycopene alone was found to

increase clearance of oncogenic HPV infections by over 50 percent.[28, 29]

My own research study investigating natural treatment methods for cervical atypia, cervical dysplasias, and carcinoma in situ of the cervix used beta-carotene supplementation as one part of a multifactorial supplementation and local treatment protocol. I found a high success rate using this combination protocol. Most of the women were given supplements of 150,000 units of mixed natural carotenes daily for a minimum of three months. Of 43 women studied, 38 patients returned to normal, 3 patients had partial improvement, 2 stayed the same, and none of the patients progressed to a worse state of dysplasia during the course of the natural treatment protocol.[30, 31]

The full treatment protocols for each degree of dysplasia are described in the treatment plans in this chapter. Overall, my approach has been to recommend increased sources of carotenes in the diet as well as supplementation. There are potential concerns about using beta-carotene by itself, especially in women who are at higher risk for lung cancer. As a precaution, I avoid beta-carotene supplementation in women at high risk for lung cancer (smokers), and for everyone else, I only recommend products that have mixed carotenes and natural carotenes. Careful label reading is essential. If the label doesn't say "natural," then the product has synthetic beta-carotene.

Do not be alarmed if your skin turns an orange tint when supplementing with high amounts of carotenes. It is merely a pigment and is not a sign of liver toxicity. Carotenes are not toxic.

Carotenes

Mixed, natural carotenes, 75,000 IU twice daily
25,000–50,000 IU for prevention (see treatment plans)

Vitamin A. Studies have shown that dietary vitamin A protects against cervical cancer. Women with lower serum levels and dietary intakes of total vitamin A are significantly more likely to have dysplasia or carcinoma in situ than women with a higher intake of these nutrients.[32–34] Another study showed that the rate of progression from dysplasia to cervical cancer was nearly five times higher in women with lower serum retinol levels than those with higher serum retinol levels[35] and that diets rich in vitamin A and high-retinol foods may reduce risk of in-situ and invasive cervical cancer.[36] In addition, in vitro studies confirm that vitamin A and its analogues inhibit the proliferation of HPV infection through apoptosis (cell death) and inhibition of cell growth rates. Such therapy is promising in decreasing the progression of early cervical lesions to cancer.[37–39]

Topical vitamin A is an important form of treatment as well. In one study of 301 women, topical vitamin A (retinoic acid) increased the complete regression rate of moderate dysplasia from 27 percent in the placebo group to 43 percent in the treatment group. Women with severe dysplasia failed to respond.[40] An earlier, well-known study on topical vitamin A and dysplasia on the exocervix (external surface of the cervix) at the University of Arizona had comparable results, eliminating the disease in 10 of the 20 women. Five of the 10 had mild dysplasia, and 5 had moderate dysplasia.[41] Too few patients had severe dysplasia to evaluate. This finding was replicated recently in a study of three different doses of topical retinoic acid in women with CIN 1 and 2.[42] In my own research, vitamin A suppositories were applied topically as part of a multifactorial systemic and local treatment plan. (The protocol is described later in this chapter.)

Vitamin E. Low levels of serum vitamin E have been associated with an increased risk of all stages of CIN and cervical cancer and high levels associated with a decreased risk.[43–46] Low levels of vitamin E combined with deficient levels of vitamin A have been associated with an increased risk of oncogenic HPV infection.[47] One study demonstrated a greater than 50 percent inhibition of proliferation of HPV-infected cells in vitro.[48] In addition, vitamin E is a potent antioxidant and, therefore, may mitigate the oxidative damage asso-

ciated with cervical dysplasia and cancer.[49] In a recent study, women with CIN or cervical cancer were found to have low levels of vitamin E and other antioxidants—like glutathione, vitamin C, and CoQ10—were found to be low, while markers of lipid peroxidation were found to be high, both corresponding to severity of disease stage.[50–52]

Vitamin E can help in the treatment of cervical cancer as well by improving the efficacy of radiation therapy and enhancing tumor response and chromosomal damage of cancer cells while concurrently protecting normal cells.[53]

Vitamin C. The possible role of vitamin C in preventing cervical dysplasia is of special interest because vitamin C is involved in collagen synthesis, detoxifies chemical carcinogens, interferes with the formation of chemical carcinogens, and modulates the immune system. It has been demonstrated in more than one study that there is a significant decrease in vitamin C intake as well as plasma levels of vitamin C in patients with cervical dysplasia.[54, 55] Vitamin C supplementation has not been studied by itself as a treatment for cervical dysplasia. It was a part of the comprehensive treatment protocol in my research study.

Vitamin C

2,000–6,000 mg per day
1,000–2,000 mg per day for prevention (see treatment plans)

Folic Acid. There have been several studies using folic acid supplementation in women with mild and moderate cervical dysplasia, with conflicting results. In one study, women with mild or moderate dysplasia received 10 mg daily of folic acid supplementation or placebo for three months. All of these women had used oral contraceptives for at least six months and continued to do so. The results showed significant improvement or normalization of Pap smears and biopsies at the end of the treatment period.[56]

In patients with folic acid deficiency, changes in the cells of the cervix (called megaloblastic abnormalities) and low blood levels of folic acid have been associated with a moderately increased risk of invasive cervical cancer.[57, 58] Deficiency has been observed more often in women who are taking oral contraceptives. In another study, women taking 10 mg of folic acid daily for three weeks (while continuing oral contraceptives) showed a striking reversion of the megaloblastic changes toward the normal,[59] with a regression-to-normal rate of 20 percent in this study and 100 percent in another.[60] Folic acid supplementation may be effective in preventing dysplasia from progressing as well. Theoretically, folic acid may act by decreasing homocysteine, which, when elevated, has been associated with an increased risk of cervical cancer.[61, 62] It should be noted that a recent study demonstrated the difficulty of getting adequate folate via diet and, therefore, additional supplementation is warranted.[63]

When doses as high as 10 mg of folic acid per day are given, two points must be kept in mind. The first is that most retail natural foods stores have folic acid available only in capsules up to 800 mcg (less than 1 mg, which is equal to 1,000 mcg). Higher doses of folic acid are available only by prescription from your medical doctor or licensed alternative practitioner. A prescription liquid form is available for which one drop is equal to 5 mg, which is very cost effective. The second issue is that high doses of folic acid can mask a vitamin B_{12} anemia. To avoid this, take either a multiple vitamin-mineral, B-complex, or B_{12} supplement along with the daily folic acid.

Folic Acid

2.5–10 mg per day
800–2,400 mcg per day for prevention (see treatment plans)

B Vitamins. B vitamins, specifically riboflavin, thiamine, and B_{12}, have an inverse correlation with risk for CIN, leading some researchers to promote the protective role they may play in cervical cancer, reducing the risk by

as much as 50 to 90 percent for the upper limits of intake.[64] Women with the highest levels of serum B_{12} were less likely to have a persistent infection.[65] Serum B_{12} levels should be evaluated and deficiency corrected. As with folic acid, B_{12} may act by decreasing homocysteine, which, when elevated, has been associated with an increased risk of cervical cancer.[66, 67]

Vitamin B_{12}

1,000 mcg per day

Botanicals

Green Tea. One of the most exciting advances in the treatment of cervical dysplasia is the research that has been published on green tea. In both laboratory and clinical studies, constituents of green tea, namely polyphenol E (poly E) and epigallocatechin-3-gallate (EGCG), have been effective against HPV-infected cervical cells and lesions. The mechanisms involved appear to be apoptosis, cell cycle arrest, modification of gene expression, and antitumor effects.[68, 69] A clinical study confirms these findings in patients through the use of either topical application via a poly E ointment and/or oral ingestion via a poly E or an EGCG capsule. All treatment groups improved compared to placebo (50 to 75 percent versus 10 percent), but the topical treatment groups improved the most significantly compared to oral alone (75 percent versus 50 to 60 percent).[70]

Green Tea

Green tea extract (95% polyphenols, 80% catechins, 55% EGCG, 10% caffeine): 300 mg per day orally
Green tea suppositories: insert one twice weekly (see treatment plans)

Indole-3-Carbinol/Diindolylmethane (DIM). Indole-3-carbinol (I3C) is a phytochemical found in cruciferous vegetables, including cabbage, broccoli, Brussels sprouts, cauliflower, and kale. I3C is converted in the stomach to a variety of compounds including diindolylmethane (DIM). It has been suggested that I3C can act in several ways to prevent abnormal cell growth and prevent tumor progression. Recent studies indicate that I3C has the ability to prevent and maybe even treat some common cancers, especially those that are estrogen related,[71] by altering the pathway of estrogen metabolism.[72–74]

Women with CIN 2 and 3 have altered estrogen metabolism; higher 16-alpha hydroxyestrone, a potent carcinogen; and fewer 2-hydroxyestrogen metabolites than normal.[75] One therapeutic goal of treatment, then, is to increase the 2-hydroxylation of estrogen and decrease the 16 alpha-hydroxylation. In one double-blind, placebo-controlled study of 30 women with CIN 2 or CIN 3,[76] 4 of 8 patients in the 200 mg group and 4 of 9 in the 400 mg group had complete regression of their CIN compared to none of the placebo group. A laboratory study of human cervical cancer cells determined that I3C and DIM could induce apoptosis (cell death) of human cervical cancer cells and HPV-16-infected cervical cells of mice.[77] It appears DIM is preferred over I3C due to increased bioavailability and the fact that it increases the protective 2-hydroxyestrogen without increasing another harmful metabolite, the 4-hydroxyestrogens.

Diindolylmethane (DIM)

200–400 mg per day

Additional Botanicals. Traditional herbal medicine includes the use of many plants for systemic immune support. No plants (except green tea) have been studied by themselves in relationship to the human papillomavirus and cervical dysplasia that I am aware of, although many plants are known both to act as immune modulators and to be antiviral in their activity.

This concept of immune support is an important part of preventive medicine as well as in reversing and preventing the progression of cervical dysplasia. Since up to 80 percent of the

U.S. sexually active adult population carries the human papillomavirus and less than 5 percent have a visible lesion or abnormal Pap smears, it is common sense that most people's bodies have the ability to prevent the virus from causing an actual diseased state. Specifically, their immune systems are doing a better job at keeping them healthy. This is true for women both systemically and in the vagina. There is local immune tissue in the cervical epithelium, and the immune status of this tissue is in part responsible for resistance to the virus.

This is the background logic for both systemic immune support and local immune support. As part of the research protocol, you will see the use of a systemic botanical formula including thuja, echinacea, ligusticum, and goldenseal. You will also notice herbal suppositories containing many traditional herbs for immune support, antiviral activity, and squamous cell repair. These include myrrh, echinacea, usnea, goldenseal, marshmallow root, geranium, and yarrow.

Recent evidence supports the use of curcumin in the prevention of cervical cancer due to its ability to inhibit lipid peroxidation and downregulate HPV virus.[78–80]

Curcumin

350–500 mg once to twice daily

Criteria and Guidelines for Treatment Selection

Note: Not all of the treatments described in this chapter are appropriate for self-care. Some, such as the escharotic treatment, need to be administered by a licensed health-care practitioner trained in women's health. In addition, not all cases of cervical dysplasia are appropriate for the natural treatment protocols. Licensed practitioners familiar with diagnosing and treating cervical dysplasias should be consulted to assist in making appropriate and safe decisions. For practitioners reading this book, the following criteria may be helpful in determining the appropriate treatment:

Criteria for Naturopathic Protocol

1. ASC-US.
2. ASC-US with documented HPV.
3. ASC-H: endocervical curettage is negative or positive with a satisfactory colposcopy.
4. Low-grade squamous intraepithelial neoplasia: endocervical curettage is negative with a satisfactory colposcopy.
5. High-grade squamous intraepithelial neoplasia: endocervical curettage is negative with a satisfactory colposcopy.
6. ASC-H: endocervical curettage is positive with a satisfactory colposcopy, but the patient is at low risk for more serious disease or has low-risk HPV typing, or at the discretion of the practitioner.
7. Low-grade squamous intraepithelial neoplasia: endocervical curettage is positive with a satisfactory colposcopy, but the patient is at low risk for more serious disease or has low-risk HPV typing, or at the discretion of the practitioner.
8. High-grade squamous intraepithelial neoplasia: endocervical curettage is positive with a satisfactory colposcopy, but the patient is at low risk, or at the discretion of the practitioner and considered carefully after colposcopy, biopsies, and careful follow-up.
9. It is possible to treat carcinoma in situ in selected cases, but this is definitely a judgment call and should be considered very carefully after colposcopy, biopsies, and careful follow-up.

Referrals for Colposcopy with Biopsies

1. ASC-US if HPV DNA testing is positive for high-risk HPV; if no HPV testing is done, then repeat the Pap twice at 4 to 6 month intervals. If HPV typing is negative for high-risk types, then repeat Pap in 12 months.
2. ASC-H.
3. Low-grade squamous intraepithelial lesions.
4. High-grade squamous intraepithelial lesions.
5. AGUS (atypical glandular cells of undetermined significance); need endometrial biopsy as well.
6. Adenocarcinoma in situ (AIS): need endometrial biopsy as well.

(*continued*)

Criteria and Guidelines for Treatment Selection (*continued*)

7. Pap smear diagnosis of microinvasion or frank invasion.
8. Endometrial cells present in a postmenopausal woman even if the cells are benign; also needs an endometrial biopsy.
9. A patient that may not follow through with the recommended follow-up Pap smear after an abnormal Pap result.
10. Visible unknown cervical lesion, regardless of the Pap smear test result.
11. Initial exam of a DES daughter.
12. Unexplained or persistent cervical bleeding.
13. Vulvar condyloma with abnormal Pap smear test result.
14. To be used for follow-up after treatment plan is completed, especially in high-grade squamous intraepithelial lesions.

Referrals for Conization or LEEP

1. Pap smear results that are more than one grade of dysplasia different than that seen on colposcopy or reported on in the biopsy.
2. Biopsy squamous intraepithelial lesions with three to four quadrants involved.
3. Unsatisfactory colposcopy with any degree of squamous intraepithelial lesions on biopsy.
4. The patient may not be a good candidate for more ongoing treatments and the closer follow-up required by alternative treatments.
5. No improvement in pathology using the initial naturopathic plan or repeated alternate plan.
6. If AGUS on Pap smear and no detection of disease on colposcopy, biopsies, and endocervical curettage.
7. If AIS on Pap smear and no detection of disease on colposcopy, biopsies, and endocervical curettage

Practitioner and patient discretions:

8. Positive endocervical curettage with any degree of squamous intraepithelial lesions. A more assertive approach is recommended.
9. High-risk patients: the last Pap test was more than one year previous, a history of genital warts, a history of cervical dysplasia, smokers, multiple sexual partners with lack of safe sex practices. In these cases, a more proactive and assertive approach is recommended.

Referrals for Probable Hysterectomy

1. Microinvasive cervical cancer.
2. Frank invasive cervical cancer.
3. Adenocarcinoma.

Toxicity studies prove its safety up to 8,000 mg per day by mouth for up to three months as well as its efficacy in chemoprevention in cancer, including cervical cancer.

The Escharotic Treatment. The escharotic treatment is a topical caustic treatment of the cervix used to remove abnormal cells. It involves the use of zinc chloride mixed with a botanical, Sanguinaria canadensis (bloodroot). I have used the escharotic treatment for more than 24 years, and at one time I conducted a small study using it as a treatment along with suppositories and herbal/nutritional supplementation in seven women with carcinoma in situ of the cervix.[30] After one year, four of the women remained disease free, one woman improved to atypia and then reverted to mild dysplasia, and two women had partial improvement. In a follow-up study, similar protocols were used including the escharotic treatment with some of the more severe cases. I discussed this in more detail in the section of this chapter on carotenes. Indications and directions for use of the escharotic treatment are given later in this chapter.

Botanical Formula I

Red clover: 1 oz
Dandelion root: 1½ oz
Licorice root: 1 oz
Goldenseal: ½ oz

Botanical Formula II

Thuja: 1 oz
Echinacea: 1½ oz
Goldenseal root: ½ oz
Ligusticum: 1 oz

Sample Treatment Plan for ASC-US

See the Resources section for information on the contents of and resources for the suppositories and other products included in these treatment plans.

Initial Naturopathic Plan

Topical

Week 1: vitamin A suppository nightly for 6 nights
Week 2: herbal vaginal suppository nightly for 6 nights
Week 3: vitamin A suppository nightly for 6 nights
Week 4: herbal vaginal suppository nightly for 6 nights
Week 5–12: green tea suppository 2 nights per week

Systemic

Folic acid: 10 mg daily
Vitamin C: 6 g daily
Beta-carotene: 150,000 IU daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
Botanical Formula I: ½ tsp, twice daily

Use systemic treatment for 3 months until follow-up.

Constitutional

Vegetarian diet for 3 months until follow-up

Alternative Naturopathic Plan

Topical

Week 1: vitamin A suppository nightly for 6 nights, Vag Pack suppository 1 night per week
Week 2: herbal vaginal suppository nightly for 6 nights, Vag Pack suppository 1 night per week
Week 3: vitamin A suppository nightly for 6 nights, Vag Pack suppository 1 night per week
Week 4: herbal vaginal suppository nightly for 6 nights, Vag Pack suppository 1 night per week
Weeks 5–12: green tea suppository twice per week

Systemic

Vitamin C: 6 g daily
Beta-carotene: 150,000 IU daily
Folic acid: 10 mg daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
Botanical Formula I: ½ tsp twice daily

Use systemic treatment for 3 months until follow-up.

Constitutional

Vegetarian diet for 3 months until follow-up

Additional Therapies to Consider

Zinc: 30 mg daily
Vitamin E: 400 IU daily
Selenium: 400 mcg daily
Green tea suppository: twice per week
DIM: 200 mg daily

Comments: A follow-up Pap smear in 3 to 6 months that is still abnormal warrants colposcopy and biopsies.

Maintenance Plan for 3 Months (After Normal Pap Smear)

Vitamin C: 2 g daily
Beta-carotene: 150,000 IU daily
Folic acid: 2.5 mg daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
Vegetarian diet

LIFESTYLE HABITS

Sexuality

Early age at first intercourse (before age 18) with unprotected sex and/or multiple heterosexual partners with unprotected sex are associated with an increased risk of cervical dysplasia and cervical cancer. As nearly all cases of cervical dysplasia involve HPV, women can best protect themselves by using condoms during intercourse. Even if a male partner does not have visible genital warts, he can have nonvisible genital warts and can also carry the virus.

If the partner is female, it is more difficult to contract the virus and cervical dysplasia, but not impossible. Avoiding genital-to-genital contact

Sample Treatment for Mild Dysplasia (CIN 1, Low-Grade SIL)

See the Resources section for information on the contents of and resources for the suppositories and other products included in these treatment plans.

Initial Naturopathic Plan

Topical

Week 1: vitamin A (Vital-A) suppository nightly for 6 nights, Vag Pack suppository for 1 night
Week 2: herbal vaginal suppository nightly for 6 nights, Vag Pack suppository for 1 night
Week 3: vitamin A suppository nightly for 6 nights, Vag Pack suppository for 1 night
Week 4: herbal vaginal suppository (Herbal-C) nightly for 6 nights, Vag Pack suppository for 1 night
Weeks 5–12: green tea suppository twice per week

Systemic

Vitamin C: 6 g daily
Beta-carotene: 150,000 IU daily
Folic acid: 10 mg daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
Botanical Formula I: ½ tsp twice daily

Use systemic treatment for 3 months until follow-up.

Constitutional

Vegetarian diet for 3 months until follow-up

Alternate Naturopathic Plan

Topical

Escharotic treatment (described later in this chapter) twice per week for 3 weeks

After the last escharotic treatment:

Week 1: vitamin A suppository nightly for 6 nights
Week 2: herbal vaginal suppository nightly for 6 nights
Week 3: vitamin A suppository (Vital-A) nightly for 6 nights
Week 4: herbal vaginal suppository nightly for 6 nights
Weeks 5–12: green tea suppository twice per week

Systemic

Vitamin C: 6 g daily
Beta-carotene: 200,000 IU daily
Folic acid: 10 mg daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
Botanical Formula I: ½ tsp twice daily
Selenium: 400 mcg daily

Use systemic treatment for 3 months until follow-up.

Constitutional

Vegetarian diet for 3 months until follow-up

Additional Therapies to Consider

Zinc: 30 mg daily
Vitamin E: 800 IU daily
Selenium: 400 mcg daily
DIM: 200–400 mg daily

Maintenance Plan for 6–12 Months

Vitamin C: 2 g daily
Beta-carotene: 150,000 IU daily
Folic acid: 2.5 mg daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
Vegetarian diet

or practicing safer sex if the partner has known genital warts may be advisable. It is considered very low risk for the virus alone to be transmitted between women, although it is theoretically possible. Both heterosexual and homosexual women ask about the risk of transmitting or contracting the virus through oral sex. Again, this is theoretically possible, and there are conditions when the HPV virus may lodge in the larynx and oral cavity. However, these cases are extremely rare, and so it is left to each person to make that judgment on her own. If one of the partners is immunocompromised (HIV-positive, a transplant patient, or has chronic hepatitis), then she

Sample Treatment for Moderate Dysplasia (CIN 2, High-Grade SIL)

See the Resources section for information on the contents of and resources for the suppositories and other products included in these treatment plans.

Initial Naturopathic Plan

Topical

Week 1: vitamin A suppository nightly for 6 nights, 2 Vag Pack suppositories for 1 night
Week 2: herbal vaginal suppository nightly for 6 nights, 2 Vag Pack suppositories for 1 night
Week 3: vitamin A suppository nightly for 6 nights, 2 Vag Pack suppositories for 1 night
Week 4: herbal vaginal suppository nightly for 6 nights, 2 Vag Pack suppositories for 1 night
Week 5: vitamin A suppository nightly for 6 nights, 2 Vag Pack suppositories for 1 night
Week 6: herbal vaginal suppository nightly for 6 nights, 2 Vag Pack suppositories for 1 night
Weeks 7–12: green tea suppository twice per week

Systemic

Vitamin C: 6 g daily
Beta-carotene: 200,000 IU daily
Folic acid: 10 mg daily for 3 months
Selenium: 400 mcg daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
Carotene: 150,000 IU daily
Botanical Formula II: ½ tsp twice daily

Use systemic treatment for 3 months until follow-up.

Constitutional

Vegetarian diet for 3 months until follow-up

Alternate Naturopathic Plan

Topical

Escharotic treatment twice per week for 4 weeks

After the last escharotic treatment:

Week 1: vitamin A suppository nightly for 6 nights
Week 2: papilloma suppository nightly for 6 nights
Week 3: vitamin A suppository nightly for 6 nights
Week 4: papilloma suppository nightly for 6 nights
Weeks 5–12: green tea suppository twice per week

Systemic

Folic acid: 10 mg daily
Vitamin C: 6 g daily
Multiple vitamin/mineral: follow label directions
Beta-carotene: 150,000 IU daily
Green tea capsules: 1 capsule daily
Botanical Formula I: ½ tsp twice daily

Use systemic treatment for 3 months until follow-up.

Constitutional

Vegetarian diet for 3 months until follow-up

Additional Therapies to Consider

Zinc: 30 mg daily
Vitamin E: 800 IU daily
Selenium: 400 mcg daily
DIM: 200–400 mg daily

Maintenance Plan for 1 Year

Vitamin C: 3 g daily
Beta-carotene: 150,000 IU daily
Folic acid: 2.5 mg daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
Vegetarian diet

is more vulnerable to contracting HPV, and precautions are definitely warranted.

Smoking

Probably the single most important cofactor in the development of cervical dysplasia and cervical cancer is smoking. Smokers have a two- to threefold increase in the incidence of cervical dysplasia.[81] Some studies indicate that the incidence compared to nonsmokers is even greater than that. Nicotine is actually concentrated in the glands of the cervix, where it then acts as a carcinogenic compound.

Sample Treatment for Severe Dysplasia (CIN 3, High-Grade SIL)

See the Resources section for information on the contents of and resources for the suppositories and other products included in these treatment plans.

Initial Naturopathic Plan

Topical

Escharotic treatment twice per week for 5 weeks

After the last escharotic treatment:

Week 1: vitamin A suppository nightly for 6 nights
Week 2: herbal vaginal suppository nightly for 6 nights
Week 3: vitamin A suppository nightly for 6 nights
Week 4: herbal vaginal suppository nightly for 6 nights
Weeks 5–12: green tea suppository twice per week

Systemic

Folic acid: 10 mg daily
Vitamin C: 6 g daily
Beta-carotene: 150,000 IU daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
Botanical Formula II: ½ tsp twice daily

Use systemic treatment for 3 months until follow-up.

Constitutional

Vegetarian diet for 3 months until follow-up

Alternate Naturopathic Plan

Topical

Escharotic treatment twice per week for 8 weeks

After the last escharotic treatment:

Week 1: vitamin A suppository nightly for 6 nights
Week 2: papilloma suppository nightly for 6 nights
Week 3: vitamin A suppository nightly for 6 nights
Week 4: papilloma suppository nightly for 6 nights
Weeks 5–12: green tea suppository twice per week

Systemic

Vitamin C: 6 g daily
Beta-carotene: 200,000 IU daily
Folic acid: 10 mg daily
Selenium: 400 mcg daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
DIM: 200–400 mg daily
Botanical Formula II: ½ tsp twice daily

Use systemic treatment for 3 months until follow-up.

Constitutional

Vegetarian diet for 3 months until follow-up

Additional Therapies to Consider

Zinc: 30 mg daily
Vitamin E: 800 IU daily
Selenium: 400 mcg daily
Pyridoxine: 50 mg 3 times daily

Maintenance Plan for 1 Year

Vitamin C: 3 g daily
Beta-carotene: 150,000 IU daily
Folic acid: 2.5 mg daily
Vitamin E: 400 IU daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
Botanical Formula II: alternate 1 month on, 1 month off
Vegetarian diet

Smoking may also alter immune function and affects the levels and distribution of ascorbic acid. Ascorbic acid in the cells of the cervix and the vagina and plasma levels of ascorbic acid are reduced in smokers.[82]

Oral Contraceptives

Earlier studies suggested that oral contraceptive (OC) use increased the risk of cervical neoplasia, both invasive and precancerous cervical dysplasias.[83] Recently, however, studies that are controlled for

Sample Treatment for Carcinoma In Situ (CIN 3, High-Grade SIL)

See the Resources section for information on the contents of and resources for the suppositories and other products included in these treatment plans.

Initial Naturopathic Plan

Topical

Escharotic treatment twice per week for 5 weeks

After the last escharotic treatment:

Week 1: vitamin A suppository nightly for 6 nights
Week 2: herbal vaginal suppository nightly for 6 nights
Week 3: vitamin A suppository nightly for 6 nights
Week 4: herbal vaginal suppository nightly for 6 nights
Weeks 5–12: green tea suppository twice per week

Systemic

Folic acid: 10 mg daily
Vitamin C: 6 g daily
Beta-carotene: 180,000 IU daily
Selenium: 400 mcg daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
Botanical Formula II: ½ tsp twice daily

Use systemic treatment for 3 months until follow-up.

Constitutional

Vegetarian diet for 3 months until follow-up

Alternate Naturopathic Plan

Topical

Escharotic treatment twice per week for 8 weeks

After the last escharotic treatment:

Week 1: vitamin A suppository nightly for 6 nights
Week 2: papilloma suppository nightly for 6 nights
Week 3: vitamin A suppository nightly for 6 nights
Week 4: papilloma suppository nightly for 6 nights
Weeks 5–12: green tea suppository twice per week

Systemic

Vitamin C: 10 g daily
Beta-carotene: 200,000 IU daily
Folic acid: 10 mg daily
Selenium: 400 mcg daily
Multiple vitamin/mineral: follow label directions
Green tea capsules: 1 capsule daily
DIM: 200–400 mg daily
Botanical Formula II: ½ tsp 3–4 times a day

Use systemic treatment for 3 months until follow-up.

Constitutional

Vegetarian diet for 3 months until follow-up

Additional Therapies to Consider

Zinc: 30 mg daily
Vitamin E: 800 IU daily
Selenium: 400 mcg daily
Pyridoxine: 50 mg 3 times a day
Lomatium isolate: 5 drops twice daily
Alternating sitz baths twice weekly for 4 weeks during suppository routine

Maintenance Plan for 1 Year

Vitamin C: 3 g daily
Beta-carotene: 150,000 IU daily
Folic acid: 2.5 mg daily
Multiple vitamin/mineral: follow label directions
Vitamin E: 400 IU daily
Botanical Formula I: alternate 1 month on, 1 month off
Vegetarian diet

sexual history have been reassuring. In addition, no form of hormonal contraception, be it oral or injection, was found to be associated with an increased risk for developing dysplasia.[84] While hormonal contraception is not implicated in HPV-related dysplasia, condoms should still be used concurrently.

Three large, well-controlled studies looked at invasive cervical cancer and OC use and did not find statistically significant associations compared with women who never used OCs.[85–87] There was no overall change in risk of invasive cervical cancer. However, one of the three studies did find

Sample Treatment Plan After LEEP, Conization, or Cryotherapy

Wait for 3 weeks after the procedure (described later in this chapter), and then begin the following plan. See the Resources section for information on the contents of and resources for the suppositories and other products used.

Week 1: vitamin A suppository nightly for 6 nights
Week 2: herbal suppository nightly for 6 nights
Week 3: vitamin A suppository nightly for 6 nights
Week 4: herbal suppository nightly for 6 nights

Systemic and constitutional treatment plans are the same as is described for the degree of lesion in the other corresponding treatment plans.

a modestly increased risk in long-term OC users.[85] The other two studies failed to find a significantly increased risk of invasive cervical cancer even with long-term OC use. The definition of long-term use is not always consistent, but some define it as more than five years of use. Two other recent studies assessed OC use and risk of cervical dysplasia, and neither of these found any statistically significant associations.[88, 89]

One disturbing finding with OC use is an association with an increase in the incidence of a rare cancer of the cervix called adenocarcinoma, a variant of squamous cervical cancer. The incidence of this disease has increased over the past several decades, while the incidence of invasive squamous cervical cancer has decreased since the pill was introduced. Two recent studies[86, 90] found a modest but statistically significant increased risk of invasive cervical adenocarcinoma in OC users with over 12 years of use. However, it is important to remember that the cause of cervical cancer is the sexually transmitted human papillomavirus.

PSYCHOLOGICAL FACTORS

The association between psychosocial factors and cervical dysplasia has been the subject of several investigations. Significant life stressors were found to be correlated, including low coping style, pessimism, a high degree of social alienation, high anxiety states, and feeling threatened.[91, 92] Life stressors with negative impact over the previous six months showed a direct, positive association with level of dysplasia, while coping style showed a less prominent effect.

CONVENTIONAL MEDICINE APPROACH

The degree of aggression used to combat simple human papillomavirus waxes and wanes through the years and from provider to provider. While HPV can be dormant for decades, recurrence is always possible. Some practitioners recommend observation alone through the acute viral phase of cervical infection in low-risk patients. We have seen this work at least as often as not. Many doctors give patients the option, considering their lifestyle, other risk factors, prior history, and immune system status.

Most everyone in the conventional medical community agrees on how to manage moderate and severe dysplasia: remove it. There is some ongoing controversy about the treatment of mild dysplasia. Since recent studies have shown that 70 to 80 percent of mild dysplasia will revert to normal tissue before one year, there is an equally compelling recommendation to just repeat the Pap smear in one year and avoid further treatment unless the condition progresses. If it is still mild dysplasia at 12 months, then repeat the colposcopy and biopsies to exclude more significant lesions. In other words, mild dysplasia can be observed even longer, as long as close follow-up occurs.

When treatment is needed, the procedures generally used are cryotherapy; a conization with a scalpel or laser; laser ablation; or loop electrosurgical excision procedure, referred to as LEEP. All of them remove the dysplastic cells and allow new cells to replace the old. They all work upward of 90 percent of the time when used correctly. Cryotherapy is reserved for mild dysplasia (CIN 1), because of the lesser depth of penetration. The other procedures are recommended for

Cervical Escharotic Treatment

The escharotic treatment is especially indicated for moderate dysplasia and severe dysplasia, both high-grade lesions, but only when there is a satisfactory colposcopy performed by a clinician. In addition, the use of the escharotic treatment, rather than a LEEP or conization, needs to fall within the guidelines as outlined in the criteria for naturopathic protocol. Please also read the section in this chapter clarifying when a conization or LEEP is a more appropriate treatment.

The escharotic treatment is best done twice a week with two full days between treatments. The zinc chloride (ZnCl) solution will have to be made by a compounding pharmacist, by prescription.

Instructions for the Practitioner

Before beginning the treatment, you will need the following items:

- 1 cup distilled water
- A cup containing 2 powdered bromelain capsules or tablets. Remove the powder from the capsules or crush the tablets to powder.
- ¼ tsp $ZnCl_2$ solution (90 g ZnCl/60 ml sterlized water) mixed in a bottle with ¾ tsp sanguinaria tincture
- ⅓ cup calendula succus

1. Insert speculum and visualize the cervix.
2. Blot the cervix dry with large cotton swab or cotton ball on the end of a ring forceps.
3. Dip a large cotton swab into the distilled water and then squeeze out the water. Place the damp swab into the bromelain and thickly cover the face of the cervix with the powder, repeating as needed to cover the cervix completely. Apply the powder in the endocervical canal using small, dampened cotton tip applicators (use a new applicator each time).
4. Leave the bromelain on the cervix and in the endocervical canal for 15 minutes. Place a GYN lamp facing the vagina to provide gentle heat during this portion of the treatment.
5. Now remove the bromelain by placing a large cotton swab in the calendula succus and then applying it to the cervix, thus washing off the bromelain. Repeat with a small cotton tip applicator to the endocervical canal. Be liberal; repeat washing two to four times. Take a dry large swab and absorb the washings that have pooled in the vagina.
6. Now soak a large swab in the $ZnCl_2$/sanguinaria mixture that you prepared earlier. Apply this to the cervix once. Repeat this procedure with a small cotton tip applicator inserted in the endocervical canal. Leave on for one minute. If this causes pain, wash the cervix with a small amount of distilled water. Avoid contact of the $ZnCl_2$/sanguinaria mixture with the vaginal wall.
7. Wash off the $ZnCl_2$/sanguinaria mixture with swabs of calendula succus. Wash the endocervical canal as well with a cotton tip applicator. Absorb the liquid that has pooled in the vagina with a dry cotton swab.
8. Insert two Vag Pack suppositories. Instruct the patient to leave the suppositories in place for 24 hours, using a sanitary napkin as needed for leakage.
9. After the last escharotic treatment, use the following treatment plan:

   Week 1: vitamin A suppository nightly for 6 nights
   Week 2: herbal vaginal suppository nightly for 6 nights, or in cases with HPV, use condyloma suppository
   Week 3: vitamin A suppository nightly for 6 nights
   Week 4: herbal vaginal or papilloma suppository nightly for 6 nights

moderate and severe dysplasias (CIN 2, CIN 3). Tissue destruction beyond the dysplastic lesions occurs in all of these procedures to varying degrees to help prevent recurrences. Recurrences are usually due to new infection, reactivation of the virus because of immune system changes, or inadequate prior treatment with residual cells that then persist and regrow.

Cryotherapy is the oldest and cheapest of these procedures and is a simple office procedure performed with a blunt probe applied to the cervix and tubing that supplies concentrated nitrous

oxide to cause the probe to get very cold. Tissue penetration is several millimeters. This procedure takes approximately two to three minutes and is associated with cramping at the time, which resolves quickly and is rarely present for more than a day. The devitalized tissue is sloughed as a watery discharge over the next 10 to 14 days. The cervix is usually well healed within a month.

Conization is employed primarily for endocervical dysplasia. A cold-knife procedure is performed in the operating room under anesthesia and employs a scalpel to remove a cone-shaped piece of cervix and cervical canal. Conization has the advantage of more clearly evaluating the margins, because there is no thermal artifact. Laser ablation of the transformation zone can be performed in the operating room or the office and allows for precise management of lesions but does not provide tissue for pathology. Laser conization obtains tissue similar to the cold-knife cone procedure, with some thermal destruction at the margins, and is significantly more expensive than LEEP.

The most common current treatment of endocervical or cervical dysplasia of moderate-to-severe degree is a LEEP procedure, which is generally performed in the office with cervical anesthetic and is usually well tolerated and very cost effective. LEEP can be used to remove the endocervical canal and/or the transformation zone. It also has thermal degradation at the margins. When LEEP or laser is used, the tissue beyond the cut margin is heated and destroyed for another 1 to 2 mm of penetration. Even when the dysplasia is seen all the way to the margin of the biopsy, there is still usually complete treatment of the lesion because the heat destruction penetrates into the tissue beyond the surgical site.

Women treated by LEEP are more likely to convert to HPV-negative status within one to two years after the procedure and do so significantly sooner than those who are merely watched without treatment. The LEEP can reduce cervical mucus and can occasionally cause a stenosis of the opening to the cervix. The advantage of LEEP is that it can be done in the office, is well tolerated, and is minimally expensive.

These techniques are all relatively safe and effective for preventing future cervical cancer. However, their effects on future fertility and pregnancy outcomes are unclear. Some say that done properly, none of these procedures affects fertility, sexuality, or pregnancy. There is no adequate data from randomized controlled trials to evaluate these potential effects. In one analysis of 27 observational trials comparing the fertility and pregnancy of women who underwent ablation or excision of CIN lesions to women who were not treated with these therapies, LEEP and cold-knife conizations were both associated with significantly increased risk for preterm delivery. LEEP was associated with an increased risk for preterm rupture of membranes, and the cold-knife cone was associated with an increased risk for cesarean section. The laser cone and the laser ablation had no association with any significant change for any of the outcomes. None of the treatments had any significant association with perinatal mortality, complication for the infant, or fertility.

Follow-up recommendations may vary depending on your overall case history and your practitioner's perspective. Some patients treated with any of these conventional treatments are advised to have three-month Pap smears for the first year and six-month Pap smears for the next year. Others will have the recommendation of annual Pap smears following the conventional treatment.

Prevention: The HPV Vaccine

The newest approach to conventional medical treatment of dysplasia is prevention. After a clinical trial done in 2002 initially showed that an HPV-16 vaccine reduced the incidence of both HPV-16 infection and HPV-16 cervical dysplasia,[93] continued research has lead to the reality of an HPV vaccine to reduce the incidence of cervical cancer. The FDA approved a quadrivalent vaccine in June 2006. It vaccinates women against

strains 6 and 11, which cause venereal warts, and 16 and 18, which are the most common strains found in cervical cancer. The intended recipients of this vaccine will be pubertal girls who have not yet had intercourse. However, the vaccine has been recommended up to age 26, because it will also help prevent venereal warts in women who are currently sexually active.

In one study young women without histories of HPV infection or abnormal Pap smears who were given the type 16 and 18 vaccine were significantly less likely to develop HPV type 16 or 18 infections or abnormal cervical cells during the two-plus years of follow-up.[94] In another study, the 6, 11, 16, and 18 vaccine decreased the incidence of infection by 90 percent in young women compared to placebo.[95]

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

Accurate and adequate diagnosis and evaluation is the key to knowing which is the most appropriate treatment for your case. Colposcopy (magnification) and cervical biopsies are the specific diagnostic methods for evaluation. Pap smears are not diagnostic; they are screening tests. When your licensed practitioner (naturopathic doctor, medical doctor, osteopathic doctor, nurse-practitioner, or physician's assistant) recommends that you need a colposcopy and biopsy, this is good advice. They are not recommending treatment; they are recommending accurate diagnosis.

Decisions regarding treatments such as a LEEP, cone biopsy, or cryotherapy versus one of the natural treatment protocols require a medical history, Pap smear report, colposcopy report, biopsy/pathology report, and a working knowledge of the advantages and disadvantages of each of the treatments. If your conventional practitioner is not aware of the research on the natural treatment protocols or is biased without knowledge, then he or she may not be the most appropriate person to help you make the right decision. Likewise, if your alternative practitioner is not aware of the clinical indications for the conventional treatments as distinguished from the clinical indications for the safety and efficacy of the alternative treatment plan or is biased without knowledge, then he or she too may not be the most appropriate person to help you make the right decision.

CONTRACEPTION

CHAPTER 4

OVERVIEW

Around the same time suffragettes were securing the right to vote, other women, most notably Margaret Sanger, desperately sought to provide women a means of "family limitation,"[1] later called birth control. The political struggle to legitimize contraception and bring it into the medical arena was long and fierce. Sanger was jailed on obscenity charges more than once and finally fled the country rather than face a trial she ultimately won years later. Any public discussion of reproduction was judged obscene under the prevailing Comstock Law. Although women frequently died in childbirth or struggled to feed families of six to ten or more, they were forbidden information concerning fertility regulation that was literally lifesaving. Although diaphragms and condoms gradually became more readily available (the first diaphragms in use in America were smuggled from Europe through Canada by Sanger and her husband), it was not until the Supreme Court decision *Griswald v. Connecticut* in 1966 that married women's rights to access birth control became assured.

While we modern women lament the absence of a perfect fertility control option, the mere fact that the birthrate has fallen so drastically these past 50 years illustrates both women's desire to have fewer children and the efficacy of the combined methods in achieving that goal. Nevertheless, even with the current availability of contraception, fully 57 percent of American pregnancies today are unintended.[2] Perhaps our difficulty with the issue relates to our prudish roots. Safe, effective birth control does exist, although failures, whether human or methodological, occur with each. The best we can do is choose wisely and minimize human error. In addition to natural family planning or fertility awareness methods (often described as the rhythm method), there are three general categories—hormonal contraception, barrier contraception and the intrauterine devices, and abortion—that complete the list of birth control methods. Sterilization, the most common method of fertility control, is a safe surgical procedure for either men or women. This method is used by about 20 percent[3] of couples; yet it, too, has a failure rate of about 1 in 400.

KEY CONCEPTS

- Consult your health-care practitioner to determine the effectiveness, health benefits, and health risks of each contraceptive method.
- Consult your health-care practitioner about cautions and contraindications for each method.
- Smokers older than 35 should not use hormonal contraceptive methods.
- The choice of contraception method is based on benefits, risks, effectiveness, cost, side effects, ease of use, and personal choice.
- The key to the contraceptive benefit is proper use and compliance with the chosen method.
- Pregnancy itself carries considerable health risks. These must also be considered when choosing a method of contraception.
- Regular annual health exams are required for users of hormonal contraception.
- Report any side effects that you think are related to your method of contraception to your health-care practitioner.

FERTILITY AWARENESS

Many couples successfully rely on this drug-free and device-free method that depends on identifying a woman's fertile periods and abstaining from intercourse during those times. However, to

achieve the lowest failure rates of 1 to 10 percent requires relatively long periods of abstinence each month—at least 10 and up to 20 days—depending on cycle length and predictability. The average pregnancy rate with most who use this method is 20 percent, clearly less than the 85 percent rate experienced with no method at all. More pregnancies result from taking chances during fertile times than from difficulty deciphering the methods.[4] These methods work best when women have a predictable cycle length. Ovulation is then predicted most accurately, and intercourse is restricted for the least amount of time. Barrier methods can be combined with the calendar method pretty effectively during the restricted time, but spermicide can obscure the cervical mucus method. All variations of this method assume that an ovulated egg can be fertilized for up to 24 hours and that sperm can survive in the female reproductive tract for about three but possibly up to seven days.[4] Amazingly, one might become pregnant up to a week after the last intercourse! So much for romantically planning conception location or dating a pregnancy simply from the timing of sex.

Combining all the methods somewhat probably works the best; for example, many women are quite good at predicting when they ovulate from a variety of symptoms (such as pelvic pain or *mittelschmerz*), but this is only something you notice after the fact. To successfully avoid pregnancy, you have to be able to predict ovulation about five to seven days in advance or else avoid exposure completely during the first half of the cycle. Obviously noncoital activities are permissible at all times; this method does not require actual abstinence, just avoidance of intercourse.

Calendar Methods

Rhythm, the oldest of birth control schemes, relies on a woman having a regular 28-day cycle, with ovulation occurring on day 14—exactly midcycle. Intercourse must be avoided for at least three days before and three days after ovulation—days 11 through 17 at least, and optimally seven days before and at least four days after. If a woman's cycle is not this regular, another calendar method is useful that takes into account cycle variance. First gather information about cycle length over enough time to figure out how wide the range is. You must know the longest and the shortest cycle length you experience—day 1 being the first day of menses and the last day being the one just before menses resumes. Subtract 20 from the shortest cycle to get the first fertile day (day 4 in a 24-day cycle). Subtract 10 from the longest cycle (day 22 in a 32-day cycle) to get the last fertile day. Thus, a woman with cycles ranging from 25 to 30 days avoids intercourse days 5 through 20 ($25 - 20 = 5$ and $30 - 10 = 20$). (Read through this paragraph two or three times to make sure you understand it.)

Cervical Mucus

This method uses the recognition of "fertile mucus" to predict ovulation. It depends on the physiological fact of the presence of slippery thin mucus at the cervical orifice around ovulation. You can easily learn to discern fertile mucus by experimenting with egg white, which resembles fertile mucus. Use your index finger to gather mucus from as close to the uterine opening as possible. Fertile mucus stretches between thumb and index fingers as they are separated, just like raw egg white, without breaking in the middle. Nonfertile mucus is tackier and breaks apart easily at short distances between the fingers. Experiment with an egg white, then try room-temperature butter—you will see the difference. Imagine the sperm swimming easily between long slippery parallel strands of mucus around ovulation, which is thought to ease transport into the uterus and may also modify the sperm so that it is capable of fertilizing the egg. Ovulation usually occurs in the middle or toward the end of the fertile mucus time; thus it is best to determine your length of fertility in advance a few cycles before relying on this method. Obviously semen,

spermicides, vaginal creams, or lubricants can adulterate the mucus and make this assessment unreliable. Experiment.

Basal Body Temperature

Basal body temperature is measured by taking one's temperature the very first thing in the morning before getting out of bed and before any activity at all. Wake up, reach over, take the temperature, record. Plotting these numbers daily over a few months will show a nice pattern of ovulation. The temperature may drop a bit (usually around half a degree) just before ovulation, and then goes up about a degree from there (now half a degree over baseline) just after ovulation. Release of the egg probably occurs the day *before* the elevation,[3] which persists until menses. Elevation longer than the expected 12 to 14 days usually indicates pregnancy. A digital thermometer will help you demonstrate this rise more accurately, but you can use any thermometer if you are willing to precisely plot the points.

BARRIER METHODS

Barrier methods include anything that imposes a barrier between egg and sperm and include condoms, diaphragm, cervical cap, and any of the spermicides. Only the condom physically prevents sperm from reaching the egg. The diaphragm and the previously available cervical cap are both methods of holding spermicide against the cervix; they don't really keep the egg from meeting sperm. The new FemCap does cover the cervix but doesn't hold the spermicide against the cervix. Rather, it contains a groove facing the vaginal opening to store and deliver spermicide or any microbicide. Without spermicide, these methods are not highly effective. Most condoms are impregnated with spermicide these days, because of the presumed protection nonoxynol-9 provides against sexually transmitted diseases. Nonoxynol-9 kills gonorrhea, herpes, trichomonas, syphilis, and HIV in vitro,[4] which may or may not translate into reduced transmission of these diseases between humans. Because some organisms, such as HIV, are intracellular, they may not get exposed to the spermicide during sexual intercourse, and therefore protection may be compromised. In fact, nonoxynol-9 is rather irritating to some, and the irritation may result in vaginal mucosa (the lining of the vagina) that is more susceptible to the AIDS virus. It is safe to use nonoxynol-9 unless it irritates you; in that case, don't.

Condoms should obviously be used with any new sexual partner to protect against many, but not all, sexually transmitted diseases. Alone as a method of birth control, they can be reasonably effective. If used consistently and properly, failure rates are reputed to be as low as 3 percent, although actual use failure rates are closer to 10 to 14 percent. Using condoms with an intravaginal spermicide provides about 96 percent safety from pregnancy with typical use. This combination is the best over-the-counter method.

Healthy noninfected couples that choose condoms may prefer the comfort of lambskin condoms; the pores of these condoms are too big to protect well against viral-size organisms, but they do just fine in keeping out sperm. Condoms, a very old tried-and-true method, are enjoying a surge in popularity.

Caps and diaphragms work similarly; both cover the cervix and hold spermicide either against the cervix or facing the entrance to the vagina. The suction-based cervical cap is currently not available in the United States due to a business decision by the European manufacturer. This had nothing to do with safety or effectiveness. What is now available, perhaps the newest method of birth control, is the FemCap. The FemCap is made of nonallergenic, latex-free material and is designed to cover the cervix. It has a groove facing the vaginal opening that stores and delivers spermicide. It is available by prescription only but does not require a technical fitting session and measurement by the healthcare provider. A FemCap must be applied before

arousal and should be kept in place for at least six hours after the last intercourse. A backup method is recommended while you are learning to use it. FemCaps have the advantage of being able to be left in with ongoing efficacy for as long as 48 hours. A FemCap comes with an instructional video. (Information is available at www.femcap.com.)

A diaphragm is a latex shield that covers the cervix. Diaphragms come in several sizes, and the correct size must be determined as part of a pelvic exam by a health-care practitioner. Spermicide must be placed in the diaphragm, which is then placed up against the cervix. The diaphragm must be left in for at least six hours after intercourse, and any additional intercourse during that six hours must be preceded by the addition of an applicator of spermicide. Diaphragms with spermicide have an effectiveness rate of approximately 94 percent.

The contraceptive sponge was originally introduced in 1983 and remained on the market until January 1995. It was taken off the market because the manufacturer chose not to modernize the manufacturing and hygiene standards. In 2005, the Today sponge returned to the marketplace with a new manufacturer. The sponge is a convenient, disposable, one-size-fits-all vaginal contraceptive that can be purchased over the counter at most drugstores. It is used with a spermicide and offers an 82 to 92 percent effectiveness rate.

INTRAUTERINE DEVICES

Intrauterine devices are in a contraceptive class all by themselves, and they may arguably be the least invasive and highest efficacy form of birth control. Rumors persist that Cleopatra had a gold ring in her uterus that prevented pregnancy and allowed a healthy, active love life. And the camel drivers in the same era are said to have put small rocks in their camels' uteruses to prevent pregnancy on the long roads they traveled. These may just be good stories, but for those women who are good candidates, IUDs are simple, cheap, highly effective, reversible, and have a minimal impact on underlying physiological processes.

Modern IUDs became popular with the introduction of the Lippes Loop in the early 1960s, when as many as 10 percent of women who used contraceptives chose this method. The failure rate was about 2 percent, although the expulsion rate (coming out with the menstrual flow) was reported to be as high as 12 to 20 percent.[3] Lippes Loops are still available and in use around the world, although not available in the United States.

IUDs are used much more commonly in Europe than in the United States, largely because of the persistent fear American women and providers still harbor from the Dalkon Shield debacle during the 1970s. Unfortunately, this device traumatized the cervix on insertion, and the string was made of a material that was a perfect conduit for bacteria to ascend into the uterus. An infection called pelvic inflammatory disease (PID) increased dramatically in Dalkon Shield users, essentially due to the prevalence of sexually transmitted diseases that ascended into the uterus and/or fallopian tubes; many women acquired serious infections and in many, infertility resulted. Yet the company did not recall the device for 10 years—at least 5 years after the problems were known. The reputation of the IUD was tarnished forever, and a good contraceptive method is all but lost to women who might well benefit from it today.

There are presently very few IUDs in the United States because manufacturers don't want to take a chance on a device that has become so unpopular. Copper was added to IUDs to increase effectiveness in the 1980s, which allowed smaller and better-tolerated devices to be used. The Paragard copper T fails less than 1 percent of the time[4] and lasts for at least 10 years. Fertility is unchanged over baseline in women who do not contract sexually transmitted diseases. The device comes in only one size, and so is better tolerated in

a uterus that has carried a pregnancy. It can be put in during nursing for excellent carefree contraception that will not interfere with lactation. The mechanism of action is now fairly well documented as a inflammatory response in the uterine cavity. It is not felt to be an abortifacient (a substance that induces abortion).

IUDS can make menstrual flow heavier and with more cramping. For those women with moderate or light menses, however, it is a method that requires no mess or loss of spontaneity, and IUDs can be used for years without loss of efficacy. Even at a cost of $600 to $700, this is a minimal expense if used over a 10-year period.

Women who are in monogamous relationships, have given birth, and are not at risk for sexually transmitted infections are perfect candidates for IUD use, if their periods are normal. Again, though, IUDs can increase the amount of the menstrual flow and increase cramping. The exception is the newer IUD called Mirena. It contains a progestin (Levonorgestrel) on the stem, which shrinks the endometrium and decreases menstrual flow and cramping. It can reduce the normal flow by 80 percent and causes a lack of menses in 15 percent of patients. The Mirena lasts 5 years, and the progestin stays active inside the uterus. It is thought that in the majority of women and in the majority of the time, the progestin is confined to the uterus without systemic absorption. However, clinicians will report cases of patients who appear to have had systemic progestin side effects from the Mirena. The Mirena is an important option in contraception—a method that provides 99 percent protection and decreases menstrual pain and heavy flows.

Insertion of an IUD must be done in a practitioner's office. Most women report nothing more than light cramping. STI testing for chlamydia and gonorrhea should precede insertion. Infections caused by the insertion itself are rare and may occur approximately 1 percent of the time, within 30 days of insertion. An antibiotic can be utilized to prevent infection. If you do become pregnant, the IUD should be removed. Pregnancies will be interrupted by the IUD, and a miscarriage can occur about half the time. If desired, ultrasound can be used to identify the IUD before removal to minimize disruption of a wanted pregnancy.

BIRTH CONTROL PILLS (BCPS)

Never has there been a more perfect love/hate relationship than that between women and hormonal contraception or birth control pills (BCPs), also called oral contraceptives (OCs). In 1951, Margaret Sanger is credited with convincing Gregory Pincus (who ultimately synthesized the first oral contraceptive) that his research in fertilization could be used to create an oral contraceptive. Available for the first time in the 1960s, oral contraceptives were truly a revolutionary medical option for women. Women readily embraced the option of having fewer children, and the dramatically lower birthrate that resulted has persisted, undoubtedly due to the pill's continued widespread use. Women's maternal burden was lifted for the first time in history. That's the good news.

Unfortunately, the hormonal content of early birth control pills—estrogen and progesterone—was much higher than today's pills, and more women smoked then. Both factors affected what is always the course of any new medicine—the downside became obvious only with mass use. It soon became apparent that cardiovascular disease, including heart attacks, strokes, blood clots, and pulmonary emboli, was more frequent in women who used birth control pills. But even though "more frequent," these diseases are still exceedingly rare in the healthy population of young women who are the usual pill takers. It is also true that these risks are dose related and have fallen measurably as the estrogen and progestin content of pills has fallen 4 and 10 times respectively since their initial use. The FDA-approved package insert states the following:

> The information contained in this package insert is principally based on studies carried out in patients who used oral contraceptives with formulations containing 0.05 mg [50 mcg] or higher of estrogen. The effects of long-term use with lower-dose formulations of both estrogens and progestogens remain to be determined.

The birth control pills in common use today have 20 to 35 mcg of estrogen, and only one or two formulations containing 50 mcg are even available. Moreover, the studies documenting these higher risks in the earlier days did not control for other risk factors such as smoking, high blood pressure, obesity, and so forth—all known to independently increase a woman's risk of cardiovascular disease. I like the way the late Dr. Felicia Stewart, who dedicated much of her life and career to designing research and policies that make safe, effective contraception and abortion accessible to women, describes pill risk:[4]

> If you were to draw a line 215 meters high (the height of a 70-story building) to represent 100,000 young nonsmoking pill users, and then draw a line beside it to represent the number of pill users in the United States who die each year from complications related to higher-dose pills, that second line would be about 0.5 centimeters high [about one-fifth of an inch]. In comparison, the line representing the number of U.S. women who would die of pregnancy-related problems would be just under 2.5 centimeters high [about an inch]. A line representing maternal mortality in developing countries would be 25 centimeters to 1.5 meters tall [10 inches to just under five feet].

Risks attendant to birth control use must be measured against the risk of the pregnancies they prevent. We are fortunate to live in the time of the lowest maternal mortality ever—and still the risk of oral contraception we all worry about is one-fifth that of pregnancy. If we can manage to avoid pregnancy in other ways, presumably they are safer than the pills.

There are some significant health benefits attributable to the pill—for example, an 80 percent reduction in ovarian cancer and a 50 percent reduction in uterine cancer with about a decade of use.[3] Assessing an individual's risk/benefit ratio requires individualization based on health status, family history, and so forth. If one's risk of cardiovascular disease doubles with use (it does), that sounds worrisome. But if doubling one's risk means going from a risk of 1 in 10,000 to 2 in 10,000, that doesn't sound so bad. This is just another way of looking at the same fact. Incidentally, this risk is not even close to the risk we take driving our car to work or school.

Smokers older than 35, however, should not use the birth control pill. Most other women at higher risk of heart disease, like those with diabetes, hypertension, or elevated cholesterol, should consider other options as well—but even in these conditions, pills are usually safer than an undesired pregnancy. Blood pressure needs to be followed in all pill takers, and, if elevated significantly by use, another birth control method must be chosen.

Breast Cancer and the Pill

Much attention has been given to the relationship between the pill and breast cancer, and slowly some answers emerge. The Centers for Disease Control (CDC) conducted a study in the 1980s called the "Cancer and Steroid Hormone Study" that looked at nearly 5,000 cases of breast cancer and 5,000 healthy control women and concluded that there was no increased risk of breast cancer in women who had used the pill.[3] Another significant study evaluated a pooled analysis from 54 studies involving 53,297 women with breast cancer and over 100,000 controls and concluded that there is a slight but measurable increase in the relative risk of breast cancer for current BCP users that declines

shortly after stopping the pill and disappears within 10 years.[5] By age 50, there is no difference in the risk of breast cancer in women who have ever used oral contraceptives versus those who have never used them. Also, the increase in risk during use (1.24 relative risk) translates differently in a 20-year-old woman versus a 40-year-old woman. If the risk of breast cancer at 20 is 1 in 5,000 (or less), then a relative risk of 1.24 increases it to 1 in 4,000. However, if a woman is 40 and the risk of breast cancer is about 1 in 250, a relative risk of 1.24 increases her risk to 1 in 200. Thus, the increase is clearly more significant in an older woman. In this age group, of 1,000 40-year-old women who take the pill, one will contract breast cancer as a consequence. Only about 15 percent of breast cancers occur in women younger than age 45,[6] which is when most of us take oral contraceptives.

A very recent meta-analysis that revisited oral contraceptives and the risk of breast cancer, published in October 2006, concluded that oral contraceptives do increase the risk of premenopausal breast cancer.[7] Thirty-four case-control studies of oral contraceptives and premenopausal breast cancer during or after 1980 were identified. Analysis of the data from these studies showed that the risk of breast cancer was slightly increased for both nulliparous (having never given birth) and parous (having birthed one or more times) women. In nulliparous women, the longer duration of use of the pill did not significantly affect risk. In parous women, the increased risk was more substantial when the oral contraceptives were used before the first-full term pregnancy. The risk was highest in parous women who had used the pill for four or more years before their first full-term pregnancy. There are many limitations of this kind of review because there are so many variables, including race, possible recall bias, difference in the age of first using the pill, and poor information on when the pills were last used. Taking oral contraceptives must be decided based ultimately on the benefits compared to the risks for each woman.

The cancers in former users are generally of a less advanced stage than the cancers of nonusers, and benign breast disease (cysts, fibrosis, breast pain, swelling) is generally improved by BCP use. Overall, there appears to be no evidence of any significant increase in the lifetime risk of getting breast cancer among women who have used oral contraceptives.

Before deciding for or against BCPs, consider your risk for breast cancer (although most women who get breast cancer are not at risk, and most at risk don't get it),[6] whether pregnancy poses a risk, and any other health risks and benefits related to BCP use.

Other Health Benefits of Birth Control Pills

Several years ago, the FDA began to require that, in addition to risks, pill manufacturers list benefits, because they are so significant. Some women actually take birth control pills for the health benefits they offer. Oral contraceptives protect from uterine and ovarian cancers in the general population, but we aren't sure yet about those in families with a higher incidence. They protect from pregnancy nearly 100 percent of the time, although even with perfect use, there is still about 1 pregnancy in 1,000 women per year, and with common human error, a 2 percent failure rate is more accurate. As a bonus, they reduce heavy, painful periods in everyone.

About 80 to 90 percent of functional ovarian cysts (those related to ovulation, the most common type) are eliminated in women who take birth control pills.[4] Those who suffer from endometriosis can frequently reduce their ongoing pain by suppressing the disease with oral contraceptives. Women with polycystic ovary syndrome and abnormal male pattern hair growth can decrease hair growth with oral contraceptives because they measurably reduce the male hormones known as androgens in these women. Interestingly, because of the thickening in cervical mucus that birth control pills induce,

it is less likely that women who take them will get pelvic inflammatory disease if they are unlucky enough to get gonorrhea or chlamydia in the cervix. Fertility is spared in this way.

Several recent studies have shown that a seven-day hormone-free interval causes more of a rise in follicle-stimulating hormone (FSH), which causes ovulation. Continuous daily regimens or shorter drug-free intervals (three or four days only) prevent ovulation. Suppression of ovulation reduces the cyclic symptoms some women have on the typical 21 days on and 7 days off pill regimens. There is also less breakthrough bleeding and a decrease in pregnancy rates with these shorter time-off regimens. More and more women are using their birth control daily, or for three months at a time. Many oral contraceptives are being repackaged with only three or four days of hormone-free pills, and we will likely see more of this in the future.

Nutritional Supplements for Pill Users

Apart from their hormonal effect, the hormones in birth control pills have been shown to affect metabolic and nutritional factors. Women on oral contraceptives may want to take nutritional supplementation to adjust for some of the biochemical alterations caused by the pill. Women on BCPs have a higher requirement for folate,[8] and this may be especially true for women who have had cervical dysplasia (precancerous abnormal cells of the cervix). The frequent ingestion of the steroids found in BCPs have been shown to depress levels of riboflavin, pyridoxine, vitamin B_{12}, ascorbic acid, and zinc.[9] Hormones can also affect breast tenderness, increase risk of blood clots, and induce an array of side effects in some women, and they are metabolized in the liver. Providing selective nutritional support, supporting breast health, and enhancing hormonal metabolism and detoxification pathways may optimize the experience of using hormonal contraception.

Riboflavin deficiency may occur with long periods of oral contraceptive (OC) use.[9] It may be that OCs interfere with gastrointestinal absorption or with metabolism or binding. There seems to be general consensus in the literature that consumption of oral contraceptives contributes to pyridoxine (vitamin B_6 deficiency).[9] It has been estimated that the majority of women on OCs for longer than six months manifest abnormal tryptophan metabolism. Vitamin B_6 can normalize tryptophan metabolism.

Although not consistent, some research has shown that OCs disturb folate metabolism. Anemia, the gastrointestinal and genital tracts, bone and heart health, and mental function are all affected by folic acid deficiencies. For this reason, folate is an important nutrient to supplement for women taking the pill. Oral contraception users have also been reported to have reduced levels of vitamin B_{12}.[9] This may be related to malabsorption, increased renal excretion, and enhanced tissue acidity. A woman may or may not acquire an anemia associated with a B_{12} deficiency, but long-term use of the pill may lead to this, or at least may compromise nerve function, mood, mental function, and the health of the digestive system. Carotenoids are also included in this formula to protect the cervix. Oral contraceptives have shown mixed results in increasing abnormal changes in the cervix that can lead to cervical cancer. Beta-carotene deficiency in the cervical cells may be a cofactor in the development of cervical dysplasia,[10] and decreases in plasma beta-carotene levels is found in women with either cervical dysplasia or cancer of the cervix.[11]

Reduced levels of ascorbic acid have also been observed in those who take oral contraceptives.[9] It is possible that the steroids of oral contraceptives increase the breakdown of ascorbic acid, decrease absorption, and/or change tissue distribution. Limited research in animals has shown that oral contraceptives lower blood levels of vitamin E.[9] Vitamin E is the premier antioxidant for lipids, protects structures against toxic compounds, and is important in immune function.

Most investigations have shown a reduction in plasma zinc levels following the administration of OCs.[9] Decreased absorption, increased urinary excretion, and a decrease in albumin, an important carrier of zinc, may account for this. Zinc is essential to good health and is involved in many enzyme and body functions. Immune function; wound healing; the nervous system; maintenance of vision, taste, and smell; and skin health are dependent on adequate levels of zinc. Zinc competes with copper for absorption, therefore adding a small amount of copper is also suggested to avoid any problems.

Borage seed oil is high in gamma linolenic acid (GLA), which is important in maintaining pain-free breasts. GLA decreases abnormal sensitivity of breast tissue to normal hormone levels. The proposed mechanism of GLA's action is that it normalizes the balance of fatty acids contained within the cell membranes. The steroid receptors in the breasts then have a reduced affinity for estrogen, dramatically reducing breast sensitivity.

Oral contraceptives can increase the risk of blood clots, although this risk has been considerably reduced since the lower-dose pills have become the norm. However, these concerns still deserve our attention. Bromelain has a very favorable effect on inflammation of a vein. In research, bromelain has been shown to reduce all the symptoms of inflammation in those who had developed acute thrombophlebitis.[12] Garlic preparations have been shown to promote fibrinolysis, which can offer benefit in prevention of strokes and other clotting events.[13, 14] Excessive clumping together of platelets is linked to heart disease and strokes. Garlic and its volatile oils can inhibit platelet aggregation and thereby improve circulation.[15]

Finally, women taking hormonal contraceptives can experience changes in vaginal pH, which can lead to changes in the balance of organisms in the vagina. Lactobacillus species are fundamental to maintaining a healthy ecological vaginal environment, which helps to prevent yeast and vaginal infections. It may be possible to favorably alter this vaginal ecology by taking lactobacillus in the form of a nutritional supplement.

Additional considerations may include liver support to aid in the metabolism of the steroids. There are many options here, including a lipotropic supplement and herbs such as dandelion root, burdock root, and milk thistle.

Little information is available about any interactions between botanicals and birth control pills. For now, my only real caution is with Saint-John's-wort. A few case reports, as well as two controlled clinical trials, indicate that Saint-John's-wort can cause breakthrough bleeding and interferes with the metabolism of the hormones in the pill. These observations lead me to think that the effectiveness of oral contraceptives may be reduced when taken in conjunction with Saint-John's-wort.[16–18] Other speculations have been made about the possibility of other herbs and nutrients interfering with the effectiveness of birth control pills. However, hypotheses about chaste tree, indole-3-carbinole, soy, dong quai, and others have no documentation to support these concerns.

Side Effects

Many women prefer not to take birth control pills because they see them as an unnatural form of birth control. Others are concerned, rightly so, about some of the issues that have been raised here, but some women just plain don't feel good on them. Some women have bloating, breast tenderness or pain, headaches, mood swings, depression, weight gain, nausea, lowered libido, and breakthrough bleeding. Other women may experience significant, more serious side effects such as complete hair loss, blood clots, high blood pressure, heart attack, and elevated liver enzymes.

There are many kinds of birth control pills today, and fortunately they are significantly lower in dose and cause far fewer side effects than in the past. The pills vary in their estrogen and progestin dosages and contain different kinds of estrogens and progestins. A woman may tolerate one pill

poorly and another very well. If you struggle with feeling good on "the pill," you should work with a health-care provider who knows the products well. Many side effects come from the progestin, and there are currently six different progestins found in various birth control pills. Merely switching to a pill with a different progestin can result in feeling normal while on the pill. There are pills with different estrogen doses as well.

Overall, women need to assess how they feel on oral hormonal contraceptives. Some women are moody, some are less so. Some women love the regularity of their periods and their reduced pain; others feel nauseous and bloated. Some love that their acne improves; others fret about breast cancer. Some women feel great and have low risks for most diseases; for them, the hormones can fit into a healthy life.

The pill is not a natural form of birth control, but for some women the benefits outweigh the downside. If you do choose to use birth control pills, remember that one of the advantages to barrier methods of contraception (diaphragm, FemCap, condoms) is the reduced incidence of sexually transmitted infections (STIs), especially pelvic inflammatory disease. Oral contraceptives do not significantly protect against most STIs. Condoms are the best method of contraception that also offers a "safer sex" method. Diaphragms and caps do not provide for safer sex, but they may help stop sexually transmitted infections from ascending into the uterus and pelvic region. These are important considerations when choosing your method of contraception.

Emergency Contraception

Emergency contraception refers to using birth control pill hormones to prevent pregnancy after intercourse has occurred. The only emergency contraceptive pill (ECP) that is currently available is a progestin-only pill called Plan B. Two pills, taken 12 hours apart, reduce the risk of pregnancy by 75 percent if initiated within 72 hours after unprotected intercourse. The effect appears to result primarily from an inhibition or delay of ovulation and does not disrupt an already established pregnancy.

It is also possible to use more pills of a birth control pill that you might already have on hand for emergency contraception.

Emergency Contraception

Take 4 of one of the following pills within 72 hours after unprotected sex, and take 4 more pills 12 hours later:

- Cryselle
- Levlen
- Levora
- Lo/Ovral

Another option: take 5 of one of the following pills within 72 hours after unprotected sex and take 5 more pills 12 hours later:

- Alesse
- Aviane
- Lessina
- Levlite
- Low-Ogestrel
- Nordette
- Portia
- Seasonale

OTHER FORMS OF HORMONAL CONTRACEPTION

There are other hormonal contraceptive options available, in addition to the familiar estrogen/progestin pills. There are progestin-only hormone preparations—pills, injections, and implants. These options can have many of the same nuisance side effects of combination pills—weight gain, irritability, and depression. Progestin-only birth control pills are used by women who are breast-feeding or who have a contraindication to estrogen, such as hypertension. The injection (Depo-Provera) and the new implant (Implanon) have a lower failure rate because compliance is not required on a daily basis—only once every three months for the Depo-Provera shot and every three

years for the Implanon. Both work by suppressing ovulation to an extent, neither as completely as the combination birth control pill, but this mechanism is augmented by even thicker cervical mucus that impedes the sperm at the cervix. They aren't as good for cyst suppression because of the incomplete suppression of ovulation. Implanon boasts the lowest systemic hormone dose of any hormonal method because it is released at such a steady low dose by the implant. As a consequence, menses are irregular in up to 40 percent of women. This tends to improve over time and is tolerated better by some than others.

Depo-Provera, on the other hand, suppresses menses entirely by one year of use, and it can take 5 to 18 months for fertility to return. There is concern that inadequate estrogen will be available for bone density protection as a consequence of the estrogen suppression. There is reversible bone loss over time on Depo-Provera, and the FDA has required the company to do a prospective study of bone density in users. Because both the shot and the implant cannot be immediately reversed once they start, I encourage women to try the pill first, unless they can't remember to take a daily pill or can't tolerate the estrogen. There is also a vaginal ring, Nuvaring, that contains both estrogen and progestin and lasts three weeks, which is popular with women who forget their daily pill.

Transdermal combined estrogen/progestin can be delivered in a contraceptive patch and is available as Ortho Evra. It was approved by the FDA in 2002 and delivers 20 mcg of ethinyl estradiol and 150 mcg of norelgestromin, an active metabolite of norgestimate. The regimen is to apply a patch once weekly for three consecutive weeks, followed by a patch-free week. It has a side effect profile similar to the oral contraceptives, although recent concerns have been raised about higher blood levels of estrogen in women on the patch than on the birth control pill. The newer estrogen patch is associated with about 60 percent higher blood levels of estrogen than the equivalent version in an oral pill. This increase in estrogen levels can expose women to a higher risk of clotting. Clearly, this issue needs to be discussed with your health-care practitioner.

STERILIZATION

Sterilization for men and women is still a widely used form of birth control. For men, this is a vasectomy. For women, there is now an alternative to a tubal ligation, called Essure. Tiny springs are inserted into the openings of the fallopian tubes from the cavity of the uterus, so no surgery is done. It can be provided in an outpatient setting. A doctor uses a speculum, dilates the cervix, inserts a flexible fiber optic scope to see inside the uterus, then threads the springs into the tubes.

You must have a tubal dye x-ray test three months after insertion to check that tissue grew into the springs and blocked the tubes, indicating a successful sterilization.

ABORTION

Unfortunately, all methods of birth control can fail. Humans make mistakes. Women have sex against their wills. For all these reasons and more, abortion will always be with us, and it bears a mention in a discussion of fertility control. Women practiced abortion long before they practiced birth control, because that's what was available to them. The last measurable drop in maternal mortality in the United States occurred with the legalization of abortion in 1973. Abortion has never been safer, with mortality at 0.25 deaths per 100,000 women—about 20 times safer than childbirth.[19] Unfortunately, the political fracas around abortion—and the real risk to workers and patients of clinic violence—has made access to abortion more rather than less difficult in recent times. We must recall that the battle for birth control was nearly as emotional; perhaps someday we will see this struggle resolved as well.

In the interim, if you choose an abortion, consult your regular provider first. Gynecologists and family doctors need to realize how many women (1.5 million per year) in all walks of life need this

service and how judged they feel—most obviously by "pro-life" practitioners, but also by their pro-choice doctors who send them across town to a clinic just because it's easier for that doctor. If your gynecologist won't help, go to one of the wonderful women-run and supported clinics that provide the service out of love and respect for women. Their doctors are very experienced, with extremely low complication rates. Emergency contraception can be obtained at most clinics as well, although emergency contraception is now available over the counter for women over the age of 18.

Rather than a surgical abortion, medical abortion with a drug called mifepristone (Ru-486) is a good option for early pregnancies, and it offers a method of abortion that aligns much more naturally with our bodies. The medical abortion is just like a miscarriage. There is more bleeding and cramping than a period, but it occurs within a 4- to 24-hour period, and 98 percent of the time avoids surgery altogether. The infection rate is lower, and the chance of significant uterine injury, already miniscule, is further lowered. Many women are quite pleased with this method.

Summary of Contraceptive Choices

Birth Control Pills

Advantages

Continuous contraceptive protection when taken correctly
Reversible
Other possible health benefits

Disadvantages

Has to be taken daily
Increases the risk of blood clots, heart attack, and stroke, especially in smokers over age 35
Side effects such as nausea, weight gain, headaches

Effectiveness

99 percent or greater

Depo-Provera Injections

Advantages

Continuous contraceptive protection for up to 5 years
Reversible
Don't need to remember to take a daily pill or use a device

Disadvantages

Requires a visit to a practitioner for quarterly injections
Delayed fertility after stopping the injections
Side effects such as weight change, irregular bleeding

Effectiveness

99 percent or greater

Tubal Ligation

Advantages

Continuous contraceptive protection

Disadvantages

Permanent
A surgical procedure

Effectiveness

99 percent or greater

Essure

Advantages

Continuous contraceptive protection
Insertion through vagina and uterus; no surgery is needed

Disadvantages

Permanent

Effectiveness

99 percent or greater

(*continued*)

Summary of Contraceptive Choices (*continued*)

Intrauterine Device (Copper IUD)

Advantages

Continuous contraceptive protection for up to 10 years
Don't need to remember to take a daily pill or use a device
Reversible

Disadvantages

May be expelled by the uterus; may perforate the uterus
Increases the risk for PID
May cause heavier bleeding and menstrual cramps

Effectiveness

97 to 99 percent

Intrauterine Device (Progestin IUD)

Advantages

Continuous contraceptive protection for at least 5 years
Don't need to remember to take a daily pill or use a device
May decrease menstrual cramps and heavy bleeding
Reversible

Disadvantages

May be expelled by the uterus; may perforate the uterus
Increases the risk for PID

Effectiveness

97 to 99 percent

Condom (Alone)

Advantages

Easily obtained
Inexpensive
Best method for protection against STIs
Better results when used with a spermicide

Disadvantages

May reduce sexual sensation
Less sexual spontaneity
Condoms may break
Male partner must agree

Effectiveness

88 to 98 percent

Diaphragm (with Spermicide)

Advantages

Insert up to 6 hours before intercourse
Noninvasive method
Inexpensive

Disadvantages

Must leave in for at least 8 hours after intercourse
Must reapply spermicide for repeat intercourse
Discomfort
Must be able to insert by oneself
Increases the risk of urinary tract infections

Effectiveness

82 to 94 percent

FemCap

Advantages

Insertion before sexual arousal
Easy fittings
Inexpensive

Disadvantages

Must leave in for 6 to 8 hours after intercourse
Vaginal odor and discharge
May be uncomfortable to insert

Effectiveness

82 to 94 percent

Spermicide (Alone)

Advantages

Easy to obtain and use
Good results when used with cervical caps, condoms, or diaphragms
Inexpensive

(*continued*)

Summary of Contraceptive Choices (*continued*)

Disadvantages

Must be inserted within half hour prior to intercourse
Reapplication necessary for repeated intercourse
May be messy
Allergies in some people
May increase the risk of urinary tract infections, especially with diaphragms

Effectiveness

79 to 97 percent

CYSTITIS

CHAPTER 5

OVERVIEW

Ten to twenty percent of all women have some kind of urinary discomfort or infection at least once a year. Acute uncomplicated cystitis (infection of the bladder) and recurrent cystitis are two important categories of urinary tract infections in adults. Distinguishing between uncomplicated and complicated urinary tract infections (UTIs) is important because they may require different evaluation tests and procedures, as well as different types and duration of treatment plans. A complicated infection is associated with a condition that increases the risk of urinary tract infections or is associated with an increased likelihood of treatment failure such as HIV, diabetes, or having a catheter. An uncomplicated infection is one that lasts less than one week, is unaccompanied by a fever, and presents itself in low-risk individuals, such as nonpregnant, otherwise healthy women.

Symptoms of uncomplicated cystitis include painful and frequent urination, the urge to urinate even though the bladder may be nearly empty, and pressure and pain in the pelvic area. Acute cystitis is generally uncomplicated but may be complicated if the individual has a catheter or also has a stone in the bladder. It is not always possibly to classify someone as having a complicated or uncomplicated UTI based on urinary tract symptoms alone. However, there are factors that suggest the presence of a complicated UTI in women. These include:

- Being elderly or young
- Having a hospital-acquired infection
- Pregnancy
- Having a urinary catheter
- Having had a recent procedure involving urinary tract instrumentation
- Recent use of antibiotics
- Symptoms that have lasted longer than seven days
- Diabetes
- Immunosuppression (HIV, immunosuppressive medications)

Simple, short-duration therapies may not be appropriate for these situations.

It is reassuring that most of the acute UTIs that occur are uncomplicated. Health-care practitioners can generally assume that a premenopausal, sexually active woman who is not pregnant, has not been recently treated with antibiotics, and does not have a history of a genitourinary tract abnormality has uncomplicated cystitis if she presents with dysuria (painful or difficult urination), frequent urination, or urgency. It is even likely that most postmenopausal women who do not have a genitourinary tract abnormality have uncomplicated UTIs.

A narrow spectrum of microbes are responsible for the infections in young women with acute uncomplicated cystitis: *Escherichia coli* (80 percent), *Staphylococcus saprophyticus* (5 to 15 percent), and occasionally *Klebsiella* species, *Proteus mirabilis*, or other microorganisms. Bacteriuria (bacteria in the urine) is more common in women who are sexually active, and certain forms of contraception are associated with urinary tract infections. Sexual intercourse, diaphragm use with spermicide, spermicides used alone, oral contraceptives, delayed postcoital urination, and a history of a recent urinary tract infection all increase the risk of initial and recurrent infection. Sexual intercourse is the strongest risk factor for UTIs, independent of contraception influences. As many as 30 percent of women with cystitis symptoms may have subclinical upper urinary tract involvement.

Young women who present with acute pain with urination or difficult urination usually have either acute cystitis or acute urethritis due to *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, or herpes simplex virus. Vaginitis due to candida or trichomonas can also involve dysuria. These problems can usually be differentiated on the basis of symptoms, physical exam, and urinalysis. A urine culture and vaginal cultures may also be needed.

Pregnancy is also a risk factor for UTI. The American College of Obstetricians and Gynecologists (ACOG) recommends that all pregnant women be screened for bacteriuria, even without symptoms. However, not all major authorities recommend this. Screening involves an initial urine culture in all women who are pregnant. If a pregnant woman has classic symptoms of an acute and uncomplicated cystitis and no previous history of bacteria in the urine without symptoms, some clinicians would go ahead and treat for cystitis, while others would do a urine culture before treating.

Recurrent infections, defined as more than three infections in six months or six to seven infections in a year, occur in about 20 percent of young women that have experienced a previous episode of cystitis. Over 90 percent of recurrences in young women are episodes of reinfection from exogenous sources that typically occur months apart. Recurrences due to a persistent focus of infection in the urinary tract or to anatomical or functional abnormalities are less common. Cases of recurrent cystitis should be cultured and documented at least once. Some women may need not only treatment but also continuous prophylaxis (preventive measures) or postcoital prophylaxis.

Postmenopausal women may also have frequent reinfections, which are often due to residual urine retention after voiding or to a lack of estrogen, which can cause marked changes in the vaginal and bladder microflora, including loss of lactobacilli and increased colonization by *E. coli*. Vaginal estrogen treatments are a key in restoring normal vaginal and bladder flora.

Diagnosis of a bladder infection can be based on symptoms and physical exam alone, a urine dipstick, urinalysis, and/or a urine culture. Basing the diagnosis on symptoms alone is considered reliable when the episodes are infrequent or occur less than three times per year. The urine dipstick test is a simple test performed in the practitioner's office that uses a dipstick of the urine to test for leukocyte esterase with or without urinary nitrite and pyuria (the presence of pus in the urine). There are problems with the sensitivity and specificity of the test, and it may be incorrectly negative if bladder bacteria have not had enough time to produce a sufficient amount of nitrite to be detectable. The accuracy of the test is also altered if the individual is eating a vegetable-free diet or is using a diuretic. The nitrite tests on the urine dip are frequently negative, even in the presence of two bacteria, *S. saprophyticus* and *Enterococcus* species. The leukocyte esterase test is more accurate than the nitrite test.

The urinalysis is a macroscopic and microscopic analysis of urine performed at the practitioner's office or the lab. The urine is examined for color and cloudiness, then examined under the microscope for white blood cells, red blood cells, epithelial cells (looking especially for an increased number or some sloughing down from the kidneys), bacteria, yeast, and crystals. The urine dipstick test is also done in a complete urinalysis.

A urine culture is often done after a history and physical exam suggests something other than an acute, uncomplicated UTI. If a recent UTI has just been treated and now the symptoms are recurring, a culture would identify the possibility of a resistant pathogen. Worrisome symptoms such as fever, malaise, and back pain over the kidney region suggest that the infection may have ascended the urinary tract and warrant a urine culture.

Other diagnostic evaluations of UTI such as a cystourethroscopy, ultrasound, or intravenous pyelogram should be considered in women who have recurrent UTIs. Even though these more sophisticated studies should be considered, it is also

KEY CONCEPTS

- UTIs are most commonly caused by the organism *E. coli*.
- UTIs are most common in young heterosexually active women.
- Sexual intercourse is the strongest risk factor for a UTI.
- Spermicides, diaphragms, and hormonal contraception all increase the risk for UTIs.
- Pregnant women and postmenopausal women are also at risk for UTIs due to the effect of hormones on the flora of the vagina, urethra, and bladder.
- Common diagnostic tests include the urine dipstick and the urine culture.

PREVENTION

- Increase fluid intake.
- Urinate when you have the urge.
- Maintain bathroom hygiene.
- Wear cotton undergarments.
- Urinate after intercourse.
- Consider a different contraceptive method if you are getting recurring UTIs.
- Drink fresh juices, especially berry juices including cranberry and blueberry.
- Eat fermented milk products containing probiotic bacteria.
- Reduce dietary bladder irritants such as alcohol, chocolate, citrus fruits, coffee, black tea, tomatoes, vinegar, and sugar.

important to realize that some women may report symptoms that may sound like an infection, but are actually symptoms from an overactive bladder, interstitial cystitis, or a pelvic-floor problem such as a cystocele or uterine prolapse. Keep in mind that some recurrent UTIs are caused by anatomic factors such as a shorter urethra-to-anus length or birth defects in the urinary tract.

OVERVIEW OF ALTERNATIVE TREATMENTS

For most bladder infections, a natural approach is usually very effective and the infection resolves quickly without recurrence or complications. The primary goals of a natural therapeutics approach are to:

- Enhance the individual's internal defenses against the infection by providing immune support
- Restore vaginal and bladder microflora, enhancing the flow of urine
- Promote a proper pH by acidifying the urine
- Prevent bacteria from adhering to the bladder lining

Simple goals, such as increasing the urinary flow, are easily accomplished by increasing the quantity of liquids. Water and herbal teas related to the treatment goals are the most logical choices. Sixty-four ounces of liquids per day is the common recommendation. Urinating after intercourse is also an important bladder hygiene practice that can prevent recurring UTIs.

The lactobacilli species are an especially effective means of alternative treatment for a couple of reasons. For one, they defend against *E. coli*, which causes the majority of urinary infections. A healthy vaginal ecology is dominated by lactobacilli species,[1] bacteria that defend against both UTIs and infectious vaginitis. Studies have shown that women who have recurrent UTIs have a preponderance of uropathogens on the introitus and in the vagina.[2] Lactobacilli adhere to the uroepithelial cells and inhibit the adherence of pathogenic organisms such as *E. coli* to the cells, thereby preventing proliferation. In addition, the H_2O_2-producing lactobacilli that are most commonly found in the normal bladder flora (*Lactobacillus crispatus* and *Lactobacillus jensenii*) can help to keep the bladder in its preferred acidic state.[3]

Nutrition

Since most UTIs are caused by *E. coli*, and this resides predominantly in the gastrointestinal tract,

it seems reasonable that the risk for infection might be altered by dietary influences and digestive health. In fact, the risk for infection changes with dietary modifications.[4] The dietary and lifestyle habits of 139 women university students with a diagnosis of an acute UTI were compared with those of 185 age-matched women with no UTIs in the last five years. It was found that frequent consumption of fresh juices, especially berry juices, and fermented milk products containing probiotics was associated with a decreased risk of recurring UTIs. Consuming fermented milk products three or more times per week was better than less than one time per week. In this same study, frequency of intercourse was associated with increased risk of UTI as well.

Common probiotic-containing fermented milk products include *lactobacillus acidophilus* and kefir. Increasing garlic and onions in the diet may also be helpful due to their antimicrobial activity. They have been shown to inhibit the growth of *E. coli*, *Proteus*, *Klebsiella pneumonia*, *Staphylococcus*, and *Streptococcus*.[5–7]

Other logical dietary considerations for women with recurring infections are to avoid excess sugar consumption, assess and avoid food allergens, and eat a diet that promotes healthy digestive function, including complex carbohydrates, high fiber, fermented dairy products, and healthy oils such as olive oil, nuts, and seeds.

Large amounts of fluids are highly recommended for preventing UTIs, as they literally flush out the urinary tract and dilute the concentration of disease-causing bacteria. Drink approximately 64 ounces (two liters) per day, including 16 ounces (500 ml) of unsweetened cranberry juice (see section on cranberry) and 8 ounces of blueberry juice (250 ml) daily.

Nutritional Supplements

Cranberry. No natural approach to cystitis would be complete without mention of cranberry. Women have used cranberry juice as a home remedy for decades. Several studies have shown that cranberries and cranberry juice are effective in women with active urinary tract infections.[8–9] In a large randomized, controlled study, 300 ml (10 ounces) of cranberry juice was given to 153 elderly women with confirmed bacteruria.[10] The level of bacteria in the urine and the frequency of recurring infections was dramatically decreased. In another study, 500 ml per day (17 ounces) of cranberry juice was shown to be helpful in 73 percent of the individuals with active UTIs.[11] In an older study, 16 ounces of cranberry juice daily was effective in 73 percent of individuals with an active infection.

This effectiveness is commonly attributed to cranberry juice's hippuric acid content, antibacterial effect, and acidity. However, studies have shown that components in cranberry juice reduce the ability of *E. coli* to adhere to the lining of the bladder and urethra.[12–15]

Often, women prefer cranberry extracts instead of cranberry juice as unsweetened cranberry juice is unpalatable and sweetened cranberry is more challenging to the immune system. Cranberry extracts are available in capsule form and have been studied for prevention of UTIs. Cranberry extracts were compared with cranberry juice in a one-year randomized, controlled trial in 150 sexually active women of diverse ages.[16] One tablet was given twice daily to women in one group, and 250 ml of cranberry juice was given three times per day to the other group. Both decreased the number of individuals who had at least one infection per year. Antibiotics were also used less in both the extract and the juice group, compared with the placebo group.

Cranberry extracts are less expensive than cranberry juice. Another advantage of the extracts is the concern that the oxalates in cranberry juice could contribute to kidney stone formation. While logical, no studies have yet demonstrated an increase in kidney stones after drinking cranberry juice.

Cranberry extracts can also be found in numerous combination herbal/nutritional for-

mulations along with uva-ursi, pipsissewa, Oregon grape root, marshmallow root, buchu, vitamin C, and others. Cranberry is safe for pregnant and lactating women.

Cranberry Extract

Acute infections: 400 mg 3 times daily or more
Chronic, recurring infections: 400 mg 1–2 times daily

Lactobacilli. Probiotics, especially lactobacilli, are commonly used by alternative providers to prevent UTIs. Lactobacilli species predominate the vaginal and urinary tracts of healthy premenopausal women. Women who have recurring UTIs have an imbalance of their flora, and if we restored the flora, we could go a long way to prevent the infection-causing organisms from dominating.

A recent review was done of all studies on the role of lactobacilli and UTIs in 2006.[17] From the studies that are available, probiotics appear to be beneficial for preventing recurrent UTIs in women. The *Lactobacillus rhamnosus* and *reuteri* (previously called *L. fermentum*) strains were found to be the most effective.

The hydrogen peroxide–producing lactobacilli are critical in maintaining acidity and inhibiting pathogenic bacteria from adhering to both the vaginal and bladder walls. In addition to consuming fermented dairy products with lactobacilli, vaginal suppositories and oral supplementation are good means of administering lactobacilli. In a small study, women with recurrent urinary tract infections were treated with *Lactobacillus casei* species topically and via suppository twice weekly.[18] Each patient had infection-free periods ranging from four weeks to six months.

Lactobacilli species are safe for pregnant and lactating women.

Lactobacilli Species

Acute infections: 24 billion organisms or more per day for active treatment
Chronic, recurring infections: 8–16 billion organisms per day
Prevention: 2–8 billion organisms daily

Vitamin C. The beneficial effects and functions of vitamin C are numerous and critical to optimal health. Vitamin C is involved in the manufacture of collagen, the main protein substance in the body, which results in its role in wound repair, connective tissue structures, vascular wall integrity, skin elasticity, healthy gums, and more. It is also critical to immune function, the absorption and utilization of other nutrients, and the manufacture of numerous hormones and nerve conduction substances, and it is an antioxidant. As early as the 1960s, ascorbic acid (vitamin C) was shown to be an effective urinary acidifying agent,[19] a successful means of treating urethra and bladder infections.

While some of these functions help maintain normal tissue health of the bladder and urethra, vitamin C has some additional effects when it comes to treating UTIs. During a UTI, nitrates are often generated by bacteria in the urine. Acidifying nitrite forms nitric oxide along with other reactive nitrogen oxides that are toxic to a host of organisms, including cystitis-causing bacteria. A study examining the effects of ascorbic acid on nitrite in the urine and bacterial growth found that acidifying the urine, even mildly, generated large amounts of nitrous oxide, which was increased by larger amounts of ascorbic acid. As a result, the growth of three common bladder pathogens, *E. coli*, *Pseudomonas aeruginosa*, and *Staphylococcus saprophyticus* were significantly inhibited.[20] These results provide a good ration-

Vitamin C

Acute infections: 500–2,000 mg every 2 hours for 2 days, then 500–2,000 mg 3 times daily for 5–10 days
Chronic, recurring infections: 1,000–3,000 mg daily
Prevention: 500–1,000 mg daily

ale for the beneficial effects of vitamin C for both prevention and treatment of UTIs.

Vitamin C is likely safe for pregnant and lactating women in controlled amounts: up to 2,000 mg per day in women over age 19 and up to 1,800 mg per day for women 14 to 18.

D-Mannose. D-mannose is a naturally occurring simple sugar contained in cranberry juice that is helpful in treatment of UTIs. D-mannose adheres to the bladder epithelium, interfering with the ability of the *E. coli* to adhere[21] and cause infection. It is likely safe for pregnant and lactating women.

Mannose Powder

Acute infections: ½–1 tsp 3 times daily
Chronic, recurring infections: 1 tsp or more daily
Prevention: ½–1 tsp daily

Botanicals

Uva-Ursi (*Arctostaphylos Uva-Ursi*). One of the most useful herbs for bladder infection is uva-ursi (*Arctostaphylos uva-ursi*), also known as bearberry or upland cranberry. Uva-ursi has antiseptic, antibacterial, and astringent properties, largely due to its arbutin content. Uva-ursi is especially active against *E. coli* and has diuretic properties. Uva-ursi has also been used with recurrent bladder infections and was proven effective in a double-blind study of 57 women.[22] After one year, 5 out of 27 women in the placebo group had a recurrence of cystitis, while none of 30 women had a recurrence in the uva-ursi group.

Historically, many herbalists have taught that herbs with arbutin work best in an alkaline environment. That would appear to present a problem given that acidifying the urine is a fundamental concept in the successful treatment of UTIs. This potential issue has not been a factor in the great success I've witnessed in treating UTIs by acidifying the urine with vitamin C while simultaneously using uva-ursi and other botanicals.

Because of its potential irritating and inflammatory effects on the urinary tract mucous membranes, uva-ursi is best used in combination with other botanicals. It is not safe for use by pregnant women and unknown whether or not it is safe for lactating women.

Uva-Ursi

Acute infections: 1–1½ tsp tincture or 300 mg dried herb capsule every 3 hours for 2 days, then 1–1½ tsp 3 times daily for 7 days
Chronic, recurring infections: best not to use more than 5 or 6 times per year; use in combination with soothing botanicals such as marshmallow
Prevention: best not to use daily for long term

Pipsissewa (*Chimaphila umbellata*). Pipsissewa, a native plant of the Pacific Northwest and also known as chimaphila, bitter wintergreen, or ground holly, is a traditional remedy for urinary infections. As with uva-ursi, its antiseptic/mildly antimicrobial effects are attributed to its arbutin content. It has mildly diuretic, astringent, and antispasmodic properties as well, all important mechanisms in treating UTIs. Due to its arbutin content, this herb is best used for shorter-term use, or occasional use (up to four or five times per year), as for uva-ursi. It is unknown whether or not pipsissewa is safe for pregnant and lactating women.

Pipsissewa

Dried root: 1–2 g per day
Tincture: 1–1½ tsp per day

Best used in combination with other botanicals, for both acute and chronic recurring infections

Goldenseal (*Hydrastis Canadensis*) and Oregon Grape Root (*Berberis Aquifolium*). Goldenseal and Oregon grape root are two of the most important herbs for bladder infections due to their antimicrobial properties. Berberine, an alkaloid constituent found in the rhizome and root of these plants, has demonstrated antibacterial activity against *E. coli* species, *Klebsiella* species, *Staphylococcus*, and *Pseudomonas* species.[23, 24] Berberine is effective against many bacteria and is also able to

fight infections by inhibiting the bacteria from adhering to the host cell.[25] It is unsafe for pregnant women and best not used by lactating women.

Goldenseal

Freeze-dried root: 500–1,000 mg
Dried root: 1–2 g per day
Tincture: 1–1½ tsp per day

Additional Botanicals. Other botanicals have been traditionally used for bladder infections with positive effect. The water-soluble mucilage herbs are known to be soothing to the irritated uroepithelium and reduce inflammation. These include corn silk for its soothing and cooling effect on the urinary tract; marshmallow root due to its content of mucilage, which can form a protective layer on the lining of the bladder; and even plantain leaf with its high percentage of mucilage and allantoin.

Additional antimicrobial herbs for the bladder include bucchu, myrrh, propolis, and juniper berry. Numerous immune stimulants may be helpful, including echinacea, osha, and wild indigo root. Bladder tonics stimulate the flow of blood and nutrients to the urinary tract and may be useful adjunct herbs. These herbs include nettle leaves, goldenrod, kava, and horsetail. Dandelion leaf, bucchu, and parsley root have diuretic effects and increase the flow of urine to help flush the bacteria.

Sample Treatment Plans

See the Resources section for sources of herbal products.

Acute UTI

- Cranberry juice: 16 oz daily
- Increase water: 8 or more 8-oz glasses daily
- Vitamin C: 2,000 mg every 2 hours for 2 days, then 2 g 3 times daily for 7–10 days
- Combination herbal product such as cranberry, Oregon grape root, bucchu, uva-ursi, pipsissewa, marshmallow root: 2 capsules every 2 hours for 2 days, then 2 capsules 3 times daily for 5–10 days
- D-mannose: ½–1 tsp 3 times daily for 5–10 days

Chronic, Recurring UTI (3- to 6-Month Plan)

Premenopausal Women

- Urinate upon urge and after intercourse.
- Use condoms for intercourse.
- Increase fluids.
- Take the following supplements:

  Combination herbal product: 1–2 capsules daily
  Cranberry extract: 400 mg twice daily
  Cranberry juice: 8–16 oz daily
  Oral probiotics: 8–16 billion organisms daily
  Mannose: ½–1 tsp daily; more if needed

Postmenopausal Women

- Urinate upon urge and after intercourse.
- Use condoms for intercourse.
- Increase fluids.
- Take the following supplements:

  Combination herbal product: 1–2 capsules daily
  Cranberry extract: 400 mg twice daily
  Cranberry juice: 8–16 oz daily
  Oral probiotics: 8–16 billion organisms per day
  Mannose: ½–1 tsp daily; more if needed
  Intravaginal estriol (1 mg/g): insert 1 g twice daily for 2 weeks, then twice weekly as maintenance dose; or estriol suppositories (1 mg): insert 1 daily for 2 weeks, then twice weekly as maintenance dose

- Consider oral hormone therapy.

With these prevention and treatment strategies, it will rarely be necessary to use antibiotics for acute, chronic, or recurring UTIs. Please consult with your practitioners about use of these products in pregnancy and lactation or if you are taking medications.

Intravaginal Estriol. In postmenopausal women, other influences are important to consider for chronic recurring UTIs. Lower estrogen states result in fewer lactobacilli in the vagina and bladder. Fortunately, vaginal estrogens are a very safe and effective solution. Intravaginal estriol effectively treats recurring UTIs in postmenopausal women[26] by restoring the normal vaginal flora and reducing the risk of vaginal *E. coli* colonization. Other, more commercially available vaginal estrogens are also used for this same purpose.

Intravaginal Estriol

For chronic, recurring infections and for prevention:
intravaginal compounded estriol: 1 mg/g, insert 1 g twice daily, long term

This is a prescription item. Discuss the issue of using a progestational agent with your licensed primary care practitioner, although most women will not need such an agent when using this low dose of vaginal estriol.

CONVENTIONAL MEDICAL APPROACH

The diagnosis of UTI in conventional practice is the same as that for alternative medicine. Conventional treatment, however, relies primarily on antibiotic therapy. For uncomplicated urinary tract infections, especially those following sexual intercourse, culture and sensitivity testing are not mandatory, and any antibiotic except penicillin will likely be effective. (Most gram-negative bacterial isolates are resistant to penicillin.) The most commonly used agents are nitrofurantoin macrocrystals (100 mg twice a day), trimepthoprim-sulfamethoxazole double-strength (twice a day), or a fluoroquinolone such as ciprofloxacin (500 mg twice a day).

Cephalexin (500 mg three or four times a day) is another reasonable choice, but the dosing schedule may be onerous for most patients. The current recommendation is for three days of oral therapy. If three days of therapy does not result in resolution of symptoms, a culture is recommended and the antibiotic changed pending sensitivities. Most practitioners, in such a circumstance, will treat for a longer period, usually seven days.

Recurrent uncomplicated urinary tract infections, particularly in young, sexually active women, may require what is called prophylactic (prevention) therapy to allow the bladder's depleted defenses to regenerate. This involves either a single dose of antibiotic daily, a single dose of antibiotic following intercourse, or one or two doses of antibiotic at the onset of early symptoms prior to a full-blown UTI.

Women who have structural or functional urinary tract abnormalities or who are immunocompromised develop complicated UTIs and require more aggressive evaluation and treatment. The workup will depend on the nature of the symptoms and the clinical situation.

Generally, complicated infections are treated for 7 to 21 days. A "test-of-cure" culture should be done approximately 5 to 7 days after completing therapy. In rare cases, when the response to the antibiotic does not occur, surgery may be required to drain or remove the focus of infection.

Conventional medicine has also borrowed freely from the naturopathic community, commonly employing prophylactic regimens of cranberry preparations and acidophilus. Blueberries also have abundant proanthocyanidins and are, therefore, recommended as well. Current literature discourages the use of vitamin C, as it has not proven to be of benefit. In the postmenopausal population, topical estrogen therapy has also been shown to prevent infection.

Due to the prevalence of UTI among women, there is a great impetus to develop new, non-antimicrobial preventative therapies. The most promising current work involves vaccines delivered transvaginally. Multiple applications of the vaccine are required to confer resistance to infection. In the recent past, bacteriophages, viruses that invade bacteria, were developed by

the Russians to treat resistant pathogens. This technology was brought to the United States and tested briefly, but further development was tabled because the bacteria rapidly became resistant to the treatment. Scientists therefore continue to seek more ideal means of preventing and eradicating infection. In the meantime, we are barely able to keep one step ahead of the bacteria.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

There are some definite situations as to when a licensed practitioner should be consulted. Certainly, this list includes women with urinary symptoms who are pregnant, have catheters, have had symptoms for longer than seven days, are immunocompromised (immunosuppressive drugs, HIV), or have chronic kidney disease or diabetes. Women who have recurring infections should probably be evaluated for underlying causes as well as more sophisticated treatments. In addition, if you have symptoms of a bladder infection, plus a fever, this warrants a practitioner visit right away, as it may indicate that the infection has traveled to the kidneys. Blood in the urine is another sign when one should see a practitioner.

It is important to keep in mind that sexually transmitted infections due to chlamydia, gonorrhea, or herpes simplex cause similar symptoms to bladder infections, as do yeast or bacterial vaginal infections. Making an accurate diagnosis is a key to successful treatment. A thorough history, physical, and laboratory test are the main ways a practitioner can diagnose UTIs. Whether it's alternative or conventional treatment, self-care should be limited to simple, uncomplicated, acute bladder infections that occur only once or twice per year.

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ENDOMETRIOSIS

CHAPTER 6

OVERVIEW

Endometriosis, one of the most common yet misunderstood diseases, affects 10 to 15 percent of menstruating women between the ages of 24 and 40 years. In some cases, symptoms begin with the onset of menstruation. In others, symptoms begin later and progressively become worse until menopause. The triad of symptoms includes dysmenorrhea (pain with menses), dyspareunia (pain with vaginal intercourse), and infertility. Acute pain occurs before menses and can last for a day or two during menses or throughout the month. This pain can be a life-disrupting experience, affecting a woman's social relationships, work, school, and well-being. For some women, vomiting, diarrhea, and fainting can occur along with intense labor-like pains. Other pain is described as chronic bearing-down pain and pressure on the lower back and pelvis, sometimes radiating down the legs. Other less common complaints include pain with urination and bowel movements and bleeding from the nose, bladder, and/or bowels. Endometriomas, enlarged areas of ectopic endometrial involvement on the ovaries, are found in two out of three patients with endometriosis.[1]

Early research as to the source of infertility initially led to the concept that endometriosis was a "working woman's disease." Women who delayed pregnancy until later in life and were found to have endometriosis were told to "just get pregnant." Current research does not support this concept. However, research as to altered immune action within the pelvic cavity and the possibility of antibody reactions to sperm has prompted recognition of an immunological basis for endometriosis. Other studies suggest that infertility is a cause of endometriosis, due to the unruptured follicle, rather than a result.[2] Whether endometriosis causes infertility or infertility causes endometriosis, tubal scarring, adhesions, and unruptured follicles are common with women having endometriosis and infertility problems.

The main risk factor for endometriosis is heredity. The likelihood for a woman who has a first-degree relative with severe endometriosis having endometriosis is six times higher than that for relatives of women without the disease.[3] Women with menstrual cycles that are shorter in time between cycles and longer in length have been found to be at higher risk for endometriosis.[4] Increased or altered estrogen levels, lack of exercise from early age, a high-fat diet, and use of intrauterine devices have also been found to be risk factors. Even natural red hair color was found in one study to be a factor in the development of endometriosis.[5]

Baboons who developed endometriosis in captivity were found to have higher stress levels and a decreased ability to react to stress compared to those in the wild, suggesting a stress factor.[6] Individuals who exercised consistently from an early age reported a decreased risk for endometriosis, while those who began an exercise program later on experienced less painful periods. Although not all women with endometriosis have a childhood history of abuse, a greater number of individuals with adhesions and/or endometriosis have reported abuse in their history.[7] Additional possible risk factors include prenatal exposure to high levels of estrogen and pelvic contamination with menstrual products, although these issues are largely theory and research is needed.

Physical examination reveals one or more of the following: tenderness of the pelvic area

and/or cul-de-sac (a deep pouch anterior to the rectum, separating the uterus from the large intestine); enlarged or tender ovaries; a uterus that tips backward and lacks mobility; fixed pelvic structures; and adhesions. Endometrial tissue can be found on surgical scar tissue, in the vagina, and on the cervix. Physical examination during the first or second day of menses highlights tender areas in the septum between the rectum and vagina, most likely correlated with deeply infiltrating endometriosis.[8]

An ultrasound study can determine the consistency of the endometriomas (areas of cystic endometriosis within the ovary). Evidence of endometriosis other than on the ovaries cannot be seen on the ultrasound. Although magnetic resonance imaging (MRI) can detect endometriomas, cost prevents widespread use. A blood test called a CA-125 can have positive results in endometriosis. The problem is that a high CA-125 cannot completely differentiate endometriosis from uterine fibroids, cancerous growths, and normal tissue. High levels of CA-125 have been found in stages III and IV of endometriosis, which are the diagnoses for more advanced endometriosis.[9] The CA-125 test may, however, help in monitoring treatment and progression once endometriosis has been confirmed. However, this test is not used by many practitioners.

Definitive diagnosis of endometriosis can only be accomplished with a biopsy using either of the following two surgical procedures. A laparoscopy is a surgical procedure in which the surgeon inserts a scope through one of two very small pelvic incisions. More invasive, a laparotomy consists of major pelvic and/or abdominal surgery.

Endometrial implants or lesions are known to have similarities to uterine tissue—featuring endometrial glands, endometrial stroma, and hemorrhage into adjacent tissue. Growth of this tissue may be stimulated by estrogen. Therapeutic treatment aimed at manipulating the body's own level of hormones as in menopause or pregnancy has had a positive effect. In some individuals, the implants have their own cycle, with an ebb and flow that differ from the estrogen binding during the menstrual cycle.[10]

Although the most commonly accepted theories of origin today vary and sometimes seem contradictory, they all have their place in holistic approaches to the treatment of endometriosis. The predominant theory first proposed by Dr. John Albertson Sampson in 1927 is the theory of retrograde flow—that during menses, blood flows backward and becomes seeds of implants in the pelvic cavity.[11] This theory and research showing that over 90 percent of menstruating women without endometriosis have retrograde flow have raised questions as to the biochemical and immunological differences causing implantation within the pelvic environment.[12] Endometrial implants from women with endometriosis compared with normal women have been found to be biochemically different.[13] Other studies suggest that cells may only implant in women with altered cell immunity.[14] As implants are found in the nose, lungs, and other organs far from the uterus, transportation through lymphatic channels and blood vessels has been suggested. Still other researchers believe the implants to be of embryological origin, pieces of the uterus left behind during development, which, when activated, secrete a chemical causing the nearby capillaries to bleed.[15] Research on baboons with endometriosis suggests activation by environmental toxins that mimic estrogens.[16]

Whether implants are caused by retrograde flow, decreased immune function, genetic factors, environmental influences, or embryological development or are stimulated by high estrogen levels from the environment or within the body, the worsening of symptoms prompts individuals to seek medical help. There is not necessarily a correlation between pain and the extent of the disease. Women with fixed ovaries and large endometriomas may only report mild discomfort, while those with visibly smaller lesions may report severe and chronic pain. Upon surgery,

these lesions are found to extend more deeply; they are possibly more influenced by circulating estrogens.[17] Research has found that the severity of symptoms is correlated with the depth of the lesions rather than the number of lesions.[18]

The abnormalities found in women with endometriosis and the conditions that may predispose them to it are complex. Some discussion, however, will help guide us toward more effective management and a better understanding of treatment options.

Genetic Factors

Groupings of endometriosis within families has been found in clinical studies,[3, 19] populations-based studies,[20] and even studies of twins.[21–23] Several analyses of the locations on the genes that are shared by siblings indicate abnormalities in detoxification enzymes. This would lead to susceptibilities to environmental exposures to substances that could then lead to the increase in the disease. Other insights have included that the genes involved are associated with tumor suppressor genes. If these tumor suppressor genes are affected, there is susceptibility to abnormal tissue growth, such as the endometriosis. Aberrantly expressed genes can also occur during the time of implantation, which may be an explanation for some of the cases of endometriosis-associated infertility. Other genetic errors may occur in multistep fashion involving both the development and the progression of the disease.[24]

Environmental Factors

Information about environmental influences on endometriosis in humans has been gleaned by observing the negative effects of environmental exposures to rhesus monkeys. Radiation exposure and dioxin exposure have lead to higher frequency of developing endometriosis in monkeys.[25, 26] It would seem plausible to extend this consideration to environmental effects on women, especially when it was reported that the highest dioxin pollution in the world was in Belgium, which also has the highest incidence of severe endometriosis.[27] In two studies since, however, one in Belgium found no significantly increased risk with dioxins or polychlorinated biphenyls,[28] and in Italy, no significantly increased risk of endometriosis was seen in women who had high levels of dioxin in their blood.[29]

Currently, there is no epidemiological study definitively linking any one class of chemicals to the risk of endometriosis, although there appears to be some suggestion of a link with estrogen-like compounds in the environment[30] called xenoestrogens, which can disrupt estrogen and estrogen metabolism. Substances that have been shown to have estrogenic effects in the body include polychlorinated biphenyls (PCBs), weed killers, substances that line cans, plastics, detergents, and household cleaners.[31]

Despite this lack of identification of a definitive link between chemical exposures and endometriosis, we do know that women are exposed to a multitude of chemicals in utero, in childhood, peripubertally (the time around the appearance of secondary sex characteristics such as pubic hair), and as adults. We can identify chemicals in cosmetics, nail polish, plastics, household cleaners, dry cleaning, and foods. A survey by the Centers for Disease Control and Prevention (the National Report on Human Exposure to Environmental Chemicals) is currently underway, which monitors 145 chemicals in 2,500 people in the United States.[32]

I would assert that the roles of toxic chemicals in reproductive health should not be underestimated, and that scientific investigations that "suggest a correlation" should be motivation enough to reduce the toxic exposure to chemical estrogen-like compounds that disrupt our own bodies' hormone-receptive tissues.

The Immune Connection

Increasingly, we are finding evidence that a lack of proper surveillance by the immune system in the pelvic area is the cause of endometriosis, and

alterations in other aspects of the immune system are involved in the progression of the disease.[33]

In studies on the immunological functions of baboons with spontaneous (noninduced) endometriosis, researchers have found a correlation between suppressed immunity and a higher number and greater area of lesions.[34] Both types of immunity, cell mediated and humoral, have been implicated in endometriosis, with immunological defects present even in the mildest forms of the disease.[35] Macrophages (a kind of white blood cell) that scavenge other microbes, debris, and aberrant tissue are found in greater numbers in the early stages of endometriosis.[36] This increase in macrophage activity may correlate with decreased fertility and possible reaction to sperm perceived by the woman's body as foreign.[37] In the peritoneal fluid (fluid aspirated from the area behind the membrane lining the abdominopelvic wall) of women with severe endometriosis, natural killer cell activity has been found to be suppressed.[38, 39] Natural killer cells release cell toxins and thus help keep tumor and other abnormal cells in check. By a decrease in natural killer cells, the immune defense against the growth of tissue is decreased. Interestingly, studies suggest a correlation between high estradiol levels and decreased killer cell activity.[40]

Humoral immunity is the component of the immune system that produces antibodies, more specifically immunoglobulins, which are produced by B lymphocytes. These immunoglobulins provide protection to the body by their attachment to foreign substances called antigens. Patients with endometriosis have been found to have high levels of immunoglobulins IgG and IgM when compared with normal controls.[41] Higher than normal amounts of immunoglobulins cause destruction of the body's own tissue, as seen in autoimmune conditions. Evidence of high levels of autoantibodies against ovarian and endometrial cells is consistent with the finding of individuals who have both endometriosis and autoimmune diseases.[42, 43]

Numerous changes in the makeup of the peritoneal fluid are also evident in women with endometriosis. Immune cells that mediate the inflammatory reaction such as cytokines, macrophages, T lymphocytes, and tumor necrosis factors have all been found to be increased in concentration in the peritoneal fluid in women with endometriosis,[44–46] and their increase correlates with the severity of the disease. Growth factors, angiogenic factors (increasing blood supply to areas of endometriosis tissue), and lipid peroxidation in the peritoneal fluid may stimulate the endometrial cell growth. Targeting these proinflammatory compounds and blocking their action with antioxidants and other compounds provide a good rationale for new treatment strategies, both conventional and with natural compounds.

As mentioned earlier, irregular cycles are common among women with endometriosis. Anovulatory cycles (lack of ovulation), premenstrual spotting (very light bleeding before the onset of the menstrual flow), luteal phase defects (abnormal length of the second half of the menstrual cycle), and salivary progesterone secretion are altered in women with endometriosis.[47] Since higher estrogen levels are implicated in endometriosis, it is not surprising that heavy smokers have a decreased risk for endometriosis if they began smoking earlier in life, as smoking is known to decrease estrogen levels.[48] In addition, an increased body fat placement indicative of increased estrogen levels was also found to be correlated with a higher incidence of endometriosis.[49] Since estrogens are known to stimulate endometrial implants, women on hormone replacement therapy have been known to experience a recurrence of endometriosis.[50]

The Role of the Liver and the Gut in Hormone Metabolism

The liver has the enormous task of breaking down estrogen and secreting metabolites through the bile into the large intestine. Whether hormones are produced naturally within the body, are pro-

vided through medication, or enter the body as substances from the environment that mimic estrogen, optimal functioning of the liver is imperative in maintaining a healthy balance.[51] Inappropriate breakdown of estrogen can result in local liver damage, continual recycling of estrogens, and alterations in immune function. Since the liver is involved in breaking down 80 to 90 percent of the hormones in the body, it follows that optimal liver function can be of benefit in treatment.

The large intestine, which contains different types of microflora or gut organisms, has a unique role in the excretion and recycling of estrogen. The liver inactivates estrogen by attaching a bond between glucuronic acid and the estrogen molecule and excreting this substance with the bile. Some "unfriendly" bacteria in the large intestine, however, secrete an enzyme called beta-glucaronidase that breaks down these bonds, releasing a strong estrogen that is then recycled back through the body. In order to produce this enzyme, these bacteria feed on fat taken in by the body. However, the balance can be restored by greater numbers of the "friendly" bacteria that feed on fiber and crowd out the "unfriendly" bacteria. With a balance of the "friendly" bacteria in the large intestine, a higher amount of inactivated estrogen metabolites leave the body through the large intestine, preventing their reactivation and movement back through the body.[52]

Endometriosis is a complex disease with a variety of interconnecting influences. Enhancing the immune system, the endocrine system, and the liver's detoxification of hormones; reducing and blocking proinflammatory chemicals produced by the body; and providing optimal health in the large intestine represent innovative and effective approaches to the treatment of endometriosis. Considering the long-term consequences of endometriosis—pain, disability, and disruption in personal, family, and work activities—innovative approaches that treat the whole body and remove the cause promise a light at the end of the tunnel.

OVERVIEW OF ALTERNATIVE TREATMENTS

While analgesics, anti-inflammatories and estrogen-blockers temporarily relieve symptoms, the need for a long-term definitive treatment that involves removal of the cause is imperative. A systemic approach to treatment that takes into consideration a multifaceted cause with long-term and acute symptomatic relief is the goal of alternative therapy. While late-stage endometriosis may only be addressed by radical surgery, early treatment, in the form of stimulation of the body's inherent ability to heal through enhancing the immune system, restoring proper inflammatory responses, balancing hormones, and aiding in the

KEY CONCEPTS

- A gynecological checkup is imperative with any type of pelvic pain to rule out any pelvic or abdominal abnormality.
- Provide symptom relief for acute pain.
- Provide removal of cause (endocrine, immune, environmental, liver).
- Create a plan for treatment of the chronic problem.
- Optimize nutritional intake and avoid environmental toxins.

PREVENTION

- Eat nutritious whole foods. Include foods known to reduce inflammation such as fish, curries, and garlic and high amounts of fruits and vegetables, whole grains, and legumes. Reduce red meat, especially grain-fed meat.
- Get regular exercise.
- Avoid pesticides, chemicals, solvents, and heavy metals.
- Eat organic foods.
- Drink purified water.
- Maintain good digestion and regular bowel habits.
- Avoid alcohol.

liver's ability to break down environmental and naturally occurring estrogen, is worthy of consideration.

Certain foods and supplements aid in enhancing the body's ability to mount a natural immune response. Optimal liver function involves enhancing the liver's ability to detoxify hormones, excess medicines, and toxins through two main phases, called phase I and phase II detoxification. Individuals who have decreased function of the first pathway continue to recycle hormones, toxins, and other products harmful to the body. If the second detoxification pathway is dysfunctional, the metabolic products of the first pathway build up and can become even more toxic, decreasing immune response and accumulating as oxygen free radicals. These metabolites can cause tissue injury and formation of adhesions.[53] Healthy elimination of these metabolites assures that the body doesn't get a chance to reabsorb them.

Nutrition, exercise, and healthy lifestyle practices play a preventive role in providing immune support and a healthy body's response to added stressors and imbalances of hormones. Women who exercise and eat less fat and sugar produce less estrogen. Vegetarian women excrete two to three times more estrogen in their feces and have half as much estrogen in their blood as meat-eaters.[54] Additional approaches in the area of mind-body medicine recognize that belief systems and emotional health affect optimal physical health.

Nutrition

The goods news is that there are numerous nutritional influences related to endometriosis. This means we can take an active part in prevention and management of the condition.

A recent retrospective study of over 500 women with endometriosis concluded that there was a significant decrease in risk of developing endometriosis with a greater consumption of green vegetables and fresh fruit, and an increase in risk was associated with high intake of beef and other red meat.[55]

Foods high in fiber are associated with optimal transit time in the intestines and an optimal balance of friendly microorganisms within the large intestine.[56] These microorganisms, better known as gut flora, crowd out the other types of flora that play a role in metabolizing estrogen. Studies suggest that an intake of less protein and high fiber or a vegetarian diet lead to a decrease of biologically active estrogens in blood plasma.[54] While higher protein diets are found to provide enzymes for the detoxification pathways of estradiol,[57] vegetarian diets are of greater value due to their lower fat content. Animal protein diets, especially egg yolks, poultry, and red meat, contain large amounts of arachidonic acid, which promotes inflammatory prostaglandins and thus inflammation and pain. By enhancing your diet with vegetable protein, soy, almond and other nut butters, and salmon, you tip the inflammatory pathway toward anti-inflammatory prostaglandins that inhibit tumor growth—and possibly endometrial growth. Interestingly, a recent study in Japan demonstrated that moderate isoflavone intake from soy was significantly associated with a decreased risk of premenopausal hysterectomy. This data led the authors to conclude that moderate soy intake may decrease the risk for diseases like endometriosis, which commonly precipitate premenopausal hysterectomies.[58] Another study of 50 women with endometriosis examined the effect of dietary changes, specifically the reduction of glycemic carbohydrates, the addition of omega-3 and omega-9 fatty acids, and the elimination of foods with caffeine and tyramine, and found a significant reduction in symptoms after eight weeks.[59]

By increasing intake of vegetables, specifically those that enhance liver function, the buildup of toxins and metabolites that produce cell damage is prevented. Liver-friendly foods to increase are carrots, kale, and the cabbage family vegetables due to their known help in phase II of the liver's detoxification pathway. Indole-3-carbinol (I3C), found in broccoli, brussels sprouts, cabbage, and

cauliflower, favors the less active form of estrogen.[60] Other liver-cleansing foods include beets, carrots, artichokes, lemons, dandelion greens, watercress, and burdock root. Onions, garlic, and leeks contain organosulfur compounds that enhance the immune system and induce enzymes that detoxify the liver. In addition, they contain the bioflavonoid quercitin, which is known to stimulate the immune response, protect against oxidation, block the inflammatory response, and inhibit tumor growth.[61] By eating as many of your vegetables as possible in an organic form, you cut down on your intake of pesticides that may also mimic estrogen.

Use seasonings such as turmeric (curcumin) that protect against environmental carcinogens, decrease inflammation, and increase bile secretion. Ginger is helpful with many types of inflammation—and helps with liver detoxification. Adding a tablespoon of soaked and ground milk thistle seeds each day can also help with liver function. Grind a tablespoon of fresh flaxseeds and place on cereals or salads. The increase in lignans from these seeds aids in providing fiber as well as an oil that helps in the anti-inflammatory pathway. Seasoning with fucus (a seaweed) helps stimulate T cell production and absorb toxins.[62]

Foods to omit or decrease include sugar, caffeine, egg yolks, poultry, red meat, and alcohol. Sugar is known to increase estrogen levels in men; presumably the effect is similar in women.[63] Endometriosis is found to be correlated with caffeine consumption. Women consuming 5,000 to 7,000 mg of caffeine per month had a 1.2 times greater incidence of endometriosis, while those consuming over 7,000 mg per month had a 1.6 times increase.[64] One cup of coffee contains 120 mg of caffeine; one cup of black tea contains 60 mg; one cup of decaffeinated contains about 2 mg of caffeine.

The Environmental Protection Agency estimates that 90 percent of human dioxin exposure is through food, primarily meat and dairy products.[65] Egg yolks, meat, and poultry cause the lipid pathway to be tipped toward prostaglandins and leukotrienes that cause inflammation, smooth muscle contraction, and vascular constriction. Alcohol use depletes stores of B vitamins in the liver and also has estrogenic effects on the body.

Dietary Recommendations

- Eat a high-fiber diet.
- Eat a high-protein vegetarian diet.
- Increase intake of vegetables, nuts, and seeds.
- Use turmeric, ginger, milk thistle, and flaxseeds.
- Omit or decrease alcohol, dairy, red meat, sugar, and caffeine.
- Eat cold water fish (salmon, tuna, sardines, mackerel, herring) 2 or 3 times per week.
- Eat organic foods.

Nutritional Supplements

Before beginning the discussion on nutritional supplements, it is important to explain the concepts of free radicals, antioxidants, and free radical scavengers. There are several ways to define a free radical, but a definition I like is, "an atom or group of atoms that has at least one unpaired electron and is therefore unstable and highly reactive." Antioxidants such as vitamins C and E, selenium, carotenes, and others are molecules that defend the body from cellular damage by ending the free radical chain reaction before vital molecules are harmed. These are often referred to as "free radical scavengers."

Vitamin C. Studies using vitamin C show increase in cellular immunity and decreases in

Vitamin C

Take 6–10 g in divided doses daily, starting with 1,000 mg a day, then add 1,000 mg every 4 or 5 days until the stools become loose. At this point, back down to the previous dose of vitamin C so that the stools are normal in consistency.

autoimmune progression and fatigue.[66] In addition, vitamin C enhances immunity and decreases capillary fragility and tumor growth, all of which are involved at various levels in endometriosis. Studies on autoimmune progression indicate the effectiveness of high levels of vitamin C.[67]

Beta-Carotene. Beta-carotene helps enhance immunity. Recent research shows that retinoids can help decrease IL-6, an inflammatory mediator, which has been implicated in endometriosis.[68] In addition, studies show that use of beta-carotene increased T cell levels after seven days.[69] Beta-carotene was also shown to be protective against early stages of tumor growth.[70] Impairment of phagocytosis (the engulfing of microorganisms, other cells, and foreign particles by white blood cells) is seen in vitamin A–deficient states.[71] Although vitamin A was used in this study, one-third of beta-carotene is converted to the active form of vitamin A, retinol. Additional studies suggest that immune function is due to carotenoids rather than vitamin A.[72]

Beta-Carotene

50,000–150,000 IU daily

Vitamin E. Recent research demonstrates that free radicals may contribute to the inflammation and excessive growth of endometrial tissue seen in endometriosis, and in these circumstances, antioxidants such as vitamin E and N-acetyl cysteine can act to inhibit this abnormal proliferation.[73, 74]

Vitamin E also helps to correct abnormal progesterone/estradiol ratios in patients with mammary dysplasia (increased growth of cells).[75] Since parallels have been found between abnormal tumor growth in cancer and abnormal growth of lesions in endometriosis, vitamin E supplementation may be advantageous. While secondary dysmenorrhea is usually involved with endometriosis, studies on the use of vitamin E with primary dysmenorrhea[76] show benefit perhaps through the inhibition of the arachidonic lipid pathway. Inhibiting the arachidonic pathway helps prevent the release of chemicals that would normally cause edema, inflammation, and smooth muscle contraction.

Vitamin E

400–800 IU daily

Essential Fatty Acids. Gamma-linolenic acid (borage, black currant, and evening primrose oils) and alpha-linolenic acid (flaxseed, canola, pumpkin seed, soy, and walnut oils) help decrease the inflammatory response on the tissue level through pathways that produce prostaglandins in the body. Depending on one of three main pathways of prostaglandin production, the effects can be helpful or harmful to the body. Animal fats produce a pathway of prostaglandin products that increase inflammation, muscle constriction, and edema. However, gamma-linolenic acid and alpha-linolenic acid produce the opposite effects. These fatty acids taken in supplemental form can produce the prostaglandins that are involved in inhibiting tumor growth, dilating smooth muscle, and decreasing inflammation.[77] Since endometriosis tissue, called implants, are thought to secrete chemicals that cause leakage from nearby capillary beds, decreasing the permeability of these vessels could help control the tissue destruction and adhesions, decreasing irritation in the pelvis. Recent research demonstrates that having a higher omega-3 to omega-6 fatty acid ratio may have a suppressive effect on the in vitro survival of endometrial cells, leading the authors to conclude that omega-3 fatty acids may be useful in the management of endometriosis by decreasing inflam-

Essential Fatty Acids

Eicosapentaenoic acid: 1,080 mg daily
Docahexaenoic acid: 720 mg daily
Alpha-linolenic or gamma-linolenic acid: 300 mg daily

mation.[78] In an animal model, fish oils were found to decrease prostaglandin production and inhibit the growth of endometrial implants.[79]

B Vitamins. B vitamins help the liver to inactivate estrogen. Studies suggest that supplementation of B vitamins may cause the liver to become more efficient in processing estrogen.[80]

B Vitamins

50–100 mg B-vitamin complex; B_6 should not exceed 200 mg daily

Selenium. Selenium aids in the synthesis of antioxidant enzymes responsible for detoxification reactions within the liver. In addition, selenium stimulates white blood cells and thymus function.[81] Individuals with decreased selenium levels have suboptimal cell-mediated immunity, decreased numbers of T cells, and associated inflammation.[82]

Selenium

200–400 mcg daily

Lipotropics. Lipotropics aid in promoting liver function and detoxification reactions. Supplements that contain choline (a B vitamin), betaine, and methionine promote the flow of fat and bile (containing estrogen metabolites) from the liver out through the large intestine.[83]

Lipotropics

1,000 mg choline and 1,000 mg methionine or cysteine 3 times a day

Botanicals

Herbal Medicines for Pain Relief. The herbs appropriate for acute pain relief in endometriosis are the same herbs used for menstrual cramps. Valerian, crampbark, black cohosh, and other helpful herbs are discussed in Chapter 13. A recent study of a cyclic administration of two Japanese herbal formulas of peony and licorice (Shakuyaku-kanzo-to) and peony and dong quai (Toki-shakuyaku-san) was found to decrease endometrial pain in all patients studied and was even reported to promote ovulation.[84] Another study reported both hormonal and inflammatory modulation that led to decreased volume of endometrial implants in an animal model of endometriosis through the use of *Tripterygium wilfordii*, another Chinese herb.[85]

Traditional Herbal Therapies

***Chaste Tree* (Vitex Agnus Castus).** Chaste tree has traditionally been used as a treatment for hormone imbalances in women. Through action on the pituitary gland, chaste tree has a progesterone effect by increasing luteinizing hormone (LH). Useful for fibroids, premenstrual syndrome, perimenopause, and various menstrual cycle disorders, it also has an indication in endometriosis, perhaps because less estrogen is available to stimulate endometrial tissue.[86]

***Dandelion Root* (Taraxacum Officinale).** Dandelion root is one of nature's most detoxifying herbs. It works principally on the liver and gallbladder to help remove waste products. By supporting the liver, excessive estrogens and toxins can be deactivated. Researchers in Japan have found a link between dandelion and antitumor activity.[87] In addition, dandelion leaf contains vitamins A, C, and K and calcium, as well as choline, a lipotropic substance.

***Prickly Ash* (Xanthoxylum Americanum).** Prickly ash is known for its specific action on capillary engorgement and sluggish circulation. Through its stimulation of blood flow throughout the body, prickly ash helps enhance the transport of oxygen and nutrients and the removal of cellular waste products. For women with pelvic congestion, this herb enhances circulation throughout the pelvis.

***Motherwort* (Leonurus Cardiaca).** Motherwort is antispasmodic and gently soothes the

nerves. As women with endometriosis generally experience uterine cramps and pain, motherwort is useful in promoting relaxation during times of extreme "bearing-down" pain in the uterus and other regions.[88] As a mild sedative, motherwort helps with the needed rest during menstrual cramps.

Herbal Tincture for Chronic Treatment

Chaste tree, dandelion, prickly ash, motherwort combination: ½ tsp 3 times daily for 3 months

Turska's Formula. Turska's formula is a favorite old naturopathic treatment for decreasing aberrant cancer cell growth. A tincture of this formula is useful in treating endometriosis due to the similarities of cancer to cell growth found in the pelvis. This formula contains monkshood (*Aconite napellus*), yellow jessamine (*Gelsemium sempervirens*), bryony (*Bryonia alba*), and poke root (*Phytolacca americana*). Monkshood and yellow jessamine contain alkaloids that have been known to disrupt the assembly of microtubules that eventually help in the formation of cells that differentiate and give rise to connective tissues, blood, lymphatics, bone, and cartilage. Quite possibly, these herbal alkaloids interfere with the induction of abnormal ectopic lesions within the pelvis (consistent with the theory of cells left behind in embryonic development). Bryonia is also known to provide antitumor effects. Poke root contains glycoproteins known to stimulate lymphocyte

Sample Treatment Plan for Endometriosis

Nutrition

- Increase the following in your diet:

  Vegetables (especially cauliflower, brussels sprouts, and carrots)
  Protein (tofu, beans, salmon, soy nuts, and small amounts of turkey and chicken)
  Fiber (whole-grain breads, rice, raw vegetables, and flaxseed)
  Omega-3 oils (especially cold water fish: salmon, tuna, sardines, mackerel, and herring)
- Decrease or eliminate the following:

  All saturated animal fats
  All foods containing sugar, caffeine, chocolate, or alcohol
- Avoid pesticides and heating food in plastic containers.
- Drink purified water.

Daily Supplements

- Vitamin C: 6–10 g
- Vitamin E: 400–800 IU
- Fish oils: 1,080 mg EPA and 720 mg DHA
- Beta-carotene: 50,000–150,000 IU
- Selenium: 200–400 mcg
- Lipotropics: 2–4 capsules
- Flax oil, evening primrose oil, or borage oil: 2 to 4 capsules per day

Botanicals

- **Acute tincture:**

  Black cohosh: 1 oz
  Wild yam: 1 oz
  Cramp bark: 1 oz
  Valerian: 1 oz
  ½–1 tsp every 2–4 hours for acute pelvic pain
- **Chronic tincture:**

  Chaste tree: 1 oz
  Dandelion: 1 oz
  Prickly ash: 1 oz
  Motherwort: 1 oz
  ½ tsp 3 times a day
- **Turska's formula:** 5 drops 3 times daily
- **Progesterone cream:**

  Option 1: days 1–6, no cream; days 7–26, ¼–½ tsp twice a day
  Option 2: days 1–14, no cream; days 15–26, ¼–½ tsp twice a day
  Option 3: days 1–20, no cream; days 21–27, ¼–½ tsp twice a day

transformation for immune enhancement. Poke root also has anti-inflammatory properties. Due to its potential toxicity, however, this tincture can be provided only by a licensed health professional.

Turska's Formula

5 drops 3 times daily

See Resources section for sources.

Natural Progesterone

Progesterone has been known to modify the action of estradiol by decreasing the retention of receptors, causing a fall in serum estradiol levels. Women without enough progesterone are unable to balance out estrogen, leading to problems that result from a relative excess of estrogen. In addition, progesterone has the effect of sedating painful uterine contractions. Chapter 13 discusses in more detail how progesterone inhibits uterine contractions and reduces pain. It is possible that this uterine sedative effect extends to pain relief in the pelvic region in general. I have not used natural progesterone alone as a treatment for endometriosis, but it has been my observation that progesterone is an important part of a comprehensive treatment plan.

Natural progesterone creams can be applied in various regimens. For some women I recommend ¼ teaspoon two times a day for three weeks on and the week of menses off, or apply twice daily from day 15 of the cycle to day 26. Other women just need to use it the week before their menses is due. Still other cases require higher doses of natural oral micronized progesterone in a cyclic dosing pattern.

CONVENTIONAL MEDICINE APPROACH

Conventional medical treatment for endometriosis usually involves diagnosis plus medical or surgical treatment. Because one cannot feel endometriosis most of the time or detect it by ultrasound or CAT scan, laparoscopy (a surgical procedure to view the interior of the abdomen and pelvis) remains the standard for diagnosis. Studies have repeatedly shown that 78 to 82 percent of women with chronic pelvic pain of more than six months' duration that does not respond to nonsteroidal anti-inflammatories or oral contraceptives have endometriosis. A recent development in the treatment of endometriosis is treatment of presumptive disease without laparoscopic proof. Some physicians now offer this option, and if no response is seen in six months, they then proceed with laparoscopy.

Often, women with chronic painful periods or pelvic pain are initially treated with nonsteroidal anti-inflammatory medication such as ibuprofen, naproxen, or meclofenamate. As symptoms progress, patients usually resort to prescription analgesics and/or hormones. Since estrogen is known to stimulate the growth of endometriosis, treatment is aimed at suppression of estrogen synthesis. By achieving states of pseudopregnancy (through birth control pills) or pseudomenopause (through cessation of the body's own production of estrogen and progesterone), women have found significant symptom relief. Benefit from birth control pills is thought to be due to reduced menstrual bleeding, anovulation, and lesion regression. However, stimulation of a lesion does occur, possibly due to a decrease in concentration of progesterone receptor sites and lesions.

In the past, danazol was regarded as a highly effective drug because of its suppression of the pituitary and inhibition of estrogen and adrenal hormone production. Relief quite possibly is due to reduction of endometriosis associated with autoimmune abnormalities. However, male pattern hair growth, irreversible low voice, hot flashes, depression, weight gain, acne, reduced breast size, muscle cramps, fatigue, and other symptoms related to the medication have caused danazol to become a less popular alternative, and it has mostly fallen out of use.

Prescription drugs called gonadotropin-releasing hormone agonists (GnRH agonists), such as Lupron, Synarel, and goserelin, are used to produce a menopausal state. Upon stimulation of the receptors of the brain by these hormones, a decrease in production of LH (luteinizing hormone) and FSH (follicle-stimulating hormone) is achieved and causes the individual to have a low estrogen state. This causes dramatic relief of symptoms within two to three months. Side effects due to low estrogen, similar to those accompanying natural menopause (insomnia, hot flashes, vaginal dryness, and osteoporosis) do occur. Current add-back therapy with low-dose estrogen or a progestin reduces symptoms without reducing effectiveness. Higher doses of hormone therapy such as oral contraceptives may make the lesions grow, so very low doses of hormones are recommended. After the GnRH agonist is discontinued, recurrence of endometriosis frequently occurs, so ovarian suppression regimens like oral contraceptives or Depo-Provera injections are commonly used following GnRH therapy.

Treatment with progestins helps endometrial tissue to atrophy. However, side effects include nausea, weight gain, fluid retention, breakthrough bleeding, and sometimes depression.

Combinations of estrogen and progestin such as those found in low-dose birth control pills suppress FSH and LH. Mild-to-moderate pain relief is achieved because the body's own estrogen production is decreased. In addition, since the volume of menstrual flow is also decreased, less blood is theoretically available for reflux into the pelvic cavity.

Current research shows promising results in the use of the antiprogesterone Ru-486 due to the regression of endometriosis and possible minimal side effects. Clinical trials are underway. Use of medications that enhance the immune system are also being studied.

Laparoscopic surgery has the advantage of extensive use of microscopic imaging so that surgeons can view lesions in greater detail. In addition, laparoscopy allows for a shorter recuperation time when compared to a laparotomy. During a laparotomy, the surgeon makes a larger incision in the abdomen, allowing for larger endometriomas or adhesions to be excised.

Surgery has produced cure for some individuals, while it has proved to be disappointing to others. Whether laparotomy or laparoscopy, surgical treatment varies as to type of surgery, technique, and surgeon experience. Conservative surgery removes superficial endometriosis lesions and/or endometriomas while leaving the uterus and ovaries intact. Recurrence rates vary from 5 to 20 percent per year, with a rate of 40 percent after five years. Differences in recurrence rates with surgery may be due to the method of endometriosis implant removal and the skill of the surgeon. Laser surgery is able to penetrate deeply, but without the possibility of biopsy (proving endometriosis), while excision by electrocautery, which allows for meticulous biopsy, takes time and additional effort. The knowledge and experience of the surgeon are important in the identification of the implants, since color, consistency, appearance, and location of the implants can be variable. In addition, some surgeons remove the clear peritoneal covering, as they believe that endometrial implants reside in this tissue.

The disease frequently recurs unless a woman has had a hysterectomy with bilateral salpingo-oophorectomy (removal of uterus and both ovaries and fallopian tubes). Aggressive surgery consists of removing implants, ovaries, and uterus, and sometimes, even more aggressive surgery involves removing the peritoneum as well. While surgery removes implants that adhere to the ovaries, uterus, and other pelvic organs, the effects of ovary removal and the resulting abrupt cessation of hormone production have to be taken into consideration. While beneficial for some individuals, medical or surgical management is not effective in all circumstances.

Physicians have seen an increase in endometrioid cancer in endometriosis implants. And

endometriosis can grow into bowels or cause bowel obstruction or fistulas. Therefore, finding a health-care provider who is very experienced with endometriosis treatment is very important.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

As with any pain of unknown origin, a licensed primary health-care practitioner should be consulted to rule out other causes of pain before extensive use of analgesic medications, botanical formulas, or supplements. The cultural bias that menstrual periods are supposed to be painful—as well as a reluctance to seek help due to past abuse, trauma, or fear—can be a detriment to healing. Although the norm is changing, in the past many women with endometriosis were told that the pain was "in their head" or psychosomatic. An increased understanding of the pain, pattern of symptoms, and loss of quality of life for those who experience endometriosis has drawn attention and research to this disruptive problem.

Abnormal bleeding, pain that increases in intensity, continued pain with or without menses; lower back pain; or pain with urination, bowel movements, and vaginal intercourse should be brought to the attention of your health-care practitioner, who will listen to your symptoms, take a medical history, and do a pelvic exam. This physical exam is valuable in determining whether there are masses, areas of sensitivity, or abnormal findings suggestive of endometriosis. Depending on the exam, an ultrasound, MRI, and/or blood work may be recommended. In addition, depending on these results, further recommendations may be made (such as a laparoscopy that can diagnose and potentially treat the endometriosis at the same time).

If you are reluctant to seek out help due to past trauma or just a feeling of discomfort, it is essential that you find a health-care practitioner you can trust. Have a friend (or even therapist) come with you to the office and even to the exam room to hold your hand, ask questions, and be there for you. Since the key to prevention of further pain is early diagnosis, prompt medical intervention can lead to more effective assistance in supporting your body's own ability to heal itself.

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FIBROCYSTIC BREASTS

CHAPTER 7

OVERVIEW

Virtually all knowledgeable health-care providers agree that the terms *fibrocystic breast disease* or *fibrocystic breast condition* should be abandoned in favor of a more accurate, physiologically based description. First of all, the benign breast conditions that are present in almost all of us to some degree should never have been given the "disease" label in the first place.[1] Moreover, the widespread misconception that women with painful or lumpy breasts are at increased risk of breast cancer borders on the tragic. Unfortunately, our health-care system requires a diagnostic code to reimburse services, and "fibrocystic breast disease" has one, even though the medical literature is replete with reasons why it shouldn't. This reinforces misinformation and fear and obscures the safe and simple means that exist for obtaining relief and reassurance.

Tender or lumpy breasts are one of the most common reasons why women consult their gynecologists for assessment and treatment. Since painful breasts are not always lumpy, and lumpy breasts are not always painful (and neither situation is usually abnormal), it is useful to create descriptive categories of symptoms and conditions to replace the generic term *fibrocystic*.

Physiological, Cyclical Pain and Swelling

Many women notice painful or sensitive breasts just prior to menstruation. This has been attributed to a more prominent estrogen than progesterone effect on breast tissue at this time. Sometimes less progesterone is made late in the cycle, as in irregular ovulation (inadequate luteal phase). Other women may have average amounts of progesterone but increased tissue sensitivity to estrogen with related fluid retention. Most of us tolerate this well enough once reassured it is normal, and the symptoms always resolve with menses. Women who take exogenous estrogen, such as oral contraceptives or estrogen replacement therapy during menopause, may be similarly affected.

Mastalgia

Mastalgia refers to any breast pain severe enough to interfere with the quality of a woman's life, causing her to seek treatment. Physiological, cyclical mastalgia is this severe about 15 percent of the time and comprises the bulk of this group. Women who suffer from noncyclical pain are more rare, and the pain is less likely to be hormonal in cause. Pain may be due to old trauma, acute infection, or sometimes something related to the chest wall. In contrast, breast cancer occurs as a unilateral painful firm lump only about 5 percent of the time. Painful swellings that flux with the cycle and do not change over time are not worrisome as cancer signals.

Breast Nodularity or Diffuse Lumpiness

Breast lumpiness—the most worrisome category in most women's minds—may be either cyclic or noncyclic, and might or might not include pain. The distinction between these and normal breasts is often simply a matter of degree. Normal breasts are irregularly textured because the tissue they are made of is not homogeneous. It is a mix of glands, fat, and connective tissue. Glands can be more or less prominent and more or less obscured by fat or fluid, so all breasts feel different. Symmetry is important; finding a mirror-image thickening in the opposite breast indicates a normal condition.

Nondominant Masses

Even densities that are not symmetrical are largely due to benign nonprogressive causes, but they do require careful distinction from dominant masses. When careful palpation around the edges of a nonsymmetrical lump reveals that the density merges in one or more places with the surrounding breast tissue, it is considered nondominant and may be comfortably observed for change over time. When these lesions are biopsied or, preferably, a sample of cells is taken in the office using a needle to be looked at microscopically (fine-needle aspiration), some 70 percent will show nonproliferative changes (adenosis, fibrosis, microcysts, mild hyperplasia, and more); some 20 percent will show proliferative changes without atypia—mostly epithelial hyperplasia. None of these conditions places one at increased risk for cancer, and all are self-limited. Only a fraction, roughly the 5 percent that show atypical hyperplasia, carry a significantly increased risk of breast cancer (relative risk at 4 percent), especially when coupled with a positive family history (relative risk at 9 percent).[2] It was this tiny subgroup that led to the original cancer scare attached to fibrocystic breasts.

The most useful tool a woman can bring to her own breast health is her knowledge of and familiarity with the architecture of her own breasts, particularly as it varies over time. Nothing is more helpful in avoiding an unnecessary biopsy than a self-knowledgeable woman who has observed the monthly variation in her own breasts and knows which tissue thickens cyclically. Think of the self-exam as a familiarization process, not a diagnostic one. The majority of breast cancer occurs in women over age 60, and most women don't get breast cancer at all. We all have plenty of time to learn our textures so that our own hands are the most sensitive to any changes that may occur. This will occur effortlessly over time with regular self-exams.

Dominant Masses

These outright noncyclical unilateral lesions are clearly distinct on all sides from the surrounding breast tissue. They persist over time, and except in the very young demand some kind of assessment. Most commonly they are either fibroadenomas or gross (obvious) cysts. A fibroadenoma is a rubbery, smooth, benign fibrous tumor common in younger women. In women under age 25, it can be observed over time. Fibroadenomas generally do not grow bigger. Large cysts are more common in women aged 25 to 50—an age group when cancer just begins to appear. They are softer, usually squishier, and can be made to disappear by draining them through a needle in the office; unless they recur frequently, no further treatment is necessary. Recurrent large cysts have been shown to slightly increase cancer risk in some studies but not in others;[3, 4] fibroadenomas do not. Unfortunately, noncyclical unilateral dominant masses can sometimes be cancerous.

OVERVIEW OF ALTERNATIVE TREATMENTS

Women with fibrocystic tissue causing breast pain, discomfort, and lumpiness will find comfort in an alternative perspective on their situation. Given that this condition is not really a disease, a woman can direct her energies toward relieving symptoms and optimizing breast health, as well as increasing her motivation toward general health practices and self-care.

KEY CONCEPTS

- Practice monthly breast self-exams; know your breasts; be able to detect new and unusual changes, thickenings, and lumps.
- Have a yearly breast exam by a licensed physician.
- Relieve symptoms of pain and tenderness.
- Have changes, if any, evaluated by a physician.

The liver is the primary site for estrogen clearance or estrogen metabolism. Compromised liver function can lead to a state of estrogen dominance, contributing to texture and density changes in the breast. To assure that estrogens are being metabolized properly, it may be necessary to provide nutritional and herbal support for the liver.

Digestion and elimination are fundamental factors involved in hormone-related health problems. Women having fewer than three bowel movements per week have a risk of fibrocystic breasts four to five times greater than women having at least one movement per day.[5] The longer it takes food to move through the colon, the more waste products pass into the bloodstream, creating a potentially toxic physiological environment. Bacterial flora in the large intestine, such as *Lactobacillus acidophilus*, improve the transit time of bowel toxins, as well as improving the excretion and detoxification of estrogens. Women on a vegetarian diet excrete two to three times more detoxified estrogens than women on an omnivorous diet.

Nutrition

Epidemiological evidence supports a diet rich in whole fruits and vegetables in the prevention of fibrocystic breast conditions. A recent study demonstrated that a reduced risk of proliferative and atypical breast lesions was associated with consumption of fresh fruits and vegetables, whereas a small but significant reduction of risk was associated with soy consumption, possibly by decreasing cellular proliferation in the breast tissue.[6] Another study examined the effect soy consumption has on breast tissue via direct imaging using breast enhanced scintigraphy (a nuclear medicine diagnostic imaging test). After one year of daily soy consumption, the researchers reported a number of promising subjective and objective results: patients and their physicians reported a reduction in both breast tenderness and fibrocystic changes; a small but statistically nonsignificant decrease in both the average and maximal count breast activity on scintigraphy; and a significant reduction in the variability of tissue activity.[7] Maybe somewhat surprisingly, another study showed a decrease in benign breast changes with alcohol consumption.[8] Since alcohol slows down the metabolism of estrogen, it is not clear why this study demonstrated these results.

PREVENTION

- Avoid caffeine (black tea, coffee, decaffeinated coffee, cola, chocolate, and medications with caffeine). Even decaffeinated coffee has other methylxanthines, caffeine-like chemical compounds.
- Assure regular, daily bowel movements.
- Eat a diet high in fruits, vegetables, soy foods, and whole grains.
- Decrease dietary fats, especially saturated fats.

Avoid Methylxanthines (Caffeine). Removal of caffeine from the diet, an idea that originated with Ohio surgeon Dr. John Minton, is probably the most well-known alternative treatment for fibrocystic breasts. Of the 20 uncomfortable women who followed his advice to stop all caffeine intake, 13 said their breasts felt better as a result.[9]

Dr. Virginia Ernster conducted the first randomized study of a larger number of women, in which for four months 158 women eliminated caffeine (coffee, tea, cola, and chocolate) from their diets as well as caffeinated medications (theophylline and theobromine). She found a significant reduction in clinically palpable breast findings in the abstaining group compared with the control group, although the absolute change in the breast lumps was quite minor and considered to be of little clinical significance.[10]

Several other studies have been done, leaving us with mixed reports: three studies show no association between caffeine or other methylxanthines and benign breast disease,[11–13] and two studies show a correlation with caffeine consumption.[14, 15] Such is the way of science.

Caffeine Content of Common Items

Beverage	Caffeine (mg)
Coffee, drip (8 oz)	150
Coffee, perk (8 oz)	60–120
Coffee, instant (8 oz)	70
Coffee, decaffeinated (8 oz)	2–5
Tea, black, 5-minute steep (8 oz)	60–100
Tea, green (8 oz)	20
Hot cocoa (5 oz)	2–10
Coca-Cola (12 oz)	34
Food	**Caffeine (mg)**
Milk chocolate (1 oz)	1–15
Bittersweet chocolate (1 oz)	5–35
Chocolate cake (1 slice)	20–30
Over-the-Counter Drugs	**Caffeine (mg)**
Anacin, Empirin, or Midol (2)	64
Excedrin (2)	130
NoDoz (2)	200
Aqua-Ban (2)	200
Dexatrim (1)	200

Dietary Recommendations

- Avoid caffeine.
- Decrease dietary fat to 20 percent of calories.
- Increase dietary fiber (whole grains, legumes, fruits, and vegetables).
- Increase seafood and seaweed.
- Increase soy foods.

In clinical practice, I always recommend avoiding caffeine for women with painful/lumpy breasts. Many women gain mild to dramatic results with this simple approach, and some women receive no benefit. A fair experiment would be to completely abstain for three months and observe any changes in the pain, swelling, and discomfort. A decrease in the nodularity will generally take longer, as long as eight months of complete abstention.

Dietary Fat. How dietary fat affects the human breast is still controversial, although some research has looked at low-fat diets in women with fibrocystic breasts and at how low-fat diets affect the hormone levels in these women. Reducing the fat content of the diet to 16 percent of total calories (in contrast to the average American diet of 40 percent fat), while increasing complex carbohydrate consumption, has been shown to reduce the severity of premenstrual breast tenderness and swelling, as well as reducing the actual breast swelling and nodularity in some women.[16] Reducing the dietary fat intake to 20 percent of total calories results in significant decreases in circulating estrogens in women with benign breast disease.[17]

Since fibrocystic breasts are a result of estrogen dominance, it is logical that decreasing estrogen in the body or its influence on breast tissue would improve the symptoms of breast pain and swelling. However, a slight reduction in fat intake has repeatedly showed very little, if any, effect on breast problems, including breast cancer. A more rigorous approach to lowering the amount of fat in the diet is clearly needed.

The simplest way to accomplish the necessary levels of fat reduction is to avoid animal fats in all forms; a vegan diet (vegetarian, without any animal products at all, including dairy or eggs) is naturally a very low-fat diet. Of course, vegetarians, and even strict vegans, can succumb to fat in other forms like french fries, potato chips, and other greasy fried foods. A vegan diet rich in whole grains, legumes, fruits, vegetables, seeds, nuts, olives, and seaweed that is enriched with oils for stir-frying and in salad dressings results in a diet that derives about 15 to 20 percent of its calories from fat.

Nutritional Supplements

Vitamin E. For more than 35 years, clinicians have used vitamin E in the medical management of benign breast disease. This practice was initially based on positive reports from small numbers of patients as far back as 1965 and from subsequent studies in 1971, 1978, and 1982.[18–21] When larger

numbers of women were studied, vitamin E did not fare so well, showing no significant effects either subjectively or objectively,[22, 23] and the earlier results have never been duplicated.

However, this is not to say that some women don't find symptom relief from taking vitamin E. Two studies demonstrated that vitamin E is clinically useful in relieving pain and tenderness, whether cyclical or noncyclical.[21, 24] The studies have been done with varying dosages: 150, 300, or 600 IU daily. In clinical practice, practitioners generally recommend from 400 to 800 IU of D-alpha tocopherol with a minimum trial period of two months. Since vitamin E in these dosages is completely safe to use, this is a simple and appropriate self-treatment method for a benign breast condition.

Vitamin E (Natural)

400–800 IU daily

Omega-6 Fatty Acids. The pain and tenderness of benign breast disease associated with cyclic mastalgia have been alleviated with evening primrose (*Oenothera biennis*) oil, the only one of the many essential fatty acids to be scientifically studied in relation to fibrocystic breasts.

The evening primrose plant has been commonly known as tree primrose and sun drop. Evening primrose can be found in many parts of North American and is native in the North Temperate Zone, especially at high altitudes. The native peoples of North America, as well as the English and Pilgrims, were well aware of the healing properties of the leaves and bark as an astringent, nervine (an herb that affects the nerves and includes relaxants, tonics, and even stimulants), and sedative. It was often used for stomach and liver complaints, coughs, and female reproductive problems. Even the roots were eaten as a vegetable. The seeds were recommended as a coffee substitute in wartime and have a strong flavor similar to poppy seed oil. The therapeutic value of the seed oil is a more recent discovery. It is this seed oil and its essential fatty acid content that holds the most interest today in maintaining health and preventing disease.

Evening primrose oil is rich in essential fatty acids—polyunsaturated fats that are as essential as vitamins and minerals for the maintenance of good health. The oil contains 74 percent linoleic acid (LA) and 9 percent gamma linolenic acid (GLA). Although other oils such as borage oil and black currant oil contain higher amounts of GLA, evening primrose oil is by far the most popular and familiar source of this fatty acid. Evening primrose oil also contains 11 percent oleic acid, 6 percent palmitic acid, and 2 percent stearic acid.

Under ideal conditions, the body uses LA to produce GLA. In turn, GLA is used to produce beneficial hormone-like compounds called prostaglandins. Specifically, GLA is used to produce series one prostaglandins such as prostaglandin E1 (PGE1).

Prostaglandins affect the function of virtually every system in the body. These molecules are used in the regulation of inflammation, pain, blood pressure, fluid balance, and blood clotting. Prostaglandins also affect hormone production and function.

The key to understanding the important need for supplementing with oils rich in GLA, such as evening primrose oil, is that many of us cannot convert LA to GLA efficiently. Dietary deficiencies, disease conditions, processed oils, trans-fatty acids, heated oils, alcohol, aging, viral infections, and sugar consumption block, slow down, or interfere with the enzyme that catalyzes the conversion of LA to GLA. The result is that virtually all North Americans are deficient in GLA. Supplementing with evening primrose oil can enrich the body's GLA supply and restore the production of beneficial prostaglandins derived from GLA. Research completed over the last 20 years has confirmed that supplementation with evening primrose oil has beneficial effects in numerous diseases and conditions. Benefits for

health problems supported and/or suggested by scientific trials using evening primrose oil include premenstrual syndrome, fibrocystic breast pain, eczema, rheumatoid arthritis, diabetes, heart disease, osteoporosis, and ulcerative colitis. Other conditions for which it may provide benefit include menopause and pregnancy.

The pain and tenderness of benign breast disease associated with premenstrual breast pain and fibrocystic breasts has been alleviated with evening primrose oil in more than one scientific study. In 1985, when 291 women took three grams per day of evening primrose oil for three to six months, almost half of the 92 women with cyclic breast pain experienced improvement compared with one-fifth of the patients who received the placebo. For those women who experienced breast pain throughout the month, 27 percent (just over one-fourth of the 33 women) responded positively to the evening primrose oil, compared to 9 percent on the placebo.[25] Another 73 women with breast pain with or without lumpiness randomly received three grams per day of evening primrose oil or placebo. After three months, pain and tenderness were significantly reduced in both cyclical and noncyclical groups, while the women who took the placebo did not significantly improve.[26] In the course of treatment, it has been detected that women with breast pain have unusually low concentrations of GLA and metabolites from GLA. When patients receive supplements of evening primrose oil, the concentration of GLA metabolites increases and the concentration of saturated fats in the breast decreases. This may also have long-term implications for prevention of breast diseases such as breast cancer.

Although symptom relief can be achieved through the use of evening primrose oil, it should not be relied on to actually reduce the number of developing cysts.

Other omega-6 fatty acids that may have beneficial effects but have not been studied in relation to fibrocystic breasts are flaxseed oil, black currant oil, and borage oil. Borage oil and black currant oil contain higher amounts of GLA, so potentially, one could take fewer capsules to achieve the same benefit. For example, borage oil contains 23 percent GLA versus only 9 percent in the evening primrose oil. That would mean instead of the 6 capules of evening primrose oil it would take to achieve the 3,000 mg of evening primrose oil that was used in the study, you could conceivably use at half as many capsules of borage oil.

Evening Primrose Oil (Omega-6 Fatty Acids)

1,500 mg twice daily

Vitamin A. Basic science research supports the use of vitamin A by demonstrating the presence of specific retinoid receptors in breast tissue that can modulate our genetic predisposition, thereby decreasing the risk for both benign and malignant breast changes.[27]

In a study of patients with fibrocystic breast disease, 12 women were treated with 150,000 IU of vitamin A daily for three months, and 5 of the 9 women who completed the study showed complete or partial response.[28] Some of the patients experienced mild side effects of vitamin A toxicity, including dryness of the skin and mouth.

Although the potential toxicity of vitamin A in doses this high makes it an impractical approach to fibrocystic breast disease, it is possible that beta-carotene could be substituted, since it has a similar activity without the side effects of vitamin A, or a diet high in yellow and orange fruits and vegetables.

Beta-Carotene

50,000–150,000 IU daily

Iodine/Thyroid Hormone. It has been known for a long time that for the thyroid gland to secrete thyroxine (its hormone), it requires iodine. Prescription thyroid hormone replacement with low or even normal thyroid function may result in improvement of fibrocystic breasts.[29, 30] These results suggest that iodine deficiency may be a causative factor in fibrocystic breasts.

Although the exact mechanisms of action on breast tissue are not known, the breast has an affinity for both thyroid hormone and iodine. The only areas of the breast in which iodine can be found are in the terminal and interlobular duct cells, which are also the areas primarily involved in cystic changes. Without iodine, the breast tissue becomes more sensitive to estrogenic stimulation, which in turn produces microcysts high in potassium. The potassium is believed to be an irritant that produces fibrosis and eventually cyst isolation.

Four types of iodine have been studied in the treatment of fibrocystic breasts, only one of which has been truly effective and free of side effects on the thyroid gland. According to research by Dr. William Ghent, although all forms of iodine relieve subjective clinical symptoms, the fibrocystic breast reacts differently to these different forms of iodine: sodium iodide (Lugol's solution), potassium iodide, caseinated iodine (protein-bound), and aqueous (diatomic) iodine. Symptom relief varied a great deal with the different iodines, but only the aqueous or diatomic iodine achieved both symptom relief in 74 percent of the women and also objective reduction in nodules and resolution of fibrosis in 65 percent of the patients, without adverse effects on the thyroid gland.[31]

Women get different amounts of iodine in their diet, depending on the iodine content of the soil and water, as well as the types of food they prefer to eat. Plant foods grown in the so-called goiter belt areas of the country (the Great Lakes region, the Midwest, and the Intermountain states) lack iodine because the soil and water are iodine deficient. Today, iodine deficiency is considered rare in the United States due to the widespread distribution of foods from areas of the country sufficient in iodine and due to the availability of iodized salt. Certain foods, such as seafood and seaweeds, are naturally high in iodine and might be used to supplement a diet low in iodine.

Aqueous Iodine

3–6 mg daily (prescription item)

Additional Supplements

- **B-complex:** 10 times the recommended daily dietary allowance
- **Methionine:** 1 g per day
- **Choline:** 1 g per day
- ***Lactobacillus acidophilus*:** 1 tsp 3 times per day
- **Flaxseed oil:** 1 tbs per day

Botanicals

Herbal therapies for addressing the symptoms of breast pain, swelling, and cystic nodules in the breast are largely arrived at from traditional uses of herbal medicines and from observational experience in clinical practice. Herbal diuretics are useful in decreasing breast swelling and the discomfort associated with it. The most effective of these is dandelion leaf (*Taraxacum officinale*). Unlike synthetic diuretics, dandelion leaf does not deplete potassium; instead, it actually contains a high percentage of potassium. However, since potassium is possibly implicated in fibrosis and potential cyst isolation, dandelion may not be the ideal diuretic to use. Diuretics considered to be effective for fibrocystic breasts include cleavers (*Galium aparine*), yarrow (*Achillea millefolium*), and uva ursi (*Arctostaphylos uva-ursi*).

Additionally, poke root (*Phytolacca americana*), an herb used in traditional naturopathic medical practices, can be applied as an oil to the breasts and rubbed in like a lotion, reducing painful lumpiness and nodularity.

Herbal support for the liver improves how the liver metabolizes hormones. In this case, our goal is to encourage the normal pathways for the metabolism, excretion, and recirculation of estrogens. Traditional herbs that support the liver include burdock root, dandelion root (not leaf), milk thistle, celandine, fringe tree, and beet root.

Herbal Recommendation

- Yarrow leaf capsules: 2–6 per day; or yarrow leaf liquid tincture or extract: ¼–1 tsp per day
- Phytolacca oil: apply to breasts nightly for 2 weeks, then reduce to 3 times per week

Additional Natural Therapies

Natural Progesterone. Once we agree that fibrocystic breasts are, at least in part, due to a high-estrogen/low-progesterone problem, then it is logical to use progesterone therapy as a treatment. Specifically, many practitioners and women patients have experienced that the application of natural progesterone in a cream or gel form routinely resolves the problem. Dr. John Lee, the leader in the use of natural progesterone, states that he cannot recall a single case in his own practice in which the results were not positive.[32] Lee suggests using the natural progesterone cream or gel as prescribed by a health-care practitioner until the cysts are gone and then reducing the dose to the smallest amount that is still effective, to be continued monthly as needed through menopause.

Sample Treatment Plan for Fibrocystic Breasts

Three-Month Period

- Avoid caffeine and other sources of methylxanthines.
- Lower dietary fat to 20 percent and increase dietary fiber (whole grains, legumes, fruits, vegetables, and soy foods); increase seafood and seaweed (for the natural iodine).
- Vitamin E: 400 IU twice per day
- Evening primrose oil: 1,500 mg twice per day

If there is no change after three menstrual cycles, then incorporate a more assertive approach utilizing some of the other therapies listed, or see a naturopathic physician for individualized recommendations and, especially, prescription aqueous iodine.

I cannot confirm the effectiveness or safety of this practice, and the research is not yet clear on the safety of long-term natural progesterone and breast health. There is more information about this in Chapter 12.

Natural Progesterone Cream

¼–½ tsp applied to breasts and palms twice a day from ovulation to menses

CONVENTIONAL MEDICINE APPROACH

Conventional medical literature has tended to focus more on pathologic descriptions of disease and on verifying or disproving related cancer risk rather than on exploring therapeutic options for symptom relief. In spite of conflicting data in the 1980s, many women added vitamin E and eliminated coffee from their diets with noticeable subjective improvement and no side effects other than those imparted by caffeine withdrawal. Low-fat, high complex carbohydrate diets can reduce cyclical pain, and the results of studies with evening primrose oil have been mixed.

Cyclic breast pain and swelling are felt to be hormonal, so treatment is aimed at hormonal manipulation, usually by suppression. More often than not, oral contraceptives help to relieve mild or severe premenstrual pain, although for smaller numbers of women the pain is worsened by this treatment. This paradox is explained by the fact that oral contraceptives suppress ovarian production of hormones and replace this with an average synthetic dose of both estrogens and progesterone. If the replacement level is higher than the natural one, sore breasts may result; usually, the replaced level is lower, and then the pain is relieved. Continuous oral contraceptives (no placebo break) seem to help better than cyclic regimens.

Many so-called effective conventional treatments cause such serious side effects that it is hard to imagine any cases that would warrant their use. Danazol, which interrupts LH and FSH secretion

from the pituitary gland, was once touted as the most effective breast pain reliever. However, it is a male hormone and can cause facial hair, voice deepening, and other androgenic changes, quite unacceptable side effects for most women, and it can cost more than $200 per month. It is no longer used to treat fibrocystic breasts.

Similarly, GnRH agonists work at the hypothalamic level to eradicate estrogen via a temporarily induced menopausal condition. This class of drugs may make danazol obsolete, but they again do not present a good long-term solution due to the side effects, including reversible bone loss, and they cost even more money.

Tamoxifen, an antiestrogen, has been used to treat breast cancer and can help cyclic breast pain, up to a 90 percent reduction in pain. However, it causes menopausal side effects, its long-term effects are unknown, and it increases the incidence of endometrial cancer. On the other hand, it has been shown to reduce breast cancer risk in women who are at higher risk, including those women who have atypical hyperplasia of the breast, which is determined only by a biopsy. For benign breast disease, it is difficult to imagine a situation where the benefits of tamoxifen would outweigh the risks and side effects.

Bromocriptine is a nonhormonal drug therapy that lessens the levels of prolactin, the hormone that manages lactation changes, and seems to work well, although it is often not tolerated because of nausea or dizziness.

The side effects of most of the expensive drugs used to eliminate breast pain and lumpiness are probably too extreme to warrant their use for most women until the simpler remedies have proven inadequate. If elimination of caffeine, adding vitamin E, and switching to a low-fat, high complex carbohydrate diet do not bring results, the next logical step for a conventional practitioner would most likely be a trial of oral contraceptives.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

A woman might decide to see a licensed health-care practitioner because she needs a breast exam or wants to determine the exact nature of her breast pain/tenderness or lumps. The practitioner will ask about her symptoms as well as other pertinent factors in her medical history and will perform a physical examination.

If the practitioner considers it necessary, she or he might recommend a mammogram and/or ultrasound to determine the nature of a specific lump and may encourage aspiration of a mass to determine whether it is cystic or solid. The practitioner will no doubt recommend that highly suspicious lumps be surgically biopsied.

A lump that is new or one that is increasing in size, or a lump that does not change over the course of the menstrual cycle, are all causes for concern and might lead to a professional evaluation.

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GENITAL HERPES

CHAPTER 8

OVERVIEW

Genital herpes is the most prevalent sexually transmitted infection (STI) in the United States.[1–3] Data about the prevalence of genital herpes in the United States has been collected from the National Health and Nutrition Examination Surveys between 1976 and 1980 (NHANES II) and from 1988 to 1994 (NHANES III). According to NHANES III, 45 million Americans over the age of 12 are infected with *Herpes simplex* 2 (HSV-2 or genital herpes). The prevalence increased 30 percent between 1988 and 1994, with the greatest increase among teenagers, and quintupled among white teenagers and doubled among whites in their twenties. Some 25.6 percent of women and 17.8 percent of men test positive for the virus in their blood, and blacks have a higher prevalence (45.9 percent) than do whites (17.6 percent).[4] Testing positive in the blood is different than having a genital herpes eruption history. In fact, only 10 to 20 percent of seropositive individuals have had a genital herpes lesion, showing us that the majority of cases are subclinical or undetected.

There are six members of the herpesvirus family that are known to infect humans: HSV type 1 (HSV-1) and HSV type 2 (HSV-2), varicella zoster virus, human cytomegalovirus, Epstein-Barr virus, and herpesvirus type 6. Today, HSV-2 is the leading cause of genital ulcer disease in the United States. As many as one in five Americans is believed to be infected with HSV-2—the virus type more closely associated with genital herpes. Another virus type, HSV-1—the type more closely associated with infections of the mouth, lips, pharynx, and eyes earlier in life through oral/genital contact—is believed to be responsible for 10 to 50 percent of new cases of genital herpes.[5] About 80 percent of people with their first episodes of genital herpes are 18 to 36 years of age. The highest annual incidence of genital herpes among women occurs at 20 to 24 years of age and is estimated to be 210 per 100,000 women.

The diagnosis of typical genital herpes is fairly straightforward most of the time but involves local and systemic signs. There are three distinct syndromes: primary herpes, first-episode nonprimary herpes, and recurrent herpes. There are, however, atypical manifestations, and these are the ones that are not so straightforward.

The severity of symptoms varies in extent and duration according to whether the episode is the patient's first infection with either HSV-2 or HSV-1, called primary herpes; initial genital infection in a woman who has already had an infection with the other HSV type (initial, or first-episode nonprimary herpes); or a recurrence of a genital infection with either type. A woman's first episode of genital herpes (primary herpes) is usually the most severe form of the disease. Symptoms usually start appearing within a week after infection, if they are going to appear at all. However, symptoms can start one day and up to 26 days after exposure to the virus. Typically, infection is characterized by extensive, multiple clusters of painful lesions involving the genitals, anus, perineum, or surrounding areas. Symptoms and lesions of primary genital herpes vary in severity, extent, and duration. Initial symptomatic episodes of HSV not only tend to be more severe but are followed within the first year of a greater likelihood of clinical recurrences as well as shedding of the virus without any symptoms (also known as subclinical shedding, when the outer layer of the skin or tissue harbors the virus without symptoms and then sheds, transmitting the virus). These subsequent

episodes of HSV-2 are usually associated with more symptoms and more frequent outbreaks than HSV-1 of the genital area and occur about four to five times a year in about one-third of women who have symptomatic outbreaks.

Both HSV-1 and HSV-2 infect the skin and/or mucosal tissue of the genital area and the mouth, and once this occurs, the virus infects the sensory and autonomic nerves and then ascends to the nerve ganglia in the spinal cord where it establishes a lifelong home where it can be periodically reactivated. With this episodic reactivation, the virus migrates from the ganglia along the sensory nerves to the target site, which results in either an actual outbreak or a shedding without an outbreak or with atypical symptoms, called subclinical shedding.[1, 3] In fact, the majority of primary infections with HSV-1 and HSV-2 are subclinical. This presents a great difficulty in sexual transmission, because the virus can be transmitted to another, even when you do not know you are infected or have ever been infected. Men are more likely to have asymptomatic HSV-2 infections than women.[6]

The classic herpes lesion begins as a red papule, evolving within two to three days to a vesicle containing clear fluid, and then progressing to a pustule. When the surface breaks open, a tender ulceration occurs that may explain the symptomatic burning pain. Lesions ulcerate more rapidly in moist areas than on dry skin, so that painful genital ulcerations are more apt to occur on the external vulva area. Several successive lesions may appear in the first three to four weeks of primary herpes. The lesions of primary herpes may heal in one to six weeks.

In more than two-thirds of women, primary herpes is accompanied by systemic symptoms that may include fever, malaise, body aches, headaches, and nausea. Meningitis-like symptoms, such as stiffness of the neck and sensitivity to light, are also common. Nearly three-quarters of women will also suffer from herpetic cervicitis, with vaginal discharge and intermenstrual spotting. Swollen lymph nodes in the groin area are also common. Discomfort with urination is also common, sometimes as a result of herpes in the urethra and in other cases because the urine comes into contact with lesions on the labia.

Diagnosis

A practitioner can best make a diagnosis of herpes based on the medical history, inspection of the area, and a laboratory test to provide confirmation. The focus of the history is the onset and clinical course of the genital lesions. Even though very personal, it is important that the practitioner know the following details of the woman's sexual history:

1. Pregnancy history
2. Currently sexually active or not
3. Sexually active with men, women, or both
4. If birth control is used, what kind
5. Knowledge about partner or partners' sexual history
6. Condom use for protection from sexually transmitted infections
7. Types of sexual activity: oral sex with partner, mutual oral sex, penile/vaginal sex, penile/anal sex

The practitioner also needs to know whether the lesions started as blisters or pimples and whether or not they were painful. Knowledge about any systemic symptoms of both partners is important as well.

The physical examination involves inspecting the lesions, examining the genital area thoroughly, including the anal area and the inguinal lymph nodes (those in the groin). Inspecting the vaginal area with a speculum requires careful exam of the vaginal wall and the cervix. If systemic symptoms such as fever, headache, or neurologia symptoms are present, a more thorough neurological examination needs to be performed.

The information gleaned from a good history and physical help to distinguish a genital HSV infection from other possible problems, includ-

ing vaginal candida, herpes zoster, syphilis, chancroid, allergic contact dermatitis, trauma, Behçet's syndrome, a heat rash, a rash from shaving the pubic area, a drug reaction, or a secondary infection from something like scabies.

Laboratory testing to confirm the diagnosis is indicated for most people who are having their initial genital eruption, even in women with a typical clinical symptom picture. Some lesions are classic in appearance, and perhaps a clinician will make a judgment that a laboratory test is not necessary. However, viral cultures are the most sensitive test for confirming the diagnosis of genital herpes. Determining the virus type has value for future considerations. For example, individuals with genital HSV-1 (as many as 30 percent of women with primary herpes) have a much lower risk of symptomatic recurring outbreaks. In addition, women with primary genital herpes are at increased risk for other STIs and should possibly be tested for chlamydia, gonorrhea, syphilis, and HIV infection.

The 2002 STD guidelines from the Centers for Disease Control (CDC) state that isolation of HSV in a cell culture and then immunofluorescent staining can differentiate HSV-1 from HSV-2 and is the preferred viral test in women who have an active genital lesion. There are a few problems with these tests: transporting a cell culture can be difficult, the sensitivity of the tests declines as lesions heal, and the test is far more accurate for initial episodes than for recurring lesions. If the cell culture is used, then testing the blood is used to confirm the results.[1–3]

Other testing methods include direct immunofluorescent antibody (DFA) test, direct enzyme-linked immunosorbent assay (ELISA), and antigen detection tests. Only the DFA antigen test can distinguish HSV-1 infection from HSV-2. The most useful tests for HSV genital infection detection are type-specific serologic assays for the HSV antibodies.

The most serious and feared complication of genital herpes is the transmission from an infected pregnant mother to her newborn child. Consultation with a health-care practitioner during the pregnancy is advisable both in women with recurrent genital herpes and in women who may uncommonly acquire their primary infection during pregnancy. Viral cultures late in the pregnancy may be advised, and consultations about a delivery by cesarean section may be justified. Other complications for the infant include menin-

KEY CONCEPTS

- Genital herpes is most commonly associated with HSV-2.
- Risk factors for HSV-2: female, African-American, Mexican-American, older, low education level, poverty, cocaine use, a history of two to four or more lifetime sexual partners, unprotected sex, having a sexual partner with genital herpes, living in the southeastern United States (higher rate of seropositive individuals).
- The majority of primary genital herpes infections are asymptomatic or unnoticed.
- All HSV infections establish latency and are considered incurable. The present infection may actually be a recurrence of an asymptomatic infection acquired some time in the past.
- Systemic symptoms are more common with primary infections, and symptoms are generally more severe in women than in men.
- Seek the advice of a health-care practitioner in diagnosing an initial genital lesion; differentiate herpes from other causes of genital ulceration.
- Recurring eruptions are common and are generally less severe than initial episodes.
- Treating acute episodes can reduce symptoms and shorten the duration of the eruption.
- Immune supportive therapy and antiviral therapy can reduce the frequency of recurrences and can reduce symptoms in acute episodes.
- The individual with herpes, the sexual partner, and the health-care practitioner all need to realize that genital herpes is a sensitive issue. Open communication, trust, and respect are essential for an informative dialogue and effective management of genital herpes.

PREVENTION

- Genital herpes is a sexually transmitted disease. Education about recognizing the disease and its prodromal symptoms of itching, numbness, and tingling and protection during sexual contact or abstaining during outbreaks are important in preventing transmission.
- The virus can shed; thus, transmission of the disease to another individual is possible even without symptoms. The use of barrier methods is recommended for any person who has evidence of prior infection with HSV-2.
- The safest method of protecting yourself and a sexual partner is to use some sort of barrier method to prevent contact. The use of male condoms, female condoms, dental dams, or household plastic wrap are all recommended options.
- Informing one's sexual partner of a history of herpes is the responsible thing to do. Before having sexual contact with a new partner, ask questions about his or her past sexual history, history of sexually transmitted infections, and past habits and lifestyle that may have exposed the partner to the virus and other sexually transmitted infections.
- A willingness to practice "safer sex" techniques is an important health issue to discuss with a sexual partner. One should understand that HSV infection can be spread by oral-genital contact as well as genital-genital sexual contact.
- Transmission from one body site to another is possible, and infected areas should be patted, rather than wiped, dry. Be especially careful about transmitting the infection from another part of the body to the eye.
- Enhance the immune system.
- Some individuals may need to consider prophylactic suppressive antiviral medication.

gitis, urinary or rectal dysfunction, infection in the eye, and erythema multiforme (a skin disease).

The impact of genital herpes on a person's psychological and sexual health can be quite intrusive and profound. Many people withdraw from interpersonal relationships because of stress related to their infection or because of fear of spreading the disease to others. Disruption of one's sexual life can also manifest as significantly reduced sexual pleasure and a strong sense of sexual inhibition. Many people also worry that they will be rejected by future partners and are pessimistic about the possibility of establishing normal sexual relationships. Since many people become emotionally upset upon learning of the diagnosis, a health-care provider can be extremely valuable in helping to deal with anger, guilt, or anxiety. Education and counseling include information about the nature of HSV infection, most importantly prevention of its transmission. It is important that patients also understand that the primary infection may have been asymptomatic and that even an initial outbreak may be a reactivation of an infection acquired months or even years previously.

OVERVIEW OF ALTERNATIVE TREATMENTS

A susceptible host plus exposure to the herpes simplex virus add up to acquiring the disease. Improving the health of the host and enhancement of the immune system is essential in preventing and controlling herpes. There is some evidence that a defect in the immune system is present even in otherwise healthy individuals who have recurrent HSV infection. Support of the immune system, dietary factors, stressors, skin health, and preventing and treating other non-herpes infections are all avenues for using natural therapies in reducing the likelihood of contracting herpes and in reducing the frequency and intensity of recurrent herpes infections.

Nutrition

A health-supportive diet is fundamental to good health and an optimal immune system. Although biochemical differences may require that some of us eat more of some foods and less of others, health-supportive diets are based on the guidelines listed below.

A dietary approach for preventing recurring herpes outbreaks that reduces high-arginine foods

Dietary Recommendations

- Maximize your intake of vegetables, whole grains, legumes, and fruit.
- Drink 4 to 8 glasses of water daily.
- Reduce fat intake.
- Eliminate refined sugar and chocolate.
- Avoid food additives, coloring agents, pesticides, and herbicides.
- Reduce salt and alcohol intake.
- Reduce or avoid almonds, cashews, sunflower seeds, and peanuts.

and increases high-lysine foods has become quite popular. This concept arose out of two findings. First, we know that the replication of the herpes simplex virus requires the manufacture of proteins rich in arginine, and arginine itself may be a stimulator of HSV replication. Second, laboratory research has shown that lysine has antiviral activity that blocks arginine[7] and that an arginine-deficient environment suppresses HSV replication.[8]

Thus, theoretically, reducing one's intake of arginine and increasing one's intake of lysine should be effective in reducing HSV replication. In fact, many people do observe an increased susceptibility to outbreaks if they eat chocolate or peanuts, foods that are high in arginine. Other high-arginine foods include almonds, cashews, and sunflower seeds. Foods high in lysine include most vegetables, beans, fish, turkey, and chicken.

Nutritional Supplements

L-Lysine. Scientific studies on the effectiveness of lysine supplementation have not shown consistent results, and a least one study cites dietary variability of lysine and arginine intake as a possible confounding factor that is often difficult to control and is not often assessed in studies.[9] One study that did show positive results was done in 52 patients with recurrent infections (oral, genital, or both). Test subjects received L-lysine (one gram three times daily) or a placebo. They also avoided nuts, chocolate, and gelatin. After six months, the treatment was rated as effective or very effective by 74 percent of those receiving the lysine, compared to 28 percent of those receiving placebo. The mean number of herpes outbreaks was 3.1 in the lysine group compared to 4.2 in the placebo group, and lysine-treated patients reported milder symptoms. No significant side effects were reported in either group.[10] Another experimental study was done with 41 patients who took a daily dose of 1,248 mg of lysine. This demonstrated a decreased recurrence rate and a decreased severity of symptoms during recurrences, but not a reduced healing time.[11]

For people who want to rely on lysine supplementation alone, my recommendation is to take one gram daily for maintenance and one gram three times daily during acute outbreaks. Lysine can also be found in topical ointments to be applied directly to herpes eruptions. These may be helpful in reducing symptoms but have not been adequately studied to prove their effectiveness.

Lysine

Acute: 1 g 3 times daily
Maintenance: 1 g daily

Vitamin C and Bioflavonoids. Supplementation with vitamin C may have therapeutic value in the treatment of recurrent external genital herpes eruptions. Using 600 mg of vitamin C and 600 mg of bioflavonoids three times daily for three days after the initial onset of symptoms (in the prodromal phase) was found to be the optimal dosage for the most rapid disappearance of symptoms.[12] In addition, in vitro evidence supports the use of ascorbate in combination with copper to inactivate HSV-2.[13] In women with active lesions, a randomized double-bind, placebo-controlled clinical trial was done on the topical use of a water-based solution of Ascoxal, an ascorbic acid–containing formulation, in the treatment of recurrent mucocutaneous herpes. A solution-soaked cotton pad was applied to the lesion three times for two minutes with 30-minute intervals

on the first day only. Both subjective and objective accounts demonstrated decreased symptoms and healing time. In addition, viral culture after the first day yielded HSV significantly less frequently when compared to placebo.[14]

Vitamin C and Bioflavonoids

Prodromal period: 600 mg vitamin C with 600 mg bioflavonoids 3 times daily for 3 days

Vitamin E. Applying topical vitamin E to a lesion may provide pain relief.[15] Although clinical observations have been made of only four published cases (in oral primary herpes, not genital), it would seem logical that vitamin E applied to genital eruptions may provide a similar benefit. Dry the area around the lesion with warm air and apply vitamin E oil with a cotton swab. Leave in place for 15 minutes. After the 15 minutes, pain relief should be evident. Repeat as needed.

Further evidence for the use of vitamin E was found in an animal study that employed a patented combination antioxidant cream including vitamin E, sodium pyruvate, and membrane-stabilizing fatty acids. It demonstrated that the ingredients worked synergistically to reduce genital HSV lesion development, duration, and severity significantly when compared to placebo or acyclovir.[16]

Vitamin E

Apply vitamin E oil to dry area around lesion; leave in place for 15 minutes. Repeat as needed.

Zinc. A number of zinc salts have been shown to have antiviral activity against HSV. In vitro[17] and animal studies have supported use of zinc topically with genital infection.[18–20] Supplementation with zinc has been observed to reduce the frequency, duration, and severity of genital herpes eruptions. A compound of zinc (25 mg) and vitamin C (250 mg) was given twice daily for six weeks. In some cases, the eruption was completely suppressed, and in others the eruptions disappeared within 24 hours of their onset.[21]

Zinc and Vitamin C

25 mg zinc with 250 mg vitamin C twice daily for 6 weeks

Botanicals

Lemon Balm (*Melissa Officinalis*). Lemon balm ointments have been used topically in Germany for oral cold sores, and products are now available in the United States. Laboratory evidence demonstrates the anti-HSV-2 activity of *Melissa* at nontoxic concentrations in vitro.[22, 23] The German cream Lomaherpan is a concentrate of 70:1 lemon balm extract. Several clinical studies have shown impressive results. One study demonstrated that when the lemon balm cream was used on patients with an initial oral herpes infection, or cold sore, not a single recurrence occurred. Not one patient using the cream developed another cold sore. The cream was also shown to be effective in reducing the healing time in cases of genital herpes.[24]

Another study, a double-blind, placebo-controlled, randomized trial, used a standardized topical cream (active ingredient: 1 percent Lo-701—dried extract from *Melissa officinalis L.* leaves) in 66 patients with a history of recurrent herpes labialis of at least four episodes per year. With applications four or five times a day, subjects noted shortening of the healing period, prevention of infection spreading, and rapid relief of the typical symptoms of herpes. The authors also concluded that the intervals between the periods with herpes might be prolonged with this treatment.[25]

The cream should be applied two to four times a day during an active eruption. No side effects have been observed.

Lemon Balm

Apply topically 2 to 4 times a day.

Licorice (*Glycyrrhiza Glabra*). Licorice has traditionally been used by naturopathic physi-

cians, herbalists, and other health-care practitioners to support the body's immune system and to defend against the effects of disease-causing viral infections. Laboratory studies demonstrate a component of *Glycyrrhiza glabra* root, glycyrrhetinic acid, is active against viruses, specifically in HSV where it inhibits the growth, activity, and ability to replicate, irreversibly inactivating the herpes simplex virus.[26] In clinical practice, I have observed that topical preparations of licorice containing glycyrrhetinic acid have helped to reduce both healing time and uncomfortable symptoms associated with genital herpes. Apply the ointment or gel several times daily. If used daily over several weeks or months, licorice may cause fluid retention and thereby raise blood pressure in certain individuals.

Licorice

Apply ointment or gel several times daily.

Siberian Ginseng (*Eleutherococcus Senticosus*). A randomized double-blind, placebo-controlled trial of a standardized extract of eleutherococcus showed a decrease in severity, duration, and frequency of outbreaks when used for at least three consecutive months. Although not commonly used by alternative practitioners for the treatment of herpes, this study supports eleuthero's role in suppression of herpes outbreaks.[27]

Siberian Ginseng

- Dried root: 500–3,000 mg dried root capsules
- Tincture (herb and alcohol or herb, alcohol, and water): 1 tsp 3 times per day
- Fluid extract: ½–1 tsp 2–3 times per day
- Extract (33% alcohol extract): 40–120 drops 1–3 times per day
- Solid extracts made from dried, powdered root (at least 1% eleutheroside F): 100–200 mg 3 times per day

Bee Propolis. Propolis is a resinous substance that bees make by combining substances from plants with waxes and glandular secretions. They use this resin for the construction and repair of their hives. It is also placed at the entrance to the hive where the worker bees brush up against it as they enter the hive. This sterilizes the bees from infection. The composition of propolis varies depending on the plants in the area that the bees visit. Some propolis may be higher in flavonoids, other propolis may be higher in diterpene compounds. Historically, propolis has been used for its antibacterial, antifungal, antiviral, antiprotozoan, antitumor, anti-inflammatory, immunomodulatory, and antioxidant activities. In vitro data suggests propolis has both antibacterial and antiviral properties against a variety of microorganisms, including HSV.[28–30]

Two of my favorite natural topical therapies for herpes lesions are honey and bee propolis. A small study comparing topical application of honey versus acyclovir cream found a statistically significant shorter duration of episodes and faster healing time when using honey compared to acyclovir.[31] Another larger, randomized, single-blind study showed that more subjects' lesions healed after 10 days of treatment with a 3 percent propolis ointment than with placebo or acyclovir.[32]

Bee Propolis

Apply 3% bee propolis ointment several times per day.

Aloe Vera. Aloe vera is a cactus, and the gelatinous substance inside the leaf is known to have many beneficial properties. It's not surprising that some research shows some effects for the herpes virus, and mucosal epithelial tissue appears to be a good site for the medicinal effects of aloe. In vitro data suggests that chemical constituents of aloe vera inactivate HSV-2 both alone and synergistically with acyclovir.[33, 34] Human clinical trials on men support its use topically as a 0.5 percent

Aloe Vera

0.5% cream, apply 2–4 times daily

hydrophilic cream, but not as a gel, to shorten healing time and decrease symptoms.[35, 36]

Myrrh (*Commiphora Myrrha*) and Goldenseal (*Hydrastis Canadensis*). I am not aware of any research studies using myrrh and goldenseal for genital herpes eruptions, but the traditional use of both of these herbs is longstanding. As an antiseptic and as an anti-inflammatory for inflammations and sores of the mucous membranes, these two herbs have been very reliable and may go a long way not only toward improving the health of the epithelial tissue of the mouth and genital region but also stimulating an immune response locally in that tissue.

Myrrh

Oral tincture: 10–30 drops 3 times per day

Goldenseal

Oral tincture: 10–30 drops 3 times per day

Additional Botanicals. Many botanicals have the ability to provide immune support through various mechanisms. Other plants have very specific antiviral properties as well.

The antiviral activity of Saint-John's-wort (*Hypericum perforatum*) has been demonstrated. Laboratory studies have shown that two constituents in Saint-John's-wort, hypericin and pseudohypericin, exhibit strong antiviral activity against herpes simplex virus 1 and 2 as well as influenza types A and B, in addition to a virus in the mouth that causes vesicular stomatitis.[37] *Momordica charantia*, or bitter melon, has been shown to have antiviral activity against both HSV 1 and 2 such that its effectiveness in vitro is not only greater than acyclovir, but it is also effective against acyclovir-resistant strains.[38]

Medicinal mushrooms are known for their antimicrobial activity against a number of microorganisms. Recent in vitro evidence suggests that fungal beta-glucans extracted from *Pleurotus tuber-regium* exerts its antiviral effect by binding to the virus, thereby preventing the infection of the host cells.[39]

Echinacea has shown in vitro antiviral activity against HSV-1,[40] but a human study did not demonstrate any statistically significant reduction in recurrent genital herpes.[41]

Viracea, a proprietary blend of benzalkonium chloride and derivatives from *Echinacea purpurea*, was found to have anti-HSV-1 and -2 activity in vitro, even on strains that were resistant to acyclovir.[42]

Chapparal (*Larrea tridentate*), specifically its leaf resins, have been shown to have significant antiviral activity. The natural ingredients in the leaf resin appear to the inhibit replication of the virus.[43] Preparations are available in either cap-

Sample Treatment Plan for Genital Herpes

See the Resources section for formulation sources.

During an Acute Episode

- Apply ice, preferably during the prodrome stage during symptoms of itching, numbness, or tingling or even after the eruption has appeared, for 10-minute applications several times during the day. This limits the discomfort and swelling and can keep an outbreak from fully erupting.
- Apply lemon balm ointment several times per day.
- Apply licorice gel (glycyrrhetinic acid) twice per day.
- Lysine: 1,000 mg 3 times per day
- Vitamin C: 600–800 mg with 600–800 mg bioflavonoids 3 times per day
- Zinc: 25 mg per day

Prevention

- Follow a diet that is high in lysine foods (vegetables, beans, fish, turkey, and chicken) and avoid foods high in arginine (chocolate, all nuts and seeds).
- Lysine: 1,000 mg per day
- Safe sex protection

sules or a topical lotion. One or two capsules daily of the leaf resin may reduce the frequency of outbreaks, and the topical lotion, when applied at the first sign of a tingling sensation, may prevent the outbreak from occurring.

Botanicals such as thuja (*Thuja occidentalis*), lomatium (*Lomatium disectum*), and astragalus (*Astragalus* spp.) have been traditionally used by naturopathic physicians, herbalists, and other health-care practitioners to support the body's immune system and to defend against the effects of disease-causing viral infections. These herbs are typically administered in liquid extracts, capsules or tablets, or teas. Lomatium may cause a temporary skin rash if used in an improper dose.

CONVENTIONAL MEDICINE APPROACH

Many patients prefer to use antiviral therapy to suppress infections and to reduce recurrent episodes. The primary goals of antiviral therapy are to limit the severity of the infection and to give the patient a sense of control over the disease process. Antiviral therapy is offered to normal immunocompetent patients with either primary or nonprimary genital herpes. In the vast majority of cases, oral antiviral therapy is sufficient, although more severe cases may require hospitalization and intravenous acyclovir.

Episodic therapy appears to work best for women who have a clearly identifiable prodrome. Patients who desire continuous suppressive therapy need to discuss with their physician the advantages and disadvantages of this regimen. Medical considerations, psychosocial needs, and cost are all factors influencing the wisdom of such a regimen.

The advent of herpes viral testing accuracy and knowledge of the asymptomatic carrier has led to an increase in the use of antiviral herpes treatments. The meds used to treat the virus are essentially the same as they have been for the past 10 to 20 years, but recommendations for usage and dosing have changed. The three meds most commonly prescribed are acyclovir, valacyclovir, and famciclovir. Acyclovir (Zovirax) was the first FDA-approved drug for treatment of herpes and is available as capsules, tablets, oral suspension, topical ointment and cream, and sterile powder for IV infusion. Valacyclovir (Valtrex) comes in 500 and 1000 mg caplets, famciclovir (Famvir) in 125 mg, 250 mg, or 500 mg tablets. The side effect profile of all of these meds is the same. The side effects are uncommon, but those reported are nausea, vomiting, and headache. They seem to be dose-dependent. There does not appear to be any long-term harm with the use of these meds, and there are few, if any, drug interactions. Essentially, this is a very safe medication class.

These meds are used for episodic treatment and for prevention. We now know that 5 to 10 percent of people are asymptomatic herpes shedders, so suppressive daily therapy is recommended for:

1. A person with an initial herpes outbreak
2. A person who is known to be an asymptomatic shedder
3. Patients with oral or genital herpes who have more than four episodes a year

The recommendation is for a year or more, depending on the patient's interest. The usual recommendation is for a year following the first episode of herpes, and longer if there are other cofactors.

The dosing has also changed from the original recommendations. Acyclovir, which is available generically, is recommended as follows: Ointment for genital topical therapy used several times a day until the lesions have resolved and cream for oral lesions with the same dosing. Orally, it is now 400 mg twice daily for 10 days for an initial episode, then 400 mg twice daily for 5 days for recurrences. 400 mg once daily is the suppression dose.

Valacyclovir has a variety of dosing recommendations: For an initial outbreak of genital herpes, use 1,000 mg three times a day for 10 days. For recurrent outbreaks, use 500 mg twice

daily for 5 days. For suppression, use 500 mg per day. For oral herpes, the recommendation is 2 g in the morning and 2 g in the evening on one day only. For recurrent outbreaks, many practitioners prescribe the 1,000 mg caplet and suggest that patients cut it in half for economic reasons and take one half caplet twice daily.

Famvir is dosed at 125 to 250 mg twice daily for 10 days for the initial episode and 125 to 250 mg twice daily for 5 days for the recurrent episodes. The suppression dose is 250 mg once daily. It is interesting that with this product, the suppression dosing is greater than the active treatment dosing, because the drug is more rapidly taken up by the virus when it is in its active replication phase. Hence, more drug is needed for suppression than for active treatment.

The drugs are eliminated through the kidneys, so one may need to reconsider dosing in patients with renal impairment. The drugs are approved throughout all ages of pediatric use, and they would need to be specifically dosed by a pediatrician. So far, no resistant strains are reported.

The most important treatment remains prevention. Condoms do not prevent the spread of HSV genitally. Health practitioners continue to suggest that patients refrain from sexual activity, including oral sex and kissing, when an active lesion is present. We now recognize that 5 to 10 percent of people with a history of herpes do shed virus without an active lesion. Talking to your partner about his or her sexual history and safe sex practices are probably the most important steps in dealing with herpes.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

The most appropriate method for accurate diagnosis of a genital lesion is to see a licensed health-care practitioner qualified to perform a gynecological exam. Accurate diagnosis of genital lesions is not only an important key to effective and appropriate treatment but also a key to determining sexual behavior and habits with sexual partners. Laboratory testing using viral cultures and blood tests for antibodies are the most common methods that may be recommended by your practitioner.

A qualified health-care practitioner can be extremely helpful in providing education and counseling to the person who has newly acquired herpes. Education includes information about the nature of HSV infection, various treatment options, effect on pregnancy, and prevention of transmission. Counseling includes helping patients to deal with fears, shame, guilt, and feelings of social isolation as well as developing strategies for communicating with present and future sexual partners.

Women who are pregnant need to inform their practitioner of their history of herpes. Any outbreaks during the pregnancy should be recorded and reported so that appropriate testing, treatment, and management can be done during the pregnancy and delivery. Whether your practitioner is a midwife, alternative practitioner qualified to perform home births, obstetrician, or family physician, she or he needs to know your infection status to make appropriate recommendations for your health and your baby's.

Women with recurrent genital herpes infections may need to seek more aggressive or individualized care from an alternative practitioner than the therapies discussed in this chapter. Homeopathy, additional herbal/nutritional combination products, or Chinese herbal medicine may be more effective in an individual case.

Some women may choose to use conventional pharmaceutical antiviral therapy, although this is not usually medically necessary. There are cases of primary or nonprimary genital herpes, however, when antiviral therapy is indicated for immunocompromised individuals. Cases where symptoms and complications are severe enough to warrant hospitalization may require intravenous antiviral therapy.

HEART DISEASE

CHAPTER 9

OVERVIEW

Most of us are aware that heart disease is a primary affliction for men, but cardiovascular disease (CVD) is also the leading cause of death in women. More than 500,000 women die of cardiovascular-related causes annually in the United States.[1] Taking into account other atherosclerotic disorders resulting from damaged and narrowed arteries, such as strokes, almost 4 of every 10 women will die of these diseases, approximately 100,000 prematurely (before the age of 65).[2] Starting at age 50, more women die of cardiovascular diseases than of any other condition,[3] and women younger than 55 years old who have a heart attack have a worse prognosis and higher incidence of heart attack–related death than do men of the same age who have a heart attack, as well as a greater chance of having another heart attack.[4, 5] Cardiovascular disease is also a major cause of disability in older women. For black women, the risk of heart-related death is twice as high as for white women.[6]

Even though heart disease is the leading cause of death in both men and women, the rates of coronary disease (but not necessarily death) at virtually every age are higher in men than in women.[7] When women are in their thirties and forties, the difference between men and women is four- to fivefold. After that, the difference shrinks with increasing age. Coronary artery disease (CAD) is less common in premenopausal women, and the incidence of CAD tends to be about 10 to 15 years later than men, until the age of 70.[8]

Overweight women and those with the apple fat distribution (with abdominal fat) are at greater risk for developing coronary artery disease than are slim women and those with the pear fat pattern (fat stored around the hips).[9] Abdominal obesity also increases the risk of high blood pressure and diabetes and may lower the HDL (good) cholesterol level and raise the triglyceride level. A desirable waist-to-hip ratio for middle-aged women is less than 0.8. To get your waist-to-hip ratio, measure your abdomen at the largest point and divide it by your hip measurement.

Overall weight, usually calculated in terms of body mass index (BMI), is also an important tool for assessing one's risk for coronary artery disease. To calculate your body mass index, divide your weight in kilograms by the square of your height in meters. You can also refer to the height and weight chart in Appendix B to help you to determine your body mass index. A desirable body mass index is less than 25. The Nurses' Health Study found that women with a BMI of 29 or more had triple the risk of coronary artery disease compared with women who were lean and with a BMI of less than 21.[10] Women with a BMI of 25 to 28.9 had almost double the risk. As many as one-third of white women and one-half of black women are 20 percent or more over their desirable body weight.

Between the ages of 30 and 60, and in each of the decades in this age group, women who have had either surgical or natural menopause have twice the rate of CAD compared to women in their age group who still have premenopausal ovarian function.[11] Women who have had both ovaries removed have a higher rate of CAD at an earlier age than women who undergo natural menopause.[12] The explanations for this are multiple, but the estrogen produced by the ovaries helps to maintain higher HDL levels, which protect the cardiovascular system, keep the LDL levels low, and slow the aging of the arteries. Whether

women still have their ovaries or not, the rate of cardiovascular disease increases with age[13] and increases significantly after the age of 70.[14]

One of the largest and most controversial debates in modern medicine revolves around hormone replacement therapy (HRT or HT). For more than thirty years, observational research studies on HRT consistently reported significantly reduced rates of cardiovascular disease in women who used either estrogen alone or estrogen plus progestins,[15] and HRT was routinely prescribed for primary prevention of cardiovascular disease. Then, in 1998, the Heart and Estrogen/Progestin Replacement Study (HERS)[16] found that the hormones did not protect women who already had evidence of cardiovascular disease from heart attacks, and moreover, that more women treated with HRT died of heart disease in the first year of the study than those given a placebo. This study was followed soon after, in 2002, with one called the Women's Health Initiative,[17] which found that conventional HRT (Premarin and Provera) was not associated with a decrease in heart disease, but actually with a slight increase. It was also associated with a slight increase in strokes and clots. As researchers continued to study the women in the estrogen-only group (Premarin), they did not find an increase in the risk of heart disease, but still did find a slight increase in strokes and clots.[18] In addition to the estrogen plus progestin HERS study and the estrogen-only WHI study, numerous other randomized controlled trials have been done since the HERS trial. No beneficial effects of estrogen on heart disease risk were observed in either the estrogen in the prevention of reinfarction trail (ESPRIT)[19] or in the women in the Papworth HRT atherosclerosis study (PHASE).[20]

Most recently, studies show that HRT might in fact be beneficial if taken during perimenopause or very early menopause,[21, 22] offering a window of cardioprotection if started in the early menopausal years. Estrogen has favorable effects on several heart disease risk factors: HRT increases high-density lipoprotein (HDL) cholesterol, decreases low-density lipoprotein (LDL) cholesterol, reduces oxidation of LDL cholesterol, lowers uptake of LDL in blood vessels, binds to vascular estrogen receptors, reduces vascular tone, preserves endothelial function, increases prostacyclin release, decreases thromboxane A2 formation, decreases fibrinogen, reduces plasminogen activator inhibitor, and decreases fasting blood glucose and insulin.[23]

As you can see, the last 9 or 10 years in particular have seen a flurry of trials on the subject of HRT and heart disease, and with all of these studies, commentaries, confusions, contradictions, controversies, questions, and opinions abound. Despite the more recent reassuring news about the effects of HRT when given early, women and their physicians are still left with no consistent clear message or guide as to what to think regarding HRT and cardiovascular disease. Because of this inconsistency, it is important to assess each woman individually to determine whether HRT is right for her. In addition, physician advisory organizations no longer recommend that HRT be used to reduce the risk of heart disease.

The question really is, does hormone replacement therapy benefit women, and, if so, which hormones, in what form, in what dose, and in whom is it beneficial?

In determining the best plan of action, it is important that each woman is individually assessed for her heart disease risk. Utilizing a comprehensive medical history, physical examination, and selected laboratory and heart function testing, it is possible to assess a woman's risk for coronary artery disease and the risk of heart attacks. Based on this assessment, a strategy can be put in place utilizing lifestyle changes, nutritional and botanical supplements, and in some cases prescription medications to prevent and treat cardiovascular disease. To assess each woman individually and comprehensively and use a holistic integrative therapeutic plan is a

long overdue approach in the management of heart disease in women.

What Is Heart Disease?

Before we go too far, let's clarify what we mean by cardiovascular disease. Generally, when we refer to the risk of heart disease in menopausal women we mean coronary artery disease, including coronary artery atherosclerosis, myocardial infarction (MI), acute coronary syndromes, and angina. These conditions are intimately related to hypertension and hyperlipidemia. The term *heart disease* is most often used to describe coronary atherosclerosis, hardening of and deposition of plaque in the arteries of the blood vessels that supply the heart. Other forms of heart disease include congestive heart failure, arrhythmias, mitral valve prolapse, and cardiomyopathy, but these are unrelated to issues of menopause and hormones. The focus of this chapter is the prevention and treatment of coronary artery disease (CAD) and atherosclerosis, hypertension, hyperlipidemia, and myocardial infarction.

Risk Factors for Heart Disease

Major risk factors for coronary artery disease (CAD) include high blood pressure, abnormal cholesterol profile (dyslipidemia), and diabetes. Optimal levels of lipids and lipoproteins for women are LDL cholesterol (LDL-C) less than 100 mg/dL, triglycerides less than 150 mg/dL, non-high-density lipoprotein cholesterol less than 130 mg/dL, and HDL cholesterol (HDL-C) over 50 mg/dL. Updated guidelines from the 2001 National Cholesterol Education Program (NCEP III) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (called the adult treatment panel, or ATP III) are more complex than just this and emphasize more aggressive lowering of elevated LDL levels, especially in women with higher risk factors for heart disease. If you have peripheral vascular disease, coronary artery disease, abdominal aortic aneurysm, diabetes, or metabolic syndrome, discuss testing and management with your practitioner as well as all available options, including exercise, weight management, dietary changes, aspirin, drug treatment, and nutritional supplement interventions.

Triglycerides are an important risk factor for cardiovascular disease in women, but especially when increased triglycerides are present in association with low HDL levels. If the triglyceride level is greater than 400 mg/dL and HDL cholesterol is less than 50 mg/dL, the risk of heart disease is significantly increased.[24] Patients with elevated triglycerides and a family history for heart disease most likely have familial hyperlipidemia. Triglyceride levels from 200 to 400 mg/dL are considered elevated but borderline. Weight loss alone can return elevated triglyceride levels to normal. Smoking, dietary simple carbohydrates, obesity, and lack of exercise are all related to elevated triglycerides.

When determining one's risk for heart disease, there are some critical things to look for. Women whose father had a heart attack or stroke before age 50, or mother before age 65 (unrelated to cigarette smoking), are at a genetic disadvantage. It's important for these women to work harder in the areas of prevention because they are at increased risk just by virtue of their family history.

Hypertension is the most common chronic disease in older women and a significant risk factor for stroke, congestive heart disease, and kidney disease. Beginning at age 50, hypertension is more common in women than in men and even more so in black women. See Table 9.1 for new blood pressure guidelines set in 2003. Isolated systolic hypertension (systolic BP of 160 mm Hg or greater) or combined hypertension (systolic BP of 160 or greater and diastolic BP of 90 or greater) is directly related to increased death rates from cardiovascular disease.

Impaired tolerance to glucose is another risk factor for heart disease. Women with higher than normal blood sugar or who are clinically diabetic are at increased risk. The diabetic woman has three

Table 9.1 Blood Pressure Guidelines

Blood Pressure Category	Systolic Pressure (mm Hg)	Diastolic Pressure (mm Hg)
Normal	less than 120	less than 80
Prehypertension	120–139	80–89
Stage 1 hypertension	140–159	90–99
Stage 2 hypertension	160 or higher	100 or higher

to seven times the risk of cardiovascular disease and of dying prematurely from atherosclerosis than a nondiabetic woman.[25] Diabetes is a stronger predictor of cardiovascular disease in women than in men.[26] Women are more prone to suffer unrecognized or "silent" events related to ischemia.

In addition to these risk factors, there are two syndromes, both called syndrome X, associated with heart disease risk. The first one was named by Dr. Harvey Kemp of Harvard in 1967 to describe women with normal coronary angiograms who had angina-like chest pain with or without positive treadmill tests.[27] Some of these women turned out to have abnormal circulation in the small coronary arteries, and their coronary flow didn't adjust itself appropriately.

The second syndrome X, also called Reaven's syndrome or metabolic syndrome,[28] was coined in 1988 by Dr. Gerald Reaven of Stanford University. It is a syndrome of increased truncal (midsection) obesity—a waist-to-hip ratio greater than 1:1—and is defined as a cluster of symptoms that appear to occur secondarily to cellular resistance to insulin. Individuals who secrete larger amounts of insulin because the normal insulin action is impaired are predisposed to glucose intolerance, hyperinsulinemia, dyslipidemia, and hypertension. The relationship between resistance to insulin, non-insulin-dependent diabetes mellitus, hypertension, and cardiovascular disease has been extensively documented.[29] Evidence suggests that hyperinsulinemia may be seen in as many as 25 percent of the nondiabetic population. As many as 50 percent of individuals with high blood pressure may have syndrome X.[30] Overweight individuals are more susceptible to this condition, but as many as 50 percent of hyperinsulinemic patients may be of normal weight.[31] Individuals who have glucose intolerance and hyperinsulinemia should eat a diet lower in carbohydrates, whether simple or complex. A diet that is 40 percent carbohydrates, 30 percent fat, and 30 percent protein may help to correct the hyperinsulinemia.

The diagnosis of coronary artery disease and evaluation of the potential for risk of cardiovascular disease (CVD) are fundamental steps to improve women's health and decrease their risk of acquiring and dying from cardiovascular disease. Screening tests, noninvasive diagnostic testing, and testing to help determine risk and prognosis offer the opportunity to identify women at increased risk, begin proactive prevention strategies, and provide the basis for treatment options.

For women who do not have symptoms of CAD, the goal is to identify risk factors for developing CAD. Risk prediction charts are available, and one risk chart, the Framingham risk score (FRS), includes traditional risk factors for CAD, including age, smoking history, blood pressure, obesity, sedentary lifestyle, and cholesterol values.[32] From this score, it is determined if the risk is low, intermediate, or high. This is then correlated with expected rates of death or heart attack. Prevention strategies are then determined for each woman. In general, the risk of heart dis-

ease and heart events are low in premenopausal women and therefore screening is less important until menopause. Important exceptions to this are women who have diabetes, women with peripheral arterial disease, and overweight women with polycystic ovarian syndrome.

The U.S. Preventive Services Task Force (USPSTF) recommends against routine screening in adults who are low risk for CAD.[33] For those at higher risk (a history of a nonfatal heart attack, older age, high blood pressure, smoker, abnormal cholesterol levels, diabetes, obesity, and being sedentary), appropriate testing is very important to prevent future cardiac events. It is important to make a distinction between routine screening and tests done for individuals who are symptomatic or who are suspected to have CAD. For women who have a normal resting electrocardiogram (ECG) and who have good exercise tolerance, a routine exercise treadmill test with ECG is recommended as the initial test to evaluate suspected CAD. For women who have an undetermined or intermediate risk exercise ECG test, cardiac imaging is recommended. Again, diabetic women merit special attention and will need to be evaluated more assertively due to their eightfold higher risk of cardiovascular death compared to women who are not diabetic.

For women who are symptomatic—for example with angina pains—and are intermediate or high risk, noninvasive cardiovascular risk screening, including exercise ECG testing, stress echocardiography (an ultrasound imaging of the heart called echocardiogram, done while exercising), and cardiac imaging looking for atherosclorosis are recommended. Stress echocardiography can provide important information about the function of the left ventricle of the heart, valvular disease, and any stress-induced ischemia or previous infarction. This particular test has become an important tool in testing women, because it is more specific and accurate than standard exercise ECG in women. An abnormal exercise stress echocardiography test is associated with an increased risk of future cardiac events in women, and a normal test is associated with a low risk of cardiac events. Even in symptom-free women who are suspect for CAD, stress echocardiography is a cost-efficient and better test than an exercise ECG, particularly in women who are at intermediate risk for coronary artery disease.

Cardiac imaging tests include what is called gated myocardial perfusion single-photon emission computed tomography (SPECT), a nuclear-based technique. SPECT imaging is currently the most commonly performed stress imaging test in the United States. However, it may have limitations in women, possibly due to their smaller heart and the interference of the breast tissue. Different nuclear isotopes and pharmaceuticals can be used to enhance the diagnostic value of the SPECT test. Whichever SPECT technique is used, these tests are able to further evaluate and/or predict cardiac disease, and this information can be used to determine the extent of the treatment intervention that is needed to improve their symptoms and future health.

Several new imaging technologies have emerged in the detection of subclinical CAD: computed tomography (CT), magnetic resonance imaging (MRI), and carotid intima-media thickness (IMT). Consultation with a cardiologist is important in determining the value or need for such tests.

Increasingly, blood tests for cardiovascular biomarkers, which may serve as markers for CVD, are being done in healthy women. Tests for lipoprotein (a), C-reactive protein, fibrinogen, homocysteine, and subfractions of HDL-C and LDL-C are a few of the more frequently used. It is difficult to say with certainty, at this time, in whom and how often these should be done. Currently, the scientific community has not agreed on guidelines for their use or whether such testing ultimately does a better job than the traditional physical exam with cholesterol panels and blood glucose testing. In my practice, for

Risk Factors for Coronary Artery Disease

Medical Conditions

- Hypertension
- Diabetes mellitus
- Hyperlipidemia/lipid abnormalities
- Syndrome X (insulin resistance)
- Obesity and/or excess abdominal and upper body fat (apple shape)

Lifestyle

- Sedentary lifestyle
- High-fat diet
- Cigarette smoking
- Alcohol—more than two drinks per day
- Stress

Family History

- Coronary artery disease

women who have had one regular lipid panel with abnormalities, I am inclined to order these additional, more sophisticated blood tests. The more risk factors they have, such as obesity, diabetes, and others, the more eager I am to evaluate them in as comprehensive a manner as possible. These additional blood tests can be easily done to serve that purpose.

There are heart disease risk factors unique to women. These include oral contraceptive use, pregnancy, having had both ovaries removed, and premature menopause. Additional risk factors not related to gender include increased body fat, especially if it is in the abdominal area; history of smoking; being sedentary; diabetes mellitus; high blood pressure; poor lipid ratios; and family history.

OVERVIEW OF ALTERNATIVE TREATMENTS

Conventional and alternative medicine practitioners agree that, in most cases, atherosclerosis and cardiovascular disease are directly related to diet and lifestyle. While family history and genetic predisposition play an important role in cardiovascular disease, risk factors such as cigarette smoking, exercise, dietary habits, and stress can be modified to reduce a person's risk. In fact, a recent study found that the following factors are to be correlated to increased hypertension: excessive sodium intake, low potassium intake, physical inactivity, low intake of fish oil, low calcium intake, low magnesium intake, excessive coffee consumption, and excessive alcohol intake.[34]

Dietary and lifestyle changes are the foundations of heart disease prevention and treatment. Dr. Dean Ornish and his team of researchers conducted the first significant clinical trial to determine whether comprehensive lifestyle changes affect coronary atherosclerosis. Dr. Dean Ornish's landmark study, called the Lifestyle Heart Trial, published in 1990, found that lifestyle changes (a low-fat vegetarian diet, moderate aerobic exercise, stress management, smoking cessation, and group support)[35] changed serum lipids as much as cholesterol-lowering drugs. After one year in the program, patients also showed significant overall regression of their coronary atherosclerosis. These results have been replicated in several recent studies.[36–38] It is interesting to note that patients who made less comprehensive changes in lifestyle showed significant progression of their atherosclerosis, suggesting that the conventional 30 percent–fat diet recommendation made to patients with cardiovascular disease is not low enough. See the nutrition and dietary factors section for more about the Dean Ornish low-fat diet.

Smoking is the most important risk factor for cardiovascular disease and heart attacks, even in premenopausal women. Smokers have three to five times the risk of coronary artery disease as nonsmokers, and smoking accounts for one-fifth of CVD deaths.[39, 40] Even smoking only one to four cigarettes a day doubles a woman's risk of CVD. Smoking a pack or more per day may double to quadruple that.[41] Tobacco smoke contains chemicals that damage the lining of the arteries, raise the cholesterol level, promote the

KEY CONCEPTS

- Determine your individual risk for cardiovascular disease; make an appointment with a knowledgeable health-care practitioner for medical history, physical exams, and tests.
- Monitor blood pressure regularly.
- Monitor fasting levels of total cholesterol, HDL cholesterol, LDL cholesterol, cholesterol/HDL ratio, triglycerides, and blood glucose. Consult with your health-care provider regarding at what age to start and how frequently ECGs, stress ECGs, stress echocardiograms, and cardiac or carotid artery imaging may be needed on an individual basis depending on symptoms and suspicion of CVD.
- More sophisticated testing as needed or desired: homocysteine, alpha-lipoprotein (a), fibrinogen, C-reactive protein, HDL subfractions, LDL subfractions.
- Heart disease, and especially heart disease earlier in life, is a preventable disease; appropriate diet and exercise, emotional balance and stress management, and herbal and nutritional supplementation may substantially reduce CVD risk.
- Benefits and risks of hormone replacement therapy need to be discussed with a health-care provider familiar with up-to-date research on this topic.

ability of platelets to clump together, elevate levels of fibrinogen (a clot-forming protein), and elevate the blood pressure. Smoking is especially problematic in women who use oral contraceptives. This combination increases the risk of CVD by up to 39 times due to blood clots.[42] The good news is that women who stop smoking can reduce their risk of CVD to that of a nonsmoker within two years of quitting.

Exercise is a vital part of a lifestyle routine that can have lifelong benefits in preventing heart disease and strokes. Regular exercise lowers cholesterol levels, improves the blood supply and therefore the oxygen delivered to the heart, increases the strength of the heart muscle and thus improves the volume of blood it can move, reduces blood pressure, helps to inhibit blood clots, reduces overall body fat, and minimizes damage from stress.

In many women, stress is the major cause of their high blood pressure. Relaxation techniques such as deep breathing, biofeedback, meditation, yoga, progressive muscle relaxation, and hypnosis have all been shown to have some value in lowering blood pressure.[43] Many recent studies on various stress reduction techniques have also shown improvement in blood pressure and other meas-

PREVENTION

Prevention of Heart Disease

- Get regular aerobic exercise for 30 minutes, 5–7 days per week.
- Increase fish, whole grains, fruits, vegetables, legumes, olive oil, and nuts and seeds intake.
- Eat lean meats and poultry without the skin.
- Eat low-fat or fat-free dairy (preferably organic).
- Decrease consumption of foods high in saturated fats, cholesterol, sugar, and simple carbohydrates.
- Work toward or maintain a healthy body weight.
- Do not drink more than one alcoholic beverage per day.
- Stop smoking and avoid secondhand cigarette smoke.

Prevention of Hypertension

- Limit sodium intake to less than 2,400 mg per day.
- Practice stress management techniques.
- Work toward or maintain a healthy body weight.
- Exercise daily for 30 minutes or more.

Prevention of Hyperlipidemia

- Decrease consumption of saturated fats and high-cholesterol foods.
- Increase consumption of fruits, vegetables, and whole grains.
- Exercise daily for 30 minutes or more.
- Increase consumption of olive oil, nuts, and seeds.

ures of CVD, including decreased mortality and oxidative stress.[44–49]

A fundamental tenant of alternative medicine is that lifestyle changes that include smoking cessation, appropriate exercise, diet, and the use of dietary ingredients, nutritional supplements, and herbal extracts can prevent or reduce risks and treat cardiovascular disease. Considerable scientific research exists that demonstrates the effect of these natural therapies and interventions in lowering cholesterol, improving blood lipid ratios, lowering blood pressure, preventing clots and strokes, inhibiting fibrinogen, lowering homocysteine levels, strengthening the cardiac muscle, and preventing the oxidative damage to vessel walls, all of which are implicated in cardiovascular disease risk. Ingredients such as fiber, soy, antioxidants, folic acid, vitamins B_6 and B_{12}, magnesium, fish oils and flax oil, garlic, hawthorn berry, and others are just some of the many natural therapies that give alternative practitioners a great deal of confidence in their ability to help women to prevent and treat heart disease. Most alternative practitioners employ a diverse, holistic health plan in their approach to preventing and treating CVD. Recent research supports the use of supplements like fish oil, oat bran, and plant sterols in combination with diet and exercise interventions as a way to favorably effect all lipid parameters,[50] and diets focused on decreasing cholesterol have long-term success on par with statin therapy.[51]

Nutrition and Dietary Factors

Dietary habits are a fundamental area where we can exert a great deal of influence on our heart health.

Fats. Lowering the level of dietary fat has been in the news for a long time now. The American Heart Association says that 30 percent or less of our total calories should be from fat. Many alternative practitioners advise even lower intakes because of some of the additional benefits, such as reduction of breast, ovarian, and uterine cancer risk.

In addition to amount of fat, the type of fat is also important. Understanding the harmful effects of some fats and the beneficial effects of others can be confusing. A little explanation of terms and concepts may go a long way in clarifying the issue. Fats are the most concentrated source of food energy. Each gram of fat provides 9 calories, compared with only 4 calories per gram for carbohydrates or protein. All fats are made from carbon, oxygen, and hydrogen. These elements are arranged in molecules called fatty acids. The three major classes of dietary lipids are triglycerides, phospholipids, and sterols (such as cholesterol). Ninety-five percent of the dietary fats are triglycerides. A triglyceride is a glycerol molecule with three fat molecules attached. These fat molecules are called fatty acids. Lipase enzymes, found in our bile, break apart the triglyceride molecules. The triglyceride is converted into a monoglyceride, which the body can then absorb, along with the individual fatty acids and the glycerol.

Fatty acids and monoglycerides are absorbed and transported by lipoproteins. These lipoproteins are the very low-density lipoproteins (VLDL), low-density lipoproteins (LDL), and high-density lipoproteins (HDL) that we have discussed earlier in the chapter. VLDL and LDL transport the fats from the liver to the cells in the body, and HDL returns the fats to the liver. Elevations of LDL or VLDL are associated with an increased risk for atherosclerosis (narrowing of the arteries), which compromises blood flow to the heart, which can cause a heart attack, and creates an artery prone to releasing a blood clot, which can lead to a stroke. Elevation of the HDL is protective and is associated with a lower risk of heart attacks.

Types of Fatty Acids. A distinction should be made between different types of fatty acids. Saturated fatty acids are solid at room temperature

and are typically animal fats (found in beef, lamb, butter, cheese, and lard). Saturated fats in general are not good for the heart; they contribute to LDL cholesterol and should be eaten in sparse amounts for a heart-healthy diet. A triglyceride is a saturated fat when the carbon molecules in the fatty acids are saturated with hydrogen molecules and can't carry any more. When some of the hydrogen molecules are removed, what remains is an unsaturated fatty acid, or unsaturated fat. Unsaturated fats are liquid at room temperature and, therefore, are called oils. Most vegetable oils contain mainly unsaturated fats. These are not as bad for you as saturated fats, and they contain healthy essential fatty acids (discussed later), but they aren't healthy in large quantities. Polyunsaturated fatty acids contain more than one double bond along the fatty acid chain. Replacing saturated fatty acids in the diet with polyunsaturated fatty acids (PUFAs) from vegetable oils will lower both total cholesterol and LDL levels and decrease blood pressure.[52] However, it may also lower HDL.

The third general type of fat is monounsaturated fat. These fats contain one double bond. Monounsaturated fatty acids, as found in olive oil, show either no effect on HDL or an increase in HDL, thereby promoting a better effect than either PUFAs or saturated fats. Of all the types of fat, monounsaturated is the healthiest for your heart.

An omega-9 oil, such as oleic acid (found in olive oil), is a monounsaturated fat that has the unsaturated bond at the ninth carbon molecule on the chain. Monounsaturated oils like canola and olive are ideal for cooking as they are made chiefly of oleic acid that is more resistant to damage from the heat from cooking and light from storage. The high content of oleic acid make these two oils far superior to the highly polyunsaturated oils like corn, safflower, and soy that are easily damaged by heat and light and aren't as heart-healthy. The fatty acids in these less desirable oils are changed to lipid peroxides with cooking, which have a toxic effect on the inside of the arteries. In a healthy cardiovascular prevention regime, one would, therefore, preferentially eat the seeds and fruits that contain monounsaturated oils; use canola, sesame, and olive oil for cooking; and leave the rest of the oils on the supermarket shelves. (See Table 9.2 for the fatty acid composition of different dietary oils).[53]

We don't hear a lot about sesame oil, but a number of studies have proven its cardiovascular benefits. One study showed a significant decrease in blood pressure measures in patients after 45

Table 9.2 Fatty Acid Composition of Various Dietary Oils

Oil	% GLA (Omega-6)	% LA (Omega-6)	% ALA (Omega-3)	% Oleic (Omega-9)	% Saturated Fat
Flax	0	14	55	20	9
Safflower	0	75	0	13	12
Soy	0	50	9	26	15
Olive*	0	8	0	76	16
Coconut	0	3	0	6	91
Corn	0	59	0	24	17
Canola	0	30	7	49	7

*Is especially high in the preferential monounsaturated fat, oleic acid.

days of using sesame oil and an increase in measures when patients reverted back to other oils. In addition, sesame oil decreased weight, body mass index, waist and hip measurements, blood sugar, hemoglobin A1c, total cholesterol, LDL, and triglycerides.[54] Another study found that sesame oil was superior to sunflower and nut oils in its ability to decrease oxidation of lipids, improve lipid parameters, and decrease blood pressure.[55]

Olive oil, with a monounsaturated fatty acid rich in oleic acid, is especially heart-healthy. Most of the beneficial effects of olive oil, especially the richer virgin olive oil, are attributed to its high monounsaturated fatty acid content. However, it also has other components that may help explain its cardiovascular benefits. Virgin olive oils have more phenols, which appear to provide the greatest benefits by increasing HDL cholesterol levels and reducing the oxidative damage on lipids. Phenols are a class of naturally occurring compounds found in fruits, vegetables, tea, red wine, and grape juice that are in essence antioxidants. These cardioprotective phenols included flavonoids, resveratrol, and curcumin. A daily 25 ml dose of any type of olive oil has been shown to reduce lipid cardiovascular risk factors[56] by decreasing oxidative damage on lipids, increasing HDL cholesterol levels, and improving the glutathione balance that protects against oxidative stress.

Hydrogenated oils (an unsaturated oil that has been made into a saturated fat) should be avoided for cardiovascular health. Hydrogenated oil raises LDL, lowers the protective effects of HDL, and can in fact increase the incidence of heart disease. Foods such as margarine, cakes, cookies, candies, and doughnuts often contain partially or totally hydrogenated oils. This is also true of many oils sold in supermarkets; in order to prolong their shelf life, hydrogenated fats are used in many so-called cooking oils.

Another important fat classification, and one that's come under a good bit of scrutiny lately for being especially unhealthy, is trans fats. Trans fats are made during the process of hydrogenating oils by chemically modifying a natural oil in a process that converts some of the *cis* unsaturated fatty acids to the *trans* form. When we metabolize trans fat, it behaves similar to saturated fat, leading to a higher risk of heart disease and other chronic diseases. Trans fats have adverse effects on HDL-C and LDL-C. Trans fatty acids also have an adverse effect on cell membranes, making them stiffer, and in general are associated with increased inflammatory and oxidative damage.

Trans fatty acid levels are determined by the amount of hydrogenated oils in a food. Foods such as doughnuts, french fries, margarine, most cookies, and any food that contains "partially hydrogenated oils" contain trans fats. Soybean oils, corn oils, and safflower oils contain relatively high amounts of oleic and linoleic acids, which can convert to elaidic acid during the hydrogenation process. Elaidic acid is the most common form of trans fatty acids because of its production by hydrogenation of our most common dietary oils. Elaidic acid is found in amounts as high as 60 percent in hard margarine. Being armed with a bit of knowledge about trans fats and the foods that contain them and knowing what to look for on labels will help you to steer clear of the damaging effects of trans fats.

Many women are fearful of eating more nuts due to their fat and calorie content, but nuts actually contain healthy fats, as does olive oil. Higher amounts of nuts are associated with cardioprotective effects. Increased intake of walnuts in particular, with their alpha-linolenic acid content, appears to have a triglyceride-lowering effect.[57] In addition, beneficial oils in nuts help to decrease inflammatory markers associated with CVD risk, such as C-reactive protein (CRP).[58] Nuts and seeds to increase in the diet in addition to walnuts include almonds, filberts, sesame seeds, pumpkin seeds, and flaxseed.

Cholesterol. Cholesterol is a waxy substance found in animal tissue. It is produced by the liver

(about 1,000 mg per day) and is a component of all cell walls. Blood-circulating cholesterol is supplied by the liver and the intake of animal foods. Diets that are high in cholesterol and saturated fats (beef, pork, lamb, butter, cheese, palm oil, coconut oil) contribute to poor lipid ratios and elevated cholesterol. Lowering the cholesterol in the diet will lower the blood cholesterol in most individuals.[59]

Essential Fatty Acids. The body can make most of the fatty acids it needs from the carbon, hydrogen, and oxygen provided by food. These have been arbitrarily classified as nonessential fatty acids. (This is a most unfortunate classification. It tends to mask the fact that the so-called "nonessential" fatty acids are as critical to cellular life and metabolism as are the so-called "essential." The nonessential fatty acids are manufactured by the cells from raw materials. The others must be supplied by food. We cannot survive without both.) Essential fatty acids (EFAs) are polyunsaturated fats that must be obtained from foods. The two essential fatty acids are linoleic acid and alpha-linolenic acid. Linoleic acid is the main omega-6 fatty acid. Alpha-linolenic acid is the main omega-3 fatty acid, which the body can convert to eicosapentaenoic acid (EPA) and docahexaenoic acid (DHA). Linolenic acid has been found to decrease atherosclerotic plaques, systolic blood pressure, and related mortality in that high dietary consumption is related to low incidence of atherosclerosis.[60–63]

The body uses the omega fatty acids to create eicosanoids. One of the most important classes of eicosanoids is the prostaglandins. Prostaglandins exert a local hormone-like effect on target cells and tissues. For example, in the cardiovascular system, they affect dilation or constriction of blood vessels and clot formation.

The omega-6 and omega-3 fatty acid groups each produce separate, distinct prostaglandins. Both types of fatty acids are needed, but in the right ratio. There is some disagreement as to the right ratio between omega-6 and omega-3 fatty acids. Our early ancestors probably ate roughly equal amounts of omega-6 and omega-3 essential fatty acids. In the modern industrialized countries, most people eat from 10:1 to as high as 30:1 omega-6 to omega-3. Based on the research of Yeluda and Carasso,[64] many modern alternative practitioners recommend a ratio of 4:1. This ratio of fatty acids will produce a favorable production of the friendly prostaglandins, series 1 and series 3, and a limited amount of the unfriendly series 2 prostaglandins. Overall, we want to reduce omega-6 fats and increase omega-3 fats in our diet. Increasing dietary fish, flaxseed, and walnuts and decreasing saturated fats will help to improve this ratio.

The eicosanoids from eicosapentaenoic acid are also associated with cardioprotective effects. EPA has been shown, in particular, to decrease systolic blood pressure, in part due to its effects on intracellular sodium transport,[65] while docahexaenoic acid has been shown to increase HDL.[66] In animal studies, dietary fish oil has been shown to improve vascular function and decrease oxidative stress.[67]

Fish oils contain EPA and DHA. Cold-water fish such as salmon, tuna, mackerel, herring, and halibut in particular are excellent sources of omega-3 fatty acids. Fish oils prevent clots, inhibit inflammation in the vessel walls, cause vasodilation, and promote a regular cardiac rhythm. Similar to aspirin, fish oils block the production of thromboxane A2, which is a potent vasoconstrictor and promoter of the stickiness of blood.[68] Fish oils may also lower blood pressure and triglycerides, but they may raise LDL.[69–71] Other studies show that fish oils lower total cholesterol, LDL and triglycerides, while increasing HDL.[72] In a large study of male physicians, those who ate fish at least once per week had a 52 percent lower risk of sudden cardiac death.[73] Fish oils with a seed oil of alpha-linolenic acid and vitamin E have also been shown to reduce the inflammatory marker C-reactive protein (CRP), associated with cardio-

Five Omega-6 and Omega-3 Fatty Acids to Remember

LA: Linoleic acid. An omega-6 fatty acid found in vegetable oils, nuts, and seeds. Given the proper conditions, the body converts LA to GLA and eventually into prostaglandin 1.

GLA: Gamma-linolenic acid. LA gets converted to GLA by enzymes in the body. Certain foods, habits, and events (saturated fat, partially hydrogenated oils, stress, aging, drinking alcohol) disrupt this conversion so that only 5 to 10 percent of LA gets converted to GLA. It may be better to get GLA directly from evening primrose oil, black currant oil, or borage oil supplements.

ALA: Alpha-linolenic acid. This is an omega-3 fatty acid not commonly found in foods. Seven seed oils contain some ALA, with flaxseed oil being the richest natural source. Through several biochemical steps, the body converts ALA to EPA and then to prostaglandin 3.

EPA and DHA: Eicosapentaenoic acid and docahexaenoic acid. These two omega-3 fatty acids are found in cold-water fish oils. EPA is a building block for the body to make prostaglandin 3; DHA is important for the brain, nervous system, and vision.

vascular disease.[74–79] Norwegian researchers concluded that eating fish like mackerel, herring, and salmon will significantly reduce the risk of heart disease. As little as one serving of 300 grams of fish per week will provide the benefit. They suggested that the minimal dietary requirement for EPA and DHA should be about 200 mg per day.[80]

Keep in mind that fish oil has anticoagulation effects that may act synergistically with medications like warfarin, and therefore caution should be exercised in supplementing with fish oil in people who are taking these medications.[81] Lipid-lowering medication was found to decrease beneficial omega-3 fatty acids and increase pathogenic arachidonic acid after only three months of use, leading the authors to conclude that these medications should be combined with diets low in arachidonic acid and high in omega-3 fatty acid.[82] Fish consumption not only improves laboratory values but also decreases evidence of cardiovascular disease at the blood vessel level in terms of stenosis and other markers of atherosclerosis in postmenopausal women who consumed two or more servings of fish per week.[83]

Fiber. Increasing the fiber in the diet is another vitally important nutritional habit to acquire. Fiber sources that form a gel such as psyllium seed or oat bran bind bile and cholesterol in the intestines and promote their excretion. This action improves the cholesterol by decreasing LDL levels while increasing HDL levels.[84] A diet high in whole grains, fruits, vegetables, and legumes is the optimal high-fiber diet. Soluble fibers such as pectin or oat bran have the most consistent beneficial effects on cholesterol levels.[85] Most studies on fiber have shown rather impressive lipid reductions, with the higher the initial cholesterol, the greater the benefit. One of the ways fiber helps to lower cholesterol is to increase the rate at which food passes through the digestive tract, thereby increasing the loss of cholesterol in the stool. A review of 20 scientific trials on the effect of oat products on cholesterol demonstrates that a modest reduction in blood cholesterol can be achieved by eating oat products daily.[86] Eating one bowl of oat bran cereal or oatmeal daily (3 grams of oat fiber) lowers the total cholesterol by 8 to 23 percent. These results have been achieved in as little as three weeks.

A more recent study showed that dietary fiber intake is inversely correlated with several cardiovascular disease risk factors. The highest total dietary fiber and nonsoluble dietary fiber (more than soluble) intakes from fruit, vegetables, and cereals were significantly associated with a decrease in a number of cardiovascular risk factors including overweight, hypertension, lipid markers, and homocysteine.[87] Part of fiber's effect on lipids is because these higher fiber diets are in fact diets low in cholesterol intake.[88]

Another study found that soluble fiber added simply as a breakfast bread source was found to significantly decrease blood pressure and triglyceride and cholesterol levels in diabetic patients.[89] Increased fiber intake (more than 3 grams of cereal fiber daily or more than six servings of whole grains per week) is also associated with decreased progression of coronary atherosclerosis in postmenopausal women.[90]

A number of large, recent epidemiological studies published in medicine's most respected journals found that overall, increased intake of dietary fiber is associated with decreased cardiovascular disease in adults[91, 92] and menopausal women.[93, 94] Another study looked at the combination of 10 mg of simvastatin and 15 grams of psyllium (Metamucil) and found that the combination decreased LDL cholesterol better than the same dose of medication alone and found reductions comparable to 20 mg of simvastatin after four to eight weeks of treatment without significant changes in HDL or triglycerides.[95] One study of a very low saturated fat diet plus a cholesterol-lowering drug, compared to a diet high in plant sterols, including soy foods and high-fiber whole grains, concluded that dietary intervention may be as effective as the medication.[96] Continuing to eat a diet higher in fiber as we age also provides cardioprotection. A large study found that increasing fiber later in life can decrease risk of cardiovascular disease in the elderly.[97]

Research has also shown that the sugars in fruit (fructose) significantly raise blood triglyceride and cholesterol levels. If your triglycerides are above 150 mg/dL, or if you have additional significant risk factors for heart disease such as elevated blood pressure or diabetes, avoid too much fruit, fruit juice, and other simple sugars. Limit them to one serving per day. Sugar can be eaten in small amounts only if your triglyceride level is below 150 mg/dl. All sugars can increase triglycerides, but a high amount of fructose, espcially fructose added as a sweetener, is actually more damaging than sucrose and glucose. It gets even worse if you eat high-fructose corn syrup, a very common sweetener used in packaged foods. Fructose increases LDL and does not improve HDL. A recent study showed that foods with a high glycemic index have a negative effect on HDL levels.[98]

If you have elevated triglycerides, you can eat all the whole grains that you want, although some diets, such as the popular Zone diet, present some provocative, controversial ideas that may be contrary to this.

One of the best ways to achieve a high-fiber and low-fat diet is the vegan diet. This is a vegetarian diet in which absolutely no animal products are consumed. Strict vegan diets, which are typically very low in saturated fat and dietary cholesterol and high in fiber, can help maintain or achieve desirable blood levels by especially lowering the total cholesterol and the LDL cholesterol.[99]

Specific fruits or vegetables may also have a particular positive effect on serum lipids. Raw carrots may have a more potent effect on lowering cholesterol than do oat products. Eating a raw carrot at breakfast every day for three weeks has been shown to reduce serum cholesterol by 11 percent and increase fat excretion by 50 percent.[100]

Evidence also exists demonstrating that people with a low intake of fruits and vegetables have an increased risk for heart disease.[101] Numerous studies have continued to show that a diet high in carotenes and flavonoids found in fruits and vegetables reduces the risk of heart disease and strokes.[102] It is thought that the antioxidants (C, E, carotenes, and flavonoids) found in fruits and vegetables reduce the risk of cardiovascular disease by scavenging free radical species. The antioxidants protect the unsaturated fatty acids from peroxidation, thus preventing atherosclerosis. Lipid peroxide concentrations are in fact higher in individuals with atherosclerosis.[103] Good dietary sources of carotenes as well as vitamins C and E are green leafy vegetables, yellow-orange fruits and vegetables, red and purple

fruits and vegetables, legumes, grains, and seeds. Good dietary sources of flavonoids are citrus fruits, berries, onions, parsley, legumes, green tea, and red wine.

Soy. Soy foods contain a group of nonsteroidal plant chemicals called phytoestrogens. These compounds are similar in their chemical structure to estradiol, and to equol, a phytoestrogen metabolite, but they are not actually estrogens. Phytoestrogens are categorized into three main classes: isoflavones, lignans, and coumestans. Isoflavones contribute significantly to our dietary phytoestrogen intake. Isoflavones are found in legumes and are highest in soybeans. These isoflavones are associated with the protein part of the soybeans and are not found in soy oils or soy lecithin.

One potential dietary influence for a cholesterol-lowering strategy is to consume more soy protein. This is perhaps my favorite recommendation to women because soy also offers many other potential benefits, including mild reduction of menopausal symptoms and potentially reduction in the risk of breast cancer and uterine cancer. Observations in large Asian populations, whose diet includes soybeans as a basic food group, show a lower incidence of CVD than in populations who consume a traditional Western diet.[104]

Much research has been done on soy and its relationship to blood pressure, cholesterol, and even some inflammatory biomarkers of cardiovascular disease. In general, the studies are varied, with some showing clear benefit and some not showing any. Perhaps the best evidence comes from a review of 38 scientific studies. This meta-analysis concluded that consumption of soy protein rather than animal protein significantly decreased serum concentrations of total cholesterol, LDL cholesterol, and triglycerides.[105]

The use of soy for menopausal symptoms and heart disease protection continues to receive great interest from women, practitioners, and scientists. Most recently, a large meta-analysis of studies published from 1966 to 2005 found that soy protein intake was significantly related to decreased total and LDL cholesterol and triglycerides and increased HDL.[106] Other studies of pre- and postmenopausal women found that soy is beneficial for improving lipid parameters,[107, 108] with even more favorable effects in type 2 diabetic women with hyperlipidemia,[109] decreasing lipid peroxidation better than estrogen,[110] improving platelet function,[111] decreasing homocysteine,[112] and working synergistically with statins to achieve favorable cholesterol levels.[113] New research states consuming 25 grams of soy protein (containing 50 mg of isoflavonoids) daily for five weeks may decrease systolic blood pressure by nearly 6 percent.[114]

There are many other positive soy studies, too numerous to list here, but to be fair, let's talk about those soy studies that have not showed lipid-lowering effects. A recent study looked at daily soy consumption in the form of a 50-mg isoflavone bar and found no significant change in lipids, except an increase in HDL, when consumed for eight weeks. The isoflavone-enriched bar did improve C-reactive protein (CRP), a marker of inflammation that mediates the initiation and progression of atherosclerotic plaque lesions, but had no significant effect on other plasma inflammatory markers.[115] A controlled trial of 202 healthy postmenopausal women aged 60 to 75 concluded that the use of a soy protein supplement containing isoflavones did not improve plasma lipids when started at age 60 or older.[116] A 2006 review article concluded that the evidence for soy lowering cholesterol was not overwhelmingly impressive.[117]

Interestingly, when soy intake (30 grams of soy, including 4 grams of phytosterols) was studied in the setting of a low glycemic index diet (a diet that does not raise blood sugar levels quickly), it demonstrated more improvement in lipid parameters than the standard American Heart Association Diet.[118] It may in fact be that soy is most effective as part of an overall healthy diet and lifestyle plan. Substituting soy protein

for animal protein increases the variety of nutrient intake and adds fiber, monounsaturated fats, minerals, and antioxidants while avoiding the saturated fats found in animal protein. Other studies have found that supplementing the diet with a soy protein and soy fiber lowers LDL and total cholesterol[119] and that eating any legumes, including soy, at least four times per week can lower the risk of cardiovascular disease.[120]

Despite the lack of effect in some studies on soy and lipids, when we look at the role of soy in other aspects important to women's health—reducing the incidence and severity of hot flashes, loss of bone mass, vaginal dryness, and female-related cancers—the most convincing effects of soy are in fact in the area of its action on lipids. The North American Menopause Society seems to agree with this perspective in a 2000 consensus opinion.[121]

With many good reasons for women to eat soy, blood pressure may be another area of benefit. New research states that consuming about 25 grams per day of soy protein can decrease blood pressure.[114, 122–124]

Good Carbs, Bad Carbs. It seems we all love carbohydrates. Complex carbohydrates, such as found in brown rice, whole wheat, rye, oats, barley, millet, whole fruits, and vegetables are high in both fiber and vitamin content and therefore the preferred form of carbohydrates. Refined carbohydrates, on the other hand, must be placed in the group of unhealthy foods. Sugar, a refined carbohydrate, is a significant factor in the development of atherosclerosis.[125]

High-sugar diets lead to elevations in triglycerides and cholesterol and also to an increase in insulin production. Elevations in insulin levels are associated with risk of cardiovascular disease by increasing cholesterol, triglycerides, and blood pressure. The prudent woman would decrease all sources of refined sugar in the diet by avoiding candies, pastries, and desserts; she would also avoid sweetened cereals, white breads, or any food containing refined carbohydrates. Decreasing the total carbohydrate intake in favor of increased protein may be advisable as well. A recent study of women found that weight loss of as little as 5 percent with a plan that included decreased carbohydrates and increased exercise lead to a decrease in the ability of LDL cholesterol to cause atherosclerosis.[126] Of course, this would presume the carbohydrates left in the diet to be complex and not refined.

If your triglycerides are above 150 mg/dL, or if you have additional significant risk factors for heart disease such as elevated blood pressure or diabetes, limit fruit, fruit juice, and other simple sugars to one serving per day. Sugar can be eaten in small amounts only if your triglyceride level is below 150 mg/dl. All sugars can increase triglycerides, but fructose is actually more damaging than sucrose and glucose. It gets even worse if you eat high-fructose corn syrup, a very common sweetener used in packaged foods. Fructose increases LDL and does not improve HDL. A recent study showed that foods with a high glycemic index have a negative effect on HDL levels.[98]

Foods with a high glycemic index are those foods that raise blood sugar levels quickly. These foods include items such as white bread, refined cereals, white rice, and white flour pasta. These foods greatly stress blood sugar control and cause a rapid rise in blood sugar. In response, the body secretes insulin from the pancreas. Over time, too much insulin is secreted, called hyperinsulinemia, and the body tissues become resistant to the insulin. These two consequences of a high glycemic index diet can promote the growth of cancer and increase the risk of heart disease and diabetes.

Reading labels on packaged foods is a good strategy for reducing intake of refined sugars. Any label that says sucrose, glucose, maltose, lactose, fructose, sugar, corn syrup, or white grape juice concentrate is a source of added dietary sugar.

Salt. With all this talk of lowering cholesterol and improving the cholesterol ratios, it is easy to

forget how important it is to balance the blood pressure and how foods may have a positive or a negative effect on this. For example, a diet low in potassium and high in sodium is associated with high blood pressure. By contrast, a diet high in potassium and low in sodium can protect against elevation of blood pressure.[127, 128] It has become common knowledge that too much salt in our diet may contribute to high blood pressure. Not so commonly known is that high blood pressure is also related to too little potassium in our diet. In fact, restricting salt alone may not be enough to lower the blood pressure. Potassium must be increased. Most Americans ingest twice as much sodium as potassium. Nutrition researchers recommend a 5:1 potassium-to-sodium ratio that is easily accomplished by a diet high in fresh fruits and vegetables, which are rich in potassium.

Dietary recommendations in the treatment of hypertension were evaluated by the federal government in the Dietary Approaches to Stop Hypertension (DASH) studies. The DASH diet is high in fruits, vegetables, and low-fat dairy foods and low in saturated and total fats. It is also low in cholesterol but high in fiber, potassium, calcium, and magnesium. The DASH diet, along with a sodium intake of less than 2,400 mg per day, results in significantly lower blood pressures—systolic pressure that is 7 points lower in patients without hypertension and 11.5 points lower in those with hypertension.[129] The characteristics of the DASH diet are described in Table 9.3.

Caffeine. The peer pressure to become a coffee drinker is no greater than the conflicting evidence around the health impact of coffee. Some studies say it raises cholesterol; some do not. Some say caffeinated coffee is the problem but decaffeinated is not; others show no difference between the two. There is no one consistent answer on the effect of coffee on heart disease. What does seem to be true is that caffeinated coffee drinkers also drink more alcohol, consume more dietary saturated fats and cholesterol, are more likely to be smokers, and are less likely to be current exercisers.[130]

I encourage all my patients to decrease their coffee intake to not more than one regular coffee drink per day. Using any stimulant to falsely raise energy and obscure the fact that we are tired or stressed or just plain doing too much in our lives does not seem consistent with respecting our bodies' normal rhythms. For women who have elevated cholesterol, elevated blood pressure, or generally higher risks for heart disease, the number of studies that do show a connection between coffee and hyperlipidemia, hypertension, and coronary heart disease seem to deliver an obvious message: just say no.

In hypertensive individuals, the use of caffeinated beverages is questionable. Two studies showed slight elevations in blood pressure or a potentiation of the stress-related rise in blood pressure in hypertension-prone males. In a third study, caffeine (75 mg per day) had no effect on the blood pressure of young, healthy subjects.[131] In a recent study, caffeine consumption was not found to be related to the incidence of hypertension but consumption of cola was.[132]

Caffeine also appears to have adverse effects on serum lipid profiles. In men, coffee intake induced higher levels of cholesterol.[133, 134] Moreover, when men with elevated cholesterol levels refrained from coffee for five weeks, their serum cholesterol dropped by 10 percent. Those who continued to abstain from coffee showed a 13 percent average drop at ten weeks, and those who returned to coffee gradually reached prestudy levels of total cholesterol.[135] In women, cholesterol levels increased with increasing amounts of coffee with a low of 214 mg/dL at one-half to one cup per day and a high of 234 mg/dL at four cups per day.[136] Almost all of the difference was due to an increase in low-density lipoprotein cholesterol. Cholesterol was not affected by decaffeinated coffee in this study.

Table 9.3 The DASH Diet—Basic Components (2,000 calories per day)

Food Group	Daily Servings	Serving Sizes	Examples	Significance of Food
Grains and grain products	7–8	1 slice bread ½ cup dry cereal ½ cup cooked rice, pasta, or cereal	Whole wheat bread, whole-grain cereal, oats, grits	Sources of energy and fiber
Vegetables	4–5	1 cup raw leafy vegetables ½ cup cooked vegetables 6 oz veggie juice	Tomatoes, potatoes, carrots, peas, squash, broccoli, turnip greens, collards, kale, spinach, artichokes, beans, sweet potatoes	Sources of potassium, magnesium, fiber, flavonoids, antioxidants
Fruits	4–5	6 oz fruit juice 1 medium fruit ½ cup dried fruit ½ cup fresh, frozen, or canned fruit	Apricots, bananas, dates, oranges or juice, grapefruit or juice, mangoes, melons, peaches, pineapples, prunes, rasisins, strawberries, tangerines	Sources of potassium, magnesium, fiber, flavonoids, antioxidants
Low-fat or nonfat dairy foods	2–3	8 oz milk 1 cup yogurt 1.5 oz cheese	Skim or 1% milk; nonfat or low-fat yogurt, buttermilk, and cheese; part-skim mozzarella cheese	Sources of calcium, protein
Meat, including poultry and fish	2 or fewer	3 oz cooked meat, poultry, or fish	Select lean; trim away visible fats; broil, roast, or boil instead of frying; remove skin from poultry	Sources of protein and magnesium
Nuts, seeds, legumes	4–5 per week	1.5 oz or ⅓ cup nuts ½ oz or 2 tbs seeds ½ cup cooked legumes	Almonds, filberts, mixed nuts, peanuts, walnuts, sunflower seeds, kidney beans, lentils	Sources of energy, protein, fiber, magnesium, protein

There are multiple reasons that coffee has this effect on serum cholesterol. Unfiltered coffee in particular[137, 138] increases coronary artery disease risk and mortality in men and women.[138, 139] This effect is possibly explained by the presence of the diterpines (removed by filtering), cafestol, and possibly kahweol in unfiltered coffee. Another explanation came to light in a recently published Norwegian study[140] that indicated a dose-response between coffee consumption and blood homocysteine levels: the larger the coffee intake, the greater the homocysteine levels.

Homocysteine is formed during the breakdown of certain amino acids and is known to increase the risk of heart disease when it accumulates in the blood.

Alcohol. Many sweeping statements have been made about the benefits of alcohol in preventing heart disease. If we look at the connections between heart disease and alcohol more closely, we find that these general statements are in fact paradoxical and can be misleading. Heavy use of alcohol causes damage to the heart muscle and is also related to high blood pressure, strokes, and arrhythmias (irregular heartbeats). On the other hand, people who abstain from alcohol, when compared to those who drink, are at greater risk of major heart disease events such as heart attacks. To understand the alcohol-heart connection, it is important to distinguish between light, moderate, or heavy alcohol use. A working definition is helpful: Heavy use is three or more drinks per day. One to two drinks per day is low to moderate, and light would be something less than one daily drink.

There is now strong evidence that light to moderate alcohol consumption protects against heart disease. Low to moderate alcohol intake, one drink per day, may reduce the risk of cardiovascular disease.[141] In the Nurse's Health Study, one drink per day reduced the risk of heart disease by 40 percent.[141, 142] Another study reported that women who had one drink per day had a 30 to 40 percent lower risk of all cardiovascular diseases as well as a lower death rate than heavy drinkers and very light drinkers.[143] And more recently, consumption of 15 grams (one drink) to 30 grams (two drinks) of alcohol per day by postmenopausal women was shown to improve lipid profiles and therefore decreased their cardiovascular disease risk.[144] Alcohol tends to raise HDL cholesterol, which likely contributes to its cardioprotectiveness. Alcohol also has a beneficial effect on decreasing blood clotting.

It is not clear whether there are any significant differences between red wine, white wine, liquor, and beer. However, researchers have observed the "French paradox": in France, saturated fat intake and mean cholesterol levels are high, but heart disease mortality is low. Wide publicity about this paradox has asserted that red wine consumption in France is high and is responsible for the unexpected results. As a consequence, a general perception exists that red wine is especially beneficial. Nonalcoholic ingredients in the red wine may in fact be responsible for this benefit, including antioxidants and flavonoids, namely the antioxidants in red grapes that prevent the oxidation of LDL cholesterol.

Alcohol ingestion, however, harbors potential dangers that may outweigh its alleged benefits. In my opinion, daily ingestion of alcohol cannot be responsibly recommended to women. Well-documented evidence indicates that alcohol may increase serum estradiol by 300 percent in postmenopausal women who take hormone replacement.[145] Alcohol also increases the incidence of breast cancer,[146–148] osteoporosis,[149] depression,[150] pancreatitis, liver cirrhosis, gastritis, degenerative nervous system conditions, fetus damage, substance abuse, and cancers of the mouth, pharynx, larynx, esophagus, and liver.[151] These, and the harmful cardiovascular consequences of heavy drinking, add up to considerable increase in disease and death.

From a medical perspective, all heavy drinkers should reduce their intake. It is my opinion that moderate drinkers should also reduce to light intake, and in individual cases, abstinence (those with breast cancer, those with a history of substance abuse, possibly those taking hormone replacement therapy, and maybe others). Daily alcohol probably does not belong in a healthful life. Stick to the occasional celebrations, and utilize other methods of reducing your risk of cardiovascular disease.

Chocolate. It has been hypothesized for some time that chocolate can reduce the risk of cardiovascular disease. High levels of antioxi-

dants, including stearic acid and flavonoids called procyanidins, catechins, and epicatechins, are found not only in chocolate but also in tea, red wine, and various fruits and vegetables. Cocoa is particularly rich in these flavonoids. It is thought that the flavonoids reduce leukotrienes, potent vasoconstrictors, and contain prostacyclins that vasodilate and inhibit blood stickiness.

This benefit is only found in dark chocolate, however. Milk chocolate binds to the antioxidants in chocolate and makes them unavailable. It is also higher in fat content. Dark chocolate, with 70 percent cocoa or more, also known as bittersweet or semisweet chocolate, contains little or no added sugar and is made from cocoa butter, which has a neutral or even beneficial effect on cholesterol. Dark chocolate is also made without the use of hydrogenated or partially hydrogenated oils, which have a negative impact on cholesterol.

Dark chocolate decreases LDL cholesterol oxidation, reduces the risk of blood clots, increases blood flow in arteries, and may even lower blood pressure. It may or may not have a beneficial effect on cholesterol levels. According to laboratory experiments and randomized trials, the suggestion is that the flavonoids in chocolate are likely protective against death from cardiovascular disease.[152] It is thought that eating 50 grams (about one two-ounce bar) of dark chocolate per day may reduce one's risk of CVD by 10.5 percent.[153]

Heart-Healthy Diets. There are a number of diet recommendations that utilize nutritional benefits to improve and maintain cardiovascular health. The following are some of the most respected, well-known, and effective cardiovascular diets.

The Step 1 and Step 2 Cholesterol-Lowering Diets. The Step 1 and Step 2 diets were created by the National Heart, Lung, and Blood Association's National Cholesterol Education Program (NCEP) and have been endorsed by the American Heart Association (AHA). These diets were designed to reduce the risk of cardiovascular disease by focusing on reducing elevated cholesterol levels.

The Step 1 diet advises to reduce total fat intake to less than 30 percent of daily calories, with 8 to 10 percent of calories coming from saturated fats. Polyunsaturated fats should comprise less than 10 percent of daily calories. Monounsaturated fats (olive oil, avocados, soy) should be limited to less than 15 percent of total calories. The intake of cholesterol should be less than 300 mg per day. Protein should be about 15 percent of total calories, and total calorie intake should be determined based on what amount would help to maintain normal body weight.

The stricter Step 2 diet requires greater discipline and perhaps the guidance of a dietician/nutritionist. Step 2 differs from Step 1 in that less than 7 percent of daily calories comes from saturated fats and cholesterol intake is limited to less than 200 mg.

If you have a diet that differs from the Step 1 diet, and you have hyperlipidemia, then start with this diet. If you are already following the Step 1 diet, or a similar diet, and your cholesterol is still abnormal, especially an elevated LDL, then you should start the Step 2 diet. In either case, a lipid panel test should be done after three months of the diet.

In general, a Step 1 diet typically reduces the total cholesterol by 5 to 7 percent. The Step 2 diet typically drops the level of LDL another 3 to 7 percent. The dietary changes, along with an exercise program designed to reduce weight, should be done in women who are overweight. Even a small weight loss of 5 to 10 pounds has been associated with a greater reduction in LDL cholesterol than just the Step 1 diet and no weight loss. Weight loss also results in raising HDL-cholesterol levels, lowering triglycerides levels, and lowering blood pressure.[154]

The TLC Diet. In 2001, the National Cholesterol Education Program released new guidelines for the management of cholesterol in the "Third Report of the Expert Panel on Detection, Evalu-

ation, and Treatment of High Blood Cholesterol in Adults, Adult Treatment Panel III (ATP)." The American Heart Association has adopted the NCEP III guidelines, calling for more intensive life-habit interventions to lower cholesterol and reduce the risk for heart disease and of heart attacks. They call this the Therapeutic Lifestyle Changes (TLC) diet. Its target is to lower LDL cholesterol. See the following sidebar for the recommendations of the TLC diet.

AHA Recommendations. The American Heart Association dietary recommendations are designed to reduce high cholesterol, high blood pressure, and excess weight. These are the dietary guidelines:

- Eat a variety of fruits and vegetables. Choose five or more servings per day.
- Eat a variety of grain products, including whole grains. Choose six or more servings per day.
- Include fat-free and low-fat milk products, fish, legumes (beans), skinless poultry, and lean meats.
- Choose fats with 2 grams or less of saturated fat per serving, such as liquid and tub margarines, canola oil, and olive oil.
- Balance the number of calories you eat with the number you use each day. (To find that number, multiply the number of pounds you weigh now by 15 calories. This represents the average number of calories used in one day if you're moderately active. If you get very little exercise, multiply your weight by 13 instead of 15. Less-active people burn fewer calories.)
- Maintain a level of physical activity that keeps you fit and matches the number of calories you eat. Walk or do other activities for at least 30 minutes on most days. To lose weight, do enough activity to use up more calories than you eat every day.
- Limit your intake of foods high in calories or low in nutrition, including foods like soft drinks and candy that have a lot of sugars.
- Limit foods high in saturated fat, trans fat, and/or cholesterol, such as full-fat milk products, fatty meats, tropical oils, partially hydrogenated vegetable oils, and egg yolks. Instead choose foods low in saturated fat, trans fat, and cholesterol.
- Eat less than 6 grams of salt per day (2,400 mg of sodium).

Therapeutic Lifestyle Changes (TLC) Diet

Limits for LDL-Raising Nutrients

Saturated fats	Less than 7% of total calories
Trans fats	Minimal or none
Dietary cholesterol	Less than 200 mg per day

Therapeutic Options for Lowering LDL

Plant stanols/sterols	2 g per day
Soluble fiber	10–25 g per day
Total calories	Adjust total calorie intake to maintain desirable body weight
Physical activity	Include enough moderate exercise to expend at least 200 calories per day

Recommendations for Nutrient Intake

Nutrient	Percentage of Total Calories
Total fat	25–35%*
Saturated fat	Less than 7%
Polyunsaturated fat	Up to 10%
Monounsaturated fat	Up to 20%
Carbohydrates**	50–60%
Protein	Approximately 15% (including soy protein)

*Range of percentages for total fat allows for increased intake of unsaturated fat in place of carbohydrates in people with metabolic syndrome or diabetes.
**Carbohydrates should be mainly from foods rich in complex carbohydrates and fiber, including whole grains, legumes, fruits, and vegetables.

- Have no more than one alcoholic drink per day.

Not all low-fat diets have provided cardiovascular prevention. In the Women's Health Initiative dietary modification trial, 48,835 postmenopausal women aged 50 to 79 years were randomly assigned to an intervention of intensive behavior modification to reduce total fat intake to 20 percent of calories and increase intakes of vegetables and fruits to five servings per day and grains to at least six servings per day.[155] After an average of 8.1 years, this diet did not significantly reduce the risk of CAD, stroke, or CVD in postmenopausal women and achieved very modest effects on CVD risk factors. What this tells me is that an even more rigorous diet and lifestyle changes need to be achieved in order to improve risk factors and reduce CVD risk.

The Mediterranean Diet. The Mediterranean diet, perhaps one of the healthiest diets in the world, emphasizes increased fiber, olive oil, fruits, vegetables, grains, and legumes and decreased refined cereals, meat products, eggs, and saturated fats. This diet has been shown to have a beneficial effect on cardiovascular health in a number of large studies.[156] The Mediterranean diet has also been shown to have beneficial effects on risk factors for cardiovascular disease and may even exceed that of the low-fat diet. Compared with a low-fat diet, three months on a Mediterranean diet that included olive oil (one liter per week) or packets of walnuts, hazelnuts, and almonds decreased cardiovascular risk factors.[157] Both of these diets were associated with significant reductions in blood pressure, lower fasting glucose levels, lower insulin levels in those without diabetes, lower triglycerides, increased HDL-C, and lower C-reactive protein levels.

Ornish Lifestyle Modification Program. The low-fat diet has been promoted by Dr. Dean Ornish since the publication of his bestselling book *Dr. Dean Ornish's Program for Reversing Heart Disease*. What is now known as the Ornish Lifestyle Modification Program is based on the following four components:

1. A very low-fat, high complex carbohydrate diet rich in fruits, vegetables, whole grains, beans, and legumes
2. Regular exercise
3. Stress management
4. Family/community support systems to maintain healthy behavior

The main focus is a plant food–based diet containing whole fruits and vegetables, whole grains (brown rice, whole wheat breads, whole-grain cereals, whole wheat pasta), dried beans and legumes, soy products, lean poultry, fish, egg whites, and nonfat dairy. Plant oils are to be used only lightly, and red meat, butter, and animal fats are to be avoided, as are processed foods, high-fat foods, sweets, and caffeinated drinks. Alcohol and salt are to be consumed in moderation. The Ornish Lifestyle Modification Program claims to promote weight loss, improve cardiovascular health, help to regulate blood sugar and insulin, and lower cholesterol levels.

Whether it is the TLC diet, the Step 1 or Step 2 diet, the Mediterranean diet, or the Ornish diet, they all offer a great step toward reducing the risk of heart disease. One might be more suited to you over the other. Consider reading more about each, experimenting, or speaking with your health-care practitioner and/or a qualified nutritionist to determine which approach is best for you.

Nutritional Supplements

Although dietary changes alone can have a powerful effect in reducing the incidence of heart disease, they may not be enough for everyone. Lowering cholesterol, lowering blood pressure, inhibiting blood clots, preventing oxidative damage to the vessel walls, and several other mechanisms are all effects that can be achieved with the therapeutic use of nutritional/herbal

supplements. This is an exciting and successful area for alternative medicine to make an impact on a large segment of the population. Given that heart disease is the number-one cause of death in men and women in America, these concepts deserve the attention and respect of individuals and practitioners of all disciplines and all schools of thought.

Antioxidant Combinations. Combination nutritional supplements are difficult to evaluate because of the multi-ingredient combinations and the different doses of each single ingredient from one product to another. Numerous observational studies have, however, evaluated the effect of antioxidant combinations on cardiovascular events.[158–161] In one study, vitamins C and E reduced coronary death and death due to all causes in elderly patients.[158] In another, an antioxidant supplement significantly lowered risk for myocardial infarction (heart attack) in men and women over 55.[159] A Finnish study showed no significant effect of an antioxidant supplement on death due to coronary artery events;[161] however, only 3 percent of the people actually used an antioxidant supplement. In the very large U.S. observational study of more than 1 million men and women,[160] there were modest reductions in CVD deaths among women using antioxidants supplements who had no previous history of CVD.

Prevention trials with antioxidant combinations have unfortunately not produced hoped-for results. In the Heart Protection Study, a combination of vitamin C, vitamin E, and beta-carotene appeared to cause no difference in either death rates due to any cause, heart disease–related deaths, heart disease events, or vascular events of any kind.[162] Other quality studies of an antioxidant supplement for secondary prevention of CVD (people who already had evidence of heart disease or had a previous cardiac event) showed no significant effects on the rate of return of narrowing of a coronary artery, the rate of restenosis (a return of narrowing of the coronary artery after surgery), or the rate of cardiovascular events three years later.[163–165]

Major clinical trials of antioxidant use for the primary (initial) prevention of CVD are currently underway and include tens of thousands of participants. In the near future, with an adequate amount of high-quality scientific data, we hope to gain greater clarity as to the impact of antioxidant combination products and multivitamin combinations on cardiovascular disease.

Vitamin E. In the past, I went so far as to say that of all the vitamins or minerals, vitamin E may offer the greatest protection for women against heart disease because of its ability to be easily incorporated into the LDL-cholesterol molecule and prevent free radical damage and, as a result, prevent atherosclerosis and CAD.[166] A number of clinical trials have shown that vitamin E supplementation (alone or in combination with other antioxidants) leads to increased resistance of LDL to oxidative damage.[167, 168] Doses between 500 and 1,500 IU have shown significant reduction in LDL oxidation.[169] Women who took vitamin E supplements for more than two years had about half the risk of CVD.[170] A recent study evaluating childhood and adulthood dietary intake of vitamin E found that people who consumed the most vitamin E in their diet had a decreased risk of hypertension.[171]

The *New England Journal of Medicine* published a report showing that women who took at least 100 IU of vitamin E per day for several years had 40 percent decreased likelihood of having a coronary event when compared with non-vitamin E users.[172] Continued research has now demonstrated that doses between 400 and 800 IU per day dramatically reduce the risk of nonfatal heart attacks, but do not reduce the number of deaths from CAD.[173] Doses of 400 to 1,000 IU per day provide additional cardiovascular benefit by inhibiting platelet aggregation, increasing HDL-cholesterol, and stimulating the breakdown of fibrin (a clot-forming protein).

Levels of vitamin E in the blood may be more directly related to the development of a heart attack or stroke than are total cholesterol levels. Whereas high blood pressure was predictive of a heart attack 25 percent of the time, and high cholesterol 29 percent of the time, low blood levels of vitamin E was predictive almost 70 percent of the time.[174]

There are, though, negative studies on vitamin E's effect in cardiovascular disease. Although vitamin E was shown in animal studies to be beneficial for hypertension,[175, 176] a human trial found that relatively modest doses, 500 IU mixed tocopherols per day for six weeks, led to an increase in blood pressure and heart rate in diabetic patients.[177] A very large study, called the HOPE trial, had a significant influence in diminishing the role of vitamin E for cardioprotection in the minds of many consumers and practitioners. In women and men, 55 years of age or older, who were at high risk for cardiovascular disease, treatment with 400 IU vitamin E per day for an average of 4.5 years had no apparent effect on cardiovascular outcomes.[178] The HOPE-TOO trial was extended for another four years and studied men and women at least 55 years old who had vascular disease or diabetes.[179] Again, there were no differences in the main cardiovascular outcome between those who took vitamin E and those who took the placebo. In essence, there was no significant effect of vitamin E on myocardial infarction (MI), stroke, cardiovascular death, unstable angina, or total death rate. In fact, investigators observed an increase in heart failure rates in patients assigned to the vitamin E. It is not known whether this was due to chance or whether the alpha-tocopherol form of vitamin E became a pro-oxidant in these patients with significant disease.

One of the most damaging reports on vitamin E was a meta-analysis on high-dosage vitamin E that compiled the results of 19 studies from 1966 through August 2004 to conclude that large doses of vitamin E (400 IU per day or more) may increase death rates, at least in those people with chronic illnesses.[180] It is important to point out that this type of analysis has serious flaws. To summarize an insightful commentary written by a well-known clinician, Allan Gaby, M.D., for the Emerson Ecologics website (emersonecologics.com), in these different studies, patients were randomly assigned to take vitamin E, in doses ranging from 16.5 to 2,000 IU per day, or a placebo for at least one year. Most of the patients had one or more chronic diseases including heart disease, diabetes, Parkinson's disease, Alzheimer's disease, or kidney failure. Others were at high risk of developing heart disease. When all 19 studies were combined, the risk of what is called all-cause mortality, or death due to any cause, did not differ significantly between people assigned to vitamin E supplementation and those who were in the placebo group. In studies using doses of vitamin E less than 400 IU per day, the vitamin E supplementation was associated with a small although not statistically significant reduction in the death rate. In the 11 studies using more than 400 IU per day, vitamin E supplementation increased the risk of death by 4 percent.

A number of other influences may have affected this small but statistically significant increase, including additional nutrient supplementation, serum cholesterol levels, and the high percentage of participants with significant health problems such as high blood pressure, diabetes, cigarette smoking, and severe coronary artery disease. There may have also been a problem in the type of vitamin E used. (There are four different types of vitamin E: alpha-, beta-, gamma-, and delta-tocopherol, and gamma-tocopherol is the most effective as an antioxidant.)

With these flaws, and in contrast to the large body of scientific evidence that shows the benefits of vitamin E in slowing the progression of Alzheimer's disease, treating intermittent claudication, fibrocystic breast disease, premenstrual syndrome, osteoarthritis, and more, I continue

to advise the use of vitamin E supplementation. While controversial, I am not willing to give up on the potential benefits of vitamin E and cardioprotection.

Vitamin E

400–1,000 IU per day

Vitamin C. Vitamin C is probably not a major player in blood pressure, hyperlipidemia, or other influences on cardiovascular disease. However, vitamin C has a positive effect on the cardiovascular system and, along with folic acid and zinc, has been found to be low in the blood of hypertensive patients.[181] Vitamin C protects LDL cholesterol from oxidation,[182] raises HDL cholesterol, and lowers total cholesterol triglycerides.[183] In one recent study, 500 mg of vitamin C for 10 weeks led to significant decreases in total cholesterol and apoB, a biomarker for cardiovascular risk.[184] But a combination product that included 500 mg vitamin C, 160 mg bioflavonoids, 600 mg magnesium, and 900 mg vitamin B complex led to decreased clot formation in adults with hyperlipidemia.[185] In a recent study, 36 IU vitamin E and 250 mg vitamin C two times per day dramatically decreased atherosclerosis in hypercholesterolemic patients at both three and six years.[186] Despite these encouraging results, a long-term study of 500 mg vitamin C daily did not significantly affect any lipid measures except triglycerides in women who had high triglycerides.[187]

Smokers may gain a particular advantage with vitamin C. Nicotine has been known to reduce blood vitamin C levels. An increased intake of dietary vitamin C has been associated with decreased risk of cardiovascular disease in smokers,[188] who are typically deficient, and intake of vitamin C supplementation was associated with decreased cardiovascular disease in a retrospective study of over 85,000 women.[189]

Vitamin C

1,000 mg or more per day

Recent long-term studies of vitamin C do not support its use in hypertension, however. A study of 500 mg daily for over five years was shown to have no effect in a group of over 400 subjects.[190]

Coenzyme Q10. CoQ10 can be used for high blood pressure control, atherosclerosis, angina, mitral valve prolapse, congestive heart failure, and cardiomyopathy. As an antioxidant, CoQ10 protects against atherosclerosis by preventing the oxidation of LDL. In a recent study, 150 mg CoQ10 in combination with the lipid-lowering medication fenofibrate worked better than drug therapy alone in improving total cholesterol, triglycerides, and blood pressure.[191] A large review study showed that CoQ10 administration led to decreases in systolic and diastolic blood pressure of 16 and 10 mmHg respectively.[192] A study using 60 mg CoQ10 twice daily for 12 weeks led to an average decrease in systolic blood pressure readings of nearly 18 percent.[193] These findings were similar to a previous study looking at 60 mg CoQ10 twice daily for eight weeks in patients already receiving conventional cardiovascular treatments.[194] This study also found decreases in blood sugar, insulin, and triglycerides and increases in HDL. CoQ10 may be coadministered with conventional medication to increase duration of antihypertensive effect up to twice as long.[195] Other studies of up to 600 mg per day allowed patients to decrease the dose or discontinue the conventional medication while dramatically improving cardiovascular functioning[196, 197] and decreasing subsequent cardiovascular events and mortality by nearly half in patients with a prior history of MI.[198] CoQ10 also works together with vitamin E in preventing damage to lipids and to the vessels.[199]

It may be that CoQ10 can benefit those women who choose to take HRT and are concerned about the potential for increased risk of heart disease. A recent study showed that the

common dose of Prempro led to a decrease in CoQ10 and vitamin E levels in the blood, thereby increasing menopausal cardiovascular risk factors in women who use HRT.[200] Use of statins to treat high cholesterol has been associated with muscle pain and decreased exercise tolerance that has been correlated with a reduction in CoQ10.[201–204]

CoQ10

50–150 mg per day

Calcium. Calcium is most well known for its effects on bone health, but it can also be used to treat elevated cholesterol and hypertension. Calcium supplementation may produce modest reductions in blood pressure, usually only 1 or 2 points. But in those whose blood pressure is very sensitive to salt intake or whose dietary intake of calcium is low, supplementation may be more effective. Calcium has been related to decreases in systolic blood pressure,[205, 206] and an analysis of 40 well-controlled studies found that calcium lowers blood pressure measurements.[207] Another large review of studies of calcium for hypertension in pregnancy found that higher calcium intakes were correlated to decreased blood pressure, as well as resultant preeclampsia and death[208] and that the combination of calcium and linoleic acid decreases pregnancy-induced hypertension as well.[209, 210]

Not all studies have shown benefit, and a large review of three randomized controlled trials investigating the combinations of magnesium, potassium, and calcium found no evidence that these supplements improved blood pressure or mortality.[211] Calcium probably has only a small role in lowering cholesterol, but a recent randomized controlled trial suggests that calcium may have a role in decreasing cholesterol via its ability to improve the function of bile in the liver, thereby increasing cholesterol excretion,[212] and another study on 223 menopausal women showed that calcium supplementation did decrease cholesterol slightly and with more significant increases in HDL.[213] Calcium carbonate 400 mg three times daily can reduce cholesterol and LDL cholesterol by about 4 percent and increase HDL by 4 percent.[214]

While reducing cholesterol and blood pressure may not be calcium's strong suits, the benefits to bone health, tooth retention, weight loss, PMS, and reduction in the risk of colorectal cancer make it one of our most important dietary nutrients and nutritional supplements.

Calcium

400–1,200 mg per day calcium carbonate or other form

Magnesium. Many scientists and health practitioners believe that magnesium is one of the most important nutrients for cardiovascular protection and treatment. Drs. Burton and Bella Altura of NY Health Science Center have done some of the most consistent research in magnesium over the last 30 years. They, and others, assert that magnesium contributes to the strength of contraction of heart muscle,[215] increases HDL levels,[216] inhibits platelet aggregation and prolongs the clotting time,[217–219] decreasing the risk of heart disease, strokes, formation of atherosclerotic plaque, and blood clots that can result in heart attack or stroke.

At least 10 independent clinical studies show that patients with hypertension exhibit serum and/or tissue hypomagnesemia. On the average, patients with long-term hypertension have at least a 15 percent deficit in total magnesium.[220] A recent review of studies showed that supplementation with magnesium appears to modestly decrease blood pressure,[221] yet another large review showed no effect at all.[222] Magnesium may be more effective in decreasing blood pressure and improving arterial function when combined with potassium.[223] Evidence from both animals and humans suggests that magnesium levels in diet and blood may affect blood lipids; the lower the magnesium intake, the higher the serum lipid

levels. In addition, a recent study showed that supplementation of 600 mg daily for 12 weeks produced improvements in all lipid parameters in both type 1 and 2 diabetics.[224, 225] There is strong evidence suggesting a relationship between uncontrolled type 1 and type 2 diabetes and magnesium deficiency,[220] thus magnesium deficiency may predispose diabetic patients to an increased incidence of cardiovascular disease and death.

Magnesium also improves cardiac performance by enhancing blood flow in the coronary arteries. It also prevents oxidation of lipoproteins and subsequent atherosclerosis.

Magnesium

400–1,200 mg per day in divided doses

Niacin. Niacin (nicotinic acid) has been shown to favorably affect all lipids and lipoproteins, and it can be used either alone or in combination with other lipid-lowering agents.[226] We're not sure exactly how it works, although it likely inhibits mobilization of free fatty acids from peripheral fat tissue to the liver. As a result, niacin reduces hepatic synthesis of very low-density lipoprotein (VLDL) and triglyceride levels. Because there is less VLDL available, LDL levels decrease.[227]

The Coronary Drug Project was the first trial to study the effect of niacin on cardiovascular endpoints.[228] Niacin therapy in men with prior MI reduced the five-year incidence of nonfatal reinfarction by 27 percent. In addition, after a mean follow-up of 15 years all-cause mortality was 11 percent lower in niacin-treated men compared with placebo-treated patients.[229]

Niacin—specifically nicotinic acid—may be used to reduce total cholesterol, TG, and LDL levels and to raise HDL values. It is currently the best treatment to raise HDL levels,[227] and it can reduce the risk of nonfatal MI.[230] Niacin lowers LDL levels by about 5 to 25 percent, TG by 20 to 50 percent, lipoprotein(a) by 34 percent,[231] and the total cholesterol/HDL ratio by 27 percent[226] while increasing HDL levels by 15 to 35 percent.[232]

Niacin has been compared to several conventional pharmaceutical drugs used to reduce cholesterol levels. A study published in 1994 compared niacin and lovastatin over a period of 26 weeks in 136 patients who were at high risk for coronary heart disease.[233] Lovastatin produced a greater effect on reducing LDL cholesterol, but niacin provided better overall results. Niacin far exceeded lovastatin in increasing HDL cholesterol, which is a more significant indicator in reducing the risk for heart disease, and some estimates suggest that it can raise HDL by as much as 35 percent.[234] Niacin has also been found to decrease inflammatory markers like C-reactive protein[235] and increase adiponectin, a hormone that not only decreases atherosclerosis but improves glucose tolerance, body mass index, and fatty liver disease.[236, 237] In a study of patients with previous history of heart attack, niacin was found to decrease the risk of repeat MI and death in patients with and without metabolic syndrome.[238]

Conventional practitioners and alternative practitioners alike acknowledge that several grams of niacin per day will lower total cholesterol and LDL cholesterol, raise HDL,[239] and decrease atherosclerosis both alone and when used with conventional treatments like statins. The niacin and statins seem to act synergistically to improve lipid parameters at lower doses, in a shorter amount of time, and more effectively than when either is used alone.[240–242]

The major problem with the therapeutic dosage (1.5 to 3 grams per day) has to do with side effects. Flushing responses are common. Anecdotally, some clinicians decrease the effects of niacin's flushing by having the patient start with a low dose, like 500 mg per day, increasing the dose weekly to achieve the desired dose, and taking the dose before bed or coadministering with 81 mg baby aspirin. More seriously, liver function findings can become abnormal, and individuals with liver disease should not take niacin. Immediate-release niacin is recommended, as sustained-release niacin has been

associated with severe liver toxicity in doses of more than 2 grams per day. Niacin can also exacerbate elevated serum glucose levels in diabetics and can worsen gout. Niacin in doses of more than 1 gram per day are best taken under the guidance of a physician, with monitoring of liver-function tests.

Niacin (Nicotinic Acid)

500 mg 1–3 times per day

Pantethine. Pantethine is the activated form of vitamin B_5 (pantothenic acid) and a key component of coenzyme A (CoA). CoA plays a significant role in lipid metabolism and is involved in the transport of fats. The cells of our body need CoA to utilize fats in the form of energy. Pantethine, at the typical dose of 300 mg three times per day, has been shown to significantly reduce serum triglycerides, total cholesterol, and LDL cholesterol, while also increasing HDL cholesterol.[243, 244] This same dose was found to be effective at decreasing adverse lipid parameters in postmenopausal women.

Pantethine

300 mg 3 times per day

Potassium. The role of potassium in the body crosses over into many physiological events that include nerve transmission, muscle contraction, enzymatic reactions, carbohydrate synthesis, basic cell functions, and acid-base balance. Inadequate potassium intake in the diet might play a role in the development of high blood pressure, stroke, and cardiovascular disease. In addition to increasing the potassium foods in our diet, several studies now show that potassium supplementation can reduce blood pressure. It has been shown that potassium supplementation of 2.5 grams per day can lower the systolic blood pressure an average of 12 points and diastolic blood pressure an average of 16 points.[222] Potassium supplementation may be even more beneficial in people over age 65 who often do not respond well to antihypertensive drugs.

Potassium supplements are available by prescription and over the counter. The FDA restricts the potassium over-the-counter dose per tablet to 99 mg due to potential problems with nausea, vomiting, diarrhea, and ulcers that may result from higher doses of the mineral. The frequency and severity of side effects associated with potassium supplementation are negligible when compared with the frequency and severity of side effects associated with conventional antihypertensives.

Potassium dosing should be based on individualized need and potassium level in the blood. The common dose for treating hypertension is 48 to 90 mEquivalents daily. Drug/potassium interactions are possible, and a consultation with your health-care provider should occur if you are taking ACE inhibitors, angiotensin receptor blockers, or potassium-sparing diuretics. In addition, certain drugs influence the nutrient levels and depletion of potassium.

Decreasing sodium and increasing potassium intake helps prevent heart disease, high blood pressure, and strokes. The standard American diet has a poor potassium/sodium ratio; the ideal potassium-to-sodium ratio is greater than 5:1. A diet rich in fruits and vegetables can produce a more beneficial ratio because most of these foods have significantly greater potassium than sodium. Amongst the highest are bananas, apples, carrots, oranges, lima beans, and potatoes.

Potassium

99 mg–2.5 g per day

L-Arginine. L-arginine is an amino acid involved in many areas of our physiology, including the production of nitric oxide, an important messenger in the regulation of our blood vessels. We synthesize arginine from other substances, but dietary intake is the primary source of our arginine levels. Arginine is the precursor of nitric oxide, a gaseous molecule involved in relaxation

of the smooth muscles of our vessels, which results in vessel dilation (vasodilation) and inhibition of blood platelets clumping together.

The key to arginine's cardiovascular benefits is its ability to induce endothelial nitrous oxide production whereby an enzyme in the endothelium (lining) of the blood vessel, nitric oxide xynthase, catalyzes a reaction that produces nitrous oxide and ornithine. The nitric oxide diffuses into the underlying muscle of the vessel and causes relaxation and dilation. Nitric oxide also helps to prevent atherosclerosis in the vessels, along with its dilation and clot prevention effects.

Supplementation with arginine has been shown to increase artery dilation in normal people, people with hyperlipidemia, and in those with hypertension;[245, 246] significantly improve blood flow and function in patients with congestive heart failure;[247, 248] and in some, but not all trials, improve blood flow, vasodilation, exercise tolerance, and quality of life in those with angina.[249, 250] Therapeutic doses for cardiovascular effects seem to range from 6 to 12 grams per day. L-arginine is a very safe supplement and has been associated with only minor problems lasting a few days, including diarrhea, bloating, abdominal pain, or allergic reactions. The exceptions are those patients with kidney failure or liver disease. For these patients, supplemental arginine may not be able to be metabolized or excreted as well and should be monitored.

L-Arginine

6–12 g per day in divided doses, 3 g at a time

L-Carnitine. L-carnitine is an amino acid found naturally in the body. We obtain some L-carnitine from the diet in foods such as red meats and dairy products, but our bodies also synthesize carnitines from two other amino acids, methionine and lysine. L-carnitine has a key role in the energy production within our cells and is required to transport long-chain fatty acids into our cells.

Two to three grams per day of L-carnitine has resulted in reductions in total and LDL cholesterol in individuals with hyperlipidemia[251] and also decreased triglycerides in those with high blood pressure.[252] Lipoprotein(a) levels, an independent biomarker of cardiovascular disease risk, have also been reduced with 2 grams per day of L-carnitine, even in those with type 2 diabetes.[253] In addition, some preliminary evidence suggests carnitine may be able to attenuate the muscular side effects of statin therapy.[254]

Numerous other cardiovascular effects of L-carnitine are beyond the scope of this chapter, but improvement in exercise tolerance, functional improvement in angina, peripheral vascular disease, treatment of heart failure, and reduced death rates from heart attacks are all areas of clinical effectiveness of L-carnitine.

L-Carnitine

2–3 g per day

Folic Acid, Vitamin B_6, Vitamin B_{12}. Much research over the years has shown that elevated plasma levels of homocysteine are associated with significant increases in coronary artery disease,[255–257] myocardial infarction,[258, 259] peripheral occlusive disease, cerebral occlusive disease,[260, 261] dementia, and Alzheimer's disease.[262] Two recent meta-analyses of observational studies concluded that a 25 percent reduction in plasma homocysteine concentration was associated with decreases of 11 to 16 percent in the risk of ischemic heart disease and 19 to 22 percent reduction in the risk of stroke.[263, 264] Folate, vitamin B_{12}, and vitamin B_6 are inversely related to homocysteine levels, and anyone with a nutritional deficiency that leads to low concentrations of either one or more of these nutrients is at increased risk for elevated homocysteine levels. Testing for homocysteine levels is available through commonly available simple blood tests.

The first meta-analysis of the Homocysteine Lowering Trialists' Collaboration concluded that folic acid supplementation lowered homocysteine levels by about 25 percent.[265] The second meta-

analysis found a 23 percent reduction in homocysteine concentration was the maximum observed with 800 mcg per day of folic acid.[266] A 20 percent reduction was seen with 400 mcg and 13 percent with 200 mcg per day. Due to folic acid fortification of foods in the United States, our plasma folate concentration has increased, and subsequently our homocysteine levels have decreased. For those of us who eat a diet fortified with folic acid in some of the foods, folic acid supplementation is likely to lower homocysteine concentrations by only about 15 percent.

Women are more responsive to the homocysteine-lowering effects of folic acid than are men, and the Women's Health Initiative demonstrated that the risk of vascular disease was stronger than the association observed in males in the Physician's Health Study.[267] High consumption of foods containing folate and vitamin B_6 may reduce the risk of heart attack[268] in women by nearly 50 percent.[269] A study of 80,000 female nurses showed a direct link between the ingestion of these two B vitamins and reduced coronary disease. The results suggested that eating more fruits, vegetables, and whole grains or obtaining these vitamins through supplementation may be as important as quitting smoking, lowering cholesterol, or controlling high blood pressure in lowering heart disease risk. Folic acid and the lowering of homocysteine has recently been less impressive as a heart disease prevention strategy.

Folic Acid

400 mcg–2.5 mg per day

Vitamin B_6

10–25 mg per day

Vitamin B_{12}

400–1,000 mcg per day

Essential Fatty Acids. As I discussed in the nutrition section, a diet rich in omega-3 oils results in a much lower risk of heart disease. Besides changes in diet, supplementation of various oils is also warranted for many individuals. The daily consumption of fish oils can significantly lower blood pressure in people with hypertension, and low consumption may increase the incidence of hypertension, especially in diets with a low fish intake.[270]

A group of researchers at the Johns Hopkins Medical School evaluated the results of 17 clinical trials using fish oil supplementation and found that consuming 3 grams or more per day of fish oil led to reductions in blood pressure of individuals with hypertension,[271] lowered systolic pressure by an average of 5.5 mm Hg, and lowered diastolic pressure by 3.5 mm Hg. The effect was found to be greater at higher blood pressures. A meta-analysis of 36 trials of fish oil supplementation and blood pressure, with an average dose of 3.6 grams per day, showed that fish oil had a small effect in lowering blood pressure, especially in older people with hypertension.[272] Another meta-analysis of 31 trials also showed a small but statistically significant drop in blood pressures of about 3 points /1.6 points at 3.3 to 7 grams per day.[273] Granted, these are small decreases, but fish oils in conjunction with other nutrients, botanicals, and lifestyle changes can be used as part of a comprehensive treatment plan to achieve a reduction in blood pressure, stroke, and risk of coronary events.

There are numerous studies on the effect of omega-3 fish oils and triglycerides. In a review of human trials, about 4 grams per day of omega-3 fatty acids from fish oil decreased serum triglyceride levels by 25 to 30 percent.[274] Both the EPA content and the DHA content of fish oils have the triglyceride-lowering effects. Among postmenopausal women, fish oil supplementation of 2.4 g EPA and 1.6 g DHA per day not only lowered triglycerides by 26 percent but also improved the triglyceride/HDL ratio.[275]

Another issue pertinent to women is that for those who are on hormone replacement therapy, C-reactive protein (CRP) and triglycerides levels can be higher. A recent clinical trial of 30 women

on HRT showed that 7 grams per day of fish oil supplementation significantly decreased CRP and triglyceride levels.[78]

It may be most effective to supplement fish oils with statin medications for lowering cholesterol. In one clinical controlled trial, 59 patients who already had coronary heart disease and hypertriglyceridemia who were taking statins were able to significantly lower their levels of triglycerides and very low density lipoprotein (VLDL) when taking the fish oil and the statin.[276]

Another drug/fish oil study showed that 3.36 grams per day of fish oils were able to further decrease the triglycerides, total cholesterol, and apolipoprotein E than just the statin alone.[277] The most compelling reason to give fish oils is if it in fact lowers heart disease. We have evidence for this from 15 large studies of more than 60,000 individuals where a decrease in deaths from ischemic heart disease was observed in those who consumed fatty fish or omega-3 fatty acids.[278] In one of these studies, 1 gram per day of omega-3 EFAs was associated with a 20 percent decrease in total deaths, a 30 percent decrease in cardiovascular deaths, and a 45 percent decrease in sudden deaths.[279]

Flaxseed oil, nature's richest source of omega-3 fatty acids, is the vegetable alternative to fish oil. It contains twice as many omega-3s and is usually less expensive. Flaxseed oil provides the body with alpha-linolenic acid (ALA), which it uses to make EPA, whereas fish oil provides EPA directly. There is some concern that humans do not readily convert ALA to the EPA and DHA, and therefore flaxseed oil would be a less efficient method of gaining EPA and DHA. However, there are studies on supplementation with flaxseed oil that suggest protective effects against cardiovascular disease by inhibiting the excessive clotting of blood.[280] A recent study of flaxseed's effect on cholesterol in postmenopausal women found decreases in LDL, triglycerides, and other lipid parameters.[281]

Other seed oils may also provide some positive effects on lipids. For example, a black currant seed oil dose of 3 grams per day was shown to decrease LDL more than fish oil.[282] A more recent commercially available product, hemp seed and hemp seed oil, may also prove to be beneficial in the lowering of lipids, homocysteine, CRP, and others. Evening primrose oil rich in gamma-linolenic acid (GLA) may also have a role in prevention of heart disease[283] by decreasing LDL cholesterol.

Fish Oil

1 g per day of EPA and DHA
2–4 g per day of EPA plus DHA may be useful in patients with elevated triglycerides

Wild salmon ranges from 1.0–1.5 g EPA plus DHA per 3 oz serving, with a little more DHA than EPA. Different species range in their EPA and DHA content. Wild sockeye salmon has approximately 600 mg DHA and 430 mg EPA per 3 oz serving.

Flaxseed Oil

1 tbs per day

Evening Primrose Oil

3–4 g per day

All supplemental oils should be taken with meals.

Botanicals

Flavonoids. Flavonoids are a group of compounds found in many fruits, vegetables, nuts and seeds, and numerous medicinal plants. Over 4,000 different flavonoids have been identified in foods and plants. Quercetin, rutin, catechin, and hesperidin are the most frequently used in medicine. Flavonoids inhibit the peroxidation of lipids by acting as free radical scavengers.[284] Quercetin specifically has been shown to inhibit LDL oxidation.[285] In addition to these direct antioxidant effects, flavonoids inhibit platelet aggregation, protect vitamin E from oxidation, and chelate iron. In numerous dietary studies, flavonoids have been shown to reduce cardiovascular disease.[286, 287]

Green, oolong, and black tea are made from the leaves of the *Camellia sinensis* plant and are rich in cardioprotective flavonoids. Green tea is especially rich in the flavonoids called catechins. These include catechin, epicatechin, epicatechin gallate, epigallocatechin gallate, and proanthocyanidins. Epigallocatechin gallate is considered the most significant active component of green tea. Theaflavins are the pigments found in black tea, formed from the catechins during the fermentation of green tea to form black tea. Green tea catechins have been studied fairly extensively as preventive agents for cardiovascular disease.[288–290]

Two recent significant studies prove the cardiovascular benefits of green tea. Taking a flavonoid-rich green tea extract (375mg) for three months along with a low-fat diet decreased total cholesterol by 11.3 percent and LDL by 16.4 percent in men and women with mild to moderate hypercholesterolemia.[291] Another study, the Ohsaki study,[292] found that green tea consumption was inversely associated with mortality due to all causes and inversely associated with cardiovascular disease. Compared with individuals who consumed less than one cup per day of green tea, those who consumed five or more cups per day had a 16 percent lower risk of all-cause and CVD mortality during 11 years of follow-up.

Several studies have examined the potential effects of tea on blood pressure. While there may be transient increases in blood pressure due to the caffeine, regular use appears to be associated with lower blood pressures.[293] Both green tea and oolong tea intake of 120 mL /day or more can significantly reduce hypertension.[294] In the large population-based Rotterdam Study of Dutch men and women, the risk of heart attacks was lower in those who drank more than 375 ml (one and a half cups) per day.[295]

Garlic (*Allium Sativum*). Garlic is popular as a lipid-lowering agent, but it has a modest effect. While analyses have demonstrated that garlic can reduce total cholesterol levels by 5 to 12 percent, recent reports suggest these studies may have been too brief to draw conclusions.[296–298] There is great variability in research results, which may in part be due to the great variation in the potency of and the extracts of garlic used. Even the studies showing a positive effect lack long-term follow-up, standardized laboratory measurements, and adequate dietary controls. While evidence supports at least a short-term benefit, the effect is typically a small but statistically significant decrease in lipid levels. Since 1975, over 32 human studies have been published demonstrating the lipid-lowering effects of garlic.[299] Two meta-analyses of these studies indicate that one to three months of treatment using 600 to 900 mg of garlic powder tablets reduced total serum cholesterol an average of 9 to 12 percent and triglycerides from 8 to 27 percent.[300, 301] A recent study of 30 patients who consumed 5 grams of raw garlic for 42 days found significant decreases in total and LDL cholesterol and increased HDL cholesterol. These benefits were reversed after 42 days of no garlic.[302]

Garlic has also been shown to lower blood pressure slightly,[303] inhibit clotting,[304] and regulate heart rhythms.[305, 306] Garlic is not as aggressive at

Flavonoids

Quercetin

200–400 mg 3 times per day

Citrus Bioflavonoids

1,000–6,000 mg per day

Green Tea

More than 1 cup per day, and especially more than 5 cups per day *or*
1 capsule or more per day of green tea catechin extract

Black Tea

More than 1½ cups per day

lowering serum cholesterol and triglycerides as some of the newer pharmaceuticals, but it also does not have any of their side effects. For women with a modest elevation of cholesterol, it will provide a safer and effective alternative. For women with severe hypercholesterolemia, appropriate drugs may be used and later replaced by garlic when the desired drug effect is complete.

Garlic is not contraindicated during pregnancy and lactation, and 800 mg per day was found to be a safe and effective way to decrease gestational hypertension.[307]

Problems with ingestion of garlic are usually minor. In sensitive individuals they may include heartburn and flatulence. Some people do not appreciate the odor or taste of garlic. Odor-free or enteric-coated products may avert these undesirable effects. Individuals are rarely allergic to garlic. However, people taking anticoagulant drugs should take garlic with caution and be monitored by a health-care practitioner.

Garlic

1 fresh raw clove of garlic per day *or*
Garlic pill providing a minimum of 4,000 mcg allicin daily

Ginger (*Zingiber Officinale*). The same ginger that is used in cooking and ginger ale has been shown to inhibit platelet aggregation (blood platelets sticking together),[308] lower cholesterol,[309–312] inhibit atherosclerosis,[313] and decrease blood pressure.[314] Ginger stimulates the conversion of cholesterol to bile acids and increases bile secretion, thereby lowering cholesterol by promoting its excretion and impairing its absorption. Most research studies have used one gram of dry powdered ginger root.

Ginger

1 g per day powdered ginger root

Globe Artichoke (*Cynara Scolymus*). The leaf extract of the artichoke has been found to have some lipid-lowering activity. One clinical trial used 1,800 mg of artichoke extract versus placebo for six weeks for the treatment of high cholesterol levels.[315] The decrease in total cholesterol values was 18.5 percent in the artichoke group versus 8.6 percent in the placebo group. Also, LDL values fell by 22.9 percent. For patients with gallstones or other bile-duct obstructions, globe artichoke supplementation should be avoided due to the choleretic activity of the extract. This product is currently available as a nutritional supplement in the United States.

Globe Artichoke

600 mg 3 times per day

Procyanidolic Oligomers (PCO). Extracts from grape seeds and the bark of the maritime pine tree are high in a group of flavonoids called proanthocyanidins, also called procyanidins. Mixtures of proanthocyanidin molecules are referred to as procyanidolic oligomers (PCO). These commercially prepared extracts of grape seeds and pine bark, or PCO extracts, possess potent antioxidant activity that is far stronger than even vitamin E or vitamin C. In animal studies, PCO extracts have been shown to prevent damage to the arterial lining, lower blood cholesterol levels, and shrink cholesterol deposits in the arteries.[316, 317] Human studies have confirmed these findings in smokers,[318] and a combination of 100 mg grape seed extract and 200 mcg chromium two times daily was found to significantly decrease total and LDL cholesterol up to 20 percent.[319]

PCO

50–300 mg per day

Gugulipid (*Commiphora Mukul*). The mukul myrrh tree, native to India, Pakistan, and Afghanistan, is the source of standardized gugulipid extract. The extract is further concentrated to isolate compounds known as guggul-

sterones. The two guggulsterones important in the management of hyperlipidemia are Z-guggulsterone and E-guggulsterone. Gugulipid appears to prevent the oxidation of LDL and may regulate the level of bile acids, helping the body to excrete cholesterol. Guggulsterones are thought to be the main active constituents responsible for these effects. Studies have shown that gugulipid can decrease total cholesterol levels by 11.7 percent, LDL by 12.5 percent, and TG by 12.0 percent, with no change in HDL values.[320] Most commercial extracts are standardized to 5 percent guggulsterone content, and the typical treatment dose is 500 mg (providing 25 mg of guggulsterones) three times per day.[321]

A comprehensive review of available research on gugulipid suggests conflicting evidence at this time.[322] When using the standardized extract preparations, only mild abdominal discomfort is reported in a small number of people.

Gugulipid

500 mg with 25 mg guggulsterones, 3 times per day

Hawthorn (*Crataegus Oxyacantha*). Hawthorn leaves, berries, and blossoms contain flavonoids. One of these, proanthocyanidin, has especially good cardiovascular effect. Hawthorn preparations are modestly effective in reducing blood pressure,[323] in the prevention and treatment of atherosclerosis, lowering cholesterol, and preventing the oxidation of LDL.[324] Hawthorn preparations improve the blood supply to the heart by dilating the coronary arteries, increase the force of contraction of the heart muscle, and regulate cardiac rhythm.[323] A very recent study of 79 diabetic hypertensive patients who received 1,200 mg hawthorn versus placebo for 16 weeks found significant reductions in diastolic measures, no drug-herb interactions, and only few mild side effects.[325] Two randomized control trial found decreases in both systolic and diastolic measures when treatment was administered for about three months.[326, 327]

Hawthorn

Choose one of the following:

Tincture (1 part herb to 5 parts alcohol): 405 ml per day
Freeze-dried berries: 1.0–1.5 g per day
Flower extract (1.8 percent vitexin or 20 percent procyanidins): 100–250 mg per day
Berries or flowers (dried as a tea): 3–5 g of dried herb per day

Plant Sterols/Stanols. Plant sterols are naturally occurring cholesterol derivatives from vegetable oils, nuts, soy, corn, woods, and beans. The hydrogenation of plant sterols produces stanols. Sterols and stanols are often referred to generically by the term *phytosterols*. Phytosterols have a chemical structure similar to cholesterol, and the consumption of these plant sterols reduces the absorption of cholesterol and thus reduces circulating cholesterol levels. Even modest additions have been found to lower total blood cholesterol and LDL cholesterol by about 10 percent.[328] Sterols and stanols from a dietary intake of plant sterols in the range of 1.5 to 2.5 grams per day reduce LDL cholesterol by 8.5 to 10 percent.[329] A recent study found that dietary intervention with plant sterols could reduce cholesterol levels by about 30 percent, or approximately the same extent as one of the statin drugs, levostatin.[330] Most studies have found no effect of these sterols on triglyceride levels, but some individuals have shown effects in recent studies.[331–333] Sterols do not seem to lower HDL levels.

Sterols and stanols are often added to selected brands of margarines, semisolid food spreads, and salad dressings. As of 2000, the FDA authorized sterol-containing products to state that they reduce the risk of heart disease. The lowest effective dose for such a claim is 1.3 grams per day. Sterols and stanols are also available in dietary supplements. The supplement forms of phytosterols are advantageous in that they do not

require refrigeration, are convenient to take, and are largely calorie free.

Dietary sterols include sitosterol, campesterol, and stigmasterol. Soybean oil is the principal source of sterol esters, followed by canola, sunflower, and corn oils. Sterols reduce total cholesterol levels and LDL cholesterol because they are natural competitors of cholesterol absorption and resorption.

Plant Sterols and Stanols

Average dose of 3.4 g per day
NCEP III recommends 2 g per day

Policosanol. Policosanol is a mixture of alcohols extracted from sugar cane, wheat germ, rice bran, or beeswax. Policosanol has been used to reduce total cholesterol, LDL cholesterol, and triglycerides and to increase HDL cholesterol based on over 10 years of critical trials and 30 or so positive clinical trials. One recent meta-analysis of natural interventions for abnormal and elevated lipids concluded that policosanol is more effective than plant sterols.[334]

However, evidence to the benefits of policosanol is conflicting. In May of 2006, a randomized controlled trial studied four different doses of policosanol compared to each other and a placebo group.[335] None of the treatment groups had a decrease of LDL cholesterol of more than 10 percent, and no statistically significant difference occurred between policosanol and placebo. It may be that combining policosanol with other lipid-lowering natural agents, and especially fish oils, will offer the most effect. Animal and human studies that combined 5 or 10 mg policosanol with 1 gram omega-3 fatty acids showed a decrease in total cholesterol, triglycerides, and LDL and an increase in HDL greater than when fish oils alone were used.[336, 337] Despite this conflicting evidence, I still recommend policosanol in my clinical practice due to the results I witness.

Policosanol

10–80 mg per day

Red Yeast Rice. Red yeast rice is made from cooked white rice fermented by the yeast *Monascus purpureus*, which is then sterilized and dried. Red yeast rice has been used as a dietary staple, to make rice wine, and as a food preservative and is a cholesterol-lowering agent. The main active ingredient in red yeast rice is monacolin K (lovastatin),[338] which inhibits the enzyme that initiates the synthesis of cholesterol. Omega-3 fatty acids, isoflavones, and plant sterols in red yeast rice are likely also responsible for its beneficial effects on lipids. In one of the early studies on red yeast rice (using 2.4 g/d Cholestin), after 8 weeks cholesterol levels were lowered in men and women by 17 percent, LDL by 22 percent, and triglycerides by 12 percent, with HDL values unchanged.[339]

However, there is significant variability in quality and potency of commercial red yeast rice products. In addition, the lovastatin content in dietary supplements of red yeast rice was lowered due to challenges by the FDA and others. Due to legal issues, Cholestin is no longer available. There are, however, other effective red yeast rice products.

Red Yeast Rice

2.4 g per day

Additional Botanical Therapies. A vast range of herbs have been used for decades, or even centuries, to treat heart and vascular system conditions. Some of these herbs are categorized here according to their dominant action:

Diuretics: dandelion leaf, lily of the valley, parsley
Heart tonics: broom, bugleweed, figwort, hawthorn, lily of the valley, motherwort, night-blooming cereus
Aids to circulation: broom, cayenne, ginger, hawthorn, horse chestnut, lime flowers, mistletoe, yarrow

Nervines (reduce anxiety and stress): lemon balm, hops, lime flowers, motherwort, passionflower, skullcap, valerian

Antihypertensives: rauwolfia, hawthorn, mistletoe, garlic, yarrow, crampbark

Anti-atherosclerosis: lime flowers, hawthorn, mistletoe, yarrow

Exercise

Numerous studies show the great heart-health benefits of exercise.[340–371] Physical exercise is associated with a reduction in obesity, improved body fat distribution, a reduced risk of type 2 diabetes, reduced blood pressure, and reduced cholesterol levels. In women of all ages, exercise has been shown to reduce the risk for cardiovascular disease by altering CVD risk factors. In addition, it diminishes the stiffness of arteries and decreases damaging plaque in blood vessels. Finally, exercise reduces the risk of arrhythmias, normalizes blood lipids, and increases insulin sensitivity. A recent study suggests that exercise and modest diet changes can decrease cholesterol and resultant atherosclerosis comparable to certain statins. Most important, by staying active with moderate levels of physical activity, we can prevent cardiovascular disease independent of other risk factors and improve our life expectancy.

Aerobic exercise in particular is known to raise HDL cholesterol levels, and in women, HDL may be the most important cholesterol issue in predicting coronary artery disease. Williams found an average 0.13 mg/dL plasma HDL increase for each additional kilometer run by female runners per week. Similarly, other studies have reported modest to significant increases in HDL cholesterol following aerobic training. In one of these studies, the increase in HDL was measured at 7.6 mg/dL when exercise was combined with smoking cessation in women.

In addition to aerobic exercise, strength training has been found to reduce CVD risk factors as well. In one study, previously sedentary women performed 12 resistance exercises for one hour, three times per week. After five months of exercise, they showed decreases of 13 and 14 points in total cholesterol and low-density lipoprotein cholesterol (LDL), respectively, from baseline values. Another study noted that previously hypertensive adolescents who reduced their blood pressure by aerobic exercise were able to maintain blood pressure control by taking weight-lifting exercise after discontinuing aerobic exercise. These results are even more surprising when one considers the lack of effect noted for aerobic exercise in plasma total and LDL and triglycerides in women.

The type of exercise chosen appears less significant than its intensity or duration on its effects on CVD risk factors. Exercise recommendations have changed over the years and will likely continue to change with time. Public health recommendations vary by organization. I recommend engaging in 40 to 60 minutes of moderate-intensity physical activity such as brisk walking on most days of the week or at a vigorous intensity for 20 minutes per day. It should be noted here that the effects of exercise on CVD risk factors are not permanent. Code and colleagues found that, in both men and women, the effects of exercise on blood pressure disappeared within weeks after the return to a sedentary lifestyle.

Benefits of Exercise

Exercise:

1. Normalizes blood lipids
2. Elevates protective HDL levels in dose-response fashion
3. Significantly reduces LDL
4. Reduces and stabilizes blood pressure
5. Increases insulin sensitivity
6. Stabilizes weight and decreases fat mass and BMI
7. Is beneficial in congestive heart failure
8. Reduces CVD mortality
9. Is an essential in rehabilitation after heart attack, stroke, or bypass surgery
10. Alleviates stress

Exercise Recommendations

Prevention of Cardiovascular Disease

Follow the exercise guidelines outlined in Appendix A.

Treatment of Existing Cardiovascular Disease

1. Consult a health-care provider before beginning a new exercise program.
2. Use caution and moderation. Note that in men who seldom exercise, cardiac arrest is 56 times more likely during vigorous exercise than at rest. In men who exercise frequently, the risk is 5 times greater.[372]
3. Walking program for heart patients:[373]

Weeks	Distance (miles)	Time (min/mile)
1–2	1	20
3–4	1	17–20
5–6	1	15
7–8	1.5	15
9–10	1.5	14

To maintain the conditioning effect, exercise 20 to 30 minutes three to five times a week. If you stop exercise for more than two weeks, start again at a lower level and gradually build back up to your original program.

Examples of Moderate Exercise for Mild CAD[374]

- 30 minutes of brisk walking each day
- 10 minutes of brisk walking 3 times a day
- Swimming, biking, or working out on an exercise machine such as a treadmill, stair-climbing machine, rowing machine, or stationary cycle at moderate intensity for 30 minutes daily

Begin slowly and increase speed gradually over time. If you have never exercised before, start with a few minutes each day and increase time gradually every week until you reach 30 minutes per day.

For several decades, exercise has been advocated for the treatment of men who have had a heart attack or stroke. Recent encouraging results suggest that it should also be prescribed for women in similar situations. Ades and colleagues studied 60 older patients (41 men and 19 women) who had had previous MI or bypass surgery and participated in a rehab program that included treadmill running for 25 minutes, stationary biking for 15 minutes, and machine rowing for 10 minutes for three and twelve months.[371] The results showed improved fitness and increased number and size of capillaries in the thighs.

Women should be encouraged to gradually increase their exercise and engage in an exercise program that is safe, convenient, and hopefully satisfying and even fun, at least at times. There is no single best exercise but rather what's best for you. Regular, lifelong exercise offers women more CVD benefits than any one drug, nutrient, or herbal intervention.

Stress Management

Women's hearts appear more vulnerable to stress than men's. Arnold suggests that negative stressors such as lack of social support and perceived lack of control contribute to CAD risk.[375] A similar inference can be made from the data obtained by Blumenthal and colleagues.[376] In patients with CAD or ischemia, these authors found that a stress management program was approximately three times more effective at reducing cardiac events than exercise.

Many simple techniques can be effective in managing stress and reducing its baleful influence. Techniques such as deep-breathing exercises, biofeedback, transcendental meditation, yoga, progressive muscle relaxation, and hypnosis have all been shown to reduce stress and lower blood pressure.[377] The antihypertensive effect of these techniques is not dramatic. However, they constitute an important factor in a holistic program to lower blood pressure and treat and prevent heart disease.

Natural (Bio-Identical) Hormone Replacement Therapy

Whether a woman should go through the menopausal years without hormone therapy or

whether she should use bio-identical or conventional hormone therapy is a complex decision. The decision is especially difficult when one considers the many unanswered questions about menopause, cardiovascular disease, and natural and conventional hormones. The method I follow is to systematically evaluate each woman with a thorough medical history, physical exam, and laboratory testing. Based on these tests and the patient's preferences and concerns, the practitioner and patient can together develop a personalized plan that is right for the patient.

A woman's risk for cardiovascular disease changes over time. The plan needs to change accordingly to carefully balance the benefits versus the risks of therapy. Both practitioner and patient need to be open-minded so that informed and appropriate decisions are reached.

Conventional HRT may be appropriate for some women. When it is appropriate, it behooves physicians to advise the use of the least objectionable options. Phytoestrogens and bio-identical hormone therapy are perhaps the most appropriate for some women, and I would assert, most women. No single protocol or approach is equally appropriate for all women. Determining if my patient is at low, medium, or high risk for CAD has been a critical tool in the path to the recommendations I finally make. (See the overview section at the beginning of this chapter for more about issues pertinent to HRT and cardiovascular disease.)

Natural (Bio-Identical) Progesterone

The use of natural or bio-identical progesterone creams and oral micronized natural progesterone has grown in popularity over the last several years. However, only recently have natural progesterone creams been shown to have biological activity. Progesterone is synthesized from diosgenin or stigmasterol found in Mexican wild yams and soybeans. This hormone end product has come to be known as natural or bio-identical progesterone both because it is plant derived and, more important, because it is biochemically identical to the progesterone produced by the human ovary. Natural progesterone is biochemically different than progestin, which is commonly misstated as progesterone. The most common progestin used for menopausal women is medroxyprogesterone acetate (MPA), better known as Provera.

There are few studies on natural progesterone. However, the development of oral micronized progesterone (OMP) in the last 10 to 15 years, together with the few side effects and popularity of natural progesterone, have encouraged scientific research and medical interest in this natural hormone. For more information on the indications and effects of natural progesterone, please refer to Chapter 12.

To date, unfortunately, very few studies have addressed the possible cardiovascular effects of these preparations in postmenopausal women. The study with the biggest impact on the perception of natural progesterone was the Postmenopausal Estrogen/Progestin Interventions (PEPI) trial.[378] Although the postmenopausal women in this study were also given estrogen, the PEPI trial demonstrated similar lipid changes for estrogen and progesterone that are known to occur with administration of estrogen alone, except for HDL, which was significantly reduced. Perhaps what merits reflection here is that, despite its other undesirable effects, estrogen alone has the most favorable effect on lipids. When estrogen is combined with natural progesterone, HDL cholesterol does not improve quite as much, and when given with progestin, HDL improves even less.

A recent study compared the effects of natural progesterone and synthetic progestin (in the form of conjugated equine estrogen) and found the following: the conjugated equine estrogen (CEE) group had an increase in HDL levels of 14.4 percent after six months; the estrogen plus progestin had an increase in HDL of 4.58 percent; and the estrogen plus natural progesterone had an increase in HDL of 5.44 percent.[379] Total

cholesterol levels were significantly decreased only in the estrogen plus progestin group; triglyceride levels were increased only in the estrogen plus natural progesterone group; and the micronized progesterone was not superior to medroxyprogesterone acetate.

There is evidence showing that oral micronized progesterone (OMP) may lower blood pressure. In fact, OMP administered in doses of 200, 400, and 600 mg per day to hypertensive postmenopausal women and older men significantly reduced systolic blood pressure as compared to placebo in a two-week treatment trial.[380] With the maximum dose, systolic blood pressure was decreased approximately 19.7 mm Hg and diastolic blood pressure about 9.6 mm Hg. At the lower doses, the decreases in systolic blood pressure were less significant. Both OMP and progestins can cause fluid retention, although natural progesterone to a lesser extent.

Studies demonstrate that synthetic progestins and natural progesterone have markedly different effects on the coronary vessels[381] and on their smooth wall muscle cells.[382] The results of these two studies indicate that synthetic progestins may induce spasm of the coronary arteries, whereas estrogen and/or natural progesterone promoted dilation.

Although many women are presently using natural progesterone creams as an alternative to conventional HRT, relatively little research has been done on these products—with little information about their impact on cardiovascular risk factors. For more information on the use of natural progesterone alone or in combination with different estrogens in menopause, please refer to Chapter 12.

Perhaps most interesting is that in the Women's Health Initiative, women who were on estrogen only did not have an increased incidence of cardiovascular disease but did have an increased risk of stroke,[383] differing from the first WHI study estrogen and progestin group.[17] For a discussion on other research and how the timing of when a woman starts HRT may affect the risks and the benefits, see the overview section of this chapter.

Natural (Bio-Identical) Estrogens

Natural estrogens are what we have come to call plant-derived bio-identical hormones. They include estradiol, estrone, and estriol. Mexican wild yam contains diosgenin and soy contains stigmasterol that can be converted into an estrogen biochemically identical to that produced by our ovaries. Bio-identical estradiol and estrone in a patented delivery system and in premanufactured dosages are available by prescription from a regular pharmacy. Bio-identical estradiol, estrone, and estriol can also be compounded in customized, individualized dosages of any strength, any combination, and in many different delivery systems including lozenges, sublingual tablets, creams, gels, capsules, and even injections. The distinctions between bio-identical estrogens and other forms of HRT are presented in Chapter 12. This section will focus on their effect on the cardiovascular system.

Theoretically, if we have a dose of a bio-identical estrogen that is equivalent in strength to the dose of the conventional estrogen, the cardiovascular benefit or risk should be the same. Nonetheless, any hormone therapy that is considered to be an alternative to the leading form of therapy (conjugated equine estrogens, i.e., Premarin) must at some point be compared in order to prove its worthiness and acceptability among patients and health-care practitioners. A few studies have looked at oral micronized estradiol alone or in combination with bio-identical progesterone and compared it to conjugated equine estrogens (CEE) plus medroxyprogesterone acetate (MPA) to evaluate possible effects on CAD. Ten menopausal women, administered the natural estrogen/progesterone combination, experienced a decrease in total cholesterol. In contrast, this parameter did not change significantly at 12 months over the initial cholesterol readings in the five women who were given

Sample Treatment Plan for Cardiovascular Disease or Hyperlipidemia

See the Resources section for formulation sources.

- The National Cholesterol Education Program (NCEP) recommends that dietary therapy begin with reducing dietary saturated fat by minimizing or eliminating beef, pork, lamb, cheese, butter, milk, chocolate, and fried foods.
- Consider the Mediterranean diet: increase intake of fruits; vegetables; whole grains; legumes, especially soybean products; nuts; seeds; olive oil; and fish.
- Reduce sodium to less than 2,500 mg per day.
- Quit smoking.
- Do not exceed one alcoholic beverage (5 oz) per day.
- Practice regular aerobic exercise (30 minutes or more, 5–7 times per week)—e.g., a brisk walk.
- Reduce or eliminate coffee (both caffeinated and decaffeinated).
- Strive for healthy body weight.
- Practice stress management such as meditation or relaxation exercise 15 minutes each day.

Daily Supplements for Cardiovascular Disease

Plant sterols/stanols: 2.0–3.4 g per day
Vitamin E: 400–800 IU per day
Garlic: 1 capsule per day containing 4,000–5,000 mcg allicin
Green tea: 1 capsule extract or 3–5 cups tea per day
CoQ10: 100 mg per day
EPA/DHA fish oil: 1 g per day
Folic acid: 800 mcg per day

Daily Supplements for Hyperlipidemia

Policosanol: 20–40 mg per day
Niacin (nicotinic acid): 500–1,500 mg per day
Plant sterols/stanols: 2.0–3.4 g per day
EPA/DHA fish oil: 2–4 g per day if triglycerides are elevated
Pantethine: 300 mg 3 times per day
Other supplements based on specific situation

CEE and MPA. Both groups experienced an increase in HDL cholesterol.[384] Another study reported the results of a combination pill containing 2 mg of oral micronized estradiol, 1 mg of estriol, and 1 mg of a synthetic progestin in 265 women, who were followed for over four years; serum cholesterol and triglyceride levels decreased significantly, but HDL levels were not measured.[385]

Estriol is the other natural estrogen that can be used either alone or in combination with estradiol (called bi-est) or with estradiol and estrone (called tri-est). Estriol is used for a variety of treatments and is discussed in more detail in Chapter 12. Little is known about what estriol may or may not do with regard to CVD. However, two studies indicate positive effects of estriol administration on lipid profiles and cardiac function. Japanese researchers found that 2 mg per day of estriol was effective in decreasing total cholesterol and triglycerides and increasing HDL levels in elderly women (age 70 to 84), but not in middle-aged postmenopausal women (age 50 to 65).[386] The other study followed postmenopausal women using estriol and found an increase in their cardiac function and improved blood flow in the extremities.[387] Even so, I would not currently consider estriol a viable approach for treating or preventing heart disease.

When it comes to cardiovascular disease, I contend that ethically, practitioners using bio-identical hormone therapy must have the same benefit-risk conversation with patients as a conventional practitioner who prescribes the typical Premarin/Provera would have. That said, in my opinion, there is enough evidence at this point that oral micronized progesterone is more cardiac friendly on lipids and coronary arteries than are the synthetic progestogens or progestin (such as Provera). Other than this point, I would advocate for following the current guidelines from the North American Menopause Society and their Position Statement on HRT in Menopausal Women:[388]

Sample Treatment Plan for Hypertension

See the Resources section for formulation sources.

- Consider the DASH diet or Mediterranean diet: increase intake of fruits; vegetables; whole grains; legumes, especially soybean products; nuts; seeds; olive oil; and fish.
- Consider avoiding all sodium; at the least, reduce sodium to less than 2,500 mg per day.
- Quit smoking.
- Do not exceed one alcoholic beverage (5 oz) per day.
- Practice regular aerobic exercise (30 minutes or more, 5–7 times per week)—e.g., a brisk walk.
- Reduce or eliminate coffee (both caffeinated and decaffeinated).
- Strive for ideal body weight.
- Practice stress management such as meditation or relaxation exercise 15 minutes each day.

Daily Supplementation

Dandelion leaf capsules: 2 capsules daily
Garlic: 1 capsule containing 4,000–5,000 mcg allicin, twice per day
Coenzyme Q10: 100 mg per day
Potassium: 99 mg–2.5 g per day
Herbal tincture:
Motherwort: 2 oz
Passionflower: 2 oz
Rauwolfia (available through health-care practitioner—not to exceed .3 mg of reserpine per day)
Hawthorne: 2 oz
Dose: 1 tsp twice daily

- "Data from studies such as the WHI and the Heart and Estrogen/progestin Replacement Study (HERS) should be extrapolated only with caution to women younger than 50 years of age who initiate HT. The data should not be extrapolated to women experiencing premature menopause (under 40 years of age) and initiating HT at that time."
- "Premature menopause and premature ovarian failure are conditions associated with earlier onset of CHD [coronary heart disease], but there are no clear data as to whether ET [estrogen therapy] or EPT [estrogen/progestogen therapy] will reduce morbidity or mortality from these conditions. The benefit-risk ratio may be more favorable for younger women."
- "Nonoral routes of administration of ET/EPT may offer advantages and disadvantages, but the long-term benefit-risk ratio has not been demonstrated. Differences would be related to the role of the first-pass hepatic effect, the hormone concentrations in the blood achieved by a given route, and the biologic activity of component ingredients. There is some evidence that transdermal 17 beta-estradiol does not increase the level of C-reactive protein, and also that it may be associated with lower risk of deep venous thrombosis than oral estrogen."
- "The effect of ET on CHD and stroke is not yet clear. ET does not have a significant effect on stroke risk in postmenopausal women with known ischemic cerebrovascular disease, but for healthy older women, effects of ET on stroke risk are not clear. However, unless confirming data become available, ET should not be used for primary or secondary prevention of these conditions."

CONVENTIONAL MEDICINE APPROACH

There is still much that is unknown about cardiovascular disease, hormone replacement, and the aging process in women. The results of the Women's Health Initiative (WHI) have dramatically changed how HRT has been prescribed in this country. It is no longer routinely prescribed

to reduce the risk of cardiovascular disease, as it was for over 30 years. The approach now is much more individualized, and there is still lack of agreement if the timing of when HRT is started impacts its influence on cardiovascular disease. As with all therapies, HRT must be examined against the backdrop of benefit versus risk. The nagging questions for women continue to be, "Should I or shouldn't I?" and "Are the risks greater than the benefits?" Further discussion of these concerns is presented in Chapter 12.

Conventional practitioners are as eager to educate their patients on the importance of preventing heart disease as holistic care providers are. For several years now, patients have been encouraged by their conventional physicians to stop smoking, increase exercise, lower their dietary fat, increase fruits and vegetables, lose weight, and reduce their stress. It has become much more common to recommend diet and lifestyle changes as a first line of treatment for mild hyperlipidemia and mild hypertension.

Those individuals who are at increased risk for heart disease should discuss the potential benefits and harms of aspirin therapy with their practitioner. Low-dose aspirin is a foundation of heart disease secondary prevention, due to its ability to inhibit platelet aggregation. Recurrence rates for heart attacks are also consistently lower in women (and men) who already have coronary disease when they are treated with a low dose of aspirin.[389] In a meta-analysis of four large primary prevention trials using low-dose aspirin, a 15 percent reduction was seen in cardiovascular events and a 30 percent reduction was observed in MI rates.[390] More recently, a large randomized placebo-controlled trial of low-dose aspirin was done in the Women's Health Study (WHS).[391] In 39,876 women who did not have coronary disease, a 24 percent reduction was observed in the risk of ischemic strokes, compared with those women who did not take aspirin. Unfortunately, there was no overall reduction in MI or total cardiovascular events except in women who were 65 years or older. In that age group, aspirin therapy did reduce overall cardiovascular disease by 26 percent and the risk of MI by 34 percent.

The U.S. Preventive Services Task Force (USPSTF) has found good evidence that aspirin decreases the incidence of heart disease in adults who are at increased risk. However, they also acknowledge that aspirin increases gastrointestinal bleeding episodes and that it may also increase the incidence of hemorrhagic (bleeding) strokes. Their conclusion is that for those individuals who are at high risk for heart disease, the benefits outweigh the risks. The American Diabetes Association has also concluded that clinicians should consider aspirin for primary prevention of heart disease in diabetic patients who are older than 30 or have risk factors for cardiovascular disease and no contraindications to aspirin. The American Heart Association recommends aspirin for "patients who've had a myocardial infarction (heart attack), unstable angina, ischemic stroke (caused by blood clot) or transient ischemic attacks (TIAs or 'little strokes'), if not contraindicated." You should not start aspirin therapy without first consulting your practitioner. Also inform your practitioner if you are taking aspirin and must have a simple surgical procedure, even a dental extraction, as it increases the risk of excessive bleeding.

When treating hyperlipidemia, most conventional practitioners will follow the NCEP, ATP III guidelines. Step 1 involves identifying the lipid levels with blood testing; step 2 is to identify the presence of any atherosclerotic disease that confers a high risk for heart disease events. Step 3 is to determine the presence of major risk factors other than an LDL level above 160. These major risk factors include:

- Cigarette smoking
- Blood pressure of 140/90 or higher or someone on high blood pressure medication
- Low HDL, less than 40 mg/dL

Table 9.4 ATP Guidelines for Drug Therapy

Risk Category	LDL Goal	LDL Level for TLC	LDL for Drug Therapy
CHD or 10-year risk > 20%	< 100 mg/dL	≥ 100 mg/dL	≥ 130 mg/dL (100–129 mg/dL: optional)
2+ risk factors (10-year risk ≤ 20%)	< 130 mg/dL	≥ 130 mg/dL	10-year risk 10–20%: ≥ 130 mg/dL; ≥ 160 mg/dL
0–1 risk factors	< 160 mg/dL	≥ 160 mg/dL	≥ 190 mg/dL (160–189 mg/dL: optional)

- A family history of premature heart disease (before age 55 in father, brother, or son; before age 65 in mother, sister, or daughter)
- Age (men 45 and older and women 55 and older)

Step 4 is to determine a woman's 10-year heart disease risk according to Framingham tables of greater than 20 percent risk, 10 to 20 percent risk, or less than 10 percent risk; Step 5 is to determine the risk category. At this point, your practitioner will initiate advice. Initiating the Therapeutic Lifestyle Changes (TLC) is the first attempt at lowering your lipids, if your LDL is already at its goal. The specifics of the TLC are described in the nutrition section. Per the ATP III guidelines, drug therapy is advised, according to the scheme shown in Table 9.4.

Ideally, drugs will be advised simultaneously with TLC for women whose 10-year risk is greater than 20 percent. For those in lower risk categories, drugs may be added after a three-month trial of just the therapeutic lifestyle changes.

There are many drug or quasi-drug treatments that your conventional practitioner may consider. The major classes of lipid-lowering agents used in conventional medicine include HMG-CoA reductase inhibitors (statins), bile acid sequestrants, fibric acid derivatives, and nicotinic acid.

The group of drugs called the statins lower LDL and triglycerides, and some may raise HDL. Currently, these include lovastatin, pravastatin, simvastatin, fluvastatin, atorvastatin, and cerivastatin. They each come in several strengths. Bile acid sequestrants decrease LDL and increase HDL but do not lower triglycerides. These include cholestyramine, colestipol, and colesevelam. Nicotinic acid is used in three different forms: the immediate-release nicotinic acid (1.5–3 grams per day), the extended-release form (Niaspan, 1–2 grams), or the sustained-release form (nicotinic acid, 1–2 grams). Nicotinic acid lowers LDL, although not as much as some of the newer statins; raises HDL better than all the statins; and lowers triglycerides as much or better than the statins. Finally, fibric acids are drugs that are used primarily to lower triglycerides. These include gemfibrozil, fenofibrate, and clofibrate.

The treatment of high blood pressure is responsible for more primary care visits than any other chronic medical condition. However, approximately 75 percent of treated hypertension patients are receiving inadequate care, as defined by their inability to achieve and maintain their target blood pressure.

The American Heart Association (AHA) offers 10 ways to control your high blood pressure:

1. Know your blood pressure and have it checked regularly.
2. Maintain a healthy weight.
3. Avoid using salt in cooking or the salting of your foods. Avoid packaged salty foods.
4. Eat a diet low in saturated fat according to the AHA recommendations (see nutrition section).

5. Limit your alcohol intake to one drink per day.
6. If you are taking any medication, take it as prescribed. Do not make any changes without consulting your prescribing practitioner.
7. Make regular follow-up appointments with your practitioner.
8. Follow exercise advice.
9. Advise your immediate relatives to have their blood pressure checked.
10. Manage stress optimally.

There are many different medications to lower high blood pressure, called antihypertensives. Diuretics rid the body of excess fluids, and even sodium, and are often used as the initial therapy. Beta-blockers reduce the heart rate and the amount of blood the heart pumps. Sympathetic nerve inhibitors reduce the blood pressure by inhibiting the nerves that cause blood vessel constriction. Vasodilators cause the muscle walls in the blood vessels to relax, and therefore allow them to dilate and widen. Angiotensin-converting enzyme (ACE) inhibitors work to lower blood pressure by interfering with the body's production of angiotensin, a chemical that causes the arteries to constrict. The angiotensin II receptor blockers block the effects of angiotensin, and the calcium channel blockers are calcium antagonists that can reduce the heart rate and relax the blood vessels. Some individuals will need only short-term treatment or may be able to reduce their dose after a year or more of normal blood pressure. Others may need to be on blood pressure medications indefinitely. Keep in mind that reducing weight, eating healthier, exercising regularly, reducing sodium, and reducing or managing stressors may keep you from having to take blood pressure medications or enable you to decrease or discontinue them. When drug treatments are needed, as you can see, there are many to choose from, and it takes knowledge, skill, and experience for your practitioner to offer the best medication for you. You may need to go through trial periods on different medications to see not only which works best, but which works best with the fewest side effects. An additional reminder, though: Don't just stop your medication on your own if you get discouraged or are experiencing side effects. Call your medical office. The following sidebar contains a list of some of the drugs used to treat high blood pressure. This is not a complete list, as there are many and new ones all the time.

The use of pharmacologic agents to lower lipids and/or blood pressure is an appropriate regimen for patients who have not responded to a rigorous lifestyle modification program and nutritional and/or herbal supplementation. It is important to recognize, however, that despite the effectiveness of alternative therapies, not all patients are able to make the necessary changes or comply with the supplementation regimen. A minority of patients have conditions that will resist their own and their physician's best efforts.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., N.P., P.A., D.O.)

The signs and symptoms of coronary artery disease in women can be different from those found in men. Women more often have cases of silent myocardial infarction, have chest pain while having normal coronary vessels, and have a higher incidence of mortality with their first incidence of chest pain due to coronary artery spasm. Diagnostic testing in women may not be as reliable either. Exercise stress testing is less predictive, and angiograms reveal less extensive disease in women than in men.

One's risk of heart disease changes with time, and risk must be assessed periodically. For menopausal women, it starts with the annual physical exam, which should include a thorough medical history, physical exam, blood pressure and pulse check, weight, listening to heart and lungs, and other physical findings. Lipid panels checking for total cholesterol, HDL, LDL, triglycerides, and the cholesterol/HDL ratio and thyroid and

Drugs Used to Treat High Blood Pressure

Diuretics

- Hlorthalidone
- Furosemide
- Hydrochlorothiazide
- Ndapamide
- Metolazone

Potassium-Sparing Diurectics

- Amiloride hydrochloride
- Spironolactone
- Triamterene

Combination Diuretics

- Amiloride hydrochloride plus hydrochlorothiazide
- Spironolactone plus hydrochlorothiazide

Beta-Blockers

- Acebutolol
- Atenolol
- Betaxolol
- Bisoprolol fumarate
- Carteolol hydrochloride
- Metoprolol tartrate
- Metoprolol succinate
- Nadolol
- Penbutolol sulfate
- Pindolol
- Propranolol hydrochloride
- Timolol maleate

ACE Inhibitors

- Benazepril hydrochloride
- Captopril
- Enalapril maleate
- Fosinopril sodium
- Lisinopril
- Moexipril
- Quinapril hydrochloride
- Ramipril
- Trandolapril

Angiotensin II Receptor Blockers

- Candesartan
- Irbesartan
- Losartan potassium
- Valsartan

Calcium Channel Blockers

- Amlodipine besylate
- Diltiazem hydrochloride
- Felodipine
- Isradipine
- Nicardipine
- Nifedipine
- Nisoldipine
- Verapamil hydrochloride

Alpha Blockers

- Doxazosin mesylate
- Prazosin hydrochloride
- Terazosin hydrochloride

Combined Alpha and Beta-Blockers

- Carvedilol
- Labetalol hydrochloride

Central Agonists

- Alpha-methyldopa
- Clonidine hydrochloride
- Guanabenz acetate
- Guanfacine hydrochloride

Peripheral Adrenergic Inhibitors

- Guanadrel
- Guanethidine monosulfate
- Reserpine

Blood Vessel Dilators

- Hydralazine hydrochloride
- Minoxidil (use in severe cases or in conjuction with treatment of kidney failure)

glucose testing are done at different frequencies depending on health status and risk factors. While annual routine screening may be more often than most practitioners will recommend for women aged 50 and older, I do in fact prefer that approach to optimize the preventive medicine approach. If deemed necessary, biomarkers of cardiovascular risk, EKG, stress EKG test, and stress echocardiograms may also be recommended. The results of these tests will help determine the most appropriate next step, whether it is a more aggressive diagnostic test and/or treatment intervention.

For women with abnormal findings, it is important to seek the advice of someone who can help determine if therapeutic doses of some of the natural therapies discussed in this chapter are suitable and sufficient for success. A treatment plan can be agreed on; then, with follow-up evaluation and testing after an appropriate interval, the next step in the process can be determined. Some women may need to take cholesterol- or blood-pressure-lowering pharmaceutical agents if an aggressive natural treatment plan has not brought adequate results, at least on an interim

basis, and with appropriate monitoring and follow-up. The determination of whether to use natural or conventional HRT and its dosage can best be made by a practitioner who appreciates the role and value of each and the benefits and risks of HRT.

Another reason to see a licensed health-care practitioner (naturopathic doctor, medical doctor, osteopathic doctor, nurse-practitioner, or physician's assistant) is if you are on prescription medications, for whatever reason, and want to use the natural supplements for your blood pressure or cholesterol. There are some significant drug/herb/nutrient interactions that are important to be aware of, and in a few circumstances there are herbs and nutritional supplements that are contraindicated with select medications. An alternative practitioner in particular can assure the safest method of taking natural supplements with pharmaceutical medications.

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INFERTILITY

CHAPTER 10

OVERVIEW

Impaired fertility affects over 6 million women in the United States alone, and recent estimates suggest that approximately 10 million couples have sought infertility services. Infertility is considered a common condition and affects 10 to 15 percent of reproductive age couples. Female infertility accounts for about 50 percent of the cases, 19 percent are due to male factor infertility, 17.6 percent are due to a combination, and about 10.5 percent of the cases are caused by unknown factors.[1] Female infertility most often is due to tubal and pelvic disease (40 percent) or from a previous pelvic inflammatory infection, asymptomatic chlamydia or gonorrhea, or ovulatory dysfunction (40 percent). Endometriosis, a diminished number of oocytes in the ovary, uterine abnormalities, immunologic factors, chromosomal abnormalities, environmental chemicals and toxins, and cancer chemotherapy or radiation can also cause infertility.

Infertility is defined as a failure to conceive after 12 months of frequent intercourse without contraception in women under 35 years of age or failure to conceive after six months of intercourse without contraception in women 35 years of age or older. Infertility is further broken down into two types: primary infertility is in women with no history of prior pregnancy, and secondary infertility is with a history of prior pregnancy.

Eighty-five percent of couples will conceive after the first year of trying, with an increase to 93 percent after two years. Most spontaneous pregnancies occur within three years, and there is a poor prognosis for success without treatment after that. This final point underscores the importance of timely specialty referrals to reproductive endocrinologists for evaluation for assisted reproductive therapies for infertile couples who wish to have a child. Many ob-gyns, primary care physicians, and complementary care providers may do couples a disservice by waiting too long to make these referrals.

If pregnancy has not been achieved within one year in a woman less than 35 years old, evaluation of both partners should be initiated. Women who are 35 years old or older; women who have a history of irregular menses, pelvic pain, or dyspareunia (pain with intercourse); and women with a previous pelvic surgery, PID, or endometriosis should be evaluated earlier.

A detailed medical history is necessary to determine many things that are pertinent to fertility:

- Previous pregnancy history and outcome
- Menstrual cycle details
- Contraception history
- Duration of time without contraception
- Coital frequency
- Surgeries, hospitalizations, illnesses, PID, STIs, Pap smear history
- A review of other systems and history of any thyroid problems, nipple discharge, acne, facial hair, or hair loss
- Medications, allergies
- Family history of serious illnesses, congenital birth defects, and reproductive health problems
- Lifestyle factors: smoking history, alcohol use, exercise

A physical evaluation should include height and weight, observation for signs of excess androgens (facial hair, acne, and hair loss), abdominal hip and waist circumference, and breast, thyroid, abdominal, and pelvic exam.

Causes of Infertility in Couples

Pelvic or Structural Factors (35%)

- Infection: pelvic inflammatory disease, sexually transmitted disease, septic abortion, endometritis, pelvic tuberculosis
- Surgical history: dilation and curettage, ruptured appendicitis, adnexal surgery, leiomyoma (fibroids)
- Contraception and pregnancy history: prior intrauterine device use, DES exposure in utero, ectopic pregnancy, frequent abortion
- Endometriosis

Ovulatory or Hormonal Factors (15%)

- Secondary amenorrhea
- Abnormal uterine bleeding
- Obesity
- Luteal phase defect (short luteal phase)
- Decreased ovarian reserve
- Premature ovarian failure (early menopause)
- Polycystic ovary syndrome
- Elevated prolactin
- Elevated TSH
- Prior use of antiestrogens (Lupron, Depo-Provera, danazol)

Male Causes (35%)

- Varicocele (42% of cases)
- Unexplained (22% of cases)
- Obstructive azoospermia (14% of cases)
- Cryptorchidism (3%)
- Testicular surgeries or injury
- Genitourinary infection or sexually transmitted disease
- Postpubertal mumps
- Hypogonadism
- Genital radiation or chemotherapy
- Hypospadias
- Testicular cancer (less than 0.1% of cases)
- Retrograde ejaculation or other dysfunction
- Development abnormalities: vas deferens absence (related to cystic fibrosis), impaired testicular function (chromosome abnormality)
- Exposure to excessive heat (hot tubs, saunas), toxic chemicals, pesticides
- Medication or drug use (gonadotoxins): medications including allopurinol, colchicine, chemotherapy, cimetidine, cyclosporine, erythromycin, gentamicin, neomycin, nitrofurantoin, tetracycline, spironolactone, and sulfasalazine; drugs including nicotine (first- or secondhand), alcohol, cocaine, steroids, and marijuana

Unexplained (10%)

- Depression

Unusual Problems (5%)

- Immunologic

Rare Causes

- Substance use (alcohol, marijuana, caffeine, tobacco)

Laboratory testing can be extremely complex, and the order of what is done may vary depending on the medical history and physical exam. Initial exams often include thyroid testing, prolactin levels (for those with irregular cycles or symptoms), mentrual cycle day 3 follicle-stimulating hormone (FSH) and possibly estradiol levels to assess ovarian reserve, a mid-luteal phase progesterone test to confirm ovulation, hysterosalpingography (HSG) to assess the fallopian tubes and any abnormalities of the uterus, and analysis of semen. Other tests may be indicated such as androgen levels, blood sugar, insulin levels, or glucose tolerance testing. Pelvic and transvaginal ultrasound (TVUS) looks for uterine fibroids, ovarian cysts, and ovarian follicles, and a saline sonohystogram (SHG) is useful in evaluating the uterus for polyps, intrauterine adhesions, and submucosal fibroids. Some women who have a history of pelvic adhesions, tubal disease, or endometriosis may need to have a laparoscopic surgical evaluation.

KEY CONCEPTS

- Female infertility is most often due to a previous pelvic inflammatory disease, asymptomatic chlamydia or gonorrhea, or ovulatory dysfunction.
- Other causes of infertility include endometriosis, diminished oocytes in the ovary, uterine abnormalities, immunologic factors, chromosomal abnormalities, environmental chemicals and toxins, cancer chemotherapy, and cancer radiation.
- Maintain optimal weight.
- Manage stress.
- Support fertility with a healthy diet.
- Natural methods for infertility are most effective in anovulatory dysfunction.
- Acupuncture can increase pregnancy rates in women undergoing fertility treatment.
- The decision to pursue conventional fertility treatments depends on age, the duration and cause of the infertility, the results of ovarian-reserve testing, finances, other health issues, emotional well-being, and thoughts and emotions about adoption or surrogate options.
- Seek a fertility specialist if considering conventional fertility treatments.

PREVENTION

- Prevent pelvic inflammatory disease by practicing safer sex and avoiding sexually transmitted infections.
- Avoid environmental toxins.
- Reduce stressors.
- Avoid smoking and excess alcohol and reduce caffeine.
- Maintain optimal weight.
- Minimize exposure to environmental chemicals and toxins.
- Treat any underlying medical conditions related to infertility (exometriosis/endometriosis, polycystic ovarian dysfunction)

A day 3 FSH level (or day 3 and day 10 levels if doing a full clomiphene citrate challenge test) is important and helpful information in predicting if a woman is less likely to become pregnant beyond what would be predicted by age alone. An elevated FSH level on cycle day 3 (or day 10) of greater than 11 to 12 IU/L is associated with poor chance of conception and poor results with in vitro fertilization. A FSH test that is 25 IU/L or more or an age of 43 years or more are each associated with a chance of pregnancy that is close to zero even with attempts at ovulation induction or with assisted reproductive technologies.

OVERVIEW OF ALTERNATIVE TREATMENTS

Complementary medicine has a role in the management of infertility both before and after a referral has been made to a reproductive endocrinologist. After a detailed history and physical including pertinent lab work, treatment can be targeted to address any identified underlying causes. Unfortunately, in many cases, no cause can be determined. In these causes of unexplained infertility, the first step is to address basic issues of diet and lifestyle.

Environmental and Lifestyle Factors

Both overweight and underweight women have increased rates of infertility. Women who are overweight are more likely to experience problems with ovulation and miscarriages. An increase in abdominal fat decreases insulin sensitivity, which is related to ovulation dysfunction. Women who are underweight have infrequent or even lack of ovulation. This is compounded when combined with an eating disorder or excessive exercise. In a woman with a body mass index (BMI) less than 25, weight loss of as little as 5 percent can be significant in helping to normalize menses and ovulation, especially in cases of polycystic ovary syndrome.[2–4] Weight gain in an underweight woman is important as well. Overall, the preponderance of evidence suggests that a normal body weight increases the success of assisted reproductive therapies such as in vitro fertilization.

Focusing on daily exercise and a whole foods diet free of processed foods, alcohol, and caffeine is important to help normalize weight as well as blood sugar. However, a very recent study suggests that vigorous exercise of greater than four hours per week may interfere with the success of in vitro fertilization (IVF) and that nonexercisers may have more success with IVF than exercisers.[5] Moderate regular exercise is probably indicated for most individuals. In addition, in cases of exercise-related reproductive dysfunction, most of the evidence suggests that it isn't the intensity of the exercise but the lack of adequate nutrition, specifically total calories and protein, that causes the fertility issues.[6, 7]

Smoking, caffeine (even decaf), and alcohol have been linked to decreased fertility, so avoidance is important in both partners in couples with fertility issues. Nicotine is toxic to the reproductive system. Smoking has been shown to cause both primary and secondary infertility in women.[8, 9] One study demonstrated that 38 percent of nonsmokers conceived in their first cycle attempt compared to only 28 percent for smokers. Smokers were over three times as likely to take over one year to conceive versus nonsmokers. Heavy smokers are affected more than light smokers.[10] Smoking has also been shown to decrease success of fertility treatments.[11] In one report, female smokers had lower ovarian reserves and required more drug intervention to induce ovulation than did the nonsmokers.[12]

Other considerations are the genetic damage and chromosomal errors caused by smoking. Cadmium, nicotine, and some of the nicotine metabolites have been identified in the ovaries (and testes) and genital fluids of smokers. Cells within the ovaries are affected by one particular nicotine metabolite, cotinine, which causes oxidative damage and developmental problems of the follicles.[13, 14]

Psychological stressors deserve to be addressed as well since the process of dealing with infertility can be very stressful and emotionally taxing. Stress can both contribute to infertility and be a consequence of difficulty in conceiving. Many women and couples decide to discontinue their fertility treatments because of too much stress and upset. In addition, research suggests that past or current stress and mental illness, especially depression, may be the cause of many cases of unexplained infertility. This can be especially problematic because continued inability to get pregnant often fuels depression, leading to a vicious cycle of emotional upset and a veritable roller coaster of monthly hopes and letdowns.

Higher levels of premenstrual tension and stress are associated with lower pregnancy rates.[15] Stress hormones have inhibitory effects on the reproductive system, and, therefore, stress needs to be addressed in anyone receiving fertility services. In addition, it appears that stress decreases antioxidants, which are often low in both partners in an infertile couple. Any treatment of infertility should probably start with stress assessment and reduction techniques for both partners. Psychological counseling and a variety of relaxation techniques including biofeedback, yoga, tai chi, Qi gong, and meditation can be helpful aspects of the treatment plan for anyone with past or present stress or depression.

In the last few years, there has been a lot of public health information available on the importance of avoiding alcohol while pregnant, but when it comes to the influence of alcohol consumption on female fertility, mild to moderate alcohol use has not been well studied. It seems, however, that alcohol does reduce conception rates with a dose-related connection. Research demonstrated that female alcohol intake was associated with two to three times the risk of spontaneous abortion, and alcohol intake during the week of conception increased the risk of early pregnancy loss.[16] In another study, there was a greater than 50 percent reduction in the probability of conception during a menstrual cycle in which women consumed alcohol. In this same study, caffeine consumption did not independently

affect conception rates, but it may enhance the negative effect of alcohol.[17]

Caffeinated beverages have been associated with decreased fertility, increased miscarriages, and lower birth weights.[18] More than five cups of coffee per day, or more than 500 mg of caffeine per day, is associated with a delayed time to conception, although we don't really understand the mechanism. One possibility is that caffeine may impair estrogen production or the metabolism of estrogens.[19] Substances other than caffeine in coffee, tea, and other beverages may also be responsible for reduced fertility. Numerous caffeinated beverages, including coffee, soft drinks, black and green tea, and even decaffeinated coffee, contain tannins, and some contain even more tannins than regular coffee. In animal experiments, tannins have reduced fertility in mice and hens.[20, 21]

Increasingly, environmental pollution and exposure to heavy metals, pesticides, estrogen-like substances, and other chemicals are implicated in cases of infertility in men and women. Depending on the specific exposure, duration, and load, different aspects of fertility can be affected. These toxic exposures may affect sperm count, sperm formation, sperm viability, ovulation, egg viability, and hormone levels.

Caffeine Content

Item	Caffeine (mg)
Coffee, brewed (8 oz)	60–120
Coffee, instant (8 oz)	70
Coffee, decaffeinated (8 oz)	2–5
Double espresso (2 oz)	45–100
Tea, black, 5-minute steep (8 oz)	60–100
Tea, green (8 oz)	20
Barq's Root Beer (12 oz)	22
Coca-Cola (12 oz)	34
Pepsi (12 oz)	38
Chocolate milk (8 oz)	4
Milk chocolate (1 oz)	1–15
Dark chocolate (1 oz)	20
Ben & Jerry's Coffee Fudge Frozen Yogurt (4 oz)	42

Nutrition

In addition to the issues related to weight, caffeine, and alcohol mentioned previously, there are some specific nutritional influences on fertility in women. In women who have a short menstrual cycle, increasing soy in the diet or taking soy isoflavone supplements may increase the length of the follicular phase and delay ovulation.[22] Something as simple as flaxseed can lengthen the luteal phase of the cycle (the second half) and increase the frequency of ovulatory menstrual cycles in women who don't ovulate regularly.[23]

As far as weight loss is concerned, one can get seriously confused these days about the value of carbohydrate versus protein diets. When it comes to fertility, one study demonstrated that it did not matter whether the diet was high-carbohydrate or high-protein: both groups who stuck to low-calorie diets lost weight and had improved menstrual cycles and fertility.[24, 25]

It is, of course, important to limit certain kinds of fish that have a higher mercury content in pregnancy, but evidence indicates it may be wise to do the same in cases of infertility. Studies show that infertile couples consumed more fish and had higher levels of mercury in their blood than fertile couples.[26] Consumption of biphenyl-contaminated fish also has an adverse effect on fertility.[27] Substituting fish oils from a reliable manufacturer for fish consumption is a good way to keep omega-3 fatty acids in the diet. Prior to pregnancy, a minimum daily intake of eicosapentaenoic acid (EPA) and docahexaenoic acid (DHA), found in fish and fish oils, is about 650 mg of each.

Wild salmon ranges from 1.0 to 1.5 grams per three-ounce serving, with a little more DHA than EPA. The different species of salmon (sockeye, chinook, coho) range in EPA and DHA, and wild sockeye contains approximately 600 mg DHA and 430 mg EPA per three-ounce serving. Whether you take fish oil supplements daily or

eat fish several times per week, try to average about 650 mg of EPA and DHA per day. Specific needs for DHA increase during pregnancy (see Chapter 16). (During pregnancy, cod liver oil may be a questionable choice due to the high content of vitamin A, a teratogen, in fish liver.[28])

Nutritional Supplements

Vitamin E. Some simple vitamin and mineral supplementation may be key to fertility in selected women, and because oxidative stress affects the female reproductive system and consequently fertility, antioxidants are important considerations in enhancing fertility. Vitamin E is a powerful antioxidant, combating free radical damage, and can play a beneficial role in female fertility. Most of the research on vitamin E is pertinent to male fertility, such as making sperm more fertile. In one study, vitamin E was given to both men and women and resulted in a significant increase in fertility, and also assisted the achievement and maintenance of pregnancy in women with repeated miscarriages.[29] Other studies show that adding antioxidants, including vitamins C and E, to the diet of animals significantly reduced the decline of regular ovulation related to aging.[30] This may have importance for women in their 40s, who begin to experience reduced fertility due to diminished ovarian reserve.

Vitamin E

400–800 IU per day

Selenium. The mineral selenium is another antioxidant that protects from free radical damage. Free radicals are created when normal biochemical reactions cause oxygen molecules to become unstable. They are also formed by smoking, barbecuing, and deep-frying food, and more. Selenium can protect normal tissue from oxidative damage caused by the free radicals, including preventing chromosome damage. Selenium may also be able to provide protection from exposure to toxic heavy metals including cadmium and lead that can adversely affect sperm development. Selenium mostly affects male fertility by maximizing sperm formation, optimizing testosterone production, and increasing sperm count. (For more information on male fertility, see the section titled "Male Fertility" later in this chapter.)

Selenium

100–200 mcg daily

Zinc. The most widely studied nutritional supplement for fertility in both men and women is zinc. Zinc plays a vital role in cell division, and deficiencies are associated with reduced fertility, increased miscarriages, and chromosome damage. Less than optimal zinc levels not only reduce conception rates, but babies have lower birth weights, more birth defects, and can have a less developed brain and nervous system.[31] Zinc deficiency is especially important for sperm development.

Zinc

30 mg per day

L-Arginine. L-arginine is an amino acid necessary for the synthesis of protein and is found naturally in numerous animal protein foods. Arginine supplementation of 16 grams per day has been shown to improve uterine blood flow and fertilization rates in women who had previously failed in vitro fertilization.[32] Additional effects for enhancing sperm count and sperm quality are discussed in the male fertility section.

L-Arginine

16 g per day

Para-Aminobenzoic Acid (PABA). PABA is a part of the folic acid molecule and is found in eggs, milk, meat, and several grains. The role of PABA produced by the body is not really known, but as an oral supplement it is FDA-approved for

difficult conditions such as scleroderma, vitiligo, pemphigus, and dermatomyositis. It is approved for use as a sunscreen because it acts as a filter to block out ultraviolet radiation. In fertility, PABA supplementation of 100 mg four times daily resulted in pregnancies in 12 of 16 women with a history of infertility.[33]

PABA

100 mg 4 times per day

Multiple Vitamin-Mineral. A double-blind trial found that taking a multivitamin-mineral supplement increased female fertility.[34] A multivitamin and mineral in the form of a prenatal preparation has much of what is needed, but women who are deficient in vitamins like folic acid and B_{12}[35–37] and minerals like magnesium and selenium[38] may need additional supplementation.

Botanicals

Chaste Tree (*Vitex Agnus Castus*). Chaste tree stimulates the release of luteinizing hormone (LH) from the pituitary gland and mildly inhibits FSH. The result is an indirect ability to raise or modulate progesterone levels.[39] Chaste tree also modulates the secretion of prolactin from the pituitary gland, and in one study prolactin was significantly reduced while shortened luteal phases and progesterone deficits were normalized.[40]

Chaste Tree

Liquid extract 1 tsp per day or 0.6–0.75% standardized extract, 175–215 mg per day

Black Cohosh (*Cimicifuga Racemosa*). Similar to chaste tree, black cohosh can also stimulate pituitary secretion of LH and therefore lead to ovulation and subsequent production of progesterone by the corpus luteum.[41, 42] Black cohosh may be especially valuable for women in their 40s whose FSH levels may be starting to increase as the ovary ages.

Black Cohosh

20–40 mg standardized extract twice daily

Rhodiola (*Rhodiola Rosea*). Rhodiola may enhance fertility. It has been shown to enhance thyroid function without causing hyperthyroidism in animals, and egg maturation was enhanced as well. These and other preclinical research led to treating 40 women with amenorrhea and infertility with rhodiola (100 mg) twice daily for two weeks. Normal menses were restored in 25 women, 11 of whom became pregnant.[43, 44]

Additional Botanicals. Numerous plants have been used in traditional herbal medicine for their ability to regulate the tone of the uterus. In cases of infertility of undetermined cause, these uterine tonics are thought to prepare the uterus for implantation of a fertilized egg. These herbs include dong quai (*Angelica sinensis*), blue cohosh (*Caulophyllum thalictroides*), crampbark (*Viburnum opulus*), false unicorn or helonias (*Chamaelerium luteum*), and squaw vine (*Mitchella repens*).

Dong quai can tonify a weakened uterus by improving the metabolism within the uterus[45] as well as regulating hormonal control and improving the timing of the menstrual cycle.[46] Blue cohosh can improve the muscular tone of a hypotonic uterus and thereby was thought by early traditional herbalists to improve fertility. Crampbark has been used more in cases of miscarriage rather than actual infertility. It has been used traditionally both as a uterine sedative and a uterine tonic. False unicorn or helonias has been used to improve uterine tone and decrease what has been called pelvic congestion. This herb also tends to be used more for women who have a history of miscarriage or abnormal bleeding during the pregnancy rather than true infertility. Squaw vine is a uterine tonic that increases the circulation to and in the uterus, thereby also reducing uterine congestion. It can both sedate a hypertonic uterus as well as tonify a hypotonic uterus.

A Note About Acupuncture

Acupuncture has been shown to improve pregnancy rates in women undergoing fertility treatment. Pelvic ultrasound studies have confirmed that acupuncture treatments can improve pelvic blood flow, and this may account for its effectiveness. Another possible mechanism for the ability of acupuncture to improve female fertility is a favorable effect on gonadotropin-releasing hormone, and therefore on the secretion of gonadotropins and improved thickening of the lining of the uterus (the endometrium). In addition, acupuncture can also be helpful in improving sperm count, menstrual cycle regulation, ovulation induction, and decreasing stress and depression. Acupuncture, as with many complementary therapies, is best when combined with conventional treatment when indicated. Research studies thus far have had small sample sizes and difficulty in providing proper control, so the results should not be overemphasized until further studies can be done. Acupuncture by a licensed professional with experience working with fertility issues appears to be safe and well tolerated.

Ginseng species are an important consideration in infertility due to their ability to enhance overall health, vitality, stamina, and endurance. Siberian ginseng may be able to promote regulation of reproductive hormones, thereby regulating the timing of ovulation.[47]

Phytoestrogens can be particularly useful in the IVF fertility treatments by improving implantation, pregnancy, and delivery rates.[48] In addition, phytoestrogens may also reverse the antiestrogen effects of clomiphene citrate, a medication frequently used in the treatment of infertility.[49]

A plant that many are not familiar with, tribulus (*Tribulus terrestris*), has been studied as an ovarian stimulant. A study of women taking tribulus every day has demonstrated the ability of tribulus to normalize ovulation, whereby some of the women also became pregnant.[50] When using the tribulus simultaneously with an ovulation-induction drug, the results with the combined use were better than the drug by itself.

Polycystic ovary syndrome (PCOS), also known as chronic anovulatory syndrome, is the association of hyperandrogenism with chronic anovulation in women without specific underlying diseases of the adrenal or pituitary glands. One of the characteristics is infertility, although some PCOS patients may randomly ovulate and are fertile that month. PCOS is a complicated disorder that takes a very comprehensive, multifactorial approach. Several herbs may have a role. Flaxseed, nettles, and green tea stimulate sex-hormone-binding globulin, which can lower the elevated estrogens and androgens. Saw palmetto can inhibit 5-alpha reductase, which then inhibits the conversion of testosterone to dihydrotestosterone, and smilax and sanguinaria may be able to produce a progesterone effect. All of these mechanisms—plus modifying insulin resistance and/or lowering a hypersecretion of insulin, treating the underlying endocrine problem, and inducing ovulation—are the keys to treating PCOS.

Additional Therapies

Recent research also supports the use of manual soft-tissue therapy for pelvic adhesions, which may be implicated in some cases of infertility where there has been a history of surgery, infection, inflammation, or trauma. Adhesions form as a result of the natural healing process but cause problems by attaching to internal structures and affecting normal anatomy, mobility, and function. The manual therapy can improve tissue mobility and restore function by breaking the collagen cross-links that have formed during the healing process. The specific technique studied is the Mojzisova method, which combines both soft-tissue and osseous manipulation and is usually performed by specially trained physical therapists.[51]

Celiac disease, which may cause deficiencies in a number of nutrients, requires special consideration for appropriate diagnosis and management. Gluten avoidance has been shown to improve fertility rates in sensitive patients.[52–54]

Sample Treatment Plan for Infertility Due to Lack of Ovulation or Infrequent Ovulation Cycles

See the Resources section for formulation sources.

Diet

Whole foods diet high in vegetables, whole grains, nuts and seeds, fruits, low-fat organic dairy
Protein: 60 g daily
Soy foods: 1 serving daily
Flaxseed: 2 tbs per day
Fish: 2–3 times per week

Lifestyle

Avoid caffeine, alcohol, and smoking.
Seek optimal body weight.

Nutritional Supplements

Vitamin E: 400 IU per day
Vitamin C: 2,000 mg per day
Zinc: 30 mg per day
Selenium: 100 mcg per day
Prenatal vitamins: 2 per day

Botanicals

Chaste tree (0.6% aucubin extract capsule): 215 mg per day
Rhodiola: 200 mg per day

Celiac disease may lead to decreased absorption of fat-soluble vitamins, thereby causing deficiencies that may impair male fertility as well.

Topical or vaginal progesterone may help normalize menstrual cycles, improve implantation rates, and maintain pregnancies in women with history of repeated miscarriages but should only be used under the care of a physician.[55, 56]

MALE FERTILITY

Low sperm counts have been attributed to a number of factors, including exposure to pesticides, welding, antibiotic and other medication use, a history of mumps, gastrointestinal complaints, decreased intake of fruits and vegetables, family history of female fertility disorders, and nicotine and caffeine intake.[57] Therefore, it seems prudent when dealing with a couple who want to improve their fertility that these factors be addressed promptly, especially in patients who have demonstrated sperm abnormalities.

Supplements

A number of supplements can improve sperm quality and quantity, including vitamins C, B_{12}, and E; L-arginine; L-carnitine; selenium; zinc; and folic acid.[58]

Vitamins C and E. Vitamin C and other antioxidants can decrease sperm DNA damage that can interfere with fertility.[59] Vitamin C deficiency has been linked with significant decreases in sperm count, motility, and vitality and with an increase in morphologically abnormal sperm.[60] Vitamin E and selenium have been shown to reduce lipid peroxidation and, therefore, improve sperm quality. One study looked at men who had normal sperm counts, but low rates of fertilization during in vitro fertilization treatments. After one month of daily vitamin E supplementation, the fertilization rates increased from 19 percent to 29 percent, suggesting that the antioxidant effects of vitamin E may make the sperm more fertile.[61]

The combination of oral vitamin C and vitamin E (one gram of each), administered to male patients with DNA damage who had previously failed fertility treatments for two months, was shown to decrease DNA-fragmented sperm, and a second fertility treatment led to improvement of clinical pregnancy and implantation rates.[62]

Vitamin C

500–3,000 mg 3 times daily

Vitamin E

500–1,000 IU per day

L-Carnitine. The amino acid L-carnitine is essential for normal functioning of sperm. It seems

that the higher the levels of L-carnitine in sperm cells, the higher the sperm count and the more motile the sperm. L-carnitine given as a supplement helped to increase the sperm count and the number of normal sperm after four months.[63]

L-Carnitine

3,000 mg daily

B_{12}. A deficiency of B_{12} leads to reduced sperm counts and reduced sperm mobility. In men who had sperm counts under 20 million/ml, 1,000 mcg of vitamin B_{12} per day led to an increase to 100 million/ml.[64] In another study of men with low sperm counts, 6,000 mcg of vitamin B_{12} per day showed improvements in the sperm counts of 57 percent of them.[66]

CONVENTIONAL MEDICINE APPROACH

It is important to be aware of the latest conventional treatment options for infertility and to gain insight into when is it timely to seek specialized fertility care. The decision to pursue conventional modes of infertility treatment depends on age, the duration and cause of the infertility, the results of the ovarian-reserve assessment/testing, finances, other health issues, emotional stamina, and thoughts and feelings about adoption or surrogate options. Treatment options include intrauterine insemination (IUI) in the natural menstrual cycle, ovulation induction using clomiphene citrate or gonadotropins (with or without IUI), and in vitro fertilization.

Intrauterine insemination involves introducing a concentrated suspension of washed sperm into the upper uterine cavity. The success of IUI varies depending on the cause of infertility. IUI alone, without ovulation induction medications, increases the chance of fertility in a natural cycle by only 1 to 2 percent in couples with unexplained infertility. When clomiphene citrate (CC) is added in these couples, the fertility rate increases to 8 to 10 percent.

Three main types of medication are used to induce ovulation. Clomiphene citrate is the most common, but aromatase inhibitors (AI) and injectable gonadotropins are also used when there is no response to other treatments. Clomiphene citrate is not only the most commonly used medication, but it is also the most effective, inexpensive, and easiest to use and requires less monitoring than the other medications. Clomiphene citrate is primarily used to induce ovulation in women with abnormal ovulation patterns, in women with a luteal phase defect (abnormal length of the second half of the cycle), or in women who have unexplained infertility. It is also used to assess ovarian reserve. It is not generally effective in women who have amenorrhea due to low estrogenic states such as hypothalamic amenorrhea.

Clomiphene citrate is well tolerated most of the time and does not often have any serious side effects. However, because it depletes estrogen receptors, side effects include hot flashes, nausea and vomiting, breast discomfort, and headaches. It can also have detrimental effects on cervical mucus and the endometrial lining. Severe side effects occur in less than 2 percent of women using it. CC can lead to an increase in multiple gestations at a rate of about 6 to 10 percent. Most of these tend to be twins; less than 1 percent are triplets or higher-order multiples. Past concern about increasing the risk of ovarian cancer has faded with recent research showing no increased risk. About 80 percent of women using CC will ovulate, but only 50 percent of those will conceive. Over the course of using CC for six to nine cycles, the rate of pregnancy goes up to about 70 to 75 percent in those who begin to ovulate while on CC. Obesity, elevated androgen states, and late reproductive age diminish the response to CC.

Inducing ovulation with gonadotropins is indicated in women who fail to ovulate with CC, don't conceive on CC despite ovulatory cycles, have endometriosis, have unexplained infertility, or are of advanced reproductive age, or if CC is

contraindicated. Gonadotropin therapy involves injecting either FSH and LH, or FSH alone. FSH stimulates the development of multiple follicles and therefore carries a higher risk of multiple birth than does CC use. Overstimulation (hyperstimulation) of the ovaries is also a risk. These cycles require close monitoring with serial estradiol levels and ultrasounds. This therapy is usually combined with IUI.

Aromatase inhibitors (AIs) are best known for the treatment of breast cancer, but they've been used more recently to induce ovulation. By using AIs in the follicular phase of the menstrual cycle (the first half, before ovulation), estradiol levels are reduced and the hypothalamus and pituitary don't receive their normal feedback message. This results in increased secretion of the pituitary gonadotropins, which can stimulate ovulation. AIs are usually given at a dose of 2.5 to 5 mg per day on days 3 to 7 of the cycle. AIs are indicated for women with infrequent or no ovulation and for unexplained infertility.

Other drugs that are used on a selective basis and along with other therapies include gonadotropin-releasing hormone agonists, gonadotropin-releasing hormone antagonists, and human chorionic gonadotropin.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

It's important to remember that a significant number of pregnancies occur in previously infertile couples without any treatment at all. The main reason to see a health-care provider is to pursue a thorough investigation of the reasons for your infertility. Remember, infertility is defined as a failure to conceive after 12 months of frequent intercourse without contraception in women under 35 years of age or failure to conceive after 6 months of intercourse without contraception in women 35 years of age or older. At age 35, and especially after age 40, time becomes of the essence, so it is a good idea to seek the advice of a practitioner promptly if a desired pregnancy is delayed.

A practitioner with expertise in fertility can proceed with a methodical evaluation, treat any abnormalities that are found, provide education about the reproductive system, offer advice about your fertility potential, provide counsel regarding all options, and provide clinical and emotional support.

Infertility in women lends itself to an integrative approach using conventional therapies along with natural therapies. A health-care team of diverse practitioners—including a reproductive endocrinologist, a naturopathic physician, and perhaps an acupuncturist specializing in women's health and/or a psychotherapist—who are comfortable working collaboratively provides an optimal environment for patient care.

RESOURCES FOR PATIENTS

A number of excellent resources are available to couples that are having difficulty conceiving.

RESOLVE. An informational clearinghouse for infertile couples: offers educational materials, a medical call-in hour, help line, physician referrals, member-to-member support system, local chapters and support groups. Website: resolve.org/main/national/index.jsp?name=hom.

Preserving Fertility pamphlet. Available at resolve.org/main/national/niaw/presfert.pdf.

Conquering Infertility by Alice D. Domar, Ph.D. (Penguin, 2004). A mind/body guide to enhancing fertility and coping with infertility.

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INTERSTITIAL CYSTITIS

CHAPTER 11

OVERVIEW

Interstitial cystitis (IC) is a multifactorial syndrome whose diagnosis and cause remain elusive. Poorly understood, IC remains a significant women's health problem. About 90 percent of IC patients are female.[1] IC typically begins in young or middle-aged women.

IC is characterized by pelvic and/or perineal pain, urinary urgency, urination at night, pain increased by holding urine (which leads to frequency), and a constant urge to urinate. The pain of IC can range from a mild burning or discomfort to severe debilitating pain in the bladder, lower abdomen, perineum, pelvis, vagina, low back, and thighs. Menstruation and sexual intercourse aggravate symptoms in as many as 75 percent of women. There are often flare-ups and remissions.

When a woman has the classic symptoms of urinary urgency, frequency (more than eight times per day), bladder pain, and urinating at night (more than twice); has no evidence of a urinary tract infection; *and* reports continuous pain or pain with menstrual flow, then other pelvic diseases such as endometriosis should be given some consideration. If urinary leakage (incontinence) is present, an evaluation for the cause of the incontinence should be done. Painful or difficult urination (dysuria) may indicate a urinary tract or vaginal infection or a structural problem in the urinary tract.

Diagnostic tests for IC are mostly done to rule out other causes. Keeping a daily diary of when you feel the need to urinate may be useful. Your healthcare practitioner may use the O'Leary-Sant Index, which measures pain, voiding symptoms, and quality of life. A physical exam can help to rule out other diseases and pelvic pathology. Urinalysis and urine cultures are normal in patients with IC. If blood is visible in the urine under a microscope, then cytology tests should be done. Vaginal and cervical cultures are done if the practitioner suspects a sexually transmitted disease. Some urology experts, especially urogynecologists, may choose to recommend a potassium sensitivity test, which instills potassium into the bladder, to see if the bladder has increased in permeability. If the usual pain gets worse, the test is considered positive for IC.

On cystoscopy, bladder ulcers called Hunner's ulcers and reduced bladder capacity are detected in less than 10 percent of individuals with IC. If these ulcers are seen, this is considered definitive for IC. More commonly, IC is characterized by petechial bladder mucosal hemorrhages, inflammation, and no ulcerations.

IC is more common in patients with irritable bowel syndrome, spastic colon, abdominal cramping, hysterectomy, rheumatoid arthritis, fibromyalgia, hay fever, asthma, and allergies to foods and medications.

Drug and surgical interventions have been used to treat this condition with limited success and potential side effects. Despite continued research on IC, safe, noninvasive treatment options are lacking.

Several causes have been proposed for IC, although none have been proven. The contributing factors fall into two main categories: bladder epithelial permeability and inflammation. The exact causes are difficult to distinguish and are likely to be interrelated in any one patient. Because of this, a variety of treatment options may be used. These include vitamin A (as palmitate), bioflavonoids (from citrus), L-arginine, quercetin, N-acetyl glucosamine, corn silk, kava root, and Oregon grape root.

Although the cause of IC is unknown, it is important to consider the possible causes to

KEY CONCEPTS

- IC is a noninfectious chronic condition characterized by pelvic and/or perineal pain, urinary urgency, urinary frequency, bladder pain, and urination at night.
- IC is difficult to diagnose with any test; tests are mostly done to rule out other causes of the symptoms.
- There is no proven cause, but bladder permeability and inflammation direct the variety of treatment options available.

PREVENTION

- No specific prevention strategies have been established, but minimizing bladder irritants seems logical. Classic offenders are coffee, chocolate, alcohol, carbonated drinks, citrus fruits, and tomatoes.

understand the therapeutic basis for natural treatments. Because IC is a multifactorial syndrome, it is likely that several of these factors may be true in your case. Short descriptions of possible factors in IC follow:

- **Bladder epithelial permeability.** One of the more recent theories for IC is that the bladder epithelium is abnormally permeable, allowing components of urine to penetrate and irritate the bladder. The most common explanation of the permeability is that the bladder epithelium is deficient in glycoproteins and glycosaminoglycans (GAG). Several studies have shown that IC patients had decreased levels of glycoproteins and GAG in both the bladder and the urine.
- **Mast cell activation.** This theory proposes that bladder mast cells are activated and release histamine, prostaglandins, leukotrienes, and other substances that affect bladder smooth muscle and sensory nerve terminals. Several studies have shown that IC patients have increased urine levels of these mast cell mediators. Some IC bladder biopsy samples contain mast cells, but it is known that these cells are not specific to IC and can also be found in other bladder disorders.
- **Autoimmune causes.** Autoimmune theories are based on detecting antinuclear antibodies, increased urinary excretion of eosinophilic cationic protein, and the tendency of IC to affect women. Other evidence includes IgM in the uroepithelium, immune deposits in vessel walls, and T and B cell nodules in patients with IC.
- **Inflammation.** Most biopsies of IC bladders show mild chronic inflammation to significant infiltration of T cells, B cells, plasma cells, neutrophils, eosinophils, and mast cells. Inflammatory mediators such as interleukin-6 are also increased.
- **Infection.** The possibility of an infectious cause has been suggested by the presence of microorganisms embedded in the bladder wall of patients with IC and bacterial ribosomal mRNA in tissues of bladder biopsies.
- **Reflex sympathetic dystrophy.** Bladder sympathetic innervation may be interrupted by injury to peripheral nerves from prior UTIs, hysterectomy, or childbirth. This may lead to an increased transmission of pain impulses from the bladder and reduced circulation, facilitating inflammatory cell infiltration and leading to bladder ulceration, fibrosis, and atrophy.

Each of these theories has supportive and detractive evidence. As stated earlier, the cause of IC may vary in different people, or multiple factors may be in operation.

OVERVIEW OF ALTERNATIVE TREATMENTS

Therapeutic options, both conventional and alternative, are as varied as the theories on the cause of IC. Almost no studies have been done to help practitioners identify which patients would likely respond best to which treatments. Treatment choices are made individually for each patient, and in most cases, several treatments

should be used concurrently until symptom relief occurs. After that, a careful, gradual process of reducing dosages or simplifying the treatment interventions is appropriate.

The most commonly used treatment by both conventional and alternative practitioners is dietary changes. Patients with IC will often report that certain foods increase their symptoms. Classic offenders are coffee, chocolate, alcohol, carbonated drinks, citrus fruits, and tomatoes. Acid or potassium content is often suspected as the mechanism. Responses to these foods is hugely variable, and there is no consistent diet that works for all IC patients.

The following natural treatment plan may seem complex, but consider that the average patient with IC has symptoms three to four years prior to diagnosis. In my experience with treating IC patients over a one-year period with this protocol, significant improvements are usually seen within the first three months. Continued improvement (75 percent better or greater) is seen after six months while maintaining the same doses. Within the second six months and beyond, gradual reduction of dosage can be done on an individual basis. I have found that IC patients are so thrilled with their improvement that they hesitate to reduce the supplements and do so carefully. With this natural medicine approach, IC patients can proceed with optimism and be reassured that there is likely help for their very chronic condition.

Nutrition

Some foods and beverages seem to exacerbate symptoms for many women. Although not fully investigated, about 53 percent of patients with IC associate a flare-up of their symptoms with dietary influences, especially citrus fruits and other acidic foods and beverages.[2] Many women find it helpful to avoid certain foods. If you avoid these foods for two weeks and your symptoms improve, this is good news for the bladder. Making these dietary changes is a good self-help strategy in managing this condition.

Foods to Avoid

Alcohol	Lentils	Apples
Lima beans	Aspartame	Limes
Avocados	Mayonnaise	Bananas
Nuts*	Cantaloupes	Onions
Carbonated drinks	Oranges	Cheese**
Peaches	Chicken livers	Pickled herring
Chilies/spicy foods	Pineapple	Chocolate
Plums	Citrus fruits	Prunes
Coffee	Raisins	Corned beef
Rye bread	Cranberries	Saccharine
Grapefruit	Sour cream	Grapes
Soy sauce	Tomatoes	Guava
Strawberries	Vinegar	Lemons
Tea	Yogurt	

*Except almonds, peanuts, and pine nuts
**Except American, cottage, ricotta, and cream cheese
Source: K. Whitmore[2]

Glycosaminoglycans and Bladder Epithelial Permeability. The bladder epithelial permeability hypothesis is a compelling and active area of research. This theory asserts that the bladder epithelium is abnormally permeable in IC, so urine components penetrate and irritate the bladder. Several lines of indirect evidence support this hypothesis:

1. Some IC patients have increased pain after eating foods such as citrus fruits and tomatoes that are acidic and high in potassium.
2. Some IC patients have pain when potassium chloride is instilled into the bladder, while most healthy controls do not.[3, 4]
3. Taking fluorescein orally yields higher blood fluorescein levels in IC patients than in controls, attributed to increased fluorescein reabsorption across the bladder wall.[5]
4. In one of the only direct bladder permeability studies, radio-labeled diethylenetriamine pentaacetic acid (DTPA) was instilled in the bladder and blood samples showed that IC patients had higher blood levels of DTPA than

healthy controls, although the small study of 10 IC patients and 9 controls was not able to demonstrate statistical significance.[6]

5. Glycosaminoglycans (GAGs) normally line the epithelium and are thought to contribute to the permeability barrier. Several studies have shown that IC patients have decreased levels of GAGs in both the bladder and urine.[7–12]

GAG supplementation is used to treat IC based on the rationale that the GAG may supplement or replace the deficient epithelial GAGs. The GAG studies with published trials include PPS (pentosan polysulfate sodium) Elmiron,[13–19] heparin,[20] and hyaluronic acid (Cystostat).[21] These studies showed treatment efficacy over placebo for each of these treatments. No studies have been published on over-the-counter preparations of chondroitin sulfates and glucosamine preparations; however, a link has been established between chondroitin and IC.[22] A GAG in the form of N-acetyl glucosamine or glucosamine sulfate can be used as part of a multifactorial approach to repair the bladder epithelium.

Glucosamine Sulfate

750 mg twice daily

N-Acetyl Glucosamine

500 mg twice daily

Vitamin A. Vitamin A has been shown to inhibit mast cell growth and proliferation, and deficiency may aggravate the clinical manifestations of inflammatory reactions due to mastocytosis.[23–26] Vitamin A also helps to elevate urinary nitric oxide levels. (See the section on L-arginine and inflammation for more information on the role of nitric oxide in IC.) In addition, vitamin A deficiency has been linked to a higher level of tissue damage due to inflammation, both as an etiological and aggravating factor, and supplementation may decrease inflammation in these cases.[22, 27, 28] Vitamin A also plays an essential role in maintaining and protecting epithelial integrity and mucosal surfaces and their secretions, including those of the bladder.[26, 29]

Vitamin A may also be of benefit in the management of IC as it is essential to proper immune function[30, 31] and stimulates epithelial repair and growth.[30, 32, 33] Vitamin A increases immune response mainly due to its effect on T-helper cells.[34] In addition, evidence supports the theory that Vitamin A may also attend to the GAG repair.[35]

Vitamin A

5,000 IU per day

L-Arginine and Inflammation. Nitric oxide (NO) may play an important role in the pathogenesis of IC in that it activates the cyclooxygenase (COX) enzymes, leading to production of proinflammatory prostaglandins that exacerbate the inflammatory response.[36] NO also plays a role in IC in the regulation of smooth muscle relaxation, immunological responses, and bladder neurotransmission and blood flow.[37, 38] Luminal nitric oxide is elevated in IC, corresponding to symptom severity, and can be used as a marker for mucosal inflammation in such cases.[39–41] Nutrients such as arginine (a precursor to NO synthase) and antioxidants like vitamin A help to elevate urinary nitric oxide levels and may play an important role in the management of interstitial cystitis.[36, 40, 42, 43] Oral supplementation with arginine changes urine levels of NO,[44] and three studies demonstrated symptom improvement over placebo.[40, 45, 46] Another study reported that a six-month course of oral L-arginine increased nitric oxide–related enzymes and metabolites in the urine of patients with IC. This result was correlated with a decrease in IC symptoms.[37]

L-Arginine

500 mg twice daily

Calcium Glycerophosphate (Prelief). Calcium glycerophosphate has been shown to help reduce bladder pain and urinary urgency in IC patients when it is used with acidic foods and beverages. Calcium glycerophosphate, sold under the trade name Prelief, is a food-grade mineral, available in granulated form. When added to acidic foods and beverages, it removes the acid and helps to reduce bladder pain and urinary urgency associated with these foods.

However, from a naturopathic medicine standpoint, this should be done sparingly. This is like taking a heartburn medicine but still eating spicy Polish sausages. The food is still aggravating you, you are just temporarily protected from the immediate bodily response. The fact that these foods are causing symptoms means that they are causing irritation and inflammation.

Calcium Glycerophosphate (Prelief)

2 packets 3 times daily with meals

Add 2 packets of powder to a serving of acidic food or beverage. (It will not dissolve in alcoholic drinks.) Also take 2 packets at bedtime if desired. You can use more if needed.

Botanicals

Kava (*Kava Methysticum*). A permeable or "leaky" bladder may allow chronic diffusion of urinary potassium, leading to sensory symptoms and tissue damage. This appears to be a major factor in the pathogenesis of interstitial cystitis.[47] Kava is known historically as a urinary antispasmodic, and recent reports support its use as a smooth muscle relaxer, likely through inhibition of calcium channels.[48] In addition, kava blocks sodium and calcium ion channels in neural tissue and thereby alters potassium potentials.[47] Abnormally elevated potassium levels may induce heightened nervous and electrical sensitivity and increase mucosal sensitivity in patients with IC. Kava may help to reduce this effect by altering the potassium channel activity. In addition, IC has been reported to be aggravated by stress[49, 50] and associated with panic disorder,[51] two conditions that may be ameliorated by kava.[52]

Kava Extract

Kavalactones: 70 mg 3 times daily

Quercetin. Another proinflammatory culprit in IC is the mast cell, an immune modulatory cell that secretes its damaging contents in a process called degranulation in response to factors such as stress and toxins. Mast cells can directly damage the bladder mucosa, leading to bladder inflammation. Some researchers speculate that treatment of IC must include mast cell stabilizers.[45, 53, 54] Quercetin and other bioflavonoids may be helpful in mast cell stabilization, inhibiting degranulation and the release of damaging mediators.[55–59]

Quercetin and other bioflavonoids also contribute in other ways to mitigate the inflammatory process. Quercetin may be beneficial to connective tissue by limiting inflammation and associated tissue degradation, improving circulation, and promoting a strong collagen matrix.[60, 61] Quercetin also plays a part in modulation of the inflammatory response, at least in part by modulating prostaglandin synthesis and cytokine production.[62]

Quercetin

500–1,000 mg twice daily

Bioflavonoids

500–1,000 mg twice daily

Oregon Grape Root (*Berberis Aquifolium*). Oregon grape root, a berberine-containing botanical, is an immune modulator, specifically in mucosal membranes, and, like vitamin A, may be effective in treating allergic and inflammatory conditions like IC due to its effect on T-helper cells.[63, 64] In addition, evidence suggests that berberine may also decrease inflammation by inhibiting arachidonic acid metabolism in endothelial cells.[65]

Sample Treatment Plan

See the Resources section for formulation sources.

Nutrition

Avoid the following foods:

Alcohol	Lentils	Apples
Lima beans	Aspartame	Limes
Avocados	Mayonnaise	Bananas
Nuts*	Cantaloupes	Onions
Carbonated drinks	Oranges	Cheese**
Peaches	Chicken livers	Pickled herring
Chilies/spicy foods	Pineapple	Chocolate
Plums	Citrus fruits	Prunes
Coffee	Raisins	Corned beef
Rye bread	Cranberries	Saccharine
Grapefruit	Sour cream	Grapes
Soy sauce	Tomatoes	Guava
Strawberries	Vinegar	Lemons
Tea	Yogurt	

*Except almonds, peanuts, and pine nuts
**Except American, cottage, ricotta, and cream cheese

If the preceding list is too strict, avoid the following:

Tomatoes
Coffee
Chocolate
Alcohol

Supplements

N-acetyl glucosamine: 500 mg 3 times daily; or glucosamine sulfate: 750 mg 2 times daily
L-arginine: 500 mg 3 times daily
Quercetin: 500–1,000 mg twice daily
Vitamin C (buffered, noncitrus source): 1,000–2,000 mg daily
Corn silk: 300 mg 3 times daily
Kava extract: 1 capsule 3 times daily
Vitamin A: 5,000 IU daily

Oregon Grape Root

500 mg per day

Corn Silk (*Zea Mays*). Another botanical, corn silk, has been found to be a potent inhibitor of proinflammatory cytokines as well.[66] Corn silk also has historical evidence for its application in a variety of urinary conditions and may be helpful in the treatment of IC due to its demulcent effects.[67]

Corn Silk

300 mg 3 times daily

Additional Botanicals. Other botanicals might be considered for their anti-inflammatory properties, such as licorice (*Glycerrhiza glabra*) and feverfew (*Tanacetum parthenium*). Botanicals with demulcent properties allow for mucosal protection and soothing. These include licorice, slippery elm (*Ulmus fulva*), marshmallow (*Althea officinalis*), oat seed (*Avena sativa*), and comfrey (*Symphytum officinale*).

It can be crucial to use herbs that provide pain relief while the other therapies attempt to repair the lining of the bladder. Common choices would be kava (*Piper methysticum*), crampbark (*Viburnum opulus*), wild yam (*Dioscorea villosa*), and valerian (*Valeriana officinalis*).

CONVENTIONAL MEDICINE APPROACH

The most likely conventional IC expert will be the urogynecologist. Dietary modifications are standard recommendations. A diet low in acidic foods and avoidance of beverages such as coffee, tea, and carbonated and/or alcoholic drinks can be helpful in reducing symptoms. The practitioner also will often recommend Prelief, a nutritional supplement discussed earlier in this chapter.

The only oral medication approved for IC by the FDA is pentosan polysulfate sodium (PPS, Elmiron). Other oral medications include amitriptyline, imipramine (used for pain), hydroxyzine, antispasmodics, muscle relaxants, and numerous pain medications. PPS is the most studied conventional medicine for IC. Unfortunately, it only shows about a 30 percent efficacy rate.

Medicine can also be instilled into the bladder. Until PPS, DMSO was the only approved medication for IC. The medication is placed directly into the bladder through a catheter weekly or biweekly. Another intravesicular (within the bladder) therapy is Bacillus Calmette-Guerin (BCG). The mechanism is unknown, but the solution may modulate the immune response in the bladder. Intravesical heparin, hyaluronic acid, and intravesical PPS are other options.

Experimental therapies are being explored, including electrical nerve stimulation to activate the inhibitory circuits and decrease the sensation of pain, intravesical injection of botulinium toxin, gene therapy, and nerve growth-factor inhibitors. Surgical interventions are currently considered a last resort. These include surgical removal of visible ulcers, laser denervation, or removing a part of the colon and attaching it to the bladder to increase bladder capacity. These surgical procedures are still associated with a high rate of relapse, persistent pain, permanent or intermittent need for catheterization, and additional surgeries.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

The symptoms of IC can range in severity from mild and intermittent to chronic and very severe. The main reason to see a licensed health-care practitioner is to diagnose the cause of the symptoms. That is easier said than done, and often IC symptoms are misdiagnosed as a urinary tract infection, endometriosis, a sexually transmitted infection, or a vaginal infection. On the other hand, sometimes these, rather than IC, are the cause of the symptoms. Rarely, bladder cancer may be the cause if blood in the urine is present.

The diagnosis of IC is based upon the presenting signs and symptoms. A good medical history, physical exam, and tests are done to determine the cause of the symptoms. A cystoscopy or intravesical potassium sensitivity test may be recommended. Once the diagnosis of IC has been made, either with certainty or as a possibility, treatment can proceed. IC is a condition that lends itself well to alternative therapies—not only because they typically work as well or better than the conventional options, but also because there is no medical danger if conventional treatment options are declined. Whether alternative or conventional medicine or an integration of the two is used, symptom improvement is the ultimate measure of success.

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MENOPAUSE

CHAPTER 12

OVERVIEW

There are currently 43 million American women who are postmenopausal, and their numbers are expected to increase to 60 million by the year 2020. By the year 2015, nearly 50 percent of the women in the United States will be menopausal. This rapid expansion in the menopausal population is related both to an increase in longevity (to an average life expectancy of approximately 84 years) and to the maturation of the baby boomer generation into the menopausal age group.

Understanding the terminology and definitions can be helpful in understanding the natural biological process of aging. The term *menopause* is derived from *meno* (month, menses) plus *pausis* (pause, cessation); in other words, it is a pause in menstruation. A spontaneous or natural menopause is the permanent cessation of menstruation following the loss of ovarian activity and is strictly defined as the point after 12 consecutive months of no menses following the final menstrual period. The average age of menopause has been estimated to be between 50 and 52. In the Massachusetts Women's Health Study, the largest and most comprehensive study of middle-aged women, the median age for menopause was 51.3 years.[1] The range is generally from age 40 to 58 years of age, although some women reach menopause prematurely in their thirties and a few as late as in their sixties. Despite our aging population and greater life expectancy, the age of menopause has not changed in the last few centuries. Three important factors influence the age of menopause: current smoking, familial factors, and genetic factors involving the estrogen receptors. Other influences may also affect the timing of menopause: increased body mass index (being overweight), more than one pregnancy, history of no pregnancy, toxic chemical exposures, treatment of childhood cancers with chemotherapy and radiation, epilepsy, and cognitive scores in childhood (the higher the score, the later the menopause). There appears to be no link between age of menopause and history of hormonal contraception, socioeconomic or marital status, race, or age of first menstrual cycle.

Premenopause refers to the period of life from the first menstrual period up to the final menstrual period, but this term is often used incorrectly. To avoid confusion, it's probably best to not even use this term. *Perimenopause* is the period immediately before menopause. Perimenopause starts with changes in the menstrual cycle and ends 12 months after the final menstrual period. In the early stage of perimenopause, the menstrual cycle length begins to vary by as much as 7 days from the normal cycle. So, rather than having a 28-day cycle, maybe the cycle begins to be a 20- to 21-day cycle from day 1 of the menses to the next day 1. In the later stage of perimenopause, we start to see two or more missed menses in a year, and the cycle being 60 days or more. Some people call perimenopause the *menopause transition* or the *climacteric*. The average age of onset of the perimenopause or menopause transition is age 47.5. For most women, this transition lasts about four years. Only a very small number of women stop having their menses abruptly. Most of us experience the irregular pattern of bleeding.

Postmenopause begins after the time of the final menstrual period, whether it was a natural or medically induced menopause, and continues until the end of life. It is defined as stage +1 (early postmenopause) and stage +2 (late postmenopause). The early postmenopause stage is

five years, which includes the first year since the final menstrual period and the next four years.

Menopause should be regarded as a normal, natural event of aging except when it is brought about by surgery, medications, or radiation. As we discuss problems that can be associated with menopause for some women, it can quickly be viewed as a disease process and a sign of pending fragility, disability, and even death. It is important to appreciate that menopause is or can be the beginning of a new phase of life, with fewer family obligations, new options, new learning opportunities, and new adventures. With a proper understanding of perimenopause and menopause, and an adequately informed and respectful health-care practitioner, the majority of menopausal women can be healthy and happy and use this time period as an opportunity to foster a preventive health-care plan and lifestyle as well as an opportunity to assess their life.

Women can enter menopause by several different routes and pass through more than one phase. *Premature menopause* (also called premature ovarian failure, or POF) is a combination of secondary amenorrhea, menopausal symptoms, and a persistent elevation in follicle-stimulating hormone (FSH) levels greater than 20 IU/L before 40 years of age. One in 100 women between the ages of 15 and 40 will spontaneously develop premature menopause.[2] In two-thirds of cases, no apparent cause for the premature ovarian failure will be found.[3] These cases are called idiopathic. In one-third of cases, causes of premature menopause include metabolic and systemic disease, chromosome abnormalities, immunologic disorders, infections, lack of blood supply to the ovaries, cigarette smoking, ovariectomy or bilateral oophorectomy (both ovaries removed), pelvic irradiation, and chemotherapy.

Some women may experience a *temporary menopause* in which normal ovarian function is interrupted temporarily and the menses stops (for 12 months or more). Some medications that are used to treat conditions such as endometriosis or certain cancers may cause this.

The term *induced menopause* is used when the menses ceases after surgical removal of both ovaries. This is referred to as ovariectomy or bilateral oophorectomy and may or may not include the removal of the uterus (hysterectomy). A hysterectomy is actually only the surgical removal of the uterus. These surgeries can be done separately or together. The incidence of hysterectomy and oophorectomy in the United States is substantial. Women who undergo a bilateral oophorectomy have an increased risk of developing osteoporosis, coronary artery disease, and/or atrophy of the genital area at a younger age. Probably the most dramatic entry into menopause is to have both ovaries removed.

From 1994 through 1999, an estimated 3,525,237 hysterectomies were performed among U.S. women aged 15 years or older.[4] During this time, the overall hysterectomy rate for U.S. women was 5.5 per 1,000 women. The hysterectomy rates for women living in the South (6.5 per 1,000) is significantly higher than those in the Northeast (4.3) or West (4.8). For women living in the Midwest, it was 5.4 per 1,000. About 55 percent of women who had a hysterectomy had a bilateral oophorectomy (both ovaries removed). Uterine fibroids, endometriosis, and prolapse of the uterus are the most frequent reasons for these surgeries in women aged 15 years and older. With new laparoscopic-assisted hysterectomies, ovaries are removed more easily (and this is unfortunate if the ovaries are healthy) and removal of the ovaries has increased significantly, from 20.4 percent in 1994 to 42.5 percent in 1999.

When the ovaries are removed, the onset of menopause is immediate. The sudden onset of hot flashes, mood changes, sleep disturbances, and loss of sexual arousal is accompanied by a slower onset of fatigue, headaches, dry skin, bone and joint pain, loss of vaginal lubrication, and painful vaginal sex. This overwhelming barrage of symptoms results from the sudden drop in hormone production—estrogen, progesterone, and testosterone.

Women who have had a hysterectomy but still retain one or both ovaries will go through menopause more naturally most of the time, although sometimes earlier than they would have otherwise. Without the uterus and the monthly bleeding, it may be harder to know when menopause arrives. All the typical symptoms can occur, though. If you are fortunate to not have any of the overt menopausal symptoms, you can estimate that you'll have gone through menopause somewhere between ages 48 and 53. The FSH blood test may be used to determine menopausal status.

Other methods of inducing menopause include chemotherapy, medications, or pelvic radiation therapy, which causes the ablation of ovarian function. Women who have been treated with chemotherapy may go into menopause either temporarily or permanently. About 30 percent of these women will have a return of their menses sometime within the first year. Irradiation of the pelvic or abdominal area can also induce menopause. Tamoxifen, another cancer drug used mostly for women who have breast cancer, can either induce menopause in premenopausal women or increase menopause symptoms in postmenopausal women.

Several drugs can induce menopause that is reversible once the drugs are discontinued. These include Lupron and Synarel, which are usually given to suppress menses in the case of endometriosis and to shrink fibroids before surgery. Menopausal symptoms tend to be not as severe as in surgical menopause but worse than natural physiologic menopause.

Fortunately, all of the sex hormones are not lost with menopause or even with surgical menopause. For example, about 50 percent of our testosterone comes from the ovaries and adrenal glands; the other 50 percent comes from many different parts of the body, including the liver, the skin, and the brain. These tissues manufacture testosterone from precursor hormones that are made in the ovaries and the adrenals. In other words, the ovaries and the adrenal glands are responsible for producing all of a woman's testosterone, either directly or indirectly. The adrenal glands also produce androstenedione. Androstenedione is converted to estrogen (estrone) in the body fat and to a lesser degree in some other tissues and organs including the muscle and skin. For some women, this source of estrogen is adequate to counter some of the menopausal symptoms, and they have an easier time.

Although this adrenal source of hormonal support is a blessing, the adrenal glands produce their maximal amount of androgens in the presence of fully functioning ovaries. The function of the cortex of the adrenal glands is linked to the functions of the ovaries due to their shared original group of cells in the developing embryo. If you don't have your ovaries, then the adrenal glands will not produce their potential amount of androgens. In natural menopause, the ovaries continue producing androgens (typically referred to as male hormones) that help maintain the potential for sexual arousal.[5] Several studies have shown that surgically induced menopausal women have lower sexual desires and subjective arousal compared to women who have retained their ovaries; treating these post-oophorectomy women with estrogen and androgens results in a greater sexual response than treatment with estrogen alone.[6] Surgical menopause may also have a psychological impact on women. Not only is this related to the sudden change in hormone status, but the severity of depression that may develop can often be correlated to body image, sexual identity, cultural background, and family issues.[7]

The natural transition from the reproductive years to the postmenopausal years is not necessarily a smooth one, even though it is a normal process of aging. Though not a disease, there can be health problems associated with menopause. For many women, symptoms of these hormonal changes occur intermittently for a number of years. Dr. Susan Love calls this period "puberty in reverse." Just as the hormonal highs and lows

of puberty brought sleepiness, acne, mood swings, and unpredictable menses, this end of the spectrum with its own hormonal fluctuations may bring hot flashes, insomnia, mood swings, acne, poor concentration and memory, and unpredictable menses again.

No two women's menopause transition is alike. Many women begin to experience an array of physical, mental, and emotional symptoms long before they meet the definition of menopause.

During perimenopause, several biological changes occur:

- The number of ovarian eggs (oocytes) reaches very low levels
- The menstrual cycle begins to vary, usually shortening from one menses to the next.
- The levels of FSH in the body increase. This rise is one of the first signs of an aging reproductive system. Health-care practitioners often measure FSH levels to determine if one's symptoms are related to menopause. There are two problems with this test, however: varying patterns of FSH may occur even in the same woman, and the FSH is often normal even in a perimenopausal woman.
- Ovarian production of estradiol, progesterone, and testosterone decreases with the onset of true menopause.
- Although hormone levels will eventually decrease, lower estrogen levels aren't experienced until six months to one year before true menopause. It's only in the last year of perimenopause that estrogen levels begin to decrease. Near menopause, estrogen levels rise very high and then drop very rapidly. Declining progesterone levels precede declining estrogen levels. Some of the perimenopause symptoms may in fact be due to lowered progesterone levels or a relative change in the relationship of estrogen to progesterone.
- Eventually, the lower levels of estrogen are no longer adequate to cause a buildup of the uterine lining, and there is not enough tissue to produce a menses.
- The specific reason why menopause occurs is the ultimate loss of follicles in the ovaries. This leads to the loss of progesterone production and declining estrogen influence. This coincides with an increase in FSH and LH (luteinizing hormone).

The symptoms of decreased hormone levels and perimenopause are varied, unpredictable, and often go unrecognized as perimenopausal symptoms. The signs and symptoms of perimenopause can include menstrual irregularities, hot flashes, vaginal dryness and thinning, skin changes, fatigue, decreased libido, mood swings, depression, changes in memory and cognition, sleep disturbance, hair loss on the head, hair growth and acne on the face, heart palpitations, nausea, headaches, urinary tract infections, joint pains, and the beginning stages of osteoporosis and heart disease.

Menopausal Symptoms

The transition to menopause usually begins sometime in a woman's 40s. Symptoms tend to begin and increase over a span of months and can last about four to seven years. Seventy-five to 90 percent of women will have transient symptoms that resolve within this time period and stop without any treatment. Maybe 10 to 25 percent will have symptoms that persist. Vaginal dryness and thinning and problems related to this tend not to be transient and in fact tend to get worse with time.

The changes associated with menopause can be mild, moderate, or severe. Some women may have no significant menopausal symptoms, and others will have symptoms that are progressive and problematic for many years. The most common prevalent symptoms are vasomotor symptoms (hot flashes and night sweats), sleep disturbances, and vaginal dryness. A comprehensive list of symptoms includes the following:

- Decline in fertility (perimenopause)
- Irregular bleeding (perimenopause)
- Vasomotor symptoms
- Sleep disturbances
- Urinary problems (urinary leakage, urinary urgency, urinary frequency, infection, pelvic relaxation)
- Vulvovaginal changes (dryness, irritation, discomfort during sexual activity, discharge, itching, inflammation, infection)
- Headaches
- Mood swings
- Depression and anxiety
- Memory changes
- Sexual function effects
- Body aches
- Skin, mouth, eye dryness
- Fatigue

More rare symptoms might include voice impairment, shoulder problems, and sometimes strange, rare, and peculiar symptoms that don't seem to be related to anything else but are due to hormonal changes. These might include numbness and tingling sensations, dizziness, and nerve pain, to name a few.

Hot Flashes, Night Sweats. Hot flashes and night sweats in perimenopausal and menopausal women are often referred to clinically as vasomotor symptoms. The traditional vasomotor symptoms, commonly referred to as hot flashes and reported by about 85 percent of menopausal Western women, are related to the decline in ovarian function.[8] Hot flashes are the most common symptom associated with the menopausal period and second to irregular menses during the perimenopausal period. We still do not understand the physiology of hot flashes, the mechanism of lowered estrogen levels and hot flashes, the average age of onset, triggers, duration, frequency, or why they are prominent in some cultures and absent in others. A few triggers may affect the frequency and/or severity of hot flashes in some women. Stress, hot or spicy foods, hot drinks, warm environments, alcohol, and caffeine are the most common triggers. Hot flashes are sudden, transient episodes ranging from just feeling warm or overheated to intense heat and perspiration. Women tend to describe a wavelike sensation over the body, particularly of the upper torso, face, and head. If the hot flashes occur at night and are associated with what can be drenching perspiration, they are called night sweats.

The number of women in the United States who are affected by hot flashes is remarkable. About 75 percent of women will experience hot flashes, and 15 percent are severely affected.[9] The occurrence of hot flashes is highest in the first two years postmenopause, although information is scanty on the total time over which hot flashes are experienced. Women with surgically induced menopause often report particularly persistent, more intense, and more frequent hot flashes. It has been determined by one large study that for most women hot flashes last about 2 years, although some women experience them for 5 to 10 years.[9] As many as 15 percent of women may still report hot flashes 16 years after menopause. Hot flash frequency is particularly variable and ranges anywhere from several episodes in a year to every hour throughout each day.

Not all cultures report the same incidence of hot flashes or other menopausal symptoms. For example, Japanese and Indonesian women report far fewer hot flashes than do women from Western societies.[10] Mayan women in the Yucatan do not report any symptoms at menopause other than menstrual cycle irregularity.[11] Many researchers have attributed these differences to biological, psychological, social, and cultural factors.

The clearest explanation for hot flashes is that they appear to be the body's response to a sudden but transient downward resetting of the body's thermostat, which is located in the hypothalamus.[12] This temporary alteration of the set point would cause the sensation of intense heat and flushing. What we don't know is what triggers this event. A logical correlation between low

estrogen levels and hot flashes exists. Estrogen levels have been found to be lower in premenopausal women with hot flashes than in those without hot flashes.[13] However, not all studies are consistent, and some women never have hot flashes, while others have persistent ones, and yet others have them only sporadically. Prior to puberty, girls have low estrogen levels, but not hot flashes. Also, hot flashes are reported during pregnancy, when the estrogen level is high. Some researchers believe that hot flashes are due to an imbalance in beta-endorphins and other opiates in the brain that in turn may influence the temperature regulation center.[14] Estrogen and progesterone may alter the activity of these naturally occurring opiates, and it is possible that lower levels of estrogen and progesterone cause a withdrawal of opioids, triggering a hot flash.

What may seem like a hot flash due to perimenopause or menopause may in rare cases be caused by another condition such as thyroid disease, epilepsy, infection, insulin-producing tumors, pheochromocytoma, carcinoid syndromes, leukemia, pancreatic tumors, autoimmune disorders, or allergic disorders.

Irregular Uterine Bleeding. In the transition phase of menopause, changes in the amount of flow and the frequency of the flow are the main signs of perimenopause. These changes and irregularities in the cycle are due to decreased frequency of ovulation and unpredictable fluctuating levels of the ovarian hormones, estrogen and progesterone. The menses can become lighter or heavier, bleeding for fewer days, even less than two, or more days than your usual length. The cycles can become shorter by at least a week, as well as longer than the pattern you have become accustomed to. At some point, most women will just skip one or more menstrual cycles. Basically, changes can occur any which way, and each woman will have to identify what is an irregular bleeding pattern for her.

Even though these hormonal changes are normal, the woman with abnormal uterine bleeding needs to be evaluated by a licensed health-care practitioner. Fortunately, in the vast majority of cases there is nothing serious, and the solutions are straightforward and effective. At times, the bleeding can become too chaotic, and, of course, there are other causes of abnormal bleeding other than perimenopause such as a uterine polyp, hypothyroid, uterine fibroids, and endometriosis, to name a few. Chapter 1, on abnormal bleeding, is an important chapter to read to help understand these distinctions. Normal menstrual blood loss is approximately 40 mL. Blood loss greater than 80 mL is considered heavy, especially if there are blood clots or if you become anemic. If the bleeding is prolonged, longer than seven days, and/or the cycle is now shorter than 21 days, and/or bleeding or spotting occurs between menses or after sexual activity, then these symptoms require investigation by a health-care practitioner and effective treatments.

Although perimenopausal women are at risk for endometrial hyperplasia (a thickening of the lining of the uterus), the majority with abnormal perimenopausal bleeding do not have hyperplasia. In postmenopausal women who bleed and who are not taking HRT, the bleeding is generally due to atrophy (thinning of the lining of the uterus). Any uterine bleeding that occurs after the actual menopause (12 consecutive months since the last menstrual period) should be reported to your practitioner. In women on HRT, abnormal bleeding can be due to too little estrogen, too much estrogen, too little progesterone, or too much progesterone. It is important to see your licensed health-care practitioner in order to determine the correct hormonal solution and also to determine if further testing with a pelvic ultrasound and/or uterine biopsy is necessary. These issues are discussed further in Chapter 1.

Fertility Changes. The decline in fertility during perimenopause is related to several factors, including that word we don't want to hear, "aging" of the ovaries and the uterus. Other specific

changes are going on as well: rising levels of follicle-stimulating hormone (FSH) and changes in the feedback mechanism that regulates the menstrual cycle. This increase in FSH is a reflection of the lower number of follicles within the ovaries and the less viable quality of the follicles. Fewer follicles, poor quality, and irregular or lack of ovulation contribute to this decline in fertility. The blood level of FSH on day 3 of the menstrual cycle is a good indicator of infertility related to aging ovaries.

On the other hand, some women mistakenly think that if they are in their mid- to late 40s or early 50s, having some perimenopause symptoms, and haven't menstruated for a few months, they cannot become pregnant. On the contrary, unplanned pregnancies are common during this time period. If pregnancy is not desired, contraception must be used until you have not had a menses for 12 consecutive months, or until levels of FSH are consistently above 30 IU/L.

Insomnia/Sleep Disturbances. Sleep problems are especially common in perimenopausal women, increasing after age 40 and plateauing by age 50. Sleep problems also contribute to fatigue, poor concentration, low motivation, irritability, depression, and anxiety. Insomnia comes in many sizes and shapes, including difficulty falling asleep, difficulty staying asleep, restless sleep, and waking early and not being able to go back to sleep. These problems may last only a few days or a few weeks or become chronic with persistent problems more than three nights per week. The longer or more frequent the insomnia, the more it leads to poor coping skills, fatigue, and depression.

A primary problem for many women with hot flashes and nighttime sweats is sleep disruption. Some women are awakened during sleep due to a night sweat, but sleep disturbances are not always a result of hot flashes, and not all hot flashes disrupt sleep. Most nighttime hot flashes are associated with waking up, but almost half the time a waking episode is not associated with hot flashes. Sleep disturbances and early morning awakenings are also signs of depression and anxiety. These emotional changes are also associated with menopause for some women.

In addition to the direct influence of hormonal changes and hot flashes on insomnia, this time in a woman's life, quaintly called midlife, can also be a time of significant life changes and challenges. Job stress, relationship loss, child care, parent care, or medical problems can alter brain chemistry and sleep patterns. Insomnia can also be a result of sleep-related disordered breathing due to snoring or apnea, chronic pain such as arthritis or fibromyalgia, thyroid conditions, restless leg syndrome, asthma, or medications.

Mood Swings, Depression, and Anxiety. The psychological conditions associated with menopause have been a source of conflicting scientific data and controversy. Even though the relationship between menopause and depression has been extensively studied, the results have been inconsistent. Some studies have shown more frequent depressive moods among peri- and postmenopausal women compared to premenopausal women, while other studies have not. It may be that the psychosocial and cultural factors that influence variations in moods affect women more at the time of menopause.[15]

The Massachusetts Women's Health Study concluded that women who were depressed premenopausally had higher rates of depression in perimenopause; for the women who were not depressed during the premenopause years, the rate of depression was slightly increased during perimenopause and was highest for women who remained perimenopausal for at least 27 months.[16] Researchers observed that the rate of depression begins to decrease as women move from peri- to postmenopause and is lowest for those women who have been postmenopausal for at least 27 months. These results show that depression is moderately associated with perimenopause and that the depression is transient and will decline about two years after menopause.

A 1997 study was able to demonstrate that depression and anxiety were higher in post- than in perimenopausal women,[17] although not all studies confirm this. This study also showed that depression and anxiety scores were reduced to values below those of perimenopausal women when the women took hormone replacement therapy (HRT). Women who take estrogen alone seem to do best mood-wise, compared to women who take estrogen plus synthetic progestogens, called progestins.[18]

Mood changes may not be as prominent as depression or anxiety. Many women are plagued by irritability, melancholy, weepiness, short temper, feeling overwhelmed, and a lower tolerance of stressors. Up to 10 percent of perimenopausal women experience mood changes. Some of these mood changes are due to sleep deprivation with or without night sweats. In these circumstances, successful treatment for the moods requires treatment of the night sweats and/or insomnia.

Decreased Memory and Concentration. Trouble concentrating, planning, and learning new things and difficulty remembering names, words, or what you went into the kitchen to retrieve are common changes experienced by women in the menopause and menopause transition. Many of us experience some degree of change in memory and concentration and clarity of thinking as we age, but there are also specific cognitive changes that occur when estrogen, progesterone, and androgens are rapidly withdrawn from the system, most commonly short-term memory loss. The relatively rapid transition from the menstruating/reproductive years to menopause appears to be a factor in these cognitive changes, and related to these hormonal declines, especially in estrogen. Estrogen affects numerous neurotransmitters in our brain, including acetylcholine, serotonin, noradrenalin, and dopamine. All of these have influences on concentration, learning, and memory. This is most dramatic after childbirth or after bilateral oophorectomy (both ovaries being removed). Short-term memory impairment is also a common cognitive change in women with natural menopause. Difficulty concentrating, difficulty with previously simple technical tasks, decrease in memory, and lack of mental clarity are typical states that can then be worsened by difficulty sleeping and sleep interruptions.

An evaluation of significant cognitive impairment may be necessary to assess for a thyroid imbalance, medication problems, overuse of sedatives or alcohol, and dementia. Alzheimer's disease (AD) is the most common cause of dementia and affects 1.5 to 3 times more women than men.[19] For women on hormone therapy, adjustments in the dose may improve mental function.

Vaginal Dryness and Thinning. Vaginal dryness, vaginal thinning, and what is called atrophy are very common problems for menopausal women but usually do not become troublesome until several years after menopause. Estrogen is responsible for the thickened, elastic, lubricated tissue of the vagina and vulva (external genital area). When estrogen levels decline, the vulva loses its collagen, fat, and water-retaining ability. As a result, it becomes flattened, thin, and dry and loses tone. With estrogen loss, the vagina also shortens and narrows, and the vaginal walls become thinner, less elastic, and pale in color. Problems of vaginal dryness, vaginal discharge, and pain with vaginal sex are reported by two out of three women at the age of 75.[20] The change that is usually noticed first is a feeling of dryness of the vagina. The cause is atrophy of the mucus-producing glands of the vaginal wall. With a loss in lubrication and a thinning of the tissue, the vagina is more prone to infections and mechanical injury from vaginal penetration. Small pinpoint bleeding, itching, and burning can result. Other tissue in the same area also becomes thin and atrophied. The urethral tissue (exit route for urine), the labia (the "lips" of the external genital

region), and the vaginal wall can all atrophy. These changes can result in increased bladder infections, involuntary loss of urine (incontinence), and prolapse of the bladder, rectum, or uterus. As the atrophy progresses, women may experience an increase in urinary urgency or difficulty holding the urine.

Urinary Problems. Urinary incontinence and recurring urinary tract infections become more common in postmenopausal women. Urinary incontinence (recurring involuntary leakage of urine) is common and affects from 10 to 30 percent of women between the ages of 50 and 64. Urge incontinence occurs when there is a sudden strong desire to urinate, and stress incontinence is urinary leakage with coughing, laughing, sneezing, or lifting. Stress incontinence is more common during perimenopause and does not tend to increase over time, whereas urge incontinence tends to increase with time.

Other urinary changes include increased urinary frequency, sudden urges to urinate even when the bladder is not full, frequent nighttime urination (nocturia), and increased frequency of urinary tract infections. As estrogen levels decline, the end of the urethra, where we urinate, becomes shorter, and this reduces our defense against the bacteria that cause urinary tract infections (UTI). Lower estrogen levels also cause our vagina, urethra, and bladder to become more alkaline, which also leaves these areas prone to infections. Vaginal estrogen therapy is an important option in restoring the acidic environment of the vagina and the bladder.

Changes in Sexual Response and Sex Drive. Changes in sexual response and libido are common throughout life, can be due to a host of influences, and tend to increase with aging. With an increasing number of menopausal women, an aging population, and an increased openness about the topic of sexuality, women are increasingly coming to their health-care practitioners wanting help in this area.

According to at least one large study, as many as 30 percent of women have low sexual desire, and about 50 percent of these feel distressed about it.[21] Not all sexual problems come in the form of low desire. Female sexual disorder (FSD) is defined in four main categories: desire disorders, arousal disorder, orgasmic disorders, and pain disorders. Sexual desire disorders include hypoactive sexual desire disorder (HSDD), which is a recurrent consistent deficiency or absence of sexual thoughts, fantasies and/or interest in sexual activity, and sexual aversion disorder, a persistent or recurrent aversion to and/or avoidance of sexual contact with a partner. HSDD increases with age and is more common in women after age 60. In fact, it is thought that HSDD is more related to age than to menopause.[22, 23] Sexual arousal disorder is defined as the inability to attain or maintain sexual excitement and a lack of response to sexual stimulation such as lubrication. Orgasmic disorder is difficult, delayed, or absent orgasm after adequate sexual stimulation and arousal. Sexual pain disorders include dyspareunia, genital pain associated with vaginal penetration; vaginismus, involuntary spasm of the musculature of the entrance to the vagina that interferes with penetration; and sexual pain related to sexual stimulation other than intercourse.

Numerous variables affect sexual function, including emotional and psychological factors, medical problems causing fatigue and/or pain, certain medications (see the following sidebar), and hormonal influences.

Testosterone is necessary for a normal sex drive in women and men, helping to determine desire, arousal, and sexual sensation. During perimenopause, estrogen levels are fluctuating but ultimately are declining, and testosterone production is also declining. The hormonal issues influencing sexual function in women aren't totally understood, but fluctuating testosterone levels have been associated with a decrease in libido (desire).[24, 25] Most, but not all, sexual

Selected Medications That Can Affect Sexual Function

Reduction in Sexual Desire

- Antipsychotics
- Barbiturates
- Selective serotonin reuptake inhibitors (SSRIs)
- Tricyclic antidepressants
- Beta blockers
- Digoxin
- Spironolactone
- Oral contraceptives
- Histamine H2-receptor blockers

Reduction in Arousal

- Antihistamines
- Antihypertensives
- SSRIs
- Tricyclic antidepressants

Reduction in Orgasmic Response

- Amphetamines
- Antipsychotics
- Narcotics
- SSRIs
- Trazodone
- Tricyclic antidepressants

problems in postmenopausal women are related to estrogen loss to the genitals. Decreased estrogen levels are responsible for most of the changes and decrease in lubrication during sexual arousal, vaginal tone, vaginal elasticity, and genital engorgement. This can manifest as a lack of adequate vaginal lubrication with sexual arousal, bleeding after vaginal sex, and pain with vaginal sex. Vaginal dryness is not only associated with painful vaginal sex, but also with a decrease in sexual desire.[26] It is not hard to understand why anticipation of painful sex would dampen one's desire for sex. With a loss of estrogen, relaxation of vaginal tissue and decreased muscle tone also occur, which leads to a decrease in sexual response.

A woman's total estrogen production decreases by 70 to 80 percent in menopause, while androgen production decreases by about 50 percent. If one has a surgical menopause, the plasma levels of testosterone are decreased significantly more than in women in natural menopause,[27] and this can result in an even greater incidence of sexual dysfunction than in women who went through a natural physiologic menopause.

Acne, Facial Hair, and Hair Loss. Many peri- and postmenopausal women have problems related to the change in the ratio of estrogen to testosterone. Even though both hormones have declined, there is a relative increase in testosterone because there is less estrogen to block its effects. In addition, women have individual sensitivities to androgens. Some women only react to very high levels, while others are especially sensitive to what are considered normal androgen levels. In addition, women have different kinds of receptor site and tissue sensitivity. Some will develop acne, some thinning hair, and some excess body and/or facial hair.

Excessive hair growth occurs in areas where hair follicles are the most androgen-sensitive. These include the face, chin, skin under the jawbone, upper lip, sideburn area, and cheeks. Other sensitive areas include the area below the belly button, the lateral pubic area, midline of the chest, around the nipple area, and the low back over the sacrum. Hirsutism (excess body hair) is most notably correlated with elevated free testosterone, but testosterone must be converted by an enzyme in the skin to be fully active in the skin. This enzyme is probably higher in women who have excess body and facial hair. These enzyme levels may change in postmenopausal women, or the hair follicle may become more sensitive to the activated testosterone in some postmenopausal women.

Hair thinning and hair loss are often traumatic for women and cause a great deal of anxiety. Androgenic alopecia (hair loss) is the most

common alopecia in humans and is genetically determined. Androgens modulate hair growth. The follicle responds to the androgens and is dependent on the amount present and the presence and number of androgen receptors. The thinning of hair that can be seen in menopausal women is more likely to be diffuse but is most common on the top of the head (the vertex) and next most common at the crown. Some women have a receding hairline and thinning at the temples.

Weight Gain. One of the more troubling changes to women during the menopause transition is weight gain, which is often about five pounds. We don't understand very clearly if or how a drop in hormones, and if or how prescribing hormones, affects weight. What we do know is that aging itself and lifestyle are associated with weight gain. Lean body mass, muscle mass, and the metabolic rate decrease with age, which means we burn fewer calories. These changes, combined with being more sedentary as we age, can easily lead to weight gain. Hormonal changes in menopausal women are probably associated with an increase in insulin resistance, leading to increased fat storage, increased abdominal fat, and weight gain.

Headaches. Hormonal changes may play a role in headaches, especially in perimenopause and especially in women with migraine headaches. Migraine headaches tend to be worse on one side of the head and worse with light and noise, can be associated with nausea and vomiting, and tend to be moderate to severe. The hormonal changes associated with the menopause transition can increase the frequency and intensity of headaches, especially for those women who have a history of menstrual-related headaches. During times of more stable estrogen levels, such as during pregnancy, or once menopause has been reached, most women will experience a resolution of their headache patterns, especially migraine headaches.

Skin, Eye, and Dental Changes. We already talked about how hormone changes can be related to acne. Specifically, acne can be the effect of excess testosterone on the glandular secretions in the skin. Estrogen also has important functions in the skin. It determines the skin collagen, skin thickness, and texture. Collagen, a major protein in the skin, is dependent on estrogen, and 30 percent of skin collagen is lost during the first few years after menopause. As time goes on, more collagen is lost, resulting in increasing laxity of the skin, wrinkling, and loss of elasticity. The skin also becomes dry more easily.

A variety of changes occur in the eye relative to hormonal status. Postmenopausal women report dry eyes, burning, pressure, light and temperature sensitivity, blurring, tearing, eye fatigue, swollen eyelids, and a feeling of scratchiness. Dry eye syndrome can, oddly enough, cause excess tearing, and it appears to also be affected by drops in testosterone levels.

Fluctuations in hormones during perimenopause and lower levels in menopause are involved in inflammation of the gums, sensitivity of the teeth, tooth loss, and a burning sensation in the mouth and tongue. These symptoms may be a sign of more serious problems as well. Tooth loss may be associated with low bone density and osteoporosis. Burning sensations in the mouth can be a symptom of diabetes or anemia, and gum inflammation may be related to an increased risk of cardiovascular disease.

Heart Palpitations. A palpitation can feel like a rapid heart rate, missed heartbeats, or irregular heartbeats. Not all heart palpitations are related to a decrease in estrogen levels but may be a symptom of anxiety, panic disorder, fears, or depression. Fortunately, women in their 40s and early 50s, during the most common time of the menopause transition, are not likely to have a serious cardiac problem. Nonetheless, these symptoms should be evaluated, especially if they occur with exercise, are associated with shortness

of breath or chest pain, or if you have a family history of early heart disease or heart attack (men less than age 50 and women less than age 60).

Joint Pains. Another symptom commonly reported during menopause is joint pain and/or body aches. This is not currently well understood, but it is likely there is a connection between hormones, immune function, and inflammation in the joints. Osteoarthritis, specifically, is a common joint disease that increases with age and affects women more than men.

Osteoporosis and Cardiovascular Disease. While the symptoms of hot flashes, mood swings, insomnia, sexual dysfunction, and the rest are annoying at best, and can significantly impact quality of life, the most significant changes associated with menopause are osteoporosis and cardiovascular disease. These conditions can dramatically alter and even shorten one's life. For a comprehensive discussion on osteoporosis, refer to Chapter 14, and for heart disease, refer to Chapter 9. Prevalence, risk factors, evaluation, and alternative and conventional approaches and treatments are covered in these chapters.

Menopause Evaluation

The onset of perimenopause is an important time for a comprehensive health and lifestyle evaluation. A thorough medical history, complete physical exam, and selected tests depending on your age, your symptoms, and other medical problems should be done by a licensed healthcare practitioner.

While it may seem surprising, there is no one test for menopause. Tests to determine ovarian function are not routinely done because the diagnosis of perimenopause or menopause is largely able to be made based on the medical history. Practitioners can use hormone testing on an individual basis, mostly to differentiate menopause from thyroid problems, abnormal causes of a lack of menses such as elevated prolactin levels, or premature ovarian failure (premature menopause). The follicle stimulating hormone (FSH) test is not as accurate as we would like, but if it is consistently elevated above 30 mIU/mL, a diagnosis of menopause can be established. The difficulty with FSH tests is that they can fluctuate immensely, especially in perimenopause. The other problem is that FSH tests are frequently normal in perimenopausal women. It can also be very difficult to use the FSH test if women are on hormonal contraceptives or hormone replacement therapy (HRT or HT).

There is a recent popular notion that saliva or serum testing can be done to determine estrogen, progesterone, and testosterone levels or individual estrogen levels including estriol, estrone, and estradiol. However, saliva testing has yet to be proven accurate for the testing of these hormones, although the FDA has approved saliva tests for cortisol and DHEA levels. I will focus my comments on blood serum testing.

For the perimenopausal woman, it is difficult to gather conclusions on test results when the hormones are in such a fluctuating state. There are so many peaks and valleys and so much erratic hormone activity that testing offers little value in most situations. For the women taking HRT, it is tempting to think that we could test the blood to determine what dose to take. This is a popular recommendation in some consumer menopause books. However, I would point out that there is no mathematical grid comparing values of estrogen or progesterone or of testosterone levels in the blood and how that would equate with a certain dose of the comparable hormone. There are reference ranges for these hormones, but practitioners don't know exactly what dose to give to keep a woman in the reference range. Women absorb and metabolize hormones differently. The form of hormones and the delivery method—oral, transdermal, sublingual, or injection—also behave differently from woman to woman. In selective cases, testing may be a helpful guide. These are generally cases in which a woman is on HRT and not doing well, and

despite the practitioner's best efforts with a good medical history and adjusting the dose, she still does not feel well. But clearly, the majority of the time, it requires the practitioner's experience and menopause expertise and time to listen to the patient to know what dose, what dosing adjustments, and what forms and deliveries of hormones may work best. Even if testing is done, the decision basically comes down to good clinical judgment and the willingness of the woman and her practitioner to try various approaches.

Testing can be done to facilitate assessing a woman's risk for diabetes, heart disease, and osteoporosis. Risk assessment for heart disease is discussed in Chapter 9 and for osteoporosis, Chapter 14. Diabetes risk assessment is a combination of history and physical exam, glucose screening, and lipid panel testing. Diabetes mellitus is diagnosed when a fasting plasma glucose test is 126 mg/dL or greater on two or more occasions or the blood glucose is 200 mg/dL or greater two hours after a dose of glucose is ingested.

Other important situations also warrant testing and are discussed in the appropriate chapters in this book. To name a few, abnormal uterine bleeding may need thyroid blood tests, pelvic ultrasound, or endometrial biopsy. Urinary tract infections can be tested with urinalysis and urine cultures. Cervical cancer can be screened for with Pap smears. Breast cancer can be screened for with mammograms.

KEY CONCEPTS

- Find a good menopause practitioner to work with. Seek the advice of practitioners who can inform you about the spectrum of options.
- Seek out an initial comprehensive evaluation.
- Managing menopause symptoms is distinct from prevention of significant diseases such as heart disease and osteoporosis.
- Attempt to determine individual risks for significant diseases—osteoporosis, heart disease, breast cancer, and diabetes.
- Hormone testing is not routinely recommended and offers limited help in knowing how to manage your menopause symptoms.
- Be well informed about the process of menopause.
- Be well informed about the spectrum of alternative and conventional treatment options.
- Realize that menopause and aging are processes that evolve over time.
- What you decide today is not permanent; you can change your treatment decisions based on your changing health, changes in medical understanding and research, and newly available treatment options.

OVERVIEW OF ALTERNATIVE TREATMENTS

The fundamental goals of an alternative approach to menopause are to provide relief from common menopausal symptoms and to prevent and/or treat osteoporosis, heart disease, and other diseases of aging. The goal is to do this with methods that do not increase the risk of life-threatening diseases such as breast cancer, blood clots, and strokes.

In order to accomplish these fundamental goals, the menopausal woman and her practitioner must embrace an individualized approach. An alternative and comprehensive approach is distinct in that the evaluation of each woman lends a great deal of attention not only to individual symptoms, but also to her individual risks for future diseases. This requires a comprehensive health history; judicious use of tests to assess risks for osteoporosis and heart disease; an appreciation of risk factors for breast cancer, diabetes, and Alzheimer's disease; a willingness to individualize the treatment very carefully; and an ability to utilize the whole spectrum of interventions, including diet, exercise, stress management, nutritional supplements, herbal therapies, all available hormone options, and prescription and over-the-counter pharmaceuticals.

Although more and more conventional HRT regimens are becoming available and new non-

hormonal drugs are being developed, a practitioner who has an understanding of the whole spectrum of options from the most natural to the most conventional is in the ideal position to properly advise and prescribe a customized optimal treatment and prevention plan. A licensed naturopathic physician is currently the only primary health-care provider trained in all these options, although he or she may have to refer for some selected expertise in osteoporosis, heart disease, gynecology, or endocrinology. In the past, conventional medicine largely approached the situation as "HRT for all and forever." Since 2002 and the first Women's Health Initiative research results,[28] women and many of their doctors abandoned HRT almost overnight.

At the other extreme is an absolute fear and bias against using HRT for any reason or for any amount of time. The use of nonhormonal natural therapies has thrived in this environment, both in the form of women treating themselves and for those seeking advice from licensed alternative practitioners. In either case, caution should be exercised in presuming that just treating the symptoms of menopause is adequate. Keep in mind our fundamental goals: symptom relief, disease prevention, and disease treatment. While there are many effective nonprescription natural therapies for symptom relief, this does not adequately address greater long-term concerns such as bone density, blood pressure, cholesterol levels, breast health, or vaginal tissue health. The identification of disease risks may not be very important in the early perimenopausal years, but it acquires increasing importance as the postmenopause years accumulate. This is why I recommend that women seek the advice of a licensed naturopathic physician with a strong experience in women's health, and menopause in particular.

In this section on natural medicine, we will focus on symptom relief. See the chapters on heart disease and osteoporosis for prevention and treatment of those diseases.

The Naturopathic Approach

In the naturopathic approach to menopause, therapeutic intervention is determined following a comprehensive assessment of symptom severity and scope and an evaluation of risk factors for osteoporosis, heart disease, Alzheimer's, diabetes, and breast cancer. A determination of low, medium, or high risk, especially for osteoporosis and heart disease, is especially directive in providing choices regarding alternative and/or conventional therapies. Once the symptoms have been pinpointed and the risks have been assessed, then treatments are recommended. Treatment considerations include a spectrum of options. The seven treatment categories are:

1. Diet, exercise, lifestyle, and stress management
2. Nutritional supplementation
3. Botanical supplementation
4. Compounded bio-identical hormones
5. "Friendlier" conventional HRT
6. "Less friendly" conventional HRT
7. Nonhormonal prescription medications

You may be surprised to see the inclusion of conventional hormone replacement therapy in my list of options. Choosing to use hormones, whether compounded bio-identical or conventional pharmaceutical preparations, is a matter of weighing the benefits and the risks. Hormonal therapies should be utilized in the lowest dose, shortest duration, and safest way possible that meets the goals that have been identified. These issues are addressed in the section on hormones.

Diet/exercise/lifestyle and/or nutritional supplements and/or botanical therapies will be effective for the management of menopause symptoms in the majority of women. When these are not adequate, individualized formulations of bio-identical hormone options should be used. If these are not adequate, then "friendlier" hormone therapy (also bio-identical) is preferred over "less friendly" (synthetic and semisynthetic

and not bio-identical) HRT. (The distinctions between the different kinds of hormones are discussed in the hormone section.) Determining the treatment approach is a combination of subjective and objective findings resulting from the medical history, physical exam, any lab or diagnostic imaging tests, and the personal perspective and values of each woman. The specifics of these options and therapies will be expanded on as we discuss nutrition, exercise, nutritional supplementation, botanicals, bio-identical hormones, conventional HRT, and nonhormonal drugs.

Nutrition

An alternative approach to menopause isn't complete without proper nutrition. This includes general considerations such as a diet rich in whole natural and unprocessed foods, with an emphasis on fruits, vegetables, whole grains, beans, seeds, nuts, and healthy fats, and low in saturated fats, fried foods, white flour, alcohol, sugar, and salt.

The Value of Soy. One of the important dietary recommendations for all menopausal women may be to increase foods that are high in phytoestrogens, although their benefits may be more for preventing osteoporosis, heart disease, and even breast cancer than for the relief of menopause symptoms such as hot flashes.

A large number of plants, especially legumes, contain compounds called phytoestrogens. Phytoestrogens are mainly, but not exclusively, nonsteroidal in structure and are either of plant origin or derived from the body's metabolism of precursors present in dietary components. The most important dietary phytoestrogens are the phenolic phytoestrogens, which include the isoflavones and the lignans. Soybeans are the richest food source of isoflavones, containing 1 to 2 mg of isoflavones per gram of soy protein. The two main isoflavones of soy are genistein and daidzein. Isoflavones have a unique ability to weakly bind to estrogen receptors in the body and seem to have both a weak estrogen effect as well as an antiestrogen effect, depending on the tissue involved and the dose consumed.

There are hundreds of studies on soy and dozens on hot flashes, some showing effect and others not, making it difficult to make conclusions. For now, I'd like to pass on the results of two systematic reviews of isoflavones and menopausal symptoms and one consensus opinion from the North American Menopause Society that offer a good summary of the research. The first systematic study was a review of the literature for the randomized controlled clinical trials on soy and perimenopausal symptoms.[29] Ten trials were evaluated, and only four were positive and showed benefit for perimenopausal symptoms. There were no serious safety concerns with soy products for the treatment periods, which were up to six months. In the second systematic review, 25 trials involving approximately 2,300 women met the study criteria.[30] Soy and red clover isoflavones were evaluated in this review, including soy foods, beverages, or powders; soy extracts; and red clover extracts, for a total of 25 studies. Only one soy food trial and two soy extract trials showed the ability to reduce hot flushes.

The final report comes from a consensus opinion of the North American Menopause Society,[31] which acknowledges that some data does support the efficacy of isoflavones in reducing the incidence and severity of hot flashes but that many studies have not found any difference. It also concluded that there was not adequate data to evaluate the effect of isoflavones on breast and other cancers, bone mass, and vaginal dryness but that there were convincing health benefits of isoflavones and lipids in reducing low-density lipoproteins and triglycerides and increasing high-density lipoproteins. Perhaps the best evidence that soy lowers cholesterol comes from a review of 38 scientific studies. This meta-analysis concluded that consumption of soy protein rather than animal protein significantly decreased serum concentrations of total cholesterol, LDL cholesterol, and triglycerides.[32]

In terms of menopause symptoms and hot flashes in particular, I'm sure the three reviews are disappointing news for advocates of soy. It's important to appreciate, though, that statistical significance is not the same as clinical significance for any one person. For some women, and this has been borne out in some studies, soy protein and soy isoflavones can be helpful in reducing the frequency and severity of hot flashes. For the specifics in regard to bone effects and cardiovascular effects, please refer to the osteoporosis and heart disease chapters.

If you choose to increase soy foods or take soy beverages, powders, or supplements, a word about dosages and addressing some of the highly publicized controversies about soy is important. A reasonable approach would be to ingest a daily level of isoflavones that does not exceed the amount consumed in ethnic diets that contain high amounts of isoflavones. From a review of those diets, it appears that this amount is somewhere between 50 to 150 mg of isoflavones per day for adults. The isoflavone content of soy foods varies with the form. A listing of the isoflavone content of some of these soy foods will offer some help in calculating your daily intake (see Table 12.1).

There have been some controversies about soy, and based on the actual research, these negative comments and concerns about soy are in some cases incorrect and in other cases highly exaggerated. Some have pointed out problems with thyroid function, inhibition of mineral and protein absorption, and concerns about hormonal effects.

Some of the controversy about soy lies not only in its ability to bind to estrogen receptors but in its content of phytates and trypsin inhibitors, interference with thyroid function, and difficult digestibility for some individuals. Soy foods, especially cooked soybeans, are difficult for some people to digest, causing gas and stomach upset. Soy's content of trypsin inhibitors can block the enzymes needed for protein digestion. When the protein is improperly digested, fermentation and gas production ensues. However, many researchers believe that so few trypsin inhibitors are left behind after processing the soy food that for most people, their digestion is not affected.

The phytate content in soybeans has been another cause for concern with soy foods. Phytates are compounds found in grains and legumes that can compete with the uptake of minerals such as calcium, magnesium, iron, and zinc. Although the phytate content of soybeans is higher than that of other grains or legumes, the mineral-blocking effect of phytates is reduced

Table 12.1 Isoflavone Content of Soybeans

Soy Food	Amount	Isoflavones (mg)
Textured soy protein granules	¼ cup	62
Roasted soy nuts	¼ cup	60
Tofu, low-fat and regular	½ cup	35
Tempeh	½ cup	35
Soy beverage powders	1–2 scoops	20–50 (varies with manufacturer)
Regular soy milk	1 cup	30
Low-fat soy milk	1 cup	20
Roasted soy butter	2 tbs	17
Cooked soybeans	½ cup	35

when eaten with meat or fish. If you eat soy products in the context of a healthy, varied diet, you should get adequate minerals. Phytates are also reduced in fermented products such as tempeh and miso.

The genistein and daidzein in soy can also inhibit thyroid hormone synthesis. High-soybean diets have been implicated in diet-induced goiter. This problem is not likely to occur with an average amount of soy in the diet and again in the context of a healthy, varied diet, especially a diet that is adequate in iodine, which is now mostly the case in this country. In some susceptible individuals, or in some who take very high doses of nutritional supplementation of soy isoflavones (above 200 mg per day) or have an extreme diet low in other nutrients and high in soy, it is prudent to be aware of potential but extremely rare problems with soy ingestion.

One of the greatest fears for women contemplating menopause treatment options is the concern about estrogen replacement therapy and breast cancer. Although we will be addressing this in the hormone and conventional medicine sections of this chapter, there are several lines of evidence and logic that support the conclusion that not only is soy safe, but there is actually a relationship between increased soy intake and breast cancer prevention. Several studies concluded that Asian women who consume a traditional low-fat, high-soy diet have a four- to sixfold lower risk of developing breast cancer.[33] The constituents in soy are remarkable in their activities against a variety of cancers via several different mechanisms. Dietary phytoestrogens also inhibit cancer cell growth by competing with estradiol for the type II estrogen binding sites.[34] Even more convincing evidence for the breast cancer protection benefit of soy comes from animal studies.[35] Soy supplementation has reduced the number and size of tumors induced with a carcinogenic substance.

The most comprehensive review of the literature on soy and its effects on the breast comes from a paper citing over 280 references.[36] In reviewing animal, laboratory, and human studies, the study's authors conclude that while there is some conflicting data as to whether soy is protective against breast cancer or is safe or harmful for breast cancer patients, it is clear from reading this research that the data significantly favors safety and even protection if consumed from a young age. The authors concluded that moderation in intake is probably wise and should mimic the Asian soy intake of one to two servings per day. Doubts as to the significance of the breast cancer protective effects of soy and the safety of soy will remain until there has been a prospective study on soy comparing women on a high-soy diet with women on a low-soy diet over the span of many years with identical risk factors in other areas. One specific word of caution to breast cancer patients undergoing treatment with tamoxifen: until it has been determined if soy is beneficial in addition to tamoxifen or if it interferes with tamoxifen, I would recommend against daily soy ingestion while on tamoxifen.

For the most part and in most individuals, soy foods will not interfere with thyroid function, protein digestion, or the uptake of minerals, and they are more associated with reducing the risk of hormone-dependent cancers than with increasing it. Any potential negatives with soy are not likely to occur with one to two servings of soy foods daily, with adequate iodine in the diet, using soy in the context of a healthy, varied diet and focusing on organic sources. Organically grown soybeans are grown without pesticides and are not from genetically modified seeds. This is an important issue for soy foods in particular, as genetically modified soy crops have increasingly dominated in the agriculture business. Fortunately, there are farmers and manufacturers who are committed to raising and producing organic soy products.

The optimal use of soy would be to start early in life and eat a diverse array of soy foods with a total dietary intake of 50 to 150 mg of soy

isoflavones per day. If you don't like soy foods, take a high-quality soy protein powder or capsule.

Flaxseed. Another significant dietary source of phytoestrogens to consider is flaxseed. Flaxseed contains lignans, two of which, matairesinol and secoisolariciresinol, are known to have estrogenic activity. Other lignans are modified by intestinal bacteria to form estrogenic compounds. Lignans from plants such as flaxseed are absorbed in the circulation and have both estrogenic and antiestrogenic activity[37] much like soy, although to a lesser degree.

Flaxseed flour and its defatted meal (flaxseed meal) are the highest plant producers of lignans. The lignan content of flaxseed meal is 75 times higher than that of seaweeds (the second highest lignan-containing group) and 804 times higher than that of fruits (the lowest lignan-containing group).[37]

The evidence that lignans can reduce the risk for cancer is still unclear, although the biologic properties of lignans and data from various cultures suggest that they do. Many lignans have antitumor, antioxidant, weak estrogenic, and antiestrogenic characteristics.[38–42] Adding to the evidence, urinary excretion of lignans has been found to be lower in nonvegetarians and in postmenopausal women with breast cancer as compared with healthy women.[43–45]

Foods for Bone Health. Several dietary factors affect bone health and are involved in the development of osteoporosis: insufficient calcium intake, vitamin D deficiency, low calcium and high phosphorus intake, low fatty acid intake, insufficient dark leafy greens, a high-protein diet, excess salt intake, and excess alcohol. See Chapter 14 for dietary and lifestyle factors, supplements, herbs, hormones, and other conventional medications for prevention and treatment of bone loss.

Foods for Heart Health. Heart disease is the other major concern in the postmenopausal years. The prevention of heart disease is largely determined by diet and lifestyle. Women who make the necessary dietary changes have a significant advantage in being able to age healthfully and reduce the risk of heart disease. Lowering the level of trans fats and saturated fats while increasing omega-3 fats and monounsaturated fats from olive oil are keys to a nutritional preventive approach to heart disease. Diets that are high in cholesterol and saturated fats (beef, pork, lamb, butter, cheese, palm oil, and coconut oil) contribute to poor fat ratios and elevated cholesterol. Even though total fat intake should be reduced, switching from saturated fats to vegetable oils will lower total cholesterol levels. Olive oil is your best choice for salads and cooking.

Increasing fiber in the diet with whole grains, fruits, vegetables, and legumes is the optimal high-fiber diet. Soluble fiber such as the pectin in apples or oat bran has the most consistent beneficial effect on cholesterol levels.[46] Specific fruits or vegetables can also have a positive effect on blood levels of fat. Raw carrots, for example, may have a more potent effect in lowering cholesterol than oat products.[47] People with a low intake of fruits and vegetables have an increased risk for heart disease.[48] See Chapter 9 for dietary and lifestyle factors, supplements, herbs, hormones, and other conventional medications for prevention and treatment of heart disease.

Dietary Recommendations

- Reduce saturated fats (cheese, butter, beef, pork).
- Avoid trans fats (deep fried foods, margarine, partially hydrogenated oils).
- Reduce refined grains and flours, sugar, and salt.
- Use only a modest amount of low-fat dairy products.
- Increase fruits, vegetables, legumes (especially soy), whole grains, nuts and seeds, olive oil, and cold-water fish (salmon, tuna, mackerel, herring, halibut, and sardines).

Nutritional Supplements

Following are the nutritional supplements that are used to treat some of the symptoms of menopause. For an in-depth look at some of the nutritional

supplements used to treat and prevent heart disease and osteoporosis, consult Chapters 9 and 14.

Bioflavonoids. Bioflavonoids, such as rutin, hesperidin, and quercetin, are usually known for their antioxidant and anti-inflammatory properties and their ability to strengthen capillaries. Some evidence exists to show that giving bioflavonoids in combination with vitamin C will help to relieve menopausal hot flashes.[49]

Bioflavonoids

1,000 mg per day plus 1,000–1,500 mg vitamin C

Vitamin B_6. Vitamin B_6, or pyridoxine, plays a critical role in the manufacture of serotonin as well as other amino acid neurotransmitters. Vitamin B_6 levels are typically quite low in depressed patients, especially women taking birth control pills or conjugated equine estrogens (Premarin).[50–52] An insufficiency of vitamin B_6 may also cause insomnia and irritability. Since depression, insomnia, and irritability are typical menopausal symptoms, this vitamin may be a helpful addition to a supplement program.

Vitamin B_6

50–200 mg per day

Warning: chronic intake of dosages greater than 200 mg per day can be toxic over a period of many months or years.

Evening Primrose Oil. Currently, natural products for menopause often include evening primrose oil (EPO) because it has a reputation for alleviating vasomotor symptoms such as hot flashes. However, a study on the effects of gamma linolenic acid (GLA) from evening primrose oil found it to offer no benefit over placebo in treating menopausal flushing.[53]

Cyclic breast pain is a common symptom in menstruating women before their period. In perimenopausal women, this symptom can be exacerbated or can occur in women who have not had the problem in the past. Results of research and clinical trials have consistently shown that EPO is effective in relieving breast pain and premenstrual cyclic breast pain.[54–56] (See Chapter 7 for more information about this and other treatments for painful and lumpy breasts.)

Evening Primrose Oil

1,500–3,000 mg per day

Gamma-Oryzanol. Gamma-oryzanol is a substance found in grains and is isolated from rice bran oil. This ferulic acid compound is present in rice, wheat, barley, oats, tomatoes, asparagus, olives, berries, peas, citrus fruits, and other foods. The concentrations are higher in whole grains than in refined grains and flours.

Gamma-oryzanol was initially shown to be effective in relieving menopausal hot flashes in the early 1960s,[57] and at least one additional study has confirmed that finding.[58] The typical dosage of gamma-oryzanol is 100 mg three times daily.

Gamma-Oryzanol

100 mg 3 times per day

Vitamin E. The considerable reputation of vitamin E as a remedy for hot flashes comes from studies done as far back as 1945.[59–62] The problem is that vitamin E has received very little scientific attention for this use since those early studies. Only recently has there been renewed research interest, largely born of the need to provide menopausal breast cancer patients with safe and effective medicines for symptom relief.[63] Patients received four weeks of vitamin E (800 IU per day), then four weeks of an identical placebo, or vice versa. Hot flash frequency decreased by 25 percent in the vitamin E group and 22 percent in the placebo group. Although this is considered a statistically significant difference, the clinical impact of this reduction was marginal, and the patients did not particularly show a preference for vitamin E over placebo.

Vitamin E

400–800 IU per day

Botanical Medicines

Phytoestrogens. As discussed in the nutrition section, phytoestrogens are plant-derived substances that are able to activate the estrogen receptors in mammals. They are mainly, but not exclusively, nonsteroidal in structure and are either of plant origin or derived by the body's metabolism of precursors present in dietary components. Phytoestrogens are present in virtually every plant in varying amounts.

Phytoestrogens are capable of exerting weak estrogenic effects in some parts of the body, and they also have antiestrogenic effects due to their ability to occupy estrogen receptor sites and block the estrogen produced by our own bodies from binding. Since the phytoestrogens are so much weaker than the body's estrogen, the net effect is significantly less estrogenic stimulation in the target organ.

Phytoestrogens are found in many medicinal herbs with a historical use in conditions that are now treated by estrogens. The weak estrogenic effects of phytoestrogen-containing herbs can provide some benefit in relieving menopause symptoms. One advantage of phytoestrogens is that they have not been associated with increasing the risk of breast cancer. In fact, epidemiologic data and experimental studies in animals have demonstrated that phytoestrogens are extremely effective in inhibiting mammary tumors, not only because they occupy estrogen receptors but also through other unrelated anticancer mechanisms.[64, 65]

The common phytoestrogen compounds, the isoflavones, have a similar structure to the body's sex hormones. They have the ability to bind to estrogen receptors on human cells, and in women they have a preference for binding to the beta form of the estrogen receptor. As a result, they preferentially express estrogenic effects in the central nervous system, blood vessels, bone, and skin without causing stimulation of the breast or uterus, at least in typical doses.[66]

Dong Quai (*Angelica Sinensis*). Dong quai, also known as tang-kuei, dang-gui, and Chinese angelica, is an aromatic herb widely used throughout Asia. In Asia, dong quai is to women's health what ginseng is to men's. It has predominantly been used as a female remedy to treat menopausal hot flashes, menstrual cramps, lack of menstruation, or frequent menstruation and to promote a healthy pregnancy and easy delivery. The coumarins in dong quai are found largely in the root. The potential estrogen-like activity of dong quai has been assumed because of its observed traditional uses and clinical effects, and evidence includes its ability to cause an initial increase in uterine contraction, followed by relaxation[67] and its effect in increasing uterine weight when given to mice.[68] These observations may be a partial explanation as to why dong quai may be useful in menopause, although clearly there is some benefit at least for issues related to missed menses or frequent menstruation.

In a 12-week study conducted by Kaiser Permanente, using dong quai as a solo agent for the relief of menopausal symptoms such as hot flashes and sweats did not prove to be effective.[69] More research is needed on use of dong quai in combination with other herbal preparations.

Dong quai may increase the flow of a period or bring on a menses. In a perimenopausal woman who is either already having heavy flow problems or may have missed a menses for several months, this may be alarming. In this case, dong quai is probably not the best herbal choice for your menopausal symptoms.

Dong Quai

Dry herb used in combination with other herbs in capsule form *or*
Tincture: ½–1 tsp 1–3 times per day

Ginkgo (*Ginkgo Biloba*). Ginkgo is the world's oldest living species of tree with fossil records as old as 200 million years. The leaves of young, cultivated trees are used in modern herbal preparations. Two groups of active constituents—the terpene lactones and the ginkgo flavone glycosides—are the most critical compounds of standardized herbal products. Many forms and methods of preparation of ginkgo are available, although a high quality of *Ginkgo biloba* extract is typically standardized to 24 percent ginkgo flavone glycosides and 6 percent terpene lactones. The actions of these constituents include improving blood flow to the brain[70] and to the hands and feet.[71, 72] Although ginkgo extract has not been specifically studied in menopausal women with memory or cognition problems, it has been used to improve memory.

Clinical studies have demonstrated the efficacy of *Ginkgo biloba* extract (GBE) for the treatment of memory loss, depression, and disorientation associated with cerebrovascular insufficiency in geriatric patients.[73–75] Two studies have shown gingko to be effective for patients with mild to moderate primary dementia of the Alzheimer's type or multi-infarct dementia.[76, 77] Patients who received ginkgo showed memory and attention improvements and significant improvement in cognitive function tests and depression. Relative differences for dementia were not observed. I think it is important to include ginkgo for menopausal women because changes in mental clarity, memory, and concentration are common, and it may be that ginkgo will have an increasing role in improving these symptoms for this group of women.

Another commonly reported change in peri- and postmenopausal women is a drop in their sex drive. Extract of ginkgo appears to be remarkably effective in reversing antidepressant-induced sexual dysfunction in women as well as men.[78] Although the sexual dysfunction in this study was drug-induced rather than the result of changing hormones, I recommend trying this safe and simple approach.

Ginkgo Biloba

40–80 mg standardized extract capsules or ½–1 tsp tincture 3 times per day

Ginseng (*Panax Ginseng*). There are many types and grades of ginseng and ginseng extracts that include related species. *Panax ginseng*, also known as Korean or Chinese ginseng, is the most widely used. A standardized extract of ginseng has been shown to improve depression and well-being in 384 postmenopausal women.[79] Another randomized controlled trial found that one month of Korean red ginseng increased energy and decreased insomnia and depression.[80]

Historically, ginseng has been used as a "tonic for invigoration and fortification in times of fatigue and debility and for declining capacity for work and concentration."[81] Ginseng can help in reducing mental or physical fatigue,[82–85] enhancing the ability to cope with physical and mental stressors by supporting the adrenal glands,[86] or treating the atrophic vaginal changes due to lack of estrogen.[87]

Panax Ginseng

Standardized extract capsules: 200 mg 5% ginsenosides or 100 mg 10% saponin ginsenoside per day
High-quality root: 4–6 g per day

Licorice (*Glycyrrhiza Glabra*). The major active constituent in licorice root is glycyrrhizin. Much of the attention on licorice root has centered on its anti-inflammatory, antibacterial, antiviral, and expectorant (promotion of the elimination of mucus from the lungs or bronchi) properties, but for menopausal symptom relief we are more interested in the estrogenic activity of some of its phytoestrogen components, including beta-sitosterol, formononetin, coumarin, and others, in particular beta-sitosterol, which is ¼00th as active as estradiol.[88] However, the glycoside of glycyrrehetinic acid has been shown to have an antiestrogen activity, inhibiting the effect

of estradiol on uterine growth in ovariectomized animals.[89] It may be that licorice has both hormone and antihormone effects, or it may in fact lower estrogen levels while simultaneously raising progesterone levels. This creates some confusion in thinking about why and when to take it, and at this time we cannot really clear up the confusion because there is insufficient research to account for the use of licorice as a single menopausal herb. Licorice may, however, be used in combination with other herbs as part of an effective formulation for symptom relief.

Licorice

Dry form used in combination with other herbs in capsules *or*
Tincture: ½–1 tsp 1–3 times per day

Red Clover (*Trifolium Praetense*). Red clover, a member of the legume family, has been used worldwide as a source of hay for cattle, horses, and sheep, and the leaves and young sprouts have been used by humans as a source of protein. Historically, it has also been recognized as a medicinal plant for humans and, more recently, as a menopausal herb.

At least six clinical trials have been conducted on the effect of red clover isoflavones on vasomotor symptoms. Three show benefit, and three do not. The first two published studies on red clover and vasomotor symptoms showed no statistically significant difference between the red clover standardized extract and the placebo.[90, 91] Two other studies showed positive results in reducing hot flashes.[92, 93] The two most recent studies continue the contradictions. In a 2002 study, 80 mg of isoflavones per day resulted in a significant reduction in hot flashes as compared to baseline.[94] Another recent study, called the ICE study, compared two different doses of red clover isoflavones with placebo. The reductions in the mean daily hot flash count at 12 weeks were similar for groups receiving 82 mg of isoflavones, 57 mg, and the placebo. However, in comparison with the placebo group, the hot flashes were reduced more rapidly in the group receiving 82 mg of isoflavones.[95]

Other effects of red clover also have implication in menopausal women. One published study showed that red clover isoflavones may reduce the risk of coronary vascular disease by increasing arterial elasticity, although it did not improve cholesterol levels.[96] Red clover isoflavones may also slow bone loss of the spine.[97]

There have been no significant adverse or intolerant reactions with red clover, no significant change in blood parameters used to measure toxicity, and no evidence of uterine bleeding or increased endometrial thickness. In fact, an 80 mg red clover extract did not increase the thickness of the lining of the uterus in postmenopausal women, despite its high content of phytoestrogens.[98]

I cannot offer women who have a history of breast cancer the same degree of reassurance about using red clover as I can with black cohosh. I do not consider it definitely contraindicated, because in fact red clover has a rich history in herbal medicine as a treatment for cancers of all kinds. One can see the logic of its use in cancer because of its genistein and daidzein constituents, both known inhibitors of tumor growth and cancer cell division. However, the results of an experiment that compared the relative effects of several different herbs on estrogen-receptor positive breast cancer cells in vitro raised concern.[99] Surprisingly, the breast cancer cells in the laboratory responded the same to red clover as they did to estradiol. The question of safety or concern with using red clover extracts in postmenopausal women with a history of estrogen receptor positive breast cancer remains unanswered.

Red Clover

Standardized extract of 40 mg total isoflavones, 1 tablet 1–2 times per day *or*
Dry herb capsule (500 mg): 1 per day

Nonphytoestrogen Herbs

Black Cohosh (*Cimicifuga Racemosa*). Black cohosh, *Actaea racemosa* or *Cimicifuga racemosa*, is a member of the buttercup family and is used for a variety of women's health conditions. In the last 25 years, it has emerged as the most studied of the herbal alternatives to hormone replacement therapy for menopause symptoms. Since the 1980s and up through 2005, numerous studies, including several randomized controlled trials, have been carried out using a standardized extract of black cohosh, with encouraging but mixed results.[100–106] In one of the largest studies, 629 women with menopausal complaints received a liquid standardized extract of black cohosh at 40 drops twice per day for six to eight weeks. As early as four weeks after beginning the therapy, a clear improvement in the menopausal ailments was seen in approximately 80 percent of the women. After six to eight weeks, complete disappearance of symptoms occurred in approximately 50 percent.[107]

In 2006, one study using a standardized extract of black cohosh seemed to indicate beneficial effects on bone metabolism by stimulating bone-building cells and a weak effect on maturation of vaginal cells,[108] and another showed no effect on menopausal symptoms.[109]

In a third study, the Herbal Alternatives for Menopause (HALT) Study, five groups were studied: black cohosh (160 mg/daily), a multibotanical herbal formula including black cohosh, a multibotanical formula plus dietary soy, conjugated equine estrogen (0.625 mg/daily), and placebo.[110] Hot flash frequency and intensity did not differ between the herbal interventions and placebo at 3, 6, or 12 months with one exception. At 12 months, symptom intensity was significantly worse in the group that received the multibotanical formula plus dietary soy versus the placebo group. The unfortunate news here is that black cohosh extract, in a higher dose than is generally used in clinical practice, did not show benefit in the relief of hot flashes.

In a double-blind, randomized, placebo-controlled study, a combination of black cohosh and Saint John's wort was studied.[111] The Saint John's wort plus black cohosh group was significantly superior to the placebo group on scales measuring menopause symptoms and depression.

The average recommended dose of the standardized extract of black cohosh is 40 to 80 mg per day. The clinical studies performed prior to 1996 used doses of 40 to 140 mg of standardized extract. Although there is still some confusion about which dose of black cohosh may be most effective, the dosage used in most clinical trials to date is 20 to 40 mg of the standardized extract twice daily.

Despite the two negative studies in 2006, the collective study findings and clinical anecdotal evidence on black cohosh teach us that it is effective for menopause symptoms of hot flashes, mood swings, sleep disorders, and body aches.

Left unanswered is, how does black cohosh work? Early studies found it to have estrogenic activity,[112] whereas other studies in the last few years have demonstrated no phytoestrogens in black cohosh and no estrogen-like effects on LH or FSH. In addition, prolactin levels, estradiol, and endometrial thickness were not affected by black cohosh.[113, 114] Most recently, scientists from the University of Illinois have reported that constituents in black cohosh bind to opiate receptors and activate responses, including core temperature regulation.[115] At the moment, the mechanism of action is not clear, although some have postulated an effect on serotonin levels.

Over these same 25 years, safety and toxicity studies have also been conducted on black cohosh, and it has been subjected to increased scrutiny, as has hormone replacement therapy. Two areas that receive the most attention are whether black cohosh is safe in breast cancer patients and if there are any adverse effects on liver function.

We don't know with certainty that black cohosh is safe to use in breast cancer patients, but

we have compelling safety data that offers much reassurance. There are two recent excellent reviews of the literature on the safety of black cohosh.[116, 117] The more comprehensive Low Dog paper addresses safety in special populations, such as breast cancer survivors. Recent studies find that there is no estrogenic action of black cohosh, that it does not effect serum levels of estradiol, LH, FSH, and prolactin.[113, 114] In addition, in vitro studies have shown that black cohosh did not cause increase in proliferation of estrogen receptor positive breast cancer cells, and it had an additive effect of inhibiting proliferation when given with the antiestrogen drug tamoxifen.[118–120] A very recent study demonstrates that black cohosh inhibits the growth of human breast cancer cells.[99]

The other area that has received a lot of attention in the last two years is whether black cohosh has adverse effects on liver function. Reports and human clinical trials including more than 2,800 patients demonstrate the low incidence of adverse events associated with black cohosh. The World Health Organization (WHO) Collaborating Center for International Drug Monitoring database of adverse reactions to pharmaceutical and herbal products revealed a total of 35 adverse reactions to black cohosh as of July 31, 2000. The reactions were primarily general and temporary symptoms and were not concentrated on a particular organ system. This list did include one case of liver failure, one case of hepatitis, and one case of elevated liver enzymes. These cases were related to unspecified amounts of black cohosh and unspecified products. Some studies on animals reported increased liver weights associated with very large doses over an extended period of time.

Australia, Canada, and selected European countries have elected to require a warning label on black cohosh about liver effects. In the United States, the National Institutes of Health (NIH) concluded in 2004 that there was no competent evidence to support concerns about safety in the use of black cohosh in breast cancer patients and that there is inadequate evidence that black cohosh preparations are causally associated with hepatotoxicity. No warning labels are required on black cohosh products in the United States. In the recent Osmers study, liver enzyme testing was done, and there was no adverse effect on liver function tests.[103] Another recent long-term observational study published in the journal *Menopause* in 2006 found no endometrial proliferation, no negative effect on breast health, and no hepatotoxicity after 52 weeks of 20 mg of black cohosh extract in postmenopausal women.[121]

These facts, and a review of the scientific literature, do not present a compelling case for concern.[116, 117] The only true contraindication to black cohosh that I can point out is for the cancer patient taking cisplatin. This is based on an in vitro study in which black cohosh slightly protected mouse mammary tumor cells from cisplatin.[122] Black cohosh did not alter the response of the cells to radiation or 4-HC and had an enhancing sensitizing effect for doxorubicin and docetaxel. Very occasional side effects have been reported that include gastrointestinal discomfort, headache, nausea, vomiting, weight gain, and vertigo.

Standardized extracts of black cohosh continue to be one of the most reliable herbal approaches to treating a wide array of perimenopausal and menopausal symptoms. The most common dosage is 40 mg daily, but many achieve better results with 40 mg twice daily. One should expect results within four weeks. In my experience, about 85 percent of women will receive benefit, and maybe 50 percent will achieve complete amelioration of their hot flashes and night sweats. Black cohosh can also be safely and effectively used with hormone therapy. Lower doses of hormone therapy are often achieved by also using black cohosh extract at the same time.

Black Cohosh

Standardized extract capsules (40 mg per capsule): 1–2 capsules twice per day
Standardized liquid extract: ½–1 tsp twice per day

Chaste Tree (*Vitex Agnus Castus*). As an herb for the management of menopausal symptoms, I believe chaste tree has been overpromoted. The fruits of chaste tree contain essential oils, irridoids, pseudoindicans, and flavonoids, and the effect of chaste tree is on the hypothalamus-hypophysis axis. It increases secretion of LH and also has an effect that favors progesterone.[123–125] The result is a shift in the ratio of estrogen to progesterone and consequently a "progesterone-like" effect. One of the most common changes that occurs in the menopause transition is irregular bleeding. Whether it be frequent or infrequent, heavy or light, ultimately a change and cessation will occur. In the process, some will experience significant bleeding problems because of menses that are either too frequent or too heavy. These problems are some of the most convincing indications for chaste tree.

The first major study on chaste tree was published in 1954.[126] Although this study was predominantly treating women with amenorrhea (lack of menses), a dramatic improvement was seen in 40 patients with cystic hyperplasia of the endometrium (excessive thickening of the uterine lining). The impressive effect lends credence to its progesterone effect. Chaste tree was also studied in women with frequent menses and heavy menses, although they were not perimenopausal.[127] In women who had frequent menses, the duration between periods was lengthened, and in women with excessive bleeding, a shortening of the number of heavy bleeding days occurred.

Chaste tree is the most important herb to normalize and regulate the menstrual cycle. It is not a fast-acting herb, so do not hesitate to use it over a long period of time. Results may not be achieved until after three to six months.

Chaste Tree

Standardized extract capsules (175 mg of 75% agnuside): 1 capsule per day
Standardized liquid extract: 30–60 drops per day

Saint John's Wort (*Hypericum Perforatum*). Saint John's wort is the most thoroughly researched natural antidepressant. The majority of these studies have not been conducted on menopausal women, but in 37 of 39 clinical trials, Saint John's wort was shown to be superior to the placebo or equal to the conventional prescription antidepressant medications. In general, studies have shown improvement in individuals with mild to moderate depression.[128] In a recent review of studies, a total of 37 trials, including 26 comparisons with placebo and 14 comparisons with synthetic standard antidepressants, were evaluated. The authors concluded that "current evidence regarding hypericum extracts is inconsistent and confusing. In patients who meet criteria for major depression, several recent placebo-controlled trials suggest that the tested hypericum extracts have minimal beneficial effects while other trials suggest that hypericum and standard antidepressants have similar beneficial effects."[129]

One non-placebo-controlled clinical trial conducted in women with menopause symptoms found that 900 mg of Saint John's wort for 12 weeks significantly improved psychological and

Sample Treatment Plan for Mild Depression, Irritability, and Mood Swings

See the Resources section for formulation sources.

Diet:
Reduce alcohol, avoid sugar and simple carbohydrates.
Eat whole grains, vegetables, nuts, seeds, adequate fish or low-fat dairy, proteins, and legumes.
Eat regularly three meals per day.

Lifestyle: Get 30–60 minutes of exercise daily. (See Appendix A.)

Botanicals:
Black cohosh: 40 mg standardized extract twice daily
Saint John's wort standardized extract: 300 mg 3 times per day

psychosomatic symptoms as well as a feeling of sexual well-being.[130]

As mentioned earlier, in a double-blind, randomized, placebo-controlled study using a combination of black cohosh and Saint John's wort, the study group was significantly superior to the placebo group on both a general menopause rating scale and a depression scale.[111]

Saint John's Wort

Standardized extract of 3 percent hypericin: 300 mg 3 times per day

Kava (*Piper Methysticum*). Kava is a plant indigenous to Melanesia, Micronesia, and Polynesia. Its properties have been most often associated with analgesic, sedative, anxiolytic, muscle relaxant, and anticonvulsant effects. While kava is typically not often thought of as an herb for menopause, anxiety, irritability, tension, nervousness, and sleep disruption are common perimenopause and menopause symptoms in which kava can offer some help. Kava has been used as a social and ceremonial beverage for generations by the people of Fiji and other islands of the South Pacific, at least in part to create a relaxed, stress-free atmosphere. Kava has been shown to have significant effects in reducing anxiety in a number of studies.[131]

Three randomized, controlled trials have investigated the value of kava for menopausal symptoms.[132–134] The first two showed significant reduction in anxiety and general menopause symptoms and the third a reduction in the anxiety scale, with kava plus HRT showing the greatest improvement.

In 2003, another valuable study evaluated the effects of kava on anxiety, depression, and menopause symptoms in perimenopausal women for three months.[135] Eighty women were randomized to one of three groups. The control group knowingly received 1,000 mg of calcium per day, the second group received the calcium and 100 mg of kava, and the third group received the calcium and 200 mg of kava. There was a clear and similar reduction in depression and anxiety in the two kava dosing groups compared with the calcium alone control group, but not a clear decline in general menopause symptoms scores.

Kava

Standardized extract (70% kavapyrones): 100–210 mg per day

Additional Botanicals and Combination Herbal Products for Menopause

The natural food stores and drug stores are brimming with herbal menopause products these days. You will find the herbs we have discussed in most of them in one combination or another, and perhaps in combination with nutritional supplements, soy, or additional herbs that contain phytoestrogens or have some other therapeutic benefit specific to menopause. Most of these combination products have not been researched, even though individual ingredients have been. I am aware of only one herbal combination product that has been researched in a double-blind, placebo-controlled trial. I was one of two principal investigators on this study, which set out to research the effects of a botanical formulation containing phytoestrogens on menopausal symptoms, serum lipids, and some of the hormone indicators of menopause.[136]

The treatment group took two capsules of burdock root, licorice root, motherwort, dong quai, and wild yam root three times per day. After three months, women receiving the herbal product showed a greater response rate than women in the placebo group. One hundred percent of women taking the botanical formula had a reduction in their symptom severity, while only 67 percent of women receiving the placebo showed a decrease. Seventy-one percent of women taking the herbal formula reported a reduction in the total number of symptoms, while only 17 percent of the women taking the placebo reported a decrease in the total number of their

symptoms. The botanical formula was most effective in treating hot flashes, mood changes, and insomnia.

Numerous other herbs can be helpful for individual menopause symptoms. The German Commission E (the German agency similar to our FDA) has approved hops for mood issues such as anxiety and restlessness and for sleep disruptions.[137] Hops contain a group of nonsteroidal phytoestrogens called prenylflavonoids. In one study, 67 menopausal women were given either a placebo or a 100 mcg or 250 mcg standardized hop extract for 12 weeks.[138] At 6 weeks, the 100 mcg dose was significantly superior to the placebo, but not after 12 weeks. Even so, there was a more rapid decrease in menopause symptoms for both doses of hop extract, especially the hot flash score. The higher dose was not any better than the lower dose.

Valerian has been used for centuries by many different cultures and has been used in modern times, mostly for anxiety and insomnia. Three randomized clinical trials have showed improvement in sleep quality, although none of these studies were specific to menopausal women.[139–141]

Motherwort is another plant that has been used historically in situations that are relevant to perimenopause and menopause. It can ease heart palpitations and act as a calming agent, known as a nervine. The German Commission E has approved its use for nervous cardiac problems.[142]

OVERVIEW OF HORMONE REPLACEMENT THERAPY

Hormone replacement therapy (HRT), now often called HT as well, has been used since the 1950s to treat menopause symptoms and to prevent osteoporosis and heart disease. Several key studies, of the last nine years in particular, have challenged previously held beliefs about the safety and efficacy of long-term HRT use. The Women's Health Initiative (WHI) was the most famous of these studies and was a large-scale, randomized, controlled clinical trial of 16,608 menopausal women aged 50 to 79.[28] This study, of 0.625 mg conjugated equine estrogens (Premarin) and 2.5 mg medroxyprogesterone acetate (Provera) was halted prematurely after 5.2 years due to a slight increase in the risk of breast cancer in women receiving the HRT. Women in the hormone group also appeared to have higher rates of strokes, heart attacks, and blood clots than the placebo group. The HRT users also had a reduced risk of colorectal cancer and fractures, but overall the risks outweighed the benefits. This study marked a significant moment in history for HRT, and millions of women discontinued their HRT as a result of the findings. In the five years since the WHI, many studies have been completed, shedding new light on why decades of observational studies of postmenopausal women using HRT differed from the WHI study and why there seems to be such disparity amongst some of the key studies in the area of memory, heart disease, and breast cancer in particular. While reviewing each of these studies would be informative, I would like to summarize and utilize the 2007 position statement of the North American Menopause Society (NAMS) and its expert advisory panel of clinicians and experts in the field of women's health.[143] The primary goal of understanding HRT research in peri- and postmenopausal women is to come to some determination as to the risks and benefits of estrogen therapy (ET) and estrogen-progestogen therapy (EPT) for symptom relief and disease prevention and treatment. For a more comprehensive discussion on osteoporosis and heart disease, and on the benefits and risks of ET and EPT, I refer you to Chapters 14 and 9.

The NAMS panel offered two main categories of recommendations: those where the panel was able to reach consensus and those where they were not. There are several factors involved in the lack of consensus recommendations: the timing of when HRT was started in relation to perimenopause and menopause accounts for part of the difficulty. Starting HRT in early perimenopause has a differ-

ent risk-benefit profile than starting 5, 10, or even more years beyond the last menstrual period. In addition, the panel acknowledged that there is insufficient scientific data on the risks of long-term use of HRT for symptom control versus the long-term use for reduction of risk of certain diseases such as osteoporosis, heart disease, or even dementia. Another difficulty faced in drawing conclusions from the HRT research is that not all the groups of women studied are comparable. Some groups have more women on statins (drugs for high cholesterol) and others have more overweight women, smokers, or previous users of HRT. These are just some of the significant variables involved in comparing one study to the next.

Recommendations for the Use of HRT

The following summarizes the areas of consensus recommendations for the use of HRT,[143] along with some additional input for clarification and discussion.

Evaluation Prior to Starting HRT. All women should have a complete health evaluation, including a medical history and physical examination and a mammogram within the previous 12 months before HRT. Decisions on bone density testing are made based on each situation.

Hot Flashes. The primary indication for using HRT is for the treatment of hot flashes and night sweats.

Vaginal Symptoms. Most systemic and vaginal ET and EPT products are approved for treating symptoms of vulvar and vaginal atrophy. These symptoms include vaginal dryness, painful vaginal sexual activity, and atrophic vaginitis. If one or more of these symptoms are the only menopause symptom, then a local vaginal estrogen is recommended rather than products that deliver a systemic effect.

Progestogens. Progestogens include bio-identical progesterone and progestins (which are synthetic). The primary purpose for the use of these products is to provide protection to the lining of the uterus when estrogen is given. Postmenopausal women who have a uterus and who are given estrogen need an adequate dose of a progestogen in order to prevent endometrial cancer. For women who have no uterus, a progestogen is generally not prescribed with the systemic estrogen. (Some practitioners, and especially alternative-minded practitioners, believe that giving a bio-identical progesterone can have additional health benefits other than protecting the uterus from the estrogen. A discussion on this is included in the section on bio-identical progesterone later in this chapter.) A progestogen is generally not indicated when a low-dose vaginal estrogen is used for local vaginal effects.

Coronary Heart Disease. "The majority of observational and preclinical studies support the potential benefits of systemic ET/EPT in reducing coronary heart disease (CHD) risk. Most randomized clinical trials do not. Emerging data suggest that these disparities in findings may be related to the timing of initiation of ET/EPT in relation to the proximity of menopause. It is currently not clear if ET/EPT can prevent CHD in women who do not have evidence of CHD (called primary prevention). There is current evidence that initiating ET/EPT in perimenopausal or early postmenopausal women may indeed offer protection, but this needs further evaluation. For women who already have evidence of CHD, EPT does not provide prevention of future cardiovascular problems (called secondary prevention). For the moment, the NAMS panel states that the use of ET/EPT is not recommended for the purpose of coronary heart disease prevention in women, no matter their age. It is also important to note that in the WHI study of estrogen only, there was no increased risk of CHD.[144]

Venous Thromboembolism (Blood Clots). Postmenopausal women who use ET or EPT have an increase in the risk of venous thromboem-

bolism (VTE). This tends to appear during the first one to two years after starting the hormones, and it tends to decrease over time. In the WHI, there were 11 additional cases per 10,000 women per year of using EPT and 2 additional cases per 10,000 per year in the ET-only women aged 50 to 59. It is thought that lower doses of estrogen may be safer, and possibly estrogen delivered transdermally as well (creams, gels, and patches).

Stroke. Both ET and EPT appear to increase the risk of ischemic strokes (deficiency of blood supply caused by a clot) in postmenopausal women, although clinical trials have not been consistent. There were 8 additional strokes per 10,000 women per year in the WHI EPT group and 12 additional strokes per 10,000 women per year in the WHI ET only group. This is considered rare for the EPT group and slightly above rare for the ET group. The risk is even lower in women who are 50 to 59 years old or within the first five years of menopause. Women who already have cardiovascular disease have a higher risk of stroke even without the use of hormone therapy. The panel concluded that no HRT regimen should be used for the primary or secondary prevention of stroke, and HRT should be particularly avoided for women who have an elevated baseline risk of stroke.

Diabetes Mellitus. Large good studies suggest that HRT reduces the onset of diabetes mellitus (DM). Women in the EPT group of the WHI had a 21 percent reduction in DM or what resulted in 15 fewer cases per 10,000 women per year of hormone use. Even so, the panel does not recommend the use of EPT for the sole purpose of DM prevention.

Breast Cancer. According to the WHI, breast cancer risk slightly increases in women on EPT after five years of use. This risk was rare, slightly less than having a first-degree relative with breast cancer, but resulted in four to six additional breast cancers per 10,000 women per year in EPT users for five or more years. It is not clear if there is a difference between women who use HRT daily and those who cycle their hormones by going off for a few days per month. In the ET arm of the WHI, there was no increase in the risk of breast cancer even after seven years of use, and in fact there were eight fewer cases of breast cancer per 10,000 women per year of use of estrogen only.[144]

EPT increases the proliferation of breast cells, breast pain, and density of mammograms. ET only does this to a lesser degree. In fact, it is possible that EPT may interfere with the radiological interpretation of mammograms. (Other research has shown that women who take EPT and acquire breast cancer get diagnosed earlier on mammograms and have less invasive disease, smaller tumors, and better outcomes.)

Osteoporosis. Both ET and EPT reduce the risk of osteoporotic fractures. For women who have osteoporosis or are at high risk for fractures, ET/EPT is a treatment option. One should weigh the benefits and the risks of this and other treatment options.

Depression. Short-term ET may have antidepressant activity in perimenopausal women but not in older postmenopausal women. The panel did not support the use of ET or EPT for the treatment of depression.

Dementia and Cognitive Decline. Starting EPT after age 65 is not recommended for the prevention of dementia or cognitive decline. The Women's Health Initiative memory study showed an increase in the risk of dementia during the five years in women 65 and older.[145] It is not yet clear as to whether ET or EPT can prevent dementia when hormones are started during perimenopause or early postmenopause.

Premature Menopause and Premature Ovarian Failure. Women who have the onset of menopause early, and especially prior to age 40, have lower risks of breast cancer, but earlier onset of bone loss and CHD. It is not known if ET or EPT affects these conditions in this population of women. It is logical to think that younger

women who start ET or EPT may experience more benefits, but this is not known.

Risks and Benefits. An overriding perspective of ET and EPT use offered by the NAMS panel is that HRT should be used based on certain goals and evaluating the benefits and risks for each individual woman. This should also take into account the cause of menopause (surgical, medications, normal physiology), time since menopause, and scope and severity of symptoms and their impact on quality of life, as well as the underlying risk of cardiovascular disease, stroke, clots, DM, dementia, and depression.

Dosing. Lower doses should be considered and can provide adequate symptom relief in many women, while also being able to stabilize bone loss. Some women will not achieve adequate results with lower doses or may need an additional vaginal estrogen for local vaginal symptoms. These lower ET and EPT doses are better tolerated in terms of less breast tenderness, for example, and may have a better risk-benefit profile, although this is not known for certain.

Non-Oral Hormones. There is some evidence that transdermal estradiol supplied through patches, gels, or creams is less likely to cause blood clots because it initially bypasses metabolism by the liver, which has clotting factors. There is no evidence that transdermal estrogens are any safer for the breast.

Additional Issues. Some additional guidelines are offered by the advisory panel. The results of the WHI are relevant especially for women in their mid-60s but should be extrapolated with caution for perimenopausal women, women younger than 50 who use HRT, and for women early in their menopause. Short-term use (less than five years) in symptomatic perimenopausal and early menopausal women is generally considered beneficial with very small risks.

Long-term use of the lowest effective dose of ET or EPT is a decision that many women may want to make based on the benefits they receive in relieving their menopause symptoms. These benefits may outweigh the risks. Other women who may want to use HRT long term are women with osteoporosis who also have moderate to severe menopause symptoms. Another group is women who have low bone density for whom other nonhormonal therapies cause too many side effects or do not work to slow bone loss. For women who have been on HRT and decide to stop, symptoms have about a 50 percent chance of recurring.

The panel's position on bio-identical hormones that are compounded for an individual by a special pharmacy is that any risk-benefit data pertaining to other kinds of hormones also applies to these compounded hormones. They also expressed a concern as to quality control issues with some bio-identical compounded hormone prescriptions. (In my opinion and experience, quality control is not an issue with compounding pharmacies that are operated by licensed pharmacists with oversight by state and federal agencies.)

There were only two areas where the panel did not reach consensus. How to discontinue HRT was one area. Some clinicians recommend abrupt discontinuation of HRT, while others taper the dose. In general, it doesn't seem to affect the return of menopause symptoms. In women who have a history of severe symptoms, tapering the dose is a compelling approach, and I find it to be preferable. However, there is not current data to suggest whether stopping abruptly or reducing gradually over time is better. The other area with lack of agreement is whether taking estrogen and progestin every day has a different effect than cycling the estrogen and progestin or just cycling the progestin. There is some concern that daily progestin may be related to the adverse breast cancer and cardiovascular effects, but the data is conflicting on this topic.

The panel concluded that each woman will have to decide for herself based on her own goals

and her own concerns relevant to benefits and risks of long-term HRT. An age of less than 60 and within the first four years of menopause are the more optimal times to use HRT. The potential risks are small, and even rare, except for stroke, especially for women who use estrogen only. For women younger than 50 and at low risk for CHD, stroke, osteoporosis, breast cancer, and colon cancer, the risks or benefits for HRT are even smaller than those described in the WHI. Again, it is important to emphasize that each woman should have an evaluation prior to hormone use and should be informed of potential risks.

Bio-Identical or Natural Hormones

One of the greatest areas of confusion in menopause medicine today is the subject of bio-identical or natural hormones. The bio-identical hormones include estradiol, estrone, estriol, progesterone, testosterone, and dehydroepiandrosterone (DHEA). These hormones are distinct from many of the commercially available prescription hormones—some of which are synthetic, while others may be derived from a natural substance but are still not bio-identical. Bio-identical hormones are made from either beta-sitosterol extracted from the soybean or from diosgenin extracted from Mexican wild yam root. Those compounds are made into the desired hormone that is biochemically identical to the hormone the body produces. By definition, a "natural" hormone is plant derived and bio-identical. The bio-identical estrogens include estriol, estrone, and estradiol. By contrast, non-bio-identical hormones are intentionally different in chemical makeup from the body's natural hormones and include conjugated plant estrogens, conjugated equine estrogens, synthetic estrogens, synthetic progestogens, called progestins, and synthetic testosterone. It is the chemical structure of a hormone, not its source, that determines if a hormone is bio-identical or not.

For the past 50 years, conjugated equine estrogen, under the brand name Premarin, has been the most commonly prescribed estrogen in the United States. Conjugated estrogens are derived from pregnant mares' urine. In the 1970s it was believed that Premarin consisted of only 10 estrogens—17 beta-estradiol, 17 beta dihydroequilin, 17 beta dihydroequilenin, 17 alpha dihydroequilin, 17 alpha estradiol, estrone, equilin, 17 alpha dihydroequilenin, delta 8-9 dehydroestrone sulfate, and equilenin. Since then, advancements in technology have revealed that the original 10 estrogens make up less than 40 percent of the hormonal content of Premarin. Using modern analytical techniques, today over 200 individual components have been identified, including androgens and progestins.[146] The composition of Premarin is complex, and different estrogens produce various effects in different tissues. Herein may lie a theoretical basis for a potentially different effect of conjugated equine estrogens versus bio-identical estradiol. Dr. Joel Hargrove has shed some light on these distinctions for years.[147] His hypothesis is that a non-bio-identical hormone may act like an environmental toxin to the genetic material within the cell because even though it can bind to the receptor hormone complex, it is a foreign substance.

Besides the effect on the genes themselves, bio-identical hormones and non-bio-identical hormones may very well leave what Dr. Hargrove calls a "different metabolic footprint" on the rest of the body with different metabolic consequences. They may be directly cytotoxic to estrogen-sensitive tissues, bind differently to different kinds of estrogen receptors, alter binding of other hormones to those receptors, or alter the liver's metabolism of carcinogens. It is this distinction and potential difference in metabolic consequences, as well as the shorter half-life of bio-identical hormones, that motivates me to use almost exclusively bio-identical hormones.

Bio-identical estrogens are available as either a patented conventional hormone prescription made by a pharmaceutical company and dispensed from a regular pharmacy with a prescrip-

tion, or in a nonpatented form from a specialty pharmacy called a compounding pharmacy, also available only by prescription. There are a few key advantages to the compounded forms. First, health-care providers can create customized dosing regimens and potencies to fit each individual woman, which can be adjusted in small units to taper a woman onto or off of treatment. Second, the pharmaceutical company versions have additives, binders, adhesives, or preservatives included in their formulations because they patent one or more of those or the delivery technology rather than the estrogen itself. As more and more practitioners recognize, these chemical substances can cause reactions and side effects in many individuals. These can include skin reactions, headaches, digestive problems, or others, only because of the chemical additive, not because of the estrogen itself.

Third, bio-identical hormone formulations have a vast array of delivery options to attend to the specific individual needs of each patient. Capsules, sublingual lozenges or pellets, creams, gels, vaginal creams or gels or tablets, nasal sprays, and even pellets that are implanted under the skin are available in an infinite array of dosing combinations. These exceed the limited number of doses and deliveries that are available in either the pharmaceutical company bio-identical hormone preparations or the synthetic and semisynthetic prescription items.

Finally, bio-identical estrogens include estradiol, estriol, and estrone, as I mentioned earlier. Bio-identical progesterone, testosterone, and DHEA are also available. Any combination of these hormones can be formulated in a compounded hormone prescription: any dose, any combination, and the numerous delivery options.

I am not suggesting that bio-identical hormones are innately good and other hormones are innately bad. I want to stress that there currently is no scientific evidence that bio-identical estradiol has a better safety profile than the non-bio-identical estrogens of synthetic estrogens, conjugated equine estrogens, or conjugated plant estrogens. (There are, however, some clear and potential advantages to bio-identical progesterone over progestogens.) Much of the decision as to which kind of hormone to take depends on the woman.

Some would argue that the advantage of conventional pharmaceutical company HRT is that it has undergone years of scientific study. While this is true, there has been little effort to make distinctions between different kinds of estrogens. Also, as you will see, combining estriol with estradiol, and the use of bio-identical progesterone and testosterone with the estrogens, provide the potential maximum benefit and a more individualized approach for each patient.

Bio-Identical Estrogens

Estrogen is the major hormone that has been used to treat menopausal symptoms. There are three dominant estrogens in the body: estradiol, estrone, and estriol. Estradiol is the primary estrogen produced by the ovaries. Estrone is formed from estradiol. Estriol is produced in large amounts during pregnancy and is a breakdown product of estradiol. Before menopause, estradiol is the body's predominant estrogen; after menopause estradiol levels drop so that estrone becomes the predominant estrogen. Bio-identical estrogen preparations mirror these three naturally occurring estrogens in your body.

Estriol. Naturally occurring estriol is produced by the body almost exclusively during pregnancy. Practitioners of alternative medicine primarily use estriol to treat menopausal symptoms because it is considered to be the safest form of estrogen—it is thought to be less carcinogenic than estradiol and estrone and is about one-fourth the potency.

Several researchers have studied the use of estriol on postmenopausal women. Symptoms that were alleviated with estriol treatment included hot flashes, insomnia, and vaginal dry-

ness and itching during intercourse. A common problem associated with menopause is atrophic vaginitis, a condition that occurs when estrogen is lacking in the body. Symptoms may include vaginal dryness, pain with penetration, increased frequency of vaginal and urinary tract infections, urinary incontinence, and urinary frequency and urgency.

Estriol can be taken orally, in capsules or tablets, and intravaginally in a cream, gel, or suppository to treat urinary incontinence, urgency, persistent urinary tract infections, and recurring vaginal infections. I often prescribe estriol vaginal cream or suppositories for dry or itchy tissue related to low estrogen, vulvar/vaginal discomfort with sexual activity, urinary incontinence, and recurrent urinary tract and vaginal infections in women who are peri- or postmenopausal. These creams most likely work by restoring the vaginal flora, which improves vaginal and bladder health, and increasing lubrication, elasticity, and thickness of the vaginal skin cells.

Estriol cream is equal to the estradiol ring in decreasing vaginal dryness, decreasing atrophic signs (signs of thinning), and decreasing the vaginal pH to a more preferred acidic environment. However, the estriol cream may not be quite as good at decreasing the itching.[148] Estriol has also decreased the incidence of bladder infections.[149] A common prescription is 1 mg of estriol per gram of cream. One gram of cream is inserted in the vagina daily for two weeks as a loading dose, then twice a week as a maintenance program.

Estriol

Oral estriol: 1–4 mg per day
Vaginal cream (1 mg/g): insert 1 g every night for 2 weeks, then twice weekly as a maintenance dose

Estriol and Endometrial Cancer. Although there has been a good deal of study as to the effects of estriol therapy on the endometrial or uterine lining (conventional estrogen therapies cause a thickening or overgrowth of the lining, called endometrial hyperplasia, that can lead to cancer), there have been mixed results. In typical doses from 1 to 4 mg, there appears to be no thickening of the lining of the uterus. If I were prescribing higher doses, I would advise using estriol along with a proven progestational agent to protect the lining from this thickening effect.

Estriol and Heart Disease Risk. Estriol has not been studied as extensively as conventional HRT in terms of its affect on the risk for heart disease; however, a few studies indicate positive effects of estriol, while others have found estriol to have no effect on blood cholesterol levels, a precursor of heart disease.[150] There is no clear risk or benefit related to estriol and heart disease.

Estriol and Bone Density. Estriol also has been minimally studied regarding its effects on bone density and loss; therefore, I do not use estriol to slow or prevent bone loss or to treat low bone density. The research is just not convincing enough at this point. However, estriol taken with calcium lactate supplements may help prevent bone loss that occurs during menopause.

Estriol and Breast Cancer. Women often opt against conventional HRT because they are afraid that it might put them at risk for breast cancer. Many practitioners and researchers agree that there is a slight increased risk, and delivering the safest possible hormone options continues to be a goal. This has led some to study and use estriol for reducing the risk of and treating breast cancer.

Henry Lemon, M.D., a leading researcher on estriol, has concluded that small doses of estriol given in a noncontinuous dosing or cyclic schedule provides protection from breast cancer. Although his hypothesis and work is interesting and provides an appealing basis in which to use estriol, his findings have not been followed up with rigorous clinical trials. The results of other research has not been promising.[151] Estriol, estrone, and estradiol all stimulated human breast cancer cells in tissue cultures. However,

estriol may reduce the negative effects of the cancer drug tamoxifen for women already diagnosed with breast cancer.[152]

Prescribing Estriol. Estriol seems to be helpful in treating many of the symptoms of menopause such as hot flashes. However, the jury is still out as to whether estriol will protect you from conditions such as osteoporosis and if it provides any heart disease protection or adverse cardiovascular effects. Women who currently have breast cancer or who are survivors must weigh the benefits and risks after being provided with well-balanced information. The prudent thing to do, given current research, is for breast cancer survivors to avoid the use of oral estriol. Vaginal estriol for vaginal dryness, however, is a preferred form of vaginal estrogen for breast cancer survivors. In a study of 11 postmenopausal women with vaginal atrophy who were treated for eight weeks with 0.5 mg/day of estriol vaginal cream daily for three weeks then twice weekly for five weeks, there was no change in blood levels of estradiol or estrone.[153] In another study of 74 postmenopausal women with vaginal atrophy treated with vaginal estriol cream, while blood estriol levels rose initially followed by a gradual decline, the levels of the stronger estrogens, estrone and estradiol, were unchanged.[154] This is considered reassuring for breast cancer survivors.

A popular practice for prescribing compounded natural estrogens is to combine the potentially safer estriol with small doses of estradiol and estrone. Currently, practitioners who prescribe a triple-estrogen compound typically use a formula of 80 percent estriol, 10 percent estradiol, and 10 percent estrone. Progesterone is added to the formula at a minimum of 100 mg per day to protect the uterus from the potential effects of the estrogen in thickening the lining of the endometrium. Using estrogen only, without the proper dose of progesterone, in women with a uterus might put them at risk for endometrial hyperplasia or even endometrial (uterine) cancer.

I use a bi-estrogen formulation containing estriol and estradiol, which is increasingly popular because of concerns that estrone may be associated with more carcinogenic estrogen metabolites and thus an increase in the risk of breast cancer.

Tri-Estrogen and Bi-Estrogen Formulation Dosages

Tri-estrogen formulation (estriol 1 mg/estradiol .125 mg/estrone .125 mg/progesterone 50 mg): 1 capsule twice daily (equivalent to 0.625 mg Premarin + 2.5 mg Provera)

Bi-estrogen formulation (estriol 1 mg/estradiol .250 mg/progesterone 50 mg): 1 capsule twice daily (equivalent to 0.625 mg Premarin or 2.5 mg Provera)

Bio-Identical or Natural Progesterone

Many people make the mistake of using the term *progesterone* when they really mean its synthetic counterpart, *progestin*. Progesterone is the other natural hormone your ovaries make, other than estrogen, and its main function before menopause is to support pregnancy. Progestin is the term applied to the synthetic derivatives, which differ in biochemical structure from progesterone. Progestins are the synthetic hormones used in conventional hormone replacement therapy and birth control pills and are what often account for the side effects that some women feel when taking these medications such as irritability, depression, bloating, and mood swings. These side effects are due to the progestins' tendency to cause water retention, affect brain chemistry, and alter other steroid pathways. Progestogen is a term applied to any substance possessing progesterone qualities. It can refer to progesterone or a progestin.

During the perimenopausal phase, when a woman may have months or years of irregular ovulation, her production of progesterone begins to decline. Progesterone falls to almost zero in the beginning of menopause, while estrogen levels decline to about 40 to 60 percent of pre-

menopausal levels. The progesterone deficiency explains many of the perimenopausal symptoms such as mood swings, hot flashes, vaginal dryness, and irregular menses.

In treating perimenopause and menopause symptoms, progesterone can be used for the relief of symptoms and to balance the effects of estrogen on the uterus. It has a critical role in preventing endometrial hyperplasia (an overgrowth or thickening of the uterine lining) and uterine cancer. Progesterone is often touted in the natural products marketplace as effective for the prevention and treatment of osteoporosis, but clinical trials show that neither oral natural progesterone nor progesterone patches or creams can slow, prevent, or reverse bone loss.

I can't stress enough that if you are peri- or postmenopausal and are taking any form of estrogen, you *must* also take a proven form and dosage of progesterone (or progestin) to protect your uterus from hyperplasia and cancer. The exception is women who have had a hysterectomy; they do not need to take progesterone or progestins. However, there are times when adding natural progesterone rather than increasing the dose of the estrogen, even in women without a uterus, may alleviate some menopausal symptoms. Some women's insomnia, fatigue, mood swings, and other menopause symptoms may be more responsive to progesterone than to estrogen.

It is important to note that all progestins (the synthetic progestogen) can have undesired side effects.[155] Premenstrual symptoms such as increased breast tenderness, edema, irritability, and abdominal cramps are fairly frequent, causing as much as 40 percent of women to not take their prescriptions properly. More serious side effects are rare and include high blood pressure, blood clotting, and altered carbohydrate lipid metabolism.[156] If you try the synthetic progestins and find you cannot tolerate them, bio-identical progesterone is an excellent option. In fact, bio-identical progesterone is a preferred option not only to minimize these symptoms, but it also may have a positive affect on cholesterol profiles and help to keep the coronary arteries in the heart dilated.

If you are taking estrogen and are one of the few women who cannot tolerate either the synthetic or natural progesterone, you must be monitored by a primary care practitioner to watch for certain cancers such as uterine cancer.

Progesterone is available with a prescription in the form of an oral capsule, sublingual drops, sublingual pellets, lozenges, or transvaginal or rectal suppositories; it also may be injected. Progesterone is also available over the counter as a cream.

Progesterone Creams. The most popular form of progesterone is the topical cream. The goal of natural progesterone cream is to support the waning daily production of progesterone in the body and keep progesterone at normal levels. The goal is not to supply pharmacological levels (higher doses), as is the case with oral progesterone. Unfortunately there is currently considerable confusion and misinformation about progesterone creams. There are two basic categories of creams:

- Those that contain wild yam and no progesterone
- Those that contain diosgenin extract (a phytoestrogen compound) from wild yam that is converted into natural progesterone in a laboratory

The problem is that the creams that contain only wild yam are not effective as a progesterone agent because the body cannot convert the diosgenin to progesterone.

The confusion is further exacerbated by the varied strengths of the creams. The wild yam creams with bio-identical progesterone added come in a wide range of dosages. Some of these products have less than 2 mg of progesterone per ounce of cream, some have between 2 and 15 mg per ounce, and some have as much as 400 mg per ounce or more. It is important to know exactly what you are getting because the strength of the

cream will dictate how it is used and what symptoms it should be used for.

As a practitioner, when using the progesterone creams, I largely use the creams that have at least 400 mg per ounce because they yield the best results for most women suffering from PMS, menopause symptoms, and irregular bleeding. In general, these doses of bio-identical progesterone in cream form tend to be effective for milder symptoms of menopause.

In general, women tolerate bio-identical progesterone cream extremely well, and most find it effective for alleviating some menopausal symptoms. Very few women experience side effects (reported as less than 4 percent by the manufacturing companies), but these may include breast tenderness, drowsiness, depressive moods, headaches, and irritability. In my experience as a clinician, I have found very few side effects.

Bio-identical progesterone cream is typically used for menopausal symptoms such as hot flashes, mood swings, sleep disruption, and irregular and/or heavy bleeding. Absorption of progesterone from the creams through the skin is variable from person to person. A study evaluating different concentrations of progesterone creams has demonstrated that the progesterone can be measured in the blood if the cream is applied on a regular basis.[157] This same study also demonstrated significant improvement in hot flashes and night sweats. However, another study on transdermal progesterone cream delivering 32 mg daily did not show evidence that it supplied sufficient hormone to enter the body to achieve a biologic or therapeutic effect on lipid levels or bone mineral markers or to improve vasomotor symptoms or moods.[158] Bio-identical progesterone cream has yet to be adequately studied to show sufficient protection of the uterus when given with an oral estrogen or estrogen patch.

I do not recommend that progesterone creams be used to prevent heart disease, osteoporosis, breast cancer, endometrial hyperplasia, or uterine cancer. There is continuing research on the benefits of progesterone creams, but to date there is insufficient evidence that they protect women from any of these conditions.

Oral Micronized Progesterone (OMP). While bio-identical progesterone creams are popular with women in menopause, only the oral, injectable, and vaginal gel forms, available by prescription only, are available in high enough concentrations to protect against endometrial hyperplasia, a thickening of the uterus that can lead to cancer.

Studies demonstrate that oral micronized progesterone (OMP) is effective in preventing endometrial hyperplasia associated with estrogen use.[159] It does not undermine estrogen's bone loss benefits, nor does it improve bone density when it is added to estrogen replacement,[160] and it does not appear to increase the risk of heart disease.[161] However, I can't stress enough that if you are peri- or postmenopausal with an intact uterus and taking any kind of estrogen, you *must* also take a proven form and dosage of progesterone (or progestin) to protect your uterus from hyperplasia and uterine cancer. If you do not tolerate synthetic progestins, bio-identical progesterone is an excellent option. If you are one of the small number of women who do not even tolerate bio-

Natural Progesterone Cream

Apply natural progesterone cream (400 mg progesterone per ounce) to the palms, inner upper arms, or inner thighs.

Perimenopausal Women

Days 1–7: do not use progesterone cream during menses
Days 8–21: ¼ tsp twice a day
Days 22–28: ¼–½ tsp twice a day

Menopausal or Postmenopausal Women

¼ tsp twice daily continuously

Oral Micronized Progesterone (OMP)

Perimenopausal woman taking continuous estrogen and/or a monthly menstrual cycle is desired: 100 mg twice daily (or 200 mg once daily) 12 days per month

Perimenopausal woman taking estrogen and/or a monthly menstrual cycle is desired: 1 mg estradiol (or equivalent) plus 50 mg OMP twice daily (or 100 mg once daily) 3 weeks on and 1 week off (during menses)

Postmenopausal woman taking continuous estrogen and a monthly cycle is not desired: 1 mg estradiol (or equivalent) plus 50 mg OMP twice daily (or 100mg once daily) continuously

In my experience, women have few side effects with OMP in doses of 200 mg or less. Higher doses, 400 mg per day, are sometimes prescribed for amenorrhea, or lack of menstruation, in women who are not yet truly menopausal, or to manage heavy acute uterine bleeding. However, in high doses OMP can cause side effects, including dizziness, abdominal cramping, headaches, breast pain, nausea, diarrhea, fatigue, irritability, and abdominal bloating.[162]

identical progesterone and you are taking an estrogen, then you and your uterus must be regularly monitored by a primary care practitioner.

OMP is available by prescription from a compounding natural pharmacy in any dose your provider prescribes. It is also available from a conventional pharmacy under the trade name Prometrium. For perimenopausal women who are taking estrogen every day, oral progesterone can be given at a dose of 100 mg per day every day, or it can be given at 200 mg per day on days 15 to 26 of the cycle.

These doses are based on an average dose of estrogen replacement or less. For higher doses of estrogen, the dose of progesterone will need to be increased as well, typically doubled. Progesterone is prescribed on a cyclical basis (as opposed to every day) for women who are still bleeding. This cycling of the progesterone allows them to still have a monthly period, the onset of which occurs within a few days of stopping the progesterone.

Sublingual Progesterone. Sublingual (under the tongue) progesterone has basically the same uses for menopause and premenstrual symptoms as the creams and the oral progesterone. However, it is generally stronger than the creams and weaker than the usual oral doses. Typically, the tablets must remain under the tongue for 20 minutes while they dissolve before the progesterone is fully absorbed.

One advantage of sublingual tablets—as well as creams and vaginal and rectal suppositories—is that they are not significantly metabolized by the liver, as is the case with oral progesterone. This is thought to minimize side effects. However, there is very little information available as to how sublingual progesterone works and its possible longer-term side effects, so I take care when recommending this form of progesterone. The main issue is that sublingual progesterone and progesterone creams have not yet been proven to protect the uterus from the effects of estrogen replacement.

Rectal administration of progesterone has not been well studied. Nasal sprays of progesterone (in oil) produce relatively low serum levels, which are sustained for only a few hours.[163] Even though these levels are low, they can produce some secretory changes in the endometrium and may prove with further study to be sufficient to reverse endometrial hyperplastic effects of estrogen replacement therapy.

More About HRT and Breast Cancer. The issue of progestogens and breast cancer is complex and not very well understood. It is difficult to come to a comfortable conclusion on this matter. One of the largest studies to date, the Nurses' Health Study, showed that adding a synthetic progestin to estrogen failed to reduce the incidence of breast cancer and actually increased it.[164] Women taking estrogen alone had a 36 percent increase in their risk of breast cancer; those on estrogen plus progestin had a 50 percent increase; those on progestins alone had a 240

percent increase—although this number may be misleading because the number of women on only progestins was very small. The Nurses' Health Study also was able to report on duration of use. For women who had been taking estrogen and progestin for five to ten years, there was a 46 percent increase in their risk of breast cancer. At the end of 2000, the Nurses' Health Study published its estimates of breast cancer risk associated with HRT in postmenopausal women.[165] The results were expressed as percentage increases in the cumulative risk of breast cancer and were frightening to many: the use of estrogen alone for 10 years leads to a 23 percent increase by age 70, and the use of estrogen plus progestin for 10 years leads to a 67 percent increase by age 70. It is important to realize that the result is not an actual mathematical conclusion but the conclusion of the model, the consequences of a small difference in risk that gets magnified as the math is carried out into the future. Also, it is important to realize that risk estimates represent a projection, not an actual measurement.

Another study done in Seattle had contradictory findings to the Nurses' Health Study.[166] This study found no effect on the risk of breast cancer from either estrogen alone or estrogen and progestins together. In the WHI group of estrogen plus progestin users, there was a slight increase in breast cancer after five years of use.[28] In the estrogen-only arm of the WHI, estrogen did not increase the risk of breast cancer, even after seven years of use.[144]

At the other end of the pendulum, investigations that have found no increased risk of breast cancer with HRT or ERT use receive much less attention. The Iowa Women's Health Study is prospectively following a cohort of women who were selected in 1985.[167] After six years of following these women, a statistically significant increase in the risk of breast cancer could not be detected in women who had either ever used HRT or who were currently using it. Another report through eight years of follow-up looked at whether postmenopausal HRT increased the risks for breast cancer and death from breast cancer in women with a family history of breast cancer.[168] There was no significant increase in the rate of breast cancer even in women with a family history of breast cancer who were using HRT longer than five years. These results are consistent with other reports that there is no additional risk in using HRT/ERT in women who have a first-degree relative with breast cancer.

The latest analysis from the Iowa Women's Health Study, an 11-year follow-up, showed an association between women who had ever used postmenopausal HRT and the risk of breast cancers that were more localized and had a better prognosis.[169] The study did not find an increased risk of invasive ductal or lobular carcinoma in women who had used HRT either less than or more than five years. A slight increased risk of breast cancer was observed in current users and those with less than five years of use; current users with more than five years of use had no increase in risk. These results are the opposite of those seen in the Nurses' Health Study—women who are using HRT for more than five years have the increase in risk.[164] Two other recent studies, the Carolina Breast Cancer Study[170] and analyses from the National Health and Nutrition Examination Survey (NHANES),[171] found no increased risk with postmenopausal hormones. These recent studies perpetuate the inconsistency in research on this issue that has been true in the last 25 years. This provides some logic to the point of view that if there is an increased risk of breast cancer associated with ERT/HRT, the risk must be small because otherwise by now, after this many years, we would have seen more consistency in the data and the size of the risk estimates would be large rather than slight.

A reminder about duration of use offers some reassurance amidst the confusion. No studies find an increased risk of breast cancer with short-term use of HRT, and the conflicting results of more than 60 studies demonstrate that if there is

an increased risk with long-term use, it is a slight increase.

The effect of bio-identical progesterone on the risk of breast cancer in menopausal women who are taking bio-identical EPT is basically unresolved. Some evidence does exist that bio-identical progesterone might help to prevent breast cancer. In a 1995 study, women who were scheduled for breast reduction surgery applied progesterone cream to their breasts for two weeks before the surgery.[172] The cells in the removed breast tissue showed less cell division in the women who used the progesterone cream, and the researchers concluded that progesterone applied directly to the breast might even help prevent breast cancer. In perhaps the most compelling study to date, done in France, transdermal bio-identical estradiol plus oral micronized bio-identical progesterone was not associated with an increased risk of breast cancer whereas transdermal estradiol with progestins did increase the risk, similar to the WHI results.[173]

For women already at risk for breast cancer or who have had breast cancer, no good studies exist on the effects of progestins or progesterone.

Friendlier and Less-Friendly Conventional HRT

Friendlier conventional HRT includes all estrogens manufactured by a pharmaceutical company that are made with bio-identical estradiol or estrone. As stated previously, the differences are the binders, fillers, preservatives, adhesives, and additives used in these products. Oral capsules of 1 mg bio-identical hormones are equivalent to 0.625 mg of conjugated equine estrogens (CEE). Estrogen patches that contain 0.05 mg of bio-identical estradiol are equivalent to 0.625 mg CEE (Premarin) or to 1 mg of oral bio-identical estradiol. Estradiol cream and gel are also now manufactured by pharmaceutical companies.

Less-friendly conventional HRT uses hormones that are composed of estrogens and progestins that are not identical to a woman's own estrogen or progesterone. Conjugated equine estrogens are derived from the urine of pregnant mares. Esterified estrogens are in part estrone sulfate and in part equilin sulfates. (See Appendix C for a chart on current conventional hormone options.)

Androgens. The normal postmenopausal ovary produces testosterone as well as androstenedione and small amounts of estrogen. Following menopause, a woman's androgen (male hormone) production decreases by as much as 50 percent. Ovarian androgen production stops abruptly with surgical menopause and more gradually with natural menopause. A substantial number of menopausal women who are given estrogen replacement at standard dosages continue to have menopause symptoms such as hot flashes, night sweats, and insomnia. These women may have enhanced symptom relief when they are switched to estrogen plus androgen, usually testosterone. Studies have shown that testosterone increases the bioavailable estrogen, both that produced by the body and that given in a pill.[174]

Estrogen and testosterone therapy has been explored not only for its ability to improve vasomotor symptoms but also to improve sexual desire and sexual satisfaction. For example, a double-blind study of women who were dissatisfied with their HRT regimen showed that sexual desire, satisfaction, and frequency of sexual activity were increased when they used the estrogen/testosterone combination.[175] Another study of early postmenopausal women, both natural and surgical, were switched from estrogen alone to estrogen/testosterone therapy.[176] Overall symptom relief was greater with estrogen/testosterone therapy than with estrogen-only therapy. Sexual drive and satisfaction increased. Results of other studies have shown that the combination of 1.25 mg of esterified estrogen and 2.5 mg of methyltestosterone given daily for two years significantly reduced the intensity of hot flashes and

vaginal dryness in women with surgical menopause.[177] A study comparing the effects of estrogen and an estrogen/testosterone combination on sex drive showed improvement in 50 percent of women on estrogen alone, but 90 percent of women when testosterone was added.[178]

There have been some concerns about estrogen/testosterone therapy reversing the increased HDL cholesterol achieved with estrogen alone. The combination of esterified estrogens and methyltestosterone has been shown to decrease triglycerides, LDL, HDL, and total cholesterol in postmenopausal women. However, a two-year study of estrogen/testosterone therapy produced no change in LDL levels but did show significant reductions in triglycerides and very low-density lipoprotein, and also reduced HDL levels. So the story is mixed, and further studies are needed to determine the actual impact of these changes on cardiovascular disease. If testosterone is used, it would be prudent to monitor blood lipid levels for any adverse effects.

For treatment of osteoporosis, adding testosterone to estrogen therapy appears to produce a greater increase in bone density compared with estrogen therapy alone. In a double-blind study, 66 surgically menopausal women without osteoporosis received either 1.25 mg of esterified estrogen alone or 1.25 mg of esterified estrogen and 2.5 mg of methyltestosterone daily for two years. Both groups already had bone loss at the spine, hip, and wrist. Only the combination of estrogen with testosterone significantly increased spinal bone density after one year and two years.

Standard formulations of CEE and methyltestosterone combine either 0.625 or 1.25 mg of CEE with 5 mg of methyltestosterone. Other formulations contain either 1.25 or 0.625 mg esterified estrogens, combined with 2.5 or 1.25 mg of methyltestosterone, respectively.

Through a compounding pharmacist, one can obtain bio-identical testosterone. I generally use 1 to 3 mg of bio-identical testosterone formulated into the bi-estrogen or tri-estrogen formulation, and the pills are taken one capsule twice daily. Testosterone cream applied to the genital region has received mass media attention on "The Oprah Winfrey Show." It is used as an alternate method of delivering the testosterone. Common prescriptions are anywhere from 1 to 4 mg per gram of cream. These are applied to the external genital region right before sexual activity to enhance sensation to touch and orgasm. Use should not exceed twice per week to avert local testosterone side effects such as enlargement of the clitoris that can occur if testosterone cream is used daily and in the stronger dosages. A good resource for both menopausal women and their health-care practitioners is a book called *The Hormone of Desire*.[179]

The North American Menopause Society (NAMS) invited a panel of clinicians and researchers who were experts in the field of testosterone therapy to review the scientific evidence regarding the role of exogenous testosterone in postmenopausal women.[180] Their conclusions were as follows: Postmenopausal women with decreased sexual desire with no other cause other than being postmenopausal may be candidates for testosterone treatment. Because of lack of adequate evidence for testosterone increasing sexual function, testosterone treatment without also giving estrogen therapy cannot be recommended. Other causes of low libido are to be ruled out and laboratory testing of testosterone levels should be used only to monitor for supraphysiologic levels before and during therapy, not for the purpose of diagnosing testosterone insufficiency. Monitoring would be included in an office visit follow-up to assess changes in sexual function. Transdermal and topical gels or creams are preferred over oral forms due to their minimal effect on the liver. Testosterone therapy is contraindicated in women with breast or uterine cancer and in women with cardiovascular or liver disease. Testosterone should be given at the lowest dose for the shortest time that meets treatment objectives.

Bio-Identical Testosterone

Oral: 2–6 mg per day
Cream (1–4 mg/g): apply twice weekly to external genitalia before sexual activity

Dehydroepiandrosterone (DHEA). Dehydroepiandrosterone (DHEA) is another of the androgens. It is the most abundant circulating steroid in humans. DHEA is called a precursor hormone because it is produced in large amounts in the body and other steroid hormones are made from it, including estrogen and testosterone. In a woman, 90 percent of DHEA comes from the adrenal glands; the remaining 10 percent is manufactured by the ovaries. Our DHEA level peaks at age 25 and then declines gradually to only 15 to 20 percent of our maximum by the time we turn 70.

Many claims have been made about DHEA's effect on the immune system, and its anti-aging properties are said to include better memory, less fatigue, more energy, relaxation, and increased ability to handle stress. It is also touted as having positive effects on bone density and helping to prevent cancer and cardiovascular disease. However, the exact effect DHEA has on the body's cells is unclear. I have seen DHEA increase energy, improve stress response, improve muscle mass, and occasionally increase libido.

A daily oral intake of 50 mg of DHEA for a postmenopausal woman may restore DHEA levels to those of a young adult. At this dosage, DHEA is converted to other more potent androgens, including testosterone. In pharmacological doses of 1,600 mg, DHEA is converted to estrone and estradiol. Unfortunately, there are only a handful of randomized placebo-controlled studies examining the effects of giving DHEA to humans. Although animal studies are promising, we need more research on its particular effects on postmenopausal women.

One of the most significant effects of DHEA may be its ability to enhance a sense of general well-being. This effect was found at doses of 50 mg and 100 mg daily.[181] Few adverse effects have been reported with DHEA, although in women, androgenic side effects such as facial hair growth and acne can occur with doses as low as 50 mg. A dose of 25 mg daily may be more appropriate.[182] I typically give 5 to 20 mg per day to women who are either low in DHEA according to test results or to women with fatigue, loss of vitality, and/or low sex drive.

DHEA

5–50 mg per day

Exercise

The benefits of exercise for perimenopausal and postmenopausal women are wide and deep. Women can receive substantial reductions in cardiovascular disease,[183] a reduced risk of breast cancer,[184] an increase in bone density,[185] a lower-

Sample Treatment Plan for Hot Flash Symptom Relief

Diet:
Follow a whole foods diet high in fruits, vegetables, whole grains, and legumes.
Emphasize soybean products and flaxseed.
Reduce total fat, animal fats, and simple carbohydrates.
Eat modest amounts of organic low-fat dairy.
Exercise: Regular weight-bearing, strengthening, and aerobic exercise with light weight training
Herbal: Choose one of the following:
Black cohosh standardized extract capsules (40 mg): 1–2 capsules 1–2 times per day
Consider herbal combination formulations: dong quai, licorice root, motherwort, burdock root, hops, Saint John's wort, red clover, maca
Bio-identical progesterone cream (400 mg/oz or more): apply ¼ tsp twice daily 3 weeks on and 1 week off if perimenopausal
Bio-identical estrogens/progesterone (estriol 1 mg/estradiol 0.25 mg/progesterone): 1 capsule (50 mg) twice daily (1 week off if perimenopausal)

ing of body fat and body mass index, and an improved sense of well-being.[186] The ability of exercise to reduce the incidence or severity of hot flashes during menopause is not clear. It appears that for women who are not overweight, moderate exercise may be beneficial for hot flashes and more vigorous exercise may exacerbate them.

Exercise Recommendations. Physical exercise that includes strength, cardiac, and flexibility modalities (see Appendix A) ensures a menopause without exaggerated symptoms and protects against heart disease and osteoporosis when it is initiated early in life, is appropriate and moderate, and lasts throughout life.

However, if you have reached menopause and have been sedentary, start slowly and progress gradually. Consult an exercise consultant to learn the safest program both for aerobic and strength/weight training.

Sample Treatment Plan for Insomnia

See the Resources section for formulation sources.

Diet:
- Avoid stimulants, especially during the second half of the day (coffee, caffeinated tea, chocolate, caffeinated sodas).
- Have a protein snack before bed.

Lifestyle: Get regular exercise, practice good sleep hygiene.

Herbal:
- Black cohosh extract: 40 mg twice daily
- Valerian: 1–2 capsules or 1–2 tsp liquid extract before bed

Nutritional supplement: 2 mg melatonin before bed

For difficult cases:
- Add hormone prescription, with oral micronized progesterone taken right before bed.
- Consider adding 5-HTP, higher doses of melatonin, or other herbal combinations of hops, valerian, and passionflower.

Solutions to Selected Problems

Insomnia. In determining individualized treatments for insomnia, it is imperative to identify and address the underlying cause as well as provide options for short-term relief. The basics start with good sleep hygiene. This includes going to bed at the same time each night and avoiding or reducing naps. A comfortable bed and room temperature along with low levels of light and noise contribute to better sleep hygiene. It is often advised that the bedroom should not be used for eating or television watching but rather only for sleep and intimacy. If you are not able to fall asleep after 20 to 30 minutes in bed, get out of bed and engage in a quiet activity and then return to bed when sleepy.

Nutritional practices may influence sleep. Caffeinated drinks may have to be avoided altogether or at least within 12 hours of sleep. Some individuals have nighttime hypoglycemia. A drop in blood glucose level causes the release of chemicals that can stimulate the brain. Consuming complex carbohydrates with protein can help maintain sleep through the night by regulating nighttime blood glucose levels.

Relaxation techniques such as biofeedback, progressive muscular relaxation, meditation, and warm baths can help sedate some people. Soothing music may also reduce anxiety and stress. One study showed that after listening to music while trying to go to sleep, the level of sleepiness was significantly increased and the time to sleep onset was much lower. The music became more effective each night of continued use.[187]

Some studies of insomnia in postmenopausal women demonstrate that HRT significantly improves sleep quality, shortens sleep onset, and reduces nighttime restlessness and awakenings.[188] Sleep efficiency and time spent awake after sleep onset appear to be significantly better when using oral micronized progesterone with estrogen replacement therapy but not when using synthetic medroxyprogesterone acetate (MPA).[189]

Insomnia is not only a frequent medical problem, but it's also a difficult problem. Insom-

nia is usually a symptom of an underlying hormonal, nutritional, pharmacological, or psychological problem. Some women may need evaluation for sleep apnea, treatment of psychological issues, or pharmacological treatment.

Melatonin. One of the better-known natural treatments for insomnia is melatonin. One placebo-controlled trial on melatonin found that 0.5 mg of melatonin daily for two weeks shortened the amount of time it took to fall asleep but had no effect on sustaining sleep or improving the quality of the sleep.[190] In another study, 2 mg of melatonin per day was effective in improving sleep efficiency.[191] Melatonin has also been effective in patients with long-term insomnia who were using benzodiazepines.[192] Most patients were able to decrease their benzodiazepines by 50 percent during the second week of using 2 mg of melatonin nightly and discontinue it by the fifth or sixth week. It is thought that individuals who actually have a melatonin deficiency are most responsive to melatonin for insomnia.

5-Hydroxytryptophan (5-HTP). 5-HTP is a form of tryptophan that has been reported in numerous double-blind studies to decrease the time required to get to sleep and to decrease the number of night awakenings.[193–196] The typical dosage range of 5-HTP is 100 to 300 mg about 45 minutes before bed.

Valerian. This herb has been used for decades, if not centuries, as a sedative, including as an aid for insomnia. Studies have confirmed the effectiveness of valerian. In a double-blind study from Switzerland, valerian improved sleep latency, reduced night awakenings, and improved sleep quality, especially in women.[197] Several trials have looked at valerian in combination with other herbal sedatives such as passionflower and lemon balm. In one clinical trial, 33 percent of men and women without insomnia who took valerian and lemon balm 30 minutes before bed reported an improvement in sleep quality. Only 9 percent in the placebo group reported improvement.[198]

Other Botanicals. Numerous plants have sedative actions and have been used historically to promote sleep and improve sleep quality. These include hops, skullcap, chamomile, lemon balm, oat straw, lavender, bitter orange, California poppy, and kava. Preparations can include powdered capsules, tinctures, and teas. Most of these herbs are mild sedatives and are unlikely to suffice alone, but are typically used in combinations.

Sexual Function

Ginseng. The most well-known herb to improve energy and stamina, as well as for sexual rejuvenation, is ginseng. American ginseng has traditionally been used for weakness, loss of muscle tone, low endurance, loss of work efficiency, and decreased sexual function. The ginsenosides in American ginseng exert an estrogen-like action on the vaginal epithelium that improves the lubrication and elasticity of the vaginal tissue, contributing to sexual response and comfort. In animal studies, ginseng increased testosterone levels in males.[199] Given the potential influence of testosterone on sexual function in women, this may partly account for its effect in women as well. Therapeutic effects of ginseng on the reproductive system of female animals also include accelerating ovarian function, enhancing ovulation, and stimulating egg production.[200]

(Enhancing pelvic and specifically genital circulation is also a consideration for which one might consider ginkgo. Ginkgo was also discussed earlier in the botanicals section as an aid to improve sexual function in women taking antidepressants.[78])

Several studies show the ability of ginseng to battle fatigue and stress. One study of nurses who took ginseng showed improved scores in job competence, mood, and mental and physical performance.[84]

Ginseng has also been shown to enhance the ability to cope with various mental and physical stressors, largely due to its effect on the adrenal glands, which are involved in maintaining our

hormonal balance. Finally, in a double-blind, placebo-controlled trial of 232 patients with fatigue, it was found that ginseng improved fatigue, anxiety, nervousness, and poor concentration.[201]

Damiana. All students of herbal medicine are probably familiar with damiana's time-honored reputation as an aphrodisiac. It is unclear how the constituents of damiana bring about this effect, and indeed no studies have proven this effect on women, but it has been shown to enhance sexual behavior in animals. A combination product that included ginseng, damiana, and gingko was shown in a small placebo-controlled study to improve sexual desire and satisfaction.[202] Mexican Indians and generations of herbalists have looked to damiana to improve sexual interest and response.

Ashwagandha. In cases of general debility, nervous exhaustion, loss of muscle strength, and that all-familiar "brain fog," the ashwagandha plant that grows and is cultivated in India and even the Himalayas is well-known in folk medicine of that region as a traditional treatment of these problems. This plant is regarded in India as a tonic and adaptogen, with properties similar to ginseng. In one study, physical endurance was doubled in participants given extracts of ashwagandha (*Withania somnifera*).[203]

Rhodiola. Rhodiola, also known as golden root or arctic root, has been used for centuries to increase physical endurance and exercise performance[204] and as a folk custom to ensure fertility. Effects on regulation of the menstrual cycle and the successful treatment of 25 of 40 women who had stopped having menses altogether support its use in matters related to hormones and sexual function.[205]

Maca. Maca has been used in Peru for five thousand years. Alkaloids from the root of the plant act upon the two key glands in the brain, the hypothalamus and the pituitary, supporting and boosting energy levels and encouraging the production of ovarian hormones such as estrogen and testosterone.[206]

Look for these herbs in popular combination products to enhance sexual desire as well as to address other menopause issues.

The Importance of Lubrication. The amount of estrogen in the vagina is the main determinant of vaginal health, including the pH, the balance of organisms, the integrity of the tissues, and the amount of lubrication. As estrogen levels decline with menopause, many changes can occur, including thinning of the vaginal wall tissue, vaginal dryness, loss of vaginal tone, and susceptibility to infections. Symptoms such as pain with vaginal sexual activity, itching and burning, and even urinary leakage may result. For sexual function and comfort with vaginal sexual activity, lubrication during sex not only is helpful for comfort, but for some is a necessity. There are many over-the-counter lubricants, and in the context of natural medicine, we can look for lubricants that are less irritating due to a lack of chemicals and hypoallergenic bases. Something as simple as vitamin E oil can be used as a lubricant. Products are available that contain vitamin E oil and allantoin and are water based so they are nondrying and nonirritating. Other natural vaginal moisturizers are oil based rather than water based. Common ingredients are mineral oil, glycerin, yerba santa, castor oil, and more. It is important to check to see which ones are appropriate to use with condoms and to remember that lubricants do not contain spermicide and so do not provide contraception.

The most effective way to improve lubrication over the long term is prescription vaginal estrogens. Please refer to the section on hormones earlier in this chapter for how to use vaginal estrogens for thinning, dryness, and pain of the vagina and problems related to these atrophic changes.

Topical Ingredients to Enhance Arousal. Numerous botanical and nutrient topical products now exist to enhance female arousal and orgasm when applied to the vulva (external female genital area). One such product is a feminine massage oil

that contains borage seed oil, evening primrose oil, extracts of angelica and coleus, and several antioxidants. A randomized, double-blinded, cross-over study was conducted to evaluate the efficacy of this product in women who had been diagnosed with female sexual arousal disorder. The treatment resulted in increases in sexual pleasure in more than 90 percent of women.[207]

Another over-the-counter topical cream that supports female sexual arousal contains nitric oxide, which is the chemical produced by the body to promote the dilation of blood vessels in the female genital tissues. L-phenylalanine and L-tyrosine are amino acids that the body uses to produce neurotransmitters important in the initiation of blood vessel dilation. Niacin, also known as vitamin B_3, is known for its ability to dilate blood vessels as well. In addition, oils such as L-menthol from mint oil, rosemary oil, and cinnamon oil can increase local blood flow and have warming and stimulating effects when formulated in a cream and applied to the genital tissues.

As discussed earlier in the hormone section, topical testosterone cream is also a valuable tool to enhance genital arousal and orgasm.

CONVENTIONAL MEDICINE APPROACH

Conventional medicine treatment of menopause has changed fairly dramatically in the years following the initial publication of the Women's Health Initiative (WHI) report in 2002. Many women who were taking hormone therapy for prevention of heart disease and osteoporosis were instructed to stop their hormones, because the WHI suggested that there might be a slight increase in breast cancer and strokes in asymptomatic women taking hormones. We have known that there is a slight increase in deep venous thrombosis, which was confirmed by this study. The study also showed an improvement in prevention of osteoporosis and colon cancer, but these beneficial effects were considered not to be worth the risk. The recommendation that all menopausal women be placed on hormone therapy, which was a mainstay of conventional medicine for the preceding 40 to 60 years, has changed. After the WHI report, the American College of OB/GYN (ACOG) and the North American Menopause Society (NAMS) convened panels of specialists to look at the information and make recommendations. These recommendations are for the general patient, with provisos that each individual woman should be counseled and her risk and goals assessed, and some deviation from these guidelines may be possible at the discretion of the practitioner and patient. There are three commonly agreed-upon uses for hormone therapy:

1. Decrease of menopausal symptoms
2. Prevention of osteoporosis in women who are intolerant of other medications used to treat osteoporosis
3. Topical use of hormones for urogenital atrophy

They also recommend that hormones be used at the lowest effective doses for the shortest effective period of time. What this means is that the provider should try different doses and find one that is most effective in the reduction of a woman's symptoms. That does not mean it has to be the lowest dose possible. The shortest period of time means that women should periodically go off their hormones to see if their menopausal symptoms have reduced or gone away. These recommendations are not applicable to women who are using hormones for treatment of osteoporosis, which should be a lifetime treatment. Women with atrophic urogenital symptoms will need to use their hormones lifelong, but the topical vulvovaginal estrogens pose no meaningful risks. The lowest effective dose, in the shortest period of time, pertains primarily to a woman using hormones for menopausal symptoms.

They recommend that all women with an intact uterus have a progestogen administered along with the estrogen to prevent endometrial hyperplasia and uterine cancer. The regimens of

treatment with progestogens varies greatly but are divided into two basic approaches:

1. Continuous daily therapy
2. Cyclic treatment, adding a progestogen 12 to 14 days per month, and recently there is a "long sequential cyclic" regimen of 14 days every 3 months

Woman who do not have a uterus are not required to use a progestogen. Women who have a uterus and are progestogen intolerant can have the option of annual uterine lining evaluation with transvaginal ultrasound or an endometrial biopsy. When using transvaginal ultrasound, women with an endometrial thickness of 4 mm or less are considered not to have disease and do not need an endometrial biopsy unless there is persistent abnormal bleeding or other medical reasons. Women with more than 4 mm thickness may have a normal lining but need an endometrial biopsy and/or a saline sonohystogram. Or, instead of the two-step approach of ultrasound and then biopsy, women may instead have an endometrial biopsy yearly to assess the lining tissue.

Another alternative is the use of the progestogen intrauterine system known as a Mirena IUD. This is not an FDA-approved use of this device as of this writing. The Mirena IUD provides a large local progestogen environment for prevention of hyperplasia and cancer without any significant systemic absorption. There is no justification for the use of unopposed estrogens in a woman with a uterus unless she is doing regular assessments of her uterine lining. There are only a few reasons why women without a uterus are given progestogens along with estrogen:

1. To increase menopause symptom relief
2. To reduce the risk of endometriosis in women who had active disease during their surgery to remove the uterus and ovaries

The use of hormone therapy for other reasons is widespread, but is not approved by the FDA, ACOG, or NAMS. There have been empiric reports over the years that the use of estrogen reduces the onset or severity of dementia, macular degeneration, cataracts, tooth loss, and skin wrinkling, and many women choose to use hormones for these quality-of-life issues. This goes back to the decision to individualize each woman's therapy based on her goals and risk factors. Properly counseled about the risks of hormone therapy, many women are continuing to use hormones for these issues. That choice is between the woman and her provider.

A pharmaceutical company's FDA application information shows that 0.014 mg of transdermal estradiol in the form of a weekly patch has been shown to be effective for prevention of osteoporosis, but it does not develop blood levels high enough to increase or build an endometrial lining. Therefore, the FDA is allowing this medication to be used as an unopposed estrogen in women with a uterus. The information in the package insert for this medication suggests a progestogen challenge test at 6- to 12-month intervals. Another controversial unopposed estrogen use is topical vaginal products. Several studies suggest that there is minimal to no increase in blood estrogen levels with the use of the vaginal ring, creams, and tablets. Over the years, there have been suggestions that a woman with a uterus using these products be given a progestogen withdrawal challenge test on an annual basis. These recommendations are variably applied. Again, discussion with the woman about her choices is probably the most important management suggestion.

So, what hormones are currently being used? The delivery systems and types of hormones have changed dramatically over the past 10 to 20 years. This discussion will provide some information on the most commonly prescribed products. There are, however, two first important guiding principles for hormone therapy management that should be discussed.

First is the bioequivalence of oral and transdermal estrogen products. The following doses of the different types of estrogen supposedly

provide the same blood levels after administration, and so they are considered biologically equivalent:

Oral conjugated estrogen: 0.625 mg
Oral estradiol: 1.0 mg
Patch estradiol: 0.05 mg
Biest/Triest: 2.5 mg orally
Estradiol gel (Estrogel): 2 squirts
Estradiol cream (Estrasorb): 2 packets

A dosage higher than these amounts would give higher-than-average blood levels, and dosages lower than these amounts would give lower-than-average blood levels. It is acceptable to vary the estrogen dosage to meet the woman's symptom requirements.

The second guiding principle is that there is a minimal acceptable dosage of progestogen that will prevent hyperplasia or uterine cancer. One cannot go below the recommended amounts of progestogen or frequency intervals without the risk of hyperplasia and uterine cancer, so the recommended progestogen dosages should not be varied. For information on the various types of conventional estrogen products and the recommended progestogen dosages, see the North American Menopause Society website, menopause.org. This site offers a menopause guidebook that outlines all of the currently available conventional estrogen and progestogen products as well as a 47-page committee consensus opinion on progestogen usage. (See Appendix C for a list of conventional hormone preparations and some details about dosing.)

For purposes of the summary discussion in this chapter, these are the conventional hormone guidelines:

1. Estrogens. The most commonly used estrogens are the oral forms, and they come as estradiol (by product name and generic), conjugated animal-source estrogens (Premarin), a mixture of esterified vegetable estrogens (Enjuvia, Cenestin, Menest), esterified estrogens with methyl testosterone (Estratest and Syntest), and various generic forms. Estrogens also come in combination products containing an estrogen plus a progestogen and in transdermal patches, gels, and creams, as well as in a vaginal ring that provides transdermal systemic estrogen levels (Femring). Even some conventional practitioners are increasingly using compounded hormone therapy, which has the benefit of a variety of dosing forms and can be compounded as an oral capsule, a transdermal cream or gel, a vaginal tablet, or a sublingual-dissolving medication.

2. Combination products. The combinations of estrogen plus progestogen products are very popular because the woman can take one medication and get both hormones. These come in oral forms and in two patch brands. There is also a combination estrogen plus progestogen vaginal product called NuvaRing, which is a low-dose birth control product that has been used for perimenopausal symptom relief and cycle control. And again, there are compounded hormone products from the compounding pharmacies.

3. Progestogens. There are several commercially available non-bio-identical progestins in common usage today: Provera or Cycrin (medroxyprogesterone), Aygestin (norethindrone acetate), the minipill Micronor (norethindrone), and Megace (megestrol). Bio-identical progesterone is available in a product called Prometrium, in two dose forms. Compounding pharmacies can compound bio-identical progesterone in oral, sublingual, transdermal, or vaginal form. There is also a vaginal bio-identical progesterone, FDA approved for use in infertility, that comes in a 4 percent and 8 percent gel and can be used for vaginal application of systemic progesterone.

4. Vaginal estrogens. Vaginal estrogen products that are used only for urogenital atrophic problems are very weak estrogens and are not likely to increase blood levels. For many years, vaginal creams have been available in either estradiol or conjugated estrogens, but in the

past 10 years or more, we have also had the three-month indwelling vaginal ring estrogen called Estring and vaginal tablets of estradiol called Vagifem. Compounded vaginal estrogen products in variable doses are also available. Conventional practitioners by and large do not use these and are particularly unaware of how to use vaginal estriol, as discussed in the alternative medicine section on hormone therapy.

Nonhormonal medical options have increased in popularity and understanding. For low bone density, a bisphosphonate such as Fosamax, Actonel, or Boniva or a selective estrogen receptor modulator (SERM) such as Evista (raloxiphene) may be prescribed. Or for severe osteoporosis, parathyroid hormone (Forteo)—which works on the bone in an entirely different way than hormones, SERMs, or bisphosphonates—may be recommended.

For insomnia, there are many different options depending on age, type of use (daily versus intermittent), and abuse potential of the patient. Most sleep aids are benzodiazepines, some are antihistamines, and a new one (Rozerem) works on melatonin receptors. Consult a physician well acquainted with the use of these medications.

For anxiety and depression, there are the common SSRIs (Prozac, Paxil, Celexa, Zoloft), newer SNRIs (Effexor, Cymbalta) and tricyclic antidepressants, and sedatives.

For vasomotor symptoms, a blood pressure med, a seizure drug, SSRIs, SNRIs, and ergots can be prescribed. None of these medications' actions on relieving sweats and flushes are understood—practitioners have just observed that some women on some medications had significant improvement in their symptoms. Most of the drugs are safe and easy to use, but some are expensive. The blood pressure med used is Clonidine, usually 0.1 to 0.2 mg daily at bedtime. The anti-epileptic drug gabapentin (Neurontin) is administered as 300 mg three times a day. Effexor and Paxil have shown a reduction in sweats and flushes in studies at 37.5 to 75 mg and 10 to 20 mg daily, respectively. However, SSRIs and SNRIs have been occasionally shown to cause vasomotor symptoms in men and women. Bellergal Spacetabs, an ergot and belladonna combination, were used for many years for vasomotor symptoms but are no longer made by its pharmaceutical company. Some compounding pharmacies supply it. There are no studies on it, but empirical reports have shown mixed results. It is used one to two times daily.

Sexual problems are commonly reported by women in midlife, and the treatment is very complex. Libido can be decreased because of estrogen deficiency, sudden surgical loss of testosterone from an oophorectomy (not from natural ovarian aging), or the administration of an oral estrogen, which can lower serum testosterone. Libido can decrease because of pain with intercourse, decreased skin sensation from loss of estrogen, chronic medical problems, medications, or most often from the woman's psychosocial environment. Sexual performance problems can have similar roots but are often the result of other diseases (hypertension, diabetes, atherosclerosis) that affect clitoral and pelvic blood flow or from medications used to treat other diseases (notably antidepressants). A few studies have been done on the use of testosterone to improve sexual function and have shown conflicting results. The work done by Dr. David Archer using testosterone patches (pending FDA approval) shows improvement in women who had bilateral oophorectomy but not those who have undergone natural menopause. Testosterone is not well absorbed orally, and it has potential health risks such as permanent voice change, hair growth on the face or body, loss of head hair, lipid elevations, acne/oily skin, and emotional side effects. More research is needed on the role of hormones in sexual dysfunction in women.

In summary, the conventional practitioner's use of hormone therapy and the standard of practice these days is limited to three areas of use: meno-

pausal symptoms, osteoporosis prevention or treatment, and vaginal or urogenital atrophic symptoms. The formulations of type, dose, and delivery have significantly increased, and it is important to work with a provider who is capable and knowledgeable about the various products. Most women will do well on most hormone products, but for those women whose symptoms do not respond easily to these products, a knowledgeable menopause clinician can provide better guidance. It is important for a woman with a uterus to use a progestogen along with estrogen replacement. Women who have had a hysterectomy do not typically need progestogens. Hormone therapy is used for nonapproved, nonstandard reasons, and the patient needs to be counseled about risks and needs to define her goals. This is an acceptable practice as long as proper counseling is provided.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

Most women who are perimenopausal can feel comfortable starting on their own with the diet, exercise, herbs, nutritional supplements, and natural progesterone creams described in this chapter for the relief of menopause symptoms. Women who do not find adequate relief from these therapies will need to see a licensed primary care provider (naturopathic doctor, medical doctor, osteopathic doctor, nurse-practitioner, or physician's assistant) who preferably is educated in the range of options, not just conventional HRT.

My advice to all women is to at some time have a full evaluation by a practitioner who is educated in all the natural, hormonal, and pharmaceutical nonhormonal options. The only primary care practitioners that are trained in the medical school setting about all of these options are licensed naturopathic physicians. The purpose of this evaluation, as discussed in the overview section and the overview of alternative medicine, is to conduct a medical history, physical exam, and necessary laboratory and imaging studies to determine the risk for osteoporosis and heart disease. After a determination of whether you are at low risk, medium risk, or high risk for these conditions, a treatment plan will be recommended.

Using natural therapies versus using conventional or bio-identical HRT or some combination of the these is a very personal decision. A well-informed patient who also has the good fortune of having a well-informed, respectful, open-minded practitioner is in the best position to make appropriate decisions. Remember that any decision you make is reversible. Decisions can and do change over time. Menopause, aging, and our concerns about long-term health problems evolve over time, and balance is necessary. Naïveté is inappropriate, and over-medicalization of menopause is also inappropriate. Menopause is a normal and natural event of aging. It can be a time of strength, empowerment, personal growth, and positive, life-changing insights and decisions.

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MENSTRUAL CRAMPS

CHAPTER 13

OVERVIEW

Menstrual cramps are one of the most common problems that women face, affecting over 50 percent of menstruating women. The term *dysmenorrhea*, derived from the Greek and meaning "difficult monthly flow," is commonly used to refer to painful menstruation. Dysmenorrhea is best classified as primary or secondary. In primary dysmenorrhea, painful menstrual cramps occur that have nothing to do with any physical abnormalities or identifiable pelvic disease. Secondary dysmenorrhea is painful menstrual cramps due to some specific pelvic or systemic condition such as endometriosis, pelvic inflammatory disease, adhesions, ovarian cysts, celiac disease, thyroid conditions, congenital malformations, narrowing of the cervical opening, polyps, or uterine fibroids. We will be focusing on primary dysmenorrhea in this chapter, although the treatments in this chapter for acute pain relief can be used in both primary and secondary dysmenorrhea.

Treatment for secondary dysmenorrhea is directed to treating the underlying cause of the condition, whether it is endometriosis, fibroids, or another condition. Menstrual cramps are a significant personal and public health problem for women. Of the 50 percent of menstruating women who are affected by menstrual cramps, about 10 percent have severe pain that renders them incapacitated for one to three days each month.[1] It is estimated that 600 million work hours are lost in a year in the United States because of untreated and incapacitating dysmenorrhea. Social and family life is also disrupted by the painful episodes.

Primary dysmenorrhea occurs most commonly between the ages of 20 and 24. Women in this age group experience the most severe pain. Women older than 24 have less painful cramping, and the overall incidence of primary dysmenorrhea tends to decrease with age—more rapidly in married women than in unmarried ones, possibly due to pregnancy and childbearing. Women who begin to menstruate at a younger age and have longer menstrual periods have increased severity of pain and more days of pain. In smokers, cramps tend to last longer. In fact, a recent study showed that there is a definite relationship between the amount of cigarette smoke exposure and menstrual cramps.[2] Being overweight is also an important risk factor for menstrual cramps, and it doubles the odds of having a long painful episode.[3] Conversely, being underweight has also been shown to be an independent risk factor for dysmenorrhea.[4]

Primary dysmenorrhea usually appears within 6 to 12 months after the first menstrual period. The pain usually begins several hours before or just after the onset of menstruation and is often the most severe the first or second day of menstruation. It tends to be spasmodic and is strongest in the lower part of the abdomen above the pubic hairline, although it can often radiate to the back and along the inner aspects of the thighs. More than 50 percent of women with menstrual cramps also have additional symptoms including nausea and vomiting, fatigue, diarrhea, lower backache, and headache. Women with severe cases may also become dizzy and even faint. The symptoms may last from a few hours to one day but seldom last longer than two to three days. Some women have more congestive symptoms that are characterized by a dull aching in the low back and pelvis, bloating, and weight gain, along with some systemic symptoms

Clinical Features of Dysmenorrhea

- The initial onset is at or shortly after the first menstrual period (menarche). If dysmenorrhea starts two years or more after menarche, then other causes and secondary dysmenorrhea should be considered. Endometriosis is difficult to distinguish from primary dysmenorrhea because they produce similar symptoms. One distinction is that endometriosis tends to get worse with time.
- Duration of the pain is usually 48 to 72 hours, starting a few hours before or just after the onset of the flow. Pain that starts several days before the menses is less likely to be primary dysmenorrhea.
- The pain is cramping, or labor-like, although some women have more congestion and bloating.
- Findings on pelvic exam are normal.

including breast tenderness, headaches, and irritability.

Primary dysmenorrhea is diagnosed when other causes of pelvic pain have been excluded. Certain characteristic clinical features distinguish the diagnosis.

The cause of primary dysmenorrhea may be one of several factors, including behavioral and psychological factors; lack of blood flow, and therefore oxygen, to the uterus (ischemia); and increased production and release of uterine prostaglandins. Increased prostaglandins, specifically PgF2-alpha and PgE2, cause uterine contractions that lead to ischemia and pain. The levels of both PgF2-alpha and PgE2 are low during the first half of the menstrual cycle and the early part of the second half, then rise sharply and reach their highest levels shortly before and during the onset of menses. Studies have found that women with dysmenorrhea produce 8 to 13 times more PgF than do women without dysmenorrhea.[1] This increase in prostaglandin production may be related to the decline in progesterone levels toward the end of the cycle just before the onset of menses. Dysmenorrhea occurs only in cycles where ovulation has occurred. In cycles without ovulation, there is no increase in progesterone production in the second half of the cycle and then decline right before the onset of menses, as in a normal cycle, and there is subsequently no increase in the prostaglandin concentration in the lining of the uterus. These mechanisms form the basis for many of the therapies used, both natural and conventional.

OVERVIEW OF ALTERNATIVE TREATMENTS

An alternative approach to menstrual cramps due to primary dysmenorrhea needs to provide effective pain relief while at the same time correcting the underlying dysfunction that is creating the pain. Because it is a functional problem and not a disease state that is causing the pain, we can truly focus on a holistic approach by looking for aggravating factors in the diet, lifestyle, environment, and emotional realm. Dietary principles emphasizing good nutritional habits—eliminating junk foods, saturated fats, and trans fats; increasing omega-3 oils from fish, hemp oil, and flax oil; and increasing whole grains, fruits, and vegetables—provide a range of nutrients needed to prevent and treat menstrual cramps. Stress reduction can help relieve tension in the lower back and pelvic area that can worsen cramps. Improvements in posture improve the positioning of the spine and promote proper circulation and nerve stimulation to the pelvic organs.

Providing acute pain relief is one of the greatest challenges for natural medicine, whether it is pelvic pain, headaches, or musculoskeletal pain. Mild and moderate levels of pelvic pain are more treatable with natural therapies than is severe pain, although some women with severe pain will experience relief from the therapies that follow. Even when acute pain relief is not accomplished with alternative therapies, a treatment plan for the interim days of the month is important in order to reduce the severity of the recurring

KEY CONCEPTS

- Primary dysmenorrhea should be distinguished from secondary dysmenorrhea.
- Typical menstrual cramps are due to primary dysmenorrhea.
- Causes of secondary dysmenorrhea include endometriosis, pelvic inflammatory disease, adhesions, ovarian cysts, celiac disease, thyroid conditions, congenital malformations, narrowing of the cervical opening, polyps, and uterine fibroids.
- Seek adequate pain relief in addition to trying to correct the underlying mechanism that is causing the problem.
- About half of all women experience menstrual cramps.

PREVENTION

- Good posture and spinal alignment may decrease the tendency toward menstrual cramps.
- Stress reduction may help to relax the pelvic and low back muscles.
- Some women may find that their menstrual cramping is worsened when they use tampons; these women should switch to sanitary napkins.
- A copper IUD (Paraguard) for contraception may worsen spasmodic menstrual cramping. A progestin-containing IUD (Mirena) and hormonal contraception can improve chronic dysmenorrhea. Barrier methods of contraception have no bearing on dysmenorrhea.
- Maintain a healthy weight.
- Avoid smoking.
- Food allergies may contribute to water retention, gas, and bloating, which may contribute to congestive menstrual pain.
- An increase in exercise may improve blood flow to the uterus and create an optimal pelvic musculature that will tend to reduce the incidence of menstrual discomfort.
- Maintain optimal digestive function. Irregular bowel habits may be correlated to primary dysmenorrhea.
- Reduce foods that may contribute to an excess of the prostaglandins that cause uterine contractions: dairy products, beef, pork, lamb, poultry, eggs, deep-fried foods, and trans fats found in potato chips, french fries, and partially hydrogenated packaged foods.

menstrual cramp episodes over time. Having a natural therapeutic treatment plan for the chronic problem and using over-the-counter or prescription conventional medicines for acute pain relief can turn out to be the most effective plan. Over time, hopefully, the need for pain medications will decrease.

Many alternative practitioners have experience with natural therapies not included in this book such as acupuncture, homeopathy, and hands-on techniques that may offer effective help for many women with menstrual cramps. I often encourage women to try an herbal or nutritional product for a couple of hours during acute pain. If no relief is accomplished within that amount of time, then switch to a pharmaceutical method of pain control. As each successive month of treating the chronic problem goes by, a measure of the success of that treatment will be a decreased need to use the pain relief medication.

It is important not to overlook the role of stressors in our personal lives that can be at least part of the cause of our pain and can also affect our ability to deal with pain. A recent study of over 380 otherwise healthy women demonstrated that women who experienced high stress were twice as likely to experience dysmenorrhea in the following cycle, especially among those women with a prior history of painful menses.[5] Psychotherapy can help a woman gain insight into these influences and learn how to reduce and manage stressors. Research has shown that behavior therapy has been highly effective in reducing the symptoms of spasmodic dysmenorrhea.[6]

Biofeedback treatment with a relaxation practice has also proven to be significant in reducing dysmenorrhea.[7] After two months of biofeedback treatments, sufferers of menstrual cramps had dramatic declines in the severity and duration of

their symptoms as well as a decline in the amount of medication they were taking. Meditation, visualization, and relaxation techniques are used by many women both as a primary form of pain management and also in combination with other therapies. My advice would be to seek the advice of a trained person to help you learn which method may be most appropriate and effective for you.

Nutrition

A healthy diet is fundamental to an effective menstrual cramps treatment program. In fact, something as simple as eating breakfast regularly was found to be inversely related to the incidence and severity of dysmenorrhea.[8] Many women experience relief from cramps just by switching to good nutritional habits. There are two basic aspects to making changes in the diet. One is to decrease the intake of foods that may be contributing to the condition, and the other is to increase the intake of foods that provide a wide range of important nutrients necessary to bring about a functional change in the pelvic area. One study supports this theory by demonstrating that dietary intake of fish, eggs, and fruit was associated with less dysmenorrhea while wine intake was associated with more dysmenorrhea.[9] In addition, another study advocates a vegetarian diet as a way to increase sex-hormone-binding globulin and decrease body weight and the severity and duration of menstrual cramps.[10]

The most important foods to avoid are those that are high in arachidonic acid. This is the polyunsaturated fatty acid that the body uses to produce the series-2 prostaglandins (PgE2)—the ones that cause muscle and uterine contractions. Egg yolks, red meat, and poultry are the main sources of arachidonic acid.

In addition, many people are allergic to dairy products or lack the enzymes to digest them. Digestive problems such as bloating and gas can intensify with menstrual cramps, adding to the overall discomfort. Reducing or even eliminating the intake of milk, cheese, cottage cheese, butter, ice cream, and yogurt may be enough to have a significant impact for as many as one-third of women with menstrual cramps.

Saturated fats from nondairy sources can also intensify menstrual cramps by stimulating the PgE2 series. Most of our saturated fats come from animal products, although a few are from vegetable sources such as palm oil or coconut oil. Animal foods to reduce or avoid that contain saturated fat include beef, pork, lamb, and even chicken and turkey. Even though chicken and turkey are lower in saturated fat, they are actually higher in arachidonic acid than red meats.

Salt can be another aggravating factor for women with menstrual cramps. Too much dietary salt can increase fluid retention and worsen bloating that contributes to the congestive symptoms of menstrual cramps. Canned and frozen foods, fast foods, and processed/packaged foods are all suspect for high amounts of salt. Read the labels carefully. You may be surprised to find that some of the things you thought were healthy, such as certain salad dressings, are actually loaded with salt. Even a bean burrito at a fast-food restaurant will be high in salt. Look for "no salt" labels on your packaged foods, and go light on the saltshaker in the kitchen and at the table.

Although sugar in the diet may not be directly related to menstrual cramps, sugar does interfere with the absorption and metabolism of some B vitamins and minerals. Deficiencies or less than optimal amounts of some of these nutrients may worsen muscle tension and increase the contractile nature of the uterus. High-sugar foods are often the same foods that are high in saturated fats.

Women with monthly menstrual cramps run the risk of overusing alcohol because of its sedative and pain-relieving effects. This overuse may lead to other problems, including alcoholism and substance abuse. Nonaddictive pain relief medications would be far preferable. Alcohol also depletes the nutrient status of many B vitamins and minerals such as magnesium. These deficien-

cies and nutritional imbalances can lead to difficulty in regulating muscle function and worsen muscle spasms during menstruation. Alcohol may also interfere with the liver's ability to metabolize hormones effectively and efficiently. This may lead to heavier flows. A heavier amount of blood creates more clots, and the passage of clots will trigger an increase in the uterine muscle spasms.

The best medicinal foods for menstrual cramps are those foods that increase the antispasmodic prostaglandins, the PgE1 and PgE3 series. Certain fish, including salmon, tuna, halibut, and sardines, contain omega-3 oils, specifically eicosapentaenoic acid (EPA), a fatty acid that helps to relax muscles by the production of PgE3.[11] Many seeds and nuts are sources of linoleic acid and linolenic acid, also precursors to these muscle-relaxing prostaglandins. The best sources of both of these fatty acids are flaxseed, hemp seeds, and pumpkin seeds. Sesame seeds and sunflower seeds are excellent sources of linoleic acid. The oils from the seeds of flax, hemp, pumpkin, sesame, and sunflower are the best oils to use in salad dressings. Flax, hemp, and pumpkin oils should not be heated, but sesame and sunflower are acceptable cooking oils. In many cases the seeds, nuts, and fruits from which these oils are extracted are healthy choices as well.

To round out the healthy changes in the diet, emphasize whole grains, legumes, vegetables, and fruits. Whole grains such as brown rice, oats, millet, barley, rye, amaranth, and buckwheat provide sources of magnesium, calcium, potassium, fiber, vitamin E, B-complex vitamins, and protein. Specifically, intake of dietary fiber has been shown to be inversely proportional to menstrual pain.[12] Both calcium and magnesium reduce muscular tension, fiber helps to regulate the bowel function, and potassium has a diuretic effect that can aid in reducing bloating. Beans are also good sources of calcium, magnesium, potassium, and protein. Many vegetables are high in the calcium, magnesium, and potassium that help to relieve and prevent muscle spasms. Fruits are an excellent form of natural anti-inflammatory substances like bioflavonoids and vitamin C. These nutrients not only strengthen the blood vessels that can aid circulation to areas of muscle tension in the pelvis but also reduce the pain from menstrual cramps through their anti-inflammatory effect.

Nutritional Supplements

Vitamin B_1 (Thiamine). A large, well-designed study found that 100 mg of thiamine daily helped to alleviate dysmenorrhea completely in 87 percent of study subjects, while only 5 percent had no relief.[13]

Vitamin B_1

100 mg daily

Vitamin B_3 (Niacin). Niacin or vitamin B_3 has been shown in clinical research to be effective in 87.5 percent of women with menstrual cramps.[14] Niacin was given in 100 mg doses twice daily throughout the month, and then every two to three hours during the periods of menstrual cramps. Although a sometimes uncomfortable niacin flush could easily occur at the escalated dosing, none of the women in the study stopped the medication due to the flushing. Interestingly, the women who received no relief of their menstrual cramps were frequently the women who reported no flushing. The vasodilating effect of niacin (which causes flushing) may indeed be the main treatment effect. Vasospasm of the uterine arteries may be responsible for the menstrual pain.

Vitamin B_3 (Niacin)

100 mg twice daily throughout the month
100 mg every 2–3 hours during episodes of menstrual cramps

Vitamin C and Rutin. In a follow-up study, the author of the niacin study also found that rutin with ascorbic acid increased the effectiveness of niacin in the treatment of menstrual

cramps.[15] In twice as many women as the niacin-only study, the same dose of niacin (100 mg twice daily regularly and every two or three hours during menstrual cramps) was given while also adding 300 mg of vitamin C and 60 mg of rutin daily. These additions slightly improved the response in up to 90 percent of the women. This increased effectiveness was thought to be due to improving the permeability of the capillaries, thus potentiating the vasodilating effect of the niacin. In most cases, niacin was not effective unless it had been taken 7 to 10 days before the onset of the menstrual flow.

Vitamin C

300–3,000 mg per day

Rutin

60–1,000 mg per day

Vitamin E. Vitamin E was studied back in the 1950s for the treatment of spasmodic dysmenorrhea. It was used in doses of 150 IU ten days premenstrual and during the first four days of the menstrual period. In approximately 70 percent of the women tested, it helped to relieve menstrual discomfort within two menstrual cycles.[16] A more recent, large, well-designed study evaluated vitamin E at a dose of 200 IU two times per day beginning two days before the start of menses and continuing through the third day of the cycle and found a significant decrease in dysmenorrhea and overall blood loss after two months.[17] I generally recommend higher amounts of vitamin E because there are so many other benefits for women, including relieving cyclic breast pain, raising beneficial HDL cholesterol, and providing antioxidant protection.

Vitamin E

150–800 IU per day

Calcium. Calcium supplementation for menstrual cramps has been used by women as a self-care treatment for many years. Muscles need calcium to maintain their normal muscle tone; if they are deficient in calcium, they can more easily cramp. This is true of the uterine muscle as well. Low calcium intake is associated with menstrual water retention and greater pain during the menses.[18] The typical American diet supplies about 450 to 550 mg of calcium per day, falling short of the recommended daily allowance of 1,000 mg per day in menstruating women.

Calcium

Supplement the diet so that total calcium is 1,000 mg per day

Omega-3 Fatty Acids. Essential fatty acids are the raw materials from which prostaglandins, beneficial hormone-like substances, are made. There are two essential fatty acids: linoleic acid (omega-6 family) and linolenic acid (omega-3 family). Linoleic and linolenic acids cannot be made by the body and must be supplied daily in the diet from either food or supplements. The typical American diet is often much higher in omega-6 oils than it is in omega-3 oils. As a result, many of us end up with the PgE2 prostaglandins that cause muscle contractions and pain.

Another problem is that our bodies need a certain amount of linoleic acid to convert to gamma linolenic acid (GLA), which leads to the production of the PgE1 prostaglandins (the antispasmodic and anti-inflammatory prostaglandins). The conversion of linoleic acid to GLA and the beneficial prostaglandins requires the presence of magnesium, vitamin B_6, zinc, vitamin C, and niacin. Women who are deficient in these nutrients won't be able to make this conversion adequately. Supplementation with flax oil (high in omega-3 fatty acids), hemp oil, borage oil, black current oil, and evening primrose oil (all high in linoleic acid and GLA) is one way of favorably altering the synthesis of the beneficial prostaglandins; the end result likely will be fewer uterine contractions and less menstrual pain.

As mentioned earlier, after the rise of progesterone in the second half of the menstrual cycle followed by its decline right before menstruation, omega-6 fatty acids, particularly arachidonic acid, are released. Subsequently, an increase in PgF2-alpha and PgE2 occurs, causing uterine contractions leading to ischemia and pain. Instead of inhibiting ovulation and therefore the progesterone effect, or inhibiting the synthesis of prostaglandins with nonsteroidal anti-inflammatory agents, the omega-3 fatty acids, eicosapentaenoic acid (EPA), and docahexaenoic acid (DHA) compete with omega-6 fatty acids and result in the production of the friendlier antispasmodic and anti-inflammatory prostaglandins, series 1 and 3.

Based on these observations and mechanisms, using fish oil containing omega-3 fatty acids as a supplement seems beneficial. Dietary supplementation with fish oils was tested in 42 adolescent girls with dysmenorrhea.[11] The first group of 21 girls received fish oil (1,080 mg EPA and 720 mg DHA) and 1.5 mg vitamin E daily for two months, followed by a placebo for an additional two months. In the second group, 21 girls received a placebo for the first two months, followed by fish oil for two more months. At the conclusion of the study, on a 7-point scale, a score of 4 being moderately effective and a 7 meaning totally effective, 73 percent of the girls rated the supplementation greater than or equal to 4. Another, more recent study looked at supplementation with krill oil in decreasing menstrual symptoms, including cramps compared to standard fish oil, and found the krill oil to be superior in decreasing the severity of dysmenorrhea as evidenced by a decreased use of analgesics.[19]

Fish Oils

1,080 mg EPA and 720 mg DHA per day

Evening Primrose Oil (EPO)

500–1,000 mg up to 3 times per day

Melatonin. I have no personal experience prescribing melatonin for menstrual cramps, but I think it has potential based on some of its known biochemical effects. It has been proposed that insufficient melatonin secretion during the second half of the menstrual cycle (the luteal phase) is a factor in primary dysmenorrhea.[20] This hypothesis is based on several factors: (1) melatonin levels are low at ovulation and increase premenstrually three- to sixfold and reach their peak at menstruation;[21] (2) melatonin decreases uterine contractility;[22] (3) melatonin exerts analgesic effects;[23] (4) melatonin stimulates progesterone secretion;[24] and (5) melatonin inhibits uterine prostaglandin synthesis and release.[25]

Since melatonin has been shown to have all these effects, supplementation in order to achieve high concentrations during menstruation may serve to oppose the effects of prostaglandins and therefore prevent the occurrence of dysmenorrhea.

Melatonin

2.5 mg per day, taken 3–4 days prior to onset of menses

Botanicals

Rose. A recent study suggests that rose tea consumption helped to decrease both pain and psychological distress of women during menses.[26] In addition, another study showed that abdominal massage of rose, lavender, or clary sage essential oil in a base of almond oil was more effective than almond oil alone in decreasing the severity of dysmenorrhea.[27]

Valerian (*Valeriana Officinalis*). Valerian traditionally has been used primarily as a sedative and antispasmodic for the treatment of anxiety disorders, sleep disorders, and a diverse array of conditions associated with pain. Valerian contains an important class of compounds called valepotriates and valeric acid, which are found exclusively in this perennial plant native to North America and Europe. It is not difficult to see how

valerian would help to relieve pain, anxiety, and insomnia because both valepotriates and valeric acid are capable of binding to the same receptors in the brain as the pharmaceutical drug Valium.[28]

Although valerian has not been scientifically studied for menstrual cramps, it has been shown to relax the spasmodic contractions of intestinal muscles.[29] Both the uterus and intestines contain smooth muscles. In clinical practice, valerian is usually a significant feature of an alternative medicine approach to painful menstruation. It is most practical to take valerian in tincture form or capsules. Many people prefer valerian capsules because the tincture has a very bitter taste. Attempts to disguise the taste can be made by placing the tincture in a small amount of fruit juice and then following that with several swallows of plain juice. Valerian may make you tired and sleepy, so it is advisable to stay home and rest or take a nap.

Valerian

1 tsp tincture or 1–2 capsules every 3–4 hours or as needed for pain

Crampbark (*Viburnum Opulus*) and Black Haw (*Viburnum Prunifolium*). Both of these species of viburnum are mentioned repeatedly in the traditional botanical reference books as uterine relaxants and general antispasmodics.[30] They have been used mainly for menstrual cramps, bearing-down uterine pains, and chronic uterine and ovarian pains. Animal studies have confirmed that both species have an antispasmodic effect on the uterus.[31] Laboratory studies on human uterine tissue also have confirmed that *Viburnum prunifolium* exhibits a relaxant effect on the uterine tissue.[32]

When the menstrual pains are of either a congestive or spasmodic nature and include low back pains, especially if the pains radiate down the thighs, there is no better herbal choice than crampbark.

The root bark of black haw is reported to contain several active constituents that are uterine relaxants, one of which is scopoletin, which has been historically used as a specific medicine for menstrual cramps with severe low back and bearing-down pelvic pains. For menstrual pains associated with a profuse menstrual flow and intermittent severe pains, black haw would probably be a more specific choice than crampbark. American Indians used the root and/or stem for the treatment of painful menses, to prevent miscarriage, and as a postpartum antispasmodic.

Crampbark

½ tsp tincture or 1 capsule every 2–3 hours

Black Haw

¼ tsp tincture or 1 capsule every 2–4 hours

Caution: Both viburnum species should be avoided during pregnancy except in the hands of an experienced herbal practitioner.

Ginger (*Zingiber Officinale*). Ginger is typically known for its stimulatory effects on digestion and easing the nausea of an upset stomach. The pungent constituents in ginger, shagaol and gingerol, also have an inhibitory effect on inflammatory and spasmodic prostaglandins. Although ginger has not been studied specifically in relation to menstrual cramps, it does have antispasmodic effects on the smooth muscle of the intestines. Given that the uterus is also made up of smooth muscle, and ginger has a long history of traditional use for treating spasmodic dysmenorrhea, I use it in clinical practice with great confidence in combination with other herbs.

Ginger

1–2 g of dried ginger powder 1–2 times daily

Black Cohosh (*Cimicifuga Racemosa*). Black cohosh has gained increased attention in the last few years largely as an herb for the relief of menopause symptoms. However, when I was first studying botanical medicine, this herb was known more for its relaxant effect on the uterus

in dysmenorrhea, false labor pains, and threatened miscarriage. It can be helpful in both congestive and spasmodic menstrual cramps of even a severe nature. If the menses is also associated with PMS irritability and anxiety, delayed or irregular menstrual cycles, or scanty flow, then black cohosh would be an even more indicated herbal choice for menstrual cramps.

Black Cohosh

¼–½ tsp tincture or 1–2 capsules every 2–4 hours

Other Traditional Herbs to Consider. Herbs such as false unicorn root (*Chamaelirium luteum*), wild yam (*Dioscorea villosa*), passionflower (*Passiflora incarnata*), German chamomile (*Matricaria chamomilla*), blue cohosh (*Caulophyllum thalictroides*), and hops (*Humulus lupulus*) have an independent antispasmodic or sedative effect on the uterus in their own right. They are often used in combination with each other or in formulations with some of the more dominant choices such as crampbark, black haw, valerian, and black cohosh.

Additional herbs may also be considered for their different actions. For example, herbs that have an anti-inflammatory effect, such as white willow and ginger; diuretic herbs that decrease the pelvic congestion, such as parsley, dandelion leaf, or horsetail; and herbs that promote circulation, such as ginkgo, may also have a role in reducing the pain experienced from dysmenorrhea.

Natural Progesterone. As stated earlier, it is believed that the drop in progesterone premenstrually results in an increased production of arachidonic acid by the endometrium. This stimulates PgE2 release and uterine contractions. If we can temper or delay this drop in progesterone premenstrually, then, in effect, natural progesterone can be used to inhibit the uterine contractions, ischemia, and pain during menstruation.

Remember, though, that some decline in progesterone is necessary in order to trigger the onset of blood flow. Natural progesterone may allow a slower decline or a delayed decline. Thus, some women do indeed find that a natural progesterone cream, applied topically for 3 to 12 days prior to onset of menses, will reduce menstrual cramps.

Natural Progesterone Cream

Apply ¼ tsp of cream (>400 mg/oz) 2 times per day for 3–12 days before the expected onset of menses.

Exercise

The effects of both special exercises[33–35] and general regular physical exercise on primary dysmenorrhea have been studied. No discrepancies exist in the results from the first group of studies—special exercises are reported consistently to reduce or eliminate menstrual pain. For example, one researcher found symptom reduction in 89.3 percent of 129 dysmenorrheic women who adhered to his program of special exercises. Similarly, another researcher, investigating 141 dysmenorrheic girls 14 to 18 years of age from two different high schools, found that 92 percent of participants in one of the schools were "cured" or improved after being given a set of specific exercises to reduce menstrual pain.[36] (A girl was considered cured "if she was free of pain for at least three menstrual periods" following the performance of the prescribed exercises.) The experiment was conducted from mid-September 1956 to mid-June 1957. The results for the second school were 76 percent "cured."

The three studies on the effects of general regular physical exercise on dysmenorrhea offer conflicting results. One group of investigators[37] conducted a 12-week experiment that compared two groups of dysmenorrheic women who volunteered to either walk/jog or to act as sedentary controls. The experimental group reported significantly less severe menstrual symptoms than the controls. In contrast, another group of investigators reported a 30 percent increase in menstrual

Sample Treatment Plan for Dysmenorrhea

Dietary Recommendations

- Increase salmon, tuna, halibut, sardines, herring, fruits, vegetables, and whole grains.
- Decrease dairy, salt, sugar, red meat, poultry, and eggs.

For Acute Pain Management

- Calcium carbonate: 1,000–1,500 mg during pain
- Valerian: 1 tsp tincture or 1–2 capsules every 3–4 hours
- Crampbark and/or black haw: 2 capsules every 3–4 hours
- Relaxation techniques
- Consider combination products containing niacin, borage, vitamin E, calcium, crampbark, valerian, and black cohosh: 3 capsules every 3 hours during acute pain (see the Resources section for formulation sources)

Use Throughout the Month

- Niacin: 100 mg twice daily
- Fish oils: 1,080 mg EPA and 720 mg DHA daily
- Vitamin E: 200–400 IU daily
- Crampbark and/or black haw and/or black cohosh: 1–2 capsules daily
- Consider combination products containing niacin, borage, vitamin E, calcium, crampbark, valerian, and black cohosh: 2 capsules for daily pain (see the Resources section for formulation sources)

symptoms in regularly exercising over sedentary student nurses.[38] However, a more recent, controlled study again validated the hypothesis that regular exercise decreases menstrual symptoms in finding that "high exercisers experienced the greatest positive effect and sedentary women the least."[39]

CONVENTIONAL MEDICINE APPROACH

Two groups of drugs are highly effective against dysmenorrhea: oral contraceptives and prostaglandin synthetase inhibitors, also known as nonsteroidal anti-inflammatory drugs (NSAIDs). The choice of medication depends on whether a woman needs oral contraceptives for birth control, whether she has any allergies to aspirin or contraindications to oral contraceptives such as prior deep venous thrombosis, whether she has a history of gastric ulcers, and her age.

Women desiring birth control should probably use oral contraceptives as the first agent of choice. Combination oral contraceptives reduce prostaglandin levels and menstrual flow, and approximately 80 percent of patients achieve near-complete relief of dysmenorrhea. A newer regimen of oral contraceptive use may be even more effective. Reducing the pill-free interval to approximately four days reduces the volume of menstrual bleeding beyond the usual reduction seen in the seven-day pill-free interval and suppresses ovulation more effectively, further reducing the production of prostaglandins. Pain control with oral contraceptives is probably the result of reduced volume of menstrual fluid and suppression of ovulation, which reduces uterine prostaglandin levels.

You may need to try several oral contraceptives before you find one you are comfortable with. The majority of oral contraceptive side effects come from the progestin. Use the medications for several months before you decide whether they are effective, rather than giving up after the first cycle, and be willing to try different brands if necessary. Oral contraceptives, if successful, can be used throughout a woman's entire reproductive cycle and into her early 50s. If dysmenorrhea is reduced but not significantly eliminated, an NSAID can also be added.

For women who do not need contraception or do not tolerate or choose to take oral contra-

Exercise Recommendations for Menstrual Cramps

If not exercising regularly, incorporate exercise into your daily routine. (See Appendix A.)

Try the following special exercises for moderate to severe dysmenorrhea (adopted from Haman[33] and Golub[36]). For mild menstrual pain, do only one or two of the exercises. Do these exercises twice a day for 10 consecutive days before menses.

Exercise 1

- Stand at a right angle to the wall with left elbow on the wall on a level with the left shoulder.
- Tilt pelvis forward.
- Keeping knees slightly flexed, to avoid hyperextending them, move left hip until it touches wall.
- Return to original position.
- Repeat 5 times.
- Repeat sequence with right elbow on the wall.

Exercise 2

- Stand facing the wall with both elbows on wall on a level with shoulders.
- Without moving elbows or feet and keeping knees slightly flexed, to avoid hyperextending them, move pelvis away from wall and then toward it until pelvis touches the wall.
- Return to original position.
- Repeat 5 times.

Exercise 3

- Stand with feet 12 inches apart and arms raised to the side at shoulder level.
- Keeping knees slightly flexed, to avoid hyperextending them, twist trunk to the right and bend forward, attempting to touch the right ankle with the left hand.
- Return to original position.
- Repeat sequence in the opposite direction.
- Repeat 5 times.

Exercise 4

- Stand with feet a few inches apart and arms at the sides.
- Swing arms forward and upward, simultaneously raising the right leg backward.
- Return to the original position.
- Repeat with the left leg.
- Repeat 5 times.

ceptives, prostaglandin synthetase inhibitors can be used. These nonsteroidal anti-inflammatory drugs reduce menstrual fluid prostaglandins and their metabolites, resulting in decreased uterine contractility and menstrual pain. They also somewhat decrease the amount of menstrual flow. They are most effective if given before cramping begins and are usually only taken for two to three days per cycle.

There are several groups of prostaglandin synthetase inhibitors, including medications such as aspirin, ibuprofen, naproxen, and mefenamic acid. The aryl-propionic acid derivatives such as ibuprofen and naproxen are easily available over the counter and have been highly successful. Patients achieve a significant reduction in dysmenorrhea 60 to 90 percent of the time. Aspirin has not been shown to be any more effective than a placebo and is not generally used by women for menstrual cramps. However, aspirin in association with other proprietary agents in a combination medication such as Midol is reported by patients to be effective.

Another category of NSAIDs includes meclofenamate (Meclomen) and mefenamic acid (Ponstel). They have been available for more than 20 years and have been highly effective. They are used when cramps begin. COX-II inhibitors such as Celebrex have been very effective in the treatment of dysmenorrhea. However, some head-to-head trials with the other NSAIDs have not shown them to be more effective, and they are significantly more expensive and possibly have an increase in side effects. Side effects of all prostaglandin synthetase

inhibitors can include headaches, stomach or intestinal upset (specifically gastritis or ulcers), and a tendency to feel fatigued. Serious complications involve kidney damage and gastrointestinal bleeding. Recommended doses for acute menstrual pain are as follows:

Ibuprofen: 600 mg every 6 to 8 hours
Naproxen (Naprosyn): 500 mg every 12 hours
Naproxen sodium (Aleve): two 220-mg tablets every 6 hours
Naproxen sodium (Anaprox DS): 550 mg every 6 to 8 hours
Mefenamic acid (Ponstel): two 250-mg tablets at the onset of pain, followed by one tablet every 8 hours
Meclofenamate (Meclomen): 100 mg every 8 hours
Celebrex: 200 to 400 mg once daily

For those who do not respond to oral contraceptives or other medications, it is best to consider laparoscopy to rule out endometriosis or another pelvic disease. Usually, when the oral contraceptives or the NSAIDs work, the practitioner will consider that the patient has primary dysmenorrhea, which is not associated with another pelvic disease. If the patient has a negative laparoscopy and oral contraceptives or NSAIDs do not help the dysmenorrhea, she may be carefully watched and administered intermittent narcotic medications under the ongoing supervision of a physician. Narcotic medications should be avoided when possible because of the potential for tolerance and abuse. They should be used only when other options and diseases have been excluded.

The levonorgestrel intrauterine system in the Mirena IUD substantially reduces menstrual flow approximately 80 percent as a bonus to the excellent contraception it provides. It has also been found to significantly reduce menstrual cramps and might be a good option for women seeking both contraception and treatment of menstrual cramps.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

We need to remember that primary dysmenorrhea is pain during menses that exists without any identifiable pelvic disease. You must be certain that your menstrual pain is indeed primary dysmenorrhea and not pain due to pelvic disease such as endometriosis, adenomyosis, uterine fibroids, pelvic infection, or an ovarian tumor. These conditions need to be diagnosed by a licensed health-care practitioner capable of ordering the tests necessary to exclude these pelvic diseases if you are not responding to simple treatments.

If your pain is being well managed by conventional treatments, but you are experiencing some unwanted side effects, an alternative practitioner can work collaboratively to reduce these side effects. Alternative practitioners may also be consulted for their expertise in using effective alternative therapies and higher doses of natural anti-inflammatories, herbs that may not be easily accessible for self-treatment, or for a comprehensive treatment plant looking at the relationship of the menstrual cramps to the whole system and whole person.

OSTEOPOROSIS

CHAPTER 14

OVERVIEW

As the U.S. population ages, certain diseases and medical conditions more common among aging Americans are gaining greater public attention. Osteoporosis, a serious and disabling disease and the most prevalent metabolic bone disease in Western societies, is one such condition. Fortunately, osteoporosis can and should be prevented and, when present, treated. Osteoporosis affects 75 million people in Europe, the United States, and Japan. In the United States alone, it affects 25 million people and causes 1.5 million fractures annually.[1]

In the United States the rates of osteoporosis and fractures vary with ethnicity, with African-Americans having the highest bone mineral density (BMD) and Asian-Americans having the lowest. After adjusting for body weight, one large study of postmenopausal women revealed that white American women and Hispanic American women had the highest risk of osteoporotic fracture. This was followed by Native Americans, African-Americans, and Asian-Americans.[2] So while Asian-Americans have the lowest BMD, they also have a lower fracture rate, which we think may be related to body size.

Most cases of osteoporosis occur in postmenopausal women, and the rates increase with declining BMD and with age. Of white American women, 13 to 18 percent who are 50 years or older have osteoporosis of the hip.[3] An additional 37 to 50 percent have low bone mass (osteopenia) of the hip, again increasing with age and worse in women age 80 and older.

Osteoporosis is defined as a skeletal disease characterized by low bone mass and a deterioration in bone microarchitecture leading to bone fragility and susceptibility to fracture[4] and is responsible for about 90 percent of all hip and spine fractures in white American women aged 65 to 84.[5] The World Health Organization (WHO) has defined osteoporosis as a bone mineral density that is 2.5 standard deviations (SD) below the mean peak value in young adults.[6] This is called the T-score. A T-score that is between 1 and 2.5 SD below the mean is called osteopenia.

These definitions are useful because they provide objective criteria, but they have limitations because they ignore the importance of other determinants of bone strength. The definitions also ignore other risk factors for fractures in elderly women such as a maternal history of hip fracture, age, and poor balance. For example, most postmenopausal women with fractures do not have a bone density score that meets the WHO osteoporosis criteria.[7] The World Health Organization, the National Osteoporosis Foundation, and other expert panels are in the process of releasing new guidelines to estimate a woman's risk of an osteoporotic fracture, using a bone density test along with these other risks. These new guidelines will provide better direction for treatment interventions.

Although low bone mass, as measured by bone density, is important in determining a person's risk of fracture, other risk factors are equally important. These include maternal history of a hip fracture, previous vertebral fracture, previous hip fracture, high fall risk, and others.[8] Assessing a person's likelihood of a fall (use of sedative medications, inability to stand unaided from a sitting position, poor vision, muscle weakness) is very important as well. Low bone mass may be due to osteoporosis and/or poor bone quality. Vitamin D deficiency and other causes of hyperparathyroidism can lead to poor

bone quality as well. Clinically, the term *osteoporosis* is used in reference to loss of bone associated with relatively atraumatic fractures of the ribs, spine, wrist, and hips.

Fractures associated with osteoporosis are distinguished by three characteristics:[9]

- Greatly increased incidence with aging, with fractures occurring 2 to 100 times more among adults over age 75 than among younger people
- Greater incidence among women than men
- Associated with modest trauma

The three most common fracture sites are the spine, hip, and forearm. For a 50-year-old American woman, the risk of having an osteoporotic fracture in her remaining years is estimated to be 40 percent,[10] and two-thirds of the fractures occur after age 75. Osteoporosis-related fractures will develop in half of all women and one-fifth of all men older than 65 years.[11] Hip fractures, with a median age of 82, are particularly life altering. Within the first year following a hip fracture, the mortality rate is increased by up to 20 percent, as many as 25 percent of the survivors will be confined to long-term care facilities one year after the fracture, and 50 percent will have at least some long-term loss of mobility.[12]

Vertebral fractures (fractures of spinal vertebrae) occur a little younger, on average in a woman's mid-70s. Multiple vertebral fractures, or one severe one, can cause severe pain, loss of height, and an exaggerated curvature of the mid-spine called thoracic kyphosis. These pains and deformities can restrict bending and reaching and can greatly increase the risk of additional vertebral fractures.[13, 14] Fractures of the thoracic spine can also restrict lung function, cause digestive problems, [15] lower self-esteem and body image, and result in depression.[16]

Vertebral fractures are twice as common as either hip fractures or distal radius (wrist) fractures. The incidence of wrist fractures starts to rise immediately after menopause, with an incidence of about 15 percent by age 80, but a peak incidence about 20 to 25 years sooner. Each year, 172,000 wrist fractures occur that are the result of moderate trauma and rapid postmenopausal bone loss. The female to male ratio is 5:1. Wrist fractures are rarely fatal and cause much less disability than do hip and spinal fractures.[17, 18]

How Osteoporosis Affects the Bone

There are two types of bone: trabecular and cortical. The skeleton is living tissue composed of about 75 percent cortical bone and 25 percent trabecular bone. The trabecular bone is the inside part of the bone where the bone marrow is. It is comprised of a network of structural tissue that prevents it from compressing with pressure (for example, from a fall). The cortical bone is the hard exterior of the bone that protects the bone from external trauma. Vertebrae are made up of 90 percent trabecular bone and only 10 percent cortical bone; the hip is 50:50, and the extremities are 90 percent cortical bone. Trabecular bone is concentrated in the vertebrae, pelvis, other flat bones, and at the ends of long bones like the upper and lower leg.

Trabecular bone is metabolically much more active and has a higher turnover rate than cortical bone. To provide support for the body, bone is continuously rebuilt to maintain an optimal structure. Any damage or fatigue effect is constantly repaired through a process of bone breakdown (resorption) and rebuilding (formation) called bone remodeling. Bone formation and resorption are interdependent processes; if one is altered, it directly affects the other. The cells that cause bone resorption are called osteoclasts and stimulate the production of acid and enzymes that dissolve bone mineral and proteins. Bone building cells, or osteoblasts, promote bone formation by creating a protein matrix, which consists primarily of collagen. This becomes calcified and results in mineralized bone.

Normal bone remodeling is a process that is balanced by bone resorption and bone formation.

In childhood, bone formation far exceeds bone remodeling, leading to longer, denser bones. During the adult years, bone resorption and bone formation are in balance, and total bone mass remains relatively stable. As we age, the osteoblasts and osteoclasts may no longer function in a balanced fashion. When there is an imbalance between bone resorption and bone formation, bone loss occurs, bone mass decreases, and fracture risk increases.

Bone loss can be osteoclast-mediated, as seen in osteoporosis, or osteoblast-mediated, as seen in bone cancers. In osteoporosis, osteoclast-mediated bone loss outpaces the ability of osteoblasts to fill in the empty spaces. Certain problems cause different types of bone loss. Trabecular bone loss occurs with low estrogen levels, steroid use, and immobilization. So, when women choose not to take estrogen after menopause, they are more likely to lose trabecular bone and therefore may be at higher risk for vertebral and hip fractures. Cortical bone loss occurs with calcium and vitamin D abnormalities such as vitamin D deficiency and leads to an increased risk of extremity fractures. An extreme form of this is rickets, which presents with bowing of the femurs that results from small microfractures of those bones. Because of the differences in cortical and trabecular bone, many practitioners prefer to measure both the hip and the spine when doing bone density testing.

The Role of Menopause in Osteoporosis

As we age, bone resorption increases. This increase is worsened by a decrease in bone formation in women after menopause. Within the first few years of menopause, there is rapid bone loss due to lower levels of ovarian estrogen production. With less estrogen in the body, bone resorption is no longer inhibited. This decline in estrogen is the most significant factor in the increased bone loss associated with menopause.[19]

In the spine, bone loss of 2 percent per year begins about two to three years before the last menstrual period, and this accelerated rate of loss ends three to four years after menopause. At the hip, bone loss has an age-related rate of decline of about 0.5 percent per year. Over these five to seven years, it totals approximately 10.5 percent loss for the spine and 5.3 percent for the hip.[20] A slow and small amount of bone loss occurs from then on. Women older than 70 face other challenges that may accelerate their bone loss again such as increasing age and secondary hyperparathyroidism due to a drop in calcium absorption.

In women who have premature menopause (at or before age 40), whether spontaneous or by medical causes such as having both ovaries removed, chemotherapy, or pelvic radiation, there is a greater risk of low BMD compared to other women their age who are not menopausal.[21] By the age of 70, when risk of fracture is greater in general, this issue of early premature menopause becomes moot because no matter how menopause was attained, women will have the same risk of low BMD or fractures.

The Role of Heredity, Nutrition, and Lifestyle in Osteoporosis

Genetic predisposition contributes significantly to bone mass and to the development of osteoporosis later in life. Heredity has the greatest influence on a woman's peak bone mass, and studies have suggested that 80 percent of the determinant of peak bone density is due to genetic factors.[22, 23] Female children of women who experienced an osteoporotic fracture were found to have 3 to 7 percent lower bone mass than would be expected for their age.[24, 25] Additional studies have shown that relatives of women with osteoporosis tend to have lower bone mass.[26] The racial differences observed in bone mass also suggest the role of a genetic factor.

Dietary factors and nutrient deficiencies alter bone growth and remodeling and may result in lower bone mass. Girls or women with a dietary abnormality such as anorexia nervosa have signifi-

cantly lower bone mass than their healthy counterparts.[27] A balanced diet of plenty of vegetables, especially dark green leafy vegetables, nuts, seeds, whole grains, low-fat dairy, fish, and small amounts of animal meats play an important role in the development and maintenance of healthy bone. Adequate calcium and vitamin D intake is needed to achieve the genetically determined peak bone mass, to maintain bone mass once this peak has been achieved, and to maintain the strength and integrity of the skeleton throughout our lives.[28]

The intake of calcium is most important during the bone-building years of childhood through adolescence and in old age. During puberty, calcium is required for bone growth and for the achievement of maximal calcification. Postmenopausal women and men over 65 require a greater intake of calcium because absorption of calcium is less efficient, but the dietary intake of calcium is usually lower because of intolerance to dairy products or elimination of dairy products as part of a low-fat diet.

Lifestyle factors, such as the level of physical activity, cigarette smoking, alcohol consumption, and additional nutritional influences can profoundly impact bones. We will expand on these in the overview of alternative treatments.

Assessing Osteoporosis Risk and Diagnosing Osteoporosis

The evaluation of risk and diagnosis of osteoporosis is made by a careful medical history, a thorough physical examination, laboratory analysis, and measuring bone density.

No one test or risk factor, alone or in combination, will accurately predict which patients will or will not experience osteoporotic fractures. In general, the more risk factors present, the greater the potential for lower bone mass and the higher the risk of fracture. However, predictions from risk factors cannot pinpoint all persons who will be affected. Risk factors for osteoporosis account for only 20 to 40 percent of bone mass variance.[29] Therefore, risk factors alone do not provide adequate assessment of low bone mass, but rather are important guides in the clinical assessment of osteoporosis risks that contribute to optimal preventive management. Ultimately, an individual woman's risk of fracture is the most relevant parameter for her future health care.

It is important to distinguish between risk factors for osteoporosis as defined by BMD and risk factors for osteoporotic fractures. For osteoporosis defined by BMD, major risk factors are:

- Postmenopausal
- Advanced age
- Genetics
- Lifestyle factors (low calcium, low vitamin D intake, smoking)
- Thinness

The most common risk factors for osteoporotic fracture are female, advanced age, low BMD, previous fracture as an adult (other than the skull, facial bone, ankle, finger, and toe). A more comprehensive list of risk factors for osteoporotic fractures includes:

- Female
- Postmenopausal and advanced age
- Previous fracture as an adult (other than skull, facial bone, ankle, finger, and toe)
- History of hip fracture in a mother or father
- Body weight less than 127 pounds or body mass index (BMI) less than 21
- Characteristics: short, slender, fair-skinned, blonde, blue-eyed
- Current smoking, of any amount
- Low calcium or vitamin D intake
- More than two alcoholic drinks per day
- Early menopause (physiologic, surgical, or drug-induced)
- Increased risk of falling (impaired vision, dementia, poor health or fragility, sedentary, history of recent falls)

When trying to determine a woman's risk of low bone mass and risk of fracture, questions should be asked to determine risk factors as

Medications, Diseases, and Disorders That Increase the Risk of Osteoporosis

Medications

- Oral or intramuscular use of glucocorticoids for more than three months
- Excessive thyroid hormone
- Long-term use of the anticonvulsant phenytoin
- Heparin
- Cytotoxic drugs
- Gonadotropin-releasing hormone
- Intramuscular medroxyprogesterone contraceptive agent
- Immunosuppressive drugs (cyclosporine)

Genetic Disorders

- Osteogenesis imperfecta
- Thalassemia
- Hemochromatosis
- Hypophosphatasia

Calcium Balance Disorders

- Elevated urinary calcium
- Vitamin D deficiency

Endocrine Disorders

- Cortisol excess
- Cushing's syndrome
- Gonadal insufficiency
- Hyperthyroidism
- Type 1 diabetes

Gastrointestinal Diseases

- Cirrhosis
- Malabsorption syndromes (celiac disease, Crohn's disease)
- Total gastrectomy (removal of the stomach)

Other Disorders and Conditions

- Multiple myeloma
- Lymphoma and leukemia
- Systemic mastocytosis
- Anorexia nervosa
- Rheumatoid arthritis
- Chronic renal disease

stated in the two preceding lists. There are also various medications, disease states, and genetic disorders that are secondary causes of bone loss. This information should also be explored with a medical history. Most of these risks can be determined on a questionnaire. They don't diagnose osteoporosis, but identifying these risk factors can help to determine causes of osteoporosis and help to guide the best treatment strategy.

After menopause, the risk of falling should also be determined. Factors related to an increased risk of falling include

- A history of falls, fainting, or loss of consciousness
- Muscle weakness
- Balance problems
- Dizziness
- Difficulty standing or walking
- Arthritis
- Poor vision
- Medications that affect balance and coordination

Physical exam should assess height, weight, site of back pain and localized spinal muscle spasms, spinal contours and deformities, and dental health. A loss of height can be a sign of a fracture in the vertebrae. Normal age-related height loss is up to 1.0 to 1.5 inches. Height should be measured yearly, and a loss of height that is greater than 1.5 inches increases the possibility that a vertebral fracture has occurred.[30] Vertebral fractures also cause acute or chronic back pain, especially in the middle part of the back, called the thoracic spine. If there are multiple vertebral fractures, called compression fractures, the most obvious sign is an abnormal curvature called kyphosis. If back pain, height loss, and kyphosis are all present, this warrants an x-ray of the spine to determine if there is

osteoporosis and/or vertebral fractures. Even excessive height loss without back pain warrants an x-ray to confirm a spine fracture. Women who have one vertebral fracture are at high risk for a subsequent fracture,[31] which makes diagnosing a single vertebral fracture that much more important.

Body weight should also be recorded. A body weight less than 127 pounds or a body mass index less than 21 kg/m^2 is a risk factor for low BMD. Thinness is associated with low bone density and a twofold increased risk of fracture, especially in older women.[32]

Laboratory Tests. Laboratory tests are important in determining the cause of the low bone density or osteoporosis. Secondary causes of bone loss should be identified because the cause needs to be treated, not just the resulting effects, the bone loss. Laboratory studies and biochemical markers are done on an individual basis. Some women may need some or all of these tests initially because their risk is determined to be high from the history and physical exam. Other women will want or need these tests because their bone density is significantly low, and possible metabolic causes will be important to determine. Tests may need to be repeated over time in order to monitor the effectiveness of the treatments that have been employed. It's important to fully understand, however, that these tests cannot diagnose osteoporosis, predict bone density, or determine fracture risk.

Tests that should be routinely performed include a complete blood cell count, serum calcium, alkaline phosphatase, thyroid-stimulating hormone, albumin, and urinary calcium excretion to detect malabsorption of calcium or a renal calcium leak. Selected cases warrant additional testing of 25-hydroxyvitamin D levels in the serum, parathyroid hormone, and serum electrophoresis to determine the cause of the excessive bone loss or fractures.

There are some newer tests that are biochemical markers of bone turnover. Again, they do not diagnose osteoporosis or determine future bone loss or fracture rates. However, they can be used to determine a response to treatment. These tests of bone turnover can be done prior to beginning a treatment for osteoporosis and then again in a few months to determine if the treatment is working to slow bone turnover. Tests for biochemical markers of bone turnover can be done more frequently than a bone density test and can be done early, even within weeks after beginning the treatment. The role of these tests in routine clinical practice has not been established, however, and therefore it is difficult to determine the scope of their usefulness.

It might be tempting to think that all menopausal women should have a bone density test. I would discourage that way of thinking because a test is really only helpful if it influences the treatment. If a woman really wants the test, I have no objection to ordering it for her. However, I tend to follow the recommendations for BMD testing (described later) of the North American Menopause Society:

- Postmenopausal women with medical causes of bone loss
- All postmenopausal women who are 65 years or older
- Postmenopausal women younger than age 65 who have one or more of the following risk factors for fracture:

  Fracture after menopause (other than skull, facial bone, ankle, finger, and toe)
  Weight less than 127 pounds or BMI less than 21
  Hip fracture in mother or father
  Current smoker

Bone density testing can clarify an already difficult decision and can optimize the use of both conventional and natural medicine therapies.

Imaging Techniques. Bone imaging techniques include radiographic techniques and

ultrasound of the heel. Radiographic techniques include dual energy x-ray absorptiometry (DXA), CT scan, x-rays, dual photon absorptiometry (DPA), single-photon absorptiometry (SPA), and x-ray absorptiometry (SXA). DXA is the preferred test of the commonly used densitometry techniques and is more accurate in measuring bone density of the lumbar spine and proximal femur. DXA offers a lower dose of radiation and a shorter examination time than other imaging methods. Because of its enhanced precision and accuracy, DXA has become the gold standard for bone densitometry. The total hip, femoral neck, and lumbar spine are the three most important measurements. The lowest score of the three is the most important. Repeat tests in women who are not receiving treatment generally do not need to occur until three to five years later. For women receiving treatment for osteoporosis, BMD testing is typically done after two years, although selected cases may warrant testing at one year.

Ultrasound of the heel is less expensive, is easily administered, and uses no radiation. The heel bone is 100 percent trabecular bone, the same type of bone that makes up 90 percent of the vertebrae and 50 percent of the hip. Ultrasound measurement of the heel bone may provide a less expensive screening test for osteoporosis. Reviews have concluded that ultrasound of the heel was a good predictor of fractures of the spine.[33] Its limiting factor is that the scans are not useful in detecting small changes in density over time and therefore cannot be used to monitor the effectiveness of treatment of osteoporosis. Women with abnormal results would be referred for DXA testing to more precisely assess bone mineral density.

In women who are receiving treatment for osteoporosis, DXA scans are usually done after two years of treatment. It is important to realize that even if there is no increase in BMD on the DXA scan in the first two years, there may be significant increases in the third year, even on the same therapy. In addition, if proven fracture-reducing drugs are being used (bisphosphonates and estrogen therapy), a reduction in fracture risk occurs even if the bone density is not increased. On the other hand, if there is a decrease in the DXA scan, while on proven osteoporosis treatment medications, further testing should be done to determine if there are any secondary causes of bone loss.

World Health Organization Definitions

1. **Normal bone mineral density (BMD):** Within 1 standard deviation (SD) of young adult gender-matched means
2. **Osteopenia:** BMD between 1 and 2.5 SD below young adult means
3. **Osteoporosis:** BMD more than 2.5 SD below young adult means
4. **Severe osteoporosis:** BMD more than 2.5 SD below young adult means and the presence of one or more fragility fractures

OVERVIEW OF ALTERNATIVE TREATMENTS

Osteoporosis is far easier to prevent than to treat. An osteoporosis prevention perspective needs to start in the teenage years. Education should include several key areas:

- Medical problems, early in life and current, that can lead to osteoporosis
- Medications that can interfere with calcium metabolism
- The role of nutrition and exercise early in life and their necessity in achieving peak bone density
- Awareness of the long-term consequences for bone health of anorexia
- Awareness of the negative effect of smoking and excess alcohol

For women in their 40s, 50s, and older who have just begun to think about osteoporosis, the time for reaching peak bone density at age 30 to 35 is already past. We all lose bone density as we age, and if you achieved 100 percent of maximum by 30 or 35 and you do not have a condi-

tion or genetics that cause rapid bone loss, then all is well usually. If your peak bone density was only 85 percent of maximum, then you can't afford as much normal age-related bone loss before your bone density becomes osteopenic and then osteoporotic.

Several approaches are available to prevent osteoporosis and to treat both those who are at high risk and those who have developed the condition. Natural medicines are especially key in prevention and in helping women with mild low bone density. Once osteoporosis has been diagnosed, many of the natural interventions such as diet, exercise, nutritional supplementation, and herbal medicines could be used aggressively in milder cases to slow bone loss and possibly improve bone density, bone strength, bone architecture, and bone health in general. In general, it is my position that in cases of diagnosed osteoporosis, natural intervention should be used to supplement an antiresorptive therapy intended to stop or slow the rate of bone loss and reduce the rate of fractures. The most common proven antiresorptive therapies include estrogens, bisphosphonates, and selective estrogen receptor modulators (SERMS).

All postmenopausal women, no matter their risk for osteoporosis or bone density status, should be encouraged to practice prevention strategies. A balanced diet, adequate calcium and vitamin D, regular exercise, not smoking, low alcohol intake, and fall prevention are important steps for bone health as well as other health benefits.

KEY CONCEPTS

- Osteoporosis-related fractures will develop in almost half of all women older than 65.
- Osteoporosis is a serious and disabling disease and is far easier to prevent than to treat.
- Women with a family history of osteoporosis, and especially hip fractures, are at the highest risk of developing the condition. Eighty to ninety percent of the determination of the development of osteoporosis is a family history of osteoporosis.
- Fracture risk can be determined from a medical history, physical exam, laboratory testing, and a DXA bone density test.

PREVENTION

- Do not smoke.
- Reduce or avoid alcohol consumption and do not exceed one drink per day.
- Do regular weight-bearing exercise, especially comprehensive weight lifting throughout life.
- Ensure proper nutrition: organic low-fat dairy, soy foods, adequate calcium and vitamin D, whole grains, dark leafy green vegetables, nuts, seeds, healthy oils, and fish.
- Avoid being underweight.
- Minimize caffeine intake.
- Reduce animal protein.
- Avoid falls and injuries.
- Get regular annual health checks; laboratory testing and bone-density testing may be appropriate.
- Consider hormone replacement therapy (bio-identical hormones or conventional hormones) if you have several risk factors.
- Take nutritional supplements for bone health.

Natural interventions for mildly low bone density and osteoporosis include dietary and lifestyle factors, exercise, nutritional supplementation, the use of phytoestrogens, and natural (bio-identical) hormone replacement therapy. Each of these areas deserves special attention.

Nutrition

Several dietary factors affect bone health and are involved in the development of osteoporosis: insufficient calcium and vitamin D intake, high phosphorus intake, a high animal protein diet, excess salt intake, and other mineral deficiencies. A diet that maximizes consumption of fruits and vegetables and minimizes dietary fats is beneficial for bone development.

Women older than age 65 who do not eat enough and women who practice frequent dieting

or have eating disorders are susceptible to insufficient intake of vitamins and minerals and therefore may have insufficient bone mass. Elderly women are particularly vulnerable to the negative effects of weight loss impacting their bone health. Weight loss in this group may lead to accelerated bone loss and a higher risk of fractures, particularly of the hip.[34]

Studies have shown that excessive animal protein in the diet may promote bone loss. It particularly causes an increase in urinary excretion of calcium. Raising daily animal protein intake from 47 to 142 grams doubles the excretion of calcium in the urine.[35] Calcium is mobilized from the bone to buffer the acidic breakdown products of protein. In addition, the amino acid methionine, highest in meat, dairy products, and eggs, is converted to homocysteine, which in high amounts may also cause bone loss. All of these mechanisms of a high animal protein diet contributing to calcium and bone loss should raise serious concern about popular high animal protein diets.

On the other hand, insufficient protein may also be a problem, especially in women older than 75, and adequate protein intake may help to minimize bone loss.[36, 37] Protein supplementation of 20 grams per day in older patients who have had a hip fracture have been shown to decrease recovery time and result in lower rates of complications and a lower death rate the first seven months after the fracture.[38]

A vegetarian diet is associated with a lower risk of osteoporosis,[39] even though vegetarians do not have greater bone mass in their 20s, 30s, and 40s. Several studies have shown that vegetarians do have significantly higher bone mass later in life, which would indicate that vegetarians lose bone more slowly than nonvegetarians.[40, 41] Many high-protein animal foods also contain high amounts of phosphorus, which mobilizes calcium from the bones in order to maintain homeostasis in the bloodstream.

High-phosphorus beverages are also implicated in osteoporosis. A study in children demonstrated a severe impact of soft drinks on calcium levels. Fifty-seven children with low blood calcium levels were compared to 171 children with normal calcium levels.[42] Of the 57 children who had low blood calcium levels, 66.7 percent drank more than four 12- to 16-ounce bottles of soft drinks per week. Only 28 percent of the 171 children with normal serum calcium levels consumed that many soft drinks per week. For all 228 children, a strong correlation was seen in the serum calcium level and the number of bottles of soft drinks consumed each week. The more soft drinks consumed, the lower the calcium level in the blood. Due to the high intake of soft drinks in the United States, we can probably expect to see increased osteoporosis in the "Pepsi generation" for many years to come. The American per-capita consumption of soft drinks is about three quarts per week.

Other nutritional factors also accelerate calcium loss and may be implicated in osteoporosis. Refined sugar may raise the risk for osteoporosis by increasing the loss of calcium from the body and by causing a significant increase in fasting serum cortisol levels. A serving of refined sugar increases the urinary excretion of calcium,[43] and an excess of corticosteroids can cause osteoporosis. High sodium intake can also cause an increase in urinary excretion of calcium in some individuals.[44] Refined grains and flours may also play a part in the development of osteoporosis. Due to their lack of nutrient-rich germ and bran, there is a significant loss of vitamins and minerals in these foods. The refining process produces white flour stripped of B_6, folic acid, calcium, magnesium, manganese, copper, and zinc.

One of the best general dietary preventive habits to acquire is to eat a lot of dark green leafy vegetables. Kale, collard greens, romaine, spinach, Swiss chard, and other dark greens are a rich source of vitamins and minerals, including calcium, vitamin K, and boron. As you will learn in the nutritional supplements section, vitamin K is involved in the mineralization of bone, and boron decreases the urinary excretion of calcium and magnesium.

Soy foods appear to also have some role in preventing or slowing bone loss. Soy contains a class of compounds called phytoestrogens. The phytoestrogen especially high in soy foods is isoflavone. Phytoestrogens and isoflavones are discussed in more detail in Chapter 12; here we'll focus on their effect on bone health. Soybeans contain phytoestrogens called isoflavones and a particular isoflavone called daidzein. Daidzein is similar to a semisynthetic product called Ipri-Flavone, which is used to treat osteoporosis. Soy is the only dietary source of daidzein, which is a nonsteroidal estrogen-like molecule. Soy also increases the menstrual cycle length by one to five days, especially the follicular phase. This may have a positive effect on bone density due to longer exposure to elevated estrogen levels.

Soy appears to have a proestrogen effect on bone in some experimental evaluations. The bone density of ovariectomized rats for which soy replaced casein in the diet was compared to another group that received estrogen. The addition of soy inhibited bone loss, although not to the same extent as was achieved with estrogen treatment.[45] Another study of ovariectomized rats also reported a positive effect of the soy phytoestrogen genistein in maintaining bone.[46] These authors also reported that genistein suppresses the bone resorption cells (osteoclasts) both in the test tube and in vivo.

Several human studies have provided further insight into the possible role of soy in bone health. A study conducted at the University of Illinois found that menopausal women had an increase in mineral levels and density in their lumbar spines after taking 55 to 90 mg of isoflavones for six months.[47] The placebo group showed the lowest bone density and the greatest bone loss, while the estrogen group showed the highest bone density and the slowest bone loss. What was surprising was that the soybean protein diet was effective in preventing bone loss in the fourth lumbar vertebra and, although less so, in the right hip as well. Soybean protein seems to have more of an effect on trabecular bone (more predominant in the spine) than on cortical bone (more predominant in the hip). The soybean protein did not show as great an ability to prevent bone loss as the estrogen group, but the positive effect it showed is encouraging.

Calcium Content of Selected Soy Foods

Soy Product	Calcium (mg)
Tofu, firm (¼ block)	553
Tofu, regular (¼ block)	406
Soy milk, calcium-fortified (1 cup)	80–300
Soy milk (1 cup)	7
Soybeans, roasted (¼ cup)	119
Soybeans, boiled (¼ cup)	88
Tempeh (¼ cup)	77

The study of the relationship between soy isoflavone intake and bone mineral density was conducted from the Study of Women's Health Across the Nation, a U.S. cohort study of women aged 42 to 52 years.[48] For African-American and Caucasian women, median intakes of genistein were too low to pursue analyses. For Chinese women, no association between genistein and bone mineral density was found. Premenopausal, but not perimenopausal, Japanese women whose intakes were greater had a higher bone density of the spine and femoral neck. Mean spinal bone density of those women in the highest genistein intake group was 7.7 percent greater than that of women in the lowest group. Bone density of the femoral neck was 12 percent greater in the highest intake group versus the lowest.

Other positive studies on soy and bone density also give some credence to the role of soy for bone health. In a study estimating the daily intakes of soy isoflavones in the diets of 478 postmenopausal Japanese women who reported soy consumption, high consumption of soy products was associated with increased bone mass.[49]

Soy is also a good source of calcium. A diet that includes greater amounts of soy products can account for a meaningful amount of calcium,

and some soy foods can offer as much or more calcium than a serving of dairy products.

An adequate intake of calcium and vitamin D is fundamental for bone health and is an important adjunct to drug treatments for osteoporosis. In fact, a review of almost three dozen clinical trials found that bone mineral density of the hip increased more in the estrogen plus calcium group, compared with the estrogen group alone.[50]

Most menopausal women look to calcium supplementation to meet their calcium needs. However, dietary sources of calcium should be emphasized as part of a well-balanced diet to ensure intake of other nutrients found in high-calcium foods. Dairy products are good sources of calcium. In addition, dairy products have a high elemental calcium content and absorption rate and are affordable. There are now many dairy product alternatives as well, such as calcium-fortified soy foods, calcium-fortified rice milk, and others.

Some foods can actually inhibit calcium absorption. I don't advocate avoiding these foods, but it is important to be aware that the oxalate contained in foods such as spinach and the phytates found in whole grains can inhibit calcium absorption.

Foods high in calcium include kelp, Swiss and cheddar cheese, carob flour, dulse, collard greens, turnip greens, molasses, almonds, brewer's yeast, parsley, corn tortillas, dandelion greens, Brazil nuts, watercress, goat's milk, tofu, dried figs, buttermilk, sunflower seeds, yogurt, beet greens, wheat bran, whole milk, buckwheat, sesame seeds, olives, broccoli, walnuts, cottage cheese, and spinach. Calcium and vitamin D are discussed in detail in the nutritional supplement section.

The influence of dietary fats on mineral absorption is complex and only understood in part. Several key observations have been made, although many of the factors that influence absorption are still unknown. For example, increasing linoleic acid in the diet significantly reduce calcium in the stool, indicating that omega-6 essential fatty acids (EFAs) stimulate calcium absorption.[51] Calcium absorption will also be significantly increased when the diet is supplemented daily with fish oil, evening primrose oil, a mixture of both, or sunflower oil.[52] Deficiencies of EFAs modify bone fatty acid levels and have profound effects on the degree of mineralization of the bone. This is observed in animals fed EFA-deficient diets, who develop osteoporosis. The role of EFAs is discussed in much more detail in the nutritional supplement section of this chapter.

Alcohol and Smoking. Consumption of alcohol also appears to promote bone loss. Scientific evidence links consumption of alcohol (seven ounces or more per week) with lower bone mass, increased bone loss, an increase risk of falls, and a higher incidence of hip fracture.[53] A meta-analysis showed that consuming two alcoholic drinks per day significantly increases the risk of fracture,[54] and even heavier consumption has additional negative effects on bone density. The good news is that a small amount of alcohol, one to two ounces per week, is associated with a higher bone mineral density in women age 65 years and older[55] and a decreased risk of hip fracture.[56]

The results of most studies show that smokers lose bone more rapidly and have a lower bone mass than nonsmokers.[57] Some research shows that postmenopausal women who smoke have a significantly higher fracture rate than women who don't smoke.[58] In female smokers, the risk of hip fracture is increased by 1.5 to 2.5-fold.[14] It's not clear what mechanisms are involved in the adverse effects of smoking on bone density and fracture. Some evidence suggests that smoking may alter calcium absorption[59, 60] and lower estrogen levels.[61] All in all, it appears that women who smoke tend to lose bone more rapidly, have lower bone mass, and reach menopause about two years earlier than nonsmokers.[62–64]

Nutritional Supplements

Calcium. When women think about what they can do to prevent osteoporosis, most women think of calcium supplementation. Calcium improves bone health, increases bone mineral density, and improves the effectiveness of osteoporosis medications. Although most studies do not show a positive effect of calcium in reducing fracture risk, in the Women's Health Initiative (WHI) trial, hip fractures were significantly reduced in older women on the calcium supplement program.[65] Calcium supplementation has also been shown to decrease bone loss in postmenopausal women.[66] The effects of calcium supplementation have been greatest in women whose baseline calcium intake was low, in older women, and in women with osteoporosis.[67]

As women age, especially after menopause, calcium requirements increase due to both reduced intestinal calcium absorption and less efficient kidney conservation of calcium. Even though these two mechanisms are in play, however, the primary influence on calcium absorption is the amount of calcium that is ingested, via either diet or supplementation. Selected populations of postmenopausal women may not have adequate calcium intake, including older women, women who are lactose intolerant (and so must avoid dairy foods), vegans (who consume no animal or dairy products), and women on poor diets in general. Even in the United States, postmenopausal women have dietary intakes of calcium of about 600 mg per day, which is below the recommended amount. The National Academy of Sciences (NAS) recommendations[68] (last revised in 1997) and the National Institutes of Health (NIH) recommendations[69] (last revised in 1994) are the two most well-accepted guidelines for calcium intake in women (see the following sidebar).

To determine how much calcium you should take in a supplement, you must first estimate what your dietary intake is. Start by assuming that you get 250 mg per day, not counting any dairy foods or calcium-fortified foods, if you eat two or three meals per day. Most women take in an additional 300 mg per day in the form of one serving of dairy. If you take in more than one serving per day of dairy, add another 300 mg for each additional serving, as well as for each serving of a calcium-fortified soy food. If you drink one glass of milk per day and eat no soy foods or other calcium-fortified foods, for example, your average daily intake is 250 mg + 300 mg = 550 mg per day. So, if you are 55 and postmenopausal, you need an additional 650 to 950 mg per day to reach a total that falls within the recommendations of 1,200 to 1,500 mg per day for postmenopausal women under 65.

There is a great deal of confusion and controversy about which form of calcium is best. I discourage women from using either oyster shell or bone meal calcium. These calcium supplements may contain substantial amounts of lead. In 1981, the FDA cautioned the public to limit intake of calcium supplements made from either dolomite or bone meal because of the potentially high lead levels. Unfortunately, even other sources of calcium from various chelates may also

Recommendations for Calcium Intake

National Academy of Sciences Recommendations

Age 31–50	1,000 mg/day
Age 51 and older	1,200 mg/day

National Institutes of Health Recommendations

Premenopausal women aged 25–50	1,000 mg/day
Postmenopausal women under 65 using estrogen therapy	1,000 mg/day
Postmenopausal women not using estrogen therapy	1,500 mg/day
All women aged 65 and older	1,500 mg/day

contain minute amounts of lead. In a 1993 study of lead content in calcium supplements, lead was the highest in bone meal, unrefined calcium carbonate, and dolomite and lowest in calcium chelate supplements and refined calcium carbonate.[70] Calcium chelates are bound to citrate, fumarate, malate, succinate, and aspartate.

When the calcium is taken on an empty stomach, calcium citrate is absorbed better than calcium carbonate. In addition, it may be that as women age and have lower stomach acid production, lower fat absorption, and take in less vitamin D due to less exposure to sunshine and decreased fat absorption, calcium citrate may be a better choice to combat these compromising effects on calcium absorption. In most women, though, especially in perimenopausal women and postmenopausal women up to age 65, there is no known best form. Calcium carbonate is absorbed well when taken with food. Calcium citrate can be taken with food or on an empty stomach, making it more flexible as to timing of your supplement regime.

Calcium supplementation is extremely safe, and even in amounts of total calcium intake up to 1,500 mg per day there is no increase in the risk of a kidney stone.[71] However, in women with a history of kidney stones, calcium supplements are contraindicated except with medical testing/assessment and supervision. Calcium intake greater than 2,500 mg per day, taking into account diet and supplement, should be avoided. Some women become constipated or have nausea and indigestion with calcium supplementation, especially calcium carbonate. In these cases, calcium citrate will less likely cause these problems.

Another issue that makes it difficult to determine the optimal dose of calcium is that higher doses of calcium may interfere with the absorption of other nutrients. In two separate studies, researchers have shown that a high dietary calcium intake adversely affects zinc absorption and balance in humans.[72, 73] This may be especially important in elderly women due to their compromised zinc absorption, their possible marginal zinc status to begin with, and their high risk of osteoporosis. A zinc deficiency can result in skin changes, growth retardation, loss of appetite, changes in vision, decreased insulin function, dysfunction in prostaglandin synthesis, and immunologic abnormalities. Zinc is also essential for normal bone formation; it enhances the biochemical actions of vitamin D, is required for the formation of osteoblasts and osteoclasts, and is required for the synthesis of various proteins found in bone tissue. Zinc levels have been found to be low in the serum and bone of elderly people with osteoporosis,[74] and also in people with bone loss at the alveolar ridge of the mandible.[75] This negative interaction between calcium and zinc absorption raises concerns about how higher calcium intakes may affect the absorption of other minerals needed for bone health.

Another area of great disagreement is what ratio of calcium to magnesium is best. Some researchers and clinicians recommend twice as much calcium as magnesium; others recommend equal parts calcium and magnesium; others recommend 1.5 parts calcium and 1 part magnesium; and still others recommend twice as much magnesium as calcium. The most scientific research support exists for two parts calcium to one part magnesium. (See the section on magnesium later in this chapter.)

The optimal time to take calcium supplementation is the last question to consider. The absorption of calcium is dependent on its becoming ionized in the intestines. Calcium carbonate has to be solubilized and ionized by stomach acid in order to be absorbed. Many people have insufficient stomach acid, and stomach acid secretion decreases with age. In studies of postmenopausal women, about 40 percent are found to be severely deficient in stomach acid.[76] For this reason, I recommend taking a form of calcium that is already in a soluble and ionized state, such as calcium citrate, calcium lactate, or calcium gluconate. In these ionized products,

about 45 percent of the calcium is absorbed from calcium citrate in patients with reduced stomach acid, as compared to 4 percent absorption for calcium carbonate.[77]

All of these issues make it difficult to choose from the myriad options of form and dosing in calcium supplementation. In general, I would follow the dosages of either the NIH or NAS. If you don't mind taking more pills, then I would also recommend taking calcium citrate over calcium carbonate, or at least a combination. (Calcium citrate is much bulkier, and you have to take more pills to get adequate amounts of the elemental calcium.) Even though I can no longer argue for advantages in absorption in general of citrate over carbonate, fewer digestive side effects, the flexibility of taking the calcium with or without meals, and the possibility of enhanced absorption as you age make a good case for calcium citrate. In the end, though, the amount of your total calcium intake is far more important than the kind of calcium.

Recommended Daily Calcium Intake

Women aged 25–50: 1,000 mg/day
Women aged 51 and older: 1,200–1,500 mg/day

Vitamin D. Vitamin D is the only vitamin that's also a hormone, and it is the only vitamin we don't have to consume from our diet. Vitamin D is normally produced in the skin through ultraviolet exposure of a derivative of cholesterol (7-dehydrochlesterol) to produce previtamin D, which is then metabolized to 25-hydroxyvitamin D in the liver and then to 1-alpha dihydroxyvitamin D_3 in the kidney, at which time it becomes functional. This hormone is now able to carry out its function, including calcium absorption, phosphate absorption in the intestine, calcium mobilization in the bone, and calcium reabsorption in the kidneys. Vitamin D also maintains normal parathyroid status, is an important regulator of the immune system, and is important for muscular strength.

Vitamin D enhances intestinal calcium absorption, thereby contributing to a favorable calcium balance in the system. Increased calcium absorption also reduces parathyroid hormone–mediated bone resorption. In the United States, most infants and young children have adequate vitamin D consumption from fortified milk. During adolescence, however, the consumption of dairy products drops off and inadequate vitamin D intake is more likely to adversely affect calcium absorption.

In general, calcium intake alone may have only a slight protective effect for bone mass and fracture risk, and it is more beneficial to supplement with a combination of calcium and vitamin D. Several large studies of vitamin D (400 and 800 IU per day) plus calcium (1,000 mg per day) have not shown a significant effect on fracture risk.[78, 79] However, there are studies that do show a significant effect. One such study in people aged 65 years or older showed that both calcium and vitamin D consumption can significantly reduce the incidence of nonvertebral fractures.[80] Another study of postmenopausal women undergoing hip replacement surgery showed that women with hip fractures were more likely to have a vitamin D deficiency than those undergoing elective joint replacement.[81] More recently, the NoNOF study of survivors of hip fractures demonstrated that vitamin D supplementation, either orally or by injection, suppresses parathyroid hormone, increases bone mineral density, and reduces falls.[82] The effects were more marked with cosupplementing with 1,000 mg of calcium per day.

Perhaps the most compelling study is a meta-analysis of randomized clinical trials in postmenopausal women with a mean age of 71 to 85, which found that 700 to 800 IU per day of vitamin D was associated with significant reduction in hip and wrist fractures[83]; 400 IU per day had no effect. Finally, more recent results from the Women's Health Initiative found that 1,000 mg per day of calcium plus 400 IU of vitamin D was associated with a small but significant 1 percent increase in bone mineral density of the hip.[65]

Experts have typically thought that the moderate protective effect of vitamin D on fracture risk is due primarily to bone mineral density changes. However, there is a good body of evidence that vitamin D may also directly improve muscle strength and, as a result, reduce fracture risk by preventing falls. While randomized controlled trials have found that vitamin D reduced fractures within two to three months[84] and has benefits in improving muscle strength,[85–87] the effect of vitamin D on falls has not been well established and results of randomized trials have been mixed. A meta-analysis in 2004 attempted to determine the overall efficacy of vitamin D in preventing falls in the elderly, especially women.[88] Based on five randomized clinical trials involving 1,237 individuals, vitamin D reduced the risk of falling by 22 percent, compared with individuals, but especially women, who received calcium or a placebo. A recent study on vitamin D supplementation and fall prevention was done in Australia[89] in which 625 older residents of nursing homes and assisted-living facilities (95 percent women) were randomized to receive either vitamin D (ergocalciferol; 10,000 IU weekly or 1,000 IU daily) or a placebo. None of the participants had a vitamin D deficiency. All participants also received 600 mg of elemental calcium daily. During two years of follow-up, the incidence of falls was significantly lower in the vitamin D group compared to the placebo group (1.37 versus 1.86 falls per person/year). Those who received vitamin D were also less likely to sustain a fracture (8 percent versus 11 percent), although this was not statistically significant.

How much vitamin D is enough? The requirements for vitamin D were last set in 1997 by the Food and Nutrition Board of the Institute of Medicine and may be inadequate (see sidebar).

A popular approach of using cod liver oil to supplement vitamin D deserves awareness and a bit of caution. One tablespoon of vitamin D–fortified cod liver oil supplies 1,400 IU of vitamin D but also contains high levels of vitamin A, which can exacerbate calcium loss and be associated with low bone density.

Current Dietary Recommendations for Vitamin D

Age	Adequate Intake	Tolerable Upper Limits
0–50	200 IU/day	2,000 IU/day
51–70	400–800 IU/day	2,000 IU/day
Over 70	800 or more IU/day	2,000 IU/day

Higher doses than those listed as adequate or even upper limits will be needed by women who have had their vitamin D levels tested and found to be low or low normal. Dosage for these women should be monitored with follow-up tests.

Magnesium. The conventional scientific view is that magnesium is essential for parathyroid hormone (PTH) production and release. PTH is essential for the activation of vitamin D and therefore absorption of calcium across the gut wall. However, magnesium is an intracellular ion and difficult to measure. A magnesium level is a reflection of extracellular magnesium. There are several conditions that can lead to magnesium deficiency and therefore hypoparathyroidism and vitamin D deficiency. These include diuretic use (urinary loss), alcohol abuse (nutritional deficiency), diabetes (urinary loss), and chronic diarrhea (malabsorption). Otherwise, magnesium deficiency is rare. From the conventional scientific viewpoint, the main reason why magnesium is part of calcium supplements is that carbonates are constipating and magnesium has a laxative effect, and therefore the combination is usually better tolerated.

Even though calcium has received the most attention, alternative medicine views the importance of magnesium in skeletal metabolism and calcium regulation in a little bit different and perhaps broader context. Magnesium influences both matrix and mineral metabolism in bone. Magnesium depletion causes cessation of bone growth, decreased osteoblastic and osteoclastic

activity, osteopenia, and bone fragility.[90] Adequate serum magnesium levels are necessary for proper calcium metabolism; adequate calcium intake may not ensure proper bone health if magnesium status is abnormal.

Magnesium deficiency has been shown more than once to be related to osteoporosis. Magnesium status appears to have a major influence on the type of calcium crystals present in the bones, and therefore its deficiency is associated with abnormal calcification of the bone.[91] This may in part explain why some women who have reduced bone mineral density do not have an increase in fracture rates. These women may have a lowered bone mass, but they have excellent structural calcification, due in part to adequate levels of magnesium.

In order to assess the effects of magnesium on bone density, a group of osteoporotic postmenopausal women were given magnesium over a period of two years. At the end of the study, magnesium therapy appeared to have prevented fractures and resulted in a significant increase in bone mass density after the first year of treatment. There was, however, no change in density from then on to the end of the study.[92] The finding that magnesium supplementation actually caused an increase in bone density rather than just a stabilization of current bone density is significant. Other factors may have influenced the increase in bone density, but the results of this study warrant further investigation into the potential effect of magnesium on bone density.

Dr. Guy Abraham published a study supporting the importance of magnesium above that of calcium. His study demonstrated an 11 percent increase in bone density in the group that was given dietary advice, hormones, and nutritional supplements (500 mg calcium citrate, 600 mg magnesium oxide, vitamin C, vitamin B-complex, vitamin D, zinc, copper, manganese, and boron). The group that received the dietary advice plus the hormones but no supplementation had an average increase of only 0.7 percent.[93] An 11 percent increase in bone density is greater than that found in studies of calcium or hormone replacement therapy taken either separately or together. However, in most studies on bone density or osteoporosis-related fractures, the benefits of calcium have been observed without magnesium supplementation. A study looking at calcium absorption found no benefit on calcium absorption in postmenopausal women taking magnesium.[94] Continued research to elucidate magnesium's role in bone metabolism and calcium-magnesium interactions is needed as well as clinical treatment trials that vigorously evaluate magnesium as a potential treatment for postmenopausal osteoporosis.

Foods high in magnesium include kelp, wheat bran, wheat germ, almonds, cashews, molasses, brewer's yeast, buckwheat, Brazil nuts, dulse, filberts, peanuts, millet, whole wheat, pecans, walnuts, rye, tofu, beet greens, and coconut.

Magnesium

500–750 mg per day

Manganese. Manganese may be one of the most important trace nutrients related to osteoporosis. Manganese deficiency causes a reduction in the amount of calcium laid down in the bone and thereby an increased susceptibility to fracture. Manganese stimulates the production of mucopolysaccharides that provide a structure on which calcification takes place.[95]

Manganese

15–30 mg per day

Boron. Dr. Forrest Nielsen studied the effect of boron on bone loss in postmenopausal women. Published in 1988, his results indicated that boron supplementation reduced the urinary excretion of calcium by 44 percent, reduced urinary magnesium excretion, and markedly increased the serum concentrations of 17 beta-estradiol and testosterone.[96] These findings definitively implicate boron in calcium and mag-

nesium metabolism, hormonal stabilization, and the subsequent prevention of bone loss.

Boron

3 mg per day

Zinc. Zinc is essential for normal bone formation,[97] enhances the biochemical actions of vitamin D,[98] and is required for the formation of osteoblasts and osteoclasts and for the synthesis of various proteins found in bone tissue. Zinc levels have been found to be low in the serum and bone of elderly people with osteoporosis.[74]

Zinc

15–20 mg per day

Copper. Copper deficiency may be a related cause of osteoporosis. Copper deficiency is known to produce abnormal bone growth in growing children. Copper supplementation has been shown in laboratory studies to inhibit bone resorption.[99] Its supplementation is deemed necessary in women at risk for or with diagnosed osteoporosis.

Copper

1.5–3 mg per day

Folic Acid. Accelerated bone loss in menopausal women may in part be due to the increased levels of homocysteine, a breakdown product of methionine. Homocysteine has the potential to promote osteoporosis if it is not eliminated adequately. Since folic acid is involved in the breakdown of homocysteine, supplementing postmenopausal women with this nutrient results in significant reductions in homocysteine levels.[100] This association of homocysteine levels and osteoporosis was recently seen in a study showing that high homocysteine levels were associated with almost twice the risk of nonvertebral osteoporotic fractures in women.[101] However, in the same study, there was no association between homocysteine levels and BMD at either the femoral neck or the lumbar spine. Despite these associations, it is not yet clear that giving folic acid is a therapeutic tool in preventing bone loss or fractures. For now, it remains an interesting association, and folic acid is easy enough to include in a holistic bone health approach and prevention program.

Folic Acid

400–800 mcg per day

Vitamin B_6. Vitamin B_6 also plays a role in homocysteine metabolism. In genetic homocystinuria, B_6 supplementation has been shown to reverse the elevated levels of homocysteine.[102] Vitamin B_6 has been studied and prescribed for its role in osteoporosis prevention in other capacities as well. Animal studies have shown B_6 deficiencies to cause increased fracture healing time,[103] impaired growth of cartilage and defective bone formation,[104] and more rapid development of osteoporosis.[105] Vitamin B_6 may also stimulate the production of progesterone and, through this hormone's activation of osteoblasts, have a distinct role in preventing osteoporosis.

Vitamin B_6

50–100 mg per day

Vitamin C. One of the actions of vitamin C is to promote the formation and cross-linking of some of the structural proteins in bone. Animal studies have shown that vitamin C deficiency can cause osteoporosis.[106] Moreover, it has been known for decades that scurvy, a disease caused by vitamin C deficiency, is associated with abnormalities of bone.

Vitamin C

500 mg or more per day

Vitamin K. Vitamin K has been thought for some time to be a contributing factor in the

prevention of bone loss. It is required for the production of osteocalcin, the protein matrix on which mineralization occurs. Octeocalcin attracts calcium to bone tissue, enabling calcium crystal formation to occur. Vitamin K also plays a key role in the formation, remodeling, and repair of bone by helping the calcium adhere to the site of this protein matrix. Individuals with osteoporosis have been found to have lower serum vitamin K levels when compared to age-matched controls.[107] The amount of vitamin K that is required for optimal bone health appears to be greater than that needed for normal clotting of blood.[108]

Recently, a review and meta-analysis of 13 published clinical trials made an even stronger case for the role of vitamin K in osteoporosis.[109] In 12 of the 13 clinical trials, this meta-analysis concluded that supplementation with large doses of vitamin K can prevent bone loss of the hip and vertebrae. (The one trial that showed no effect was a study of premenopausal athletic women who were given 10 mg per day of vitamin K_1.) Even more impressively, fracture data was available in seven of the studies. The rates of hip fractures were reduced by 77 percent, other nonvertebral fractures by 81 percent, and vertebral fractures by 60 percent.[110]

Most of the studies in this meta-analysis were of postmenopausal women, but some of the studies included patients who had diseases that are associated with higher risk of osteoporosis, including patients with primary biliary cirrhosis and some on glucocorticoids. These results in fracture reduction exceed those typically seen with alendronate (about 50 percent), and fewer side effects are associated with vitamin K compared to the approximately 17 percent side effect rate of reflux and esophagitis with bisphosphonates. However, the longest study in this meta-analysis was only three years, which is a short amount of time in the world of bone density and fracture data, and further research is needed before drawing conclusions on the comparative value of vitamin K supplementation.

Vitamin K_2

45 mg per day

Essential Fatty Acids

Essential fatty acids (EFAs) have not been talked about much in relationship to osteoporosis, but there is a growing body of evidence and research to warrant attention. Most of the research and focus on osteoporosis has been around the loss of calcium from bone before and during osteoporosis, reduced bone strength, and increased risk of fractures. What has received less attention is that osteoporosis may be a marker for other serious potential health problems apart from fractures. Not only must we consider demineralization of bone, but ectopic calcification and the possible connection between ectopic calcium deposits, particularly in the arteries and kidneys, and bone decalcification.

Specifically, low bone density may be related to vascular problems, and essential fatty acids and their regulation of calcium metabolism may be a key player in influencing the sites at which calcification occurs. The role of essential fatty acids has largely been ignored in relation to osteoporosis despite animal and human studies indicating that EFAs enhance calcium absorption, enhance the effects of vitamin D, reduce urinary calcium excretion, increase bone calcium, reduce ectopic calcification elsewhere, and increase bone protein synthesis and bone strength.

The first published paper that clearly described the relevance of EFAs on calcium showed that in EFA-deficient animals, the kidneys became highly calcified, apparently because of a shift of calcium from the bones.[111] Other early studies demonstrated that EFA deficiency in animals was associated with loss of normal collagen synthesis and of normal connective tissue in bone, loss of normal cartilage, demineralization of bone, and bone weakness.[112–114]

This early body of research established that EFA deficiency led to severe osteoporosis in ani-

mals and that the osteoporosis was associated with significant ectopic calcification. Not until the 1990s, however, did new observations lead to renewed interest in EFAs and calcium. These observations indicated that prostaglandin (PG) formation could stimulate bone growth, that renal calcium stones were rare among the Inuit (Eskimos) of the Arctic, seemingly due to their high intake of EFAs from fish oils, and that EFA metabolism might form a basis for the associations between osteoporosis and coronary artery disease, peripheral vascular disease, and stroke.

Before we get too far along, it's important to have some familiarity with the basics of EFA biochemistry. There are two families of EFAs of import in this conversation, the omega-6 series and the omega-3 series. Linoleic acid (LA) is the parent compound of the omega-6 series, and alpha-linolenic acid (ALA) is the parent compound of the omega-3 series. Each of these is metabolized by a series of enzymatic reactions in which their metabolites play key roles within the body. The most important metabolites are probably dihomo-gamma-linoleic acid (DGLA) and arachidonic acid (AA) of the omega-6 series and eicosapentaenoic acid (EPA) and docahexaenoic acid (DHA) of the omega-3 series.

Essential fatty acids are required constituents of every membrane within the body. They are required for the normal functioning of every membrane and for the normal functioning of calcium release from storage. EFAs are also part of most of the signaling systems within every cell.

How calcium is excreted and how much is excreted are major factors in the metabolism of bone and the development of kidney stones, as well as the overall calcium balance in the body. Probably the major factor controlling calcium excretion is calcium intake, but we also know that prostaglandins are involved in calcium reabsorption and excretion. Significantly elevated levels of urinary prostaglandin E2 (PgE2) are positively correlated with urinary calcium excretion.[115–117] Calcium stones forming in the urine are also correlated with increased PgE2 and increased calcium excretion. Although the precise role of EFAs and prostaglandins in hypercalciuria is not understood, the balance of research demonstrates that excessive production of PGE from arachidonic acid is a factor.

If we could reduce urinary calcium excretion, this could not only have a bone-preserving effect but also reduce the formation of stones. Research in the early 1990s explored enhancing dietary EPA with fish oils to protect against stone disease. What was found was that the fish oils were able to reduce urinary calcium excretion. This work was preliminary and fundamental to understanding how EFAs and prostaglandin metabolism could affect calcium excretion and reabsorption. Although the work was undertaken in an effort to prevent kidney disease and kidney failure, it supports the idea that EFAs affect calcium metabolism and could be used to improve bone health and bone density.

The influence of dietary fats on mineral absorption is complex and only understood in part. Several key observations have been made, although many of the factors that influence absorption are still unknown. For example, increasing linoleic acid in the diet significantly reduces calcium in the stool, indicating that omega-6 EFAs stimulate calcium absorption.[51] Calcium absorption will also significantly increase when the diet is supplemented with fish oil, evening primrose oil, a mixture of both, or sunflower oil daily.[52]

Animal studies have revealed many mechanisms related to EFAs and calcium absorption. Probably the largest body of work established that there is a significant relationship among EFAs, the actions of vitamin D, the transport of calcium across the membrane, and an increase in membrane fluidity followed by an increase in calcium absorption.

As mentioned earlier in the nutrition section, deficiencies of EFAs modify bone fatty acid levels and have profound effects on the degree of miner-

alization of the bone. Animals fed EFA-deficient diets also develop osteoporosis. Evidence is also building that prostaglandins have an influence on bone metabolism. Prudent use of EFAs may reduce the degradation of bone matrix collagen, while also increasing bone mineral content. Animal studies using different ratios of evening primrose oil (high in gamma-linolenic acid or GLA), fish oil (rich in EPA and DHA), sunflower oil, and flaxseed oil suggest that supplementation with high doses of evening primrose oil and fish oil is more effective in inhibiting bone loss than is supplementation with linoleic and alpha-linolenic acids.[118]

The relationship between osteoporosis and cardiovascular disease has several correlations. One is that those individuals with osteoporosis and a subsequent hip fracture have an increased risk of mortality due to strokes. Calcium is not simply lost from the bone in osteoporosis, but some of that calcium is deposited in the arteries and kidneys. The calcification process in atherosclerosis is very similar to what occurs in bone. It may be that metabolic issues that regulate calcification are common to both diseases. Individuals with osteoporosis frequently have ectopic calcification in other tissues as well, especially the discs between the vertebrae.

Loss of bone calcium with concomitant calcification in the kidneys was observed as far back as 1931 in a study by Borland and Jackson where an induced EFA deficiency elicited both problems.[111] More recently, supplementation with EPA and GLA was shown to prevent ectopic calcification. This is better understood by looking at the role of EFAs in membrane health, calcium absorption, calcium excretion, and bone mineralization. It is also worth speculating that since deficits of long chain EFAs are important in cardiovascular disease, the associations between osteoporosis and heart disease may be dependent on a commonality of impaired EFA metabolism and poor sources of dietary fat.

While preventive measures of a well-balanced diet, avoiding smoking and excess alcohol, regular weight-bearing exercise, and proper vitamin and mineral intake should be the hallmarks in the prevention of osteoporosis, the information and data on essential fatty acids should not only motivate us to improve sources of dietary fat, it also suggests that EFA supplements are a viable method of decreasing the risk of osteoporosis.

Essential Fatty Acids: Omega-3 and Omega-6

Approximately 1 g per day of EPA and DHA

Botanical Medicine

Red Clover (*Trifolium Pratense*). Red clover is a member of the legume family rich in flavonoids, glycosides, phytoestrogens, and other vitamins and minerals. This native American herb was historically used to treat whooping cough, gout, and cancer. Some researchers speculate that red clover may have an estrogenic effect on the bone. They studied the effects of a special red clover extract, Rimostil, containing Clovone, a specific blend of isoflavones (biochanin A, formononetin, genistein, and daidzein), on serum lipids, bone density, and endometrial thickness in postmenopausal women.[119] Fifty postmenopausal women were randomly assigned to receive either 28.5 mg, 57.0 mg, or 85.5 mg of Rimostil for six months, followed by two months of a placebo. Bone density was measured at baseline, three months, and six months using a DXA scan. (Lipid levels and uterine lining thickness were also measured in this study.) All three doses of Rimostil were associated with a 2.9 to 4 percent increase in bone density from zero to six months in the proximal radius and ulna (closest to the elbow). No significant change in bone density occurred at the distal radius and ulna.

Another placebo-controlled clinical trial attempted to determine the effect of red clover isoflavones on bone density in women aged 49 to 65.[120] One group received one tablet of a standardized extract of red clover (26 mg biochanin A, 16 mg formononetin, 1 mg genistein, and 0.5 mg daidzein), and the other received a placebo.

This trial lasted one year, and 86 women in the red clover group and 91 in the placebo group completed the study. Dietary calcium and vitamin D were similar in both groups. At the end of 12 months, women in the red clover group had less bone loss of the lumbar spine than women in the placebo group. Bone density decreased by 1.08 percent in the red clover group and by 1.86 percent in the placebo group. The differences in the hip bone between the red clover and placebo groups were not significant. Two markers of bone formation were also tested in this study. For postmenopausal women in the study, there was an increase in these markers in the red clover group, and a decrease in one marker and a lower increase in another marker in the placebo group. These results suggest that red clover isoflavones may be able to slow bone loss in the lumbar spine.

Red Clover Standardized Extract

28–85 mg per day of red clover isoflavones

Ipriflavone. A synthetic derivative of isoflavones, Ipriflavone was only available in Italy and a handful of other countries until recently. It is now available over the counter in natural food stores or from alternative practitioners. Two multicenter, two-year clinical trials evaluated the efficacy and bioavailability of Ipriflavone in postmenopausal women with low bone mass.[121] Women were randomly selected to receive either oral Ipriflavone (200 mg three times daily) or a placebo, plus 1 gram oral calcium daily. Both studies were reported in the same paper. Study A showed a bone-sparing effect of 1.6 percent in the spine, and study B, 3.5 percent in the wrist after two years. A significant difference was found between the treatment groups and the placebo groups in both studies.

It seems as though Ipriflavone has a direct ability to inhibit the osteoclastic (bone-losing) cell activity, but how it does this is unknown. Although the effects on bone density using Ipriflavone tend to be small, between 1.15 and 3.7 percent, these results provide yet another option for many women who cannot, will not, or do not need to take stronger, more effective conventional treatments. It remains to be seen whether Ipriflavone can have a positive effect on the hip, a far greater concern. Although the effect on the spine and wrist is encouraging, these small increases in bone density do not necessarily mean there is a reduced fracture rate, the true test of an effective treatment for the prevention and treatment of osteoporosis.

One well-publicized study in 2001 was not able to document any benefit for Ipriflavone in women with significant bone loss and with osteoporosis.[122] It was also noted through blood tests that some of the women taking Ipriflavone developed lower lymphocyte counts. For this reason, I recommend Ipriflavone only for women with mild bone loss or for those who are at higher risk for bone loss, but not for women with significant bone loss. I also recommend getting a blood test, a complete blood count (CBC), every six months to check the lymphocyte counts.

In the studies that do show benefit, Ipriflavone was given with a calcium supplement.

Ipriflavone

200 mg 3 times per day

Herbs in High Mineral Content. Throughout the centuries of traditional herbal medicine, many herbs have been known for their high mineral content. It is difficult to use herbs as a substitute for mineral supplementation because we know so little about the precise mineral content of a given herb. However, using these high-mineral herbs to augment mineral supplementation may not only improve one's mineral status but also offers other health benefits. High-mineral herbs include nettles, oatstraw, red raspberry leaves, chamomile, horsetail, and dandelion greens.

Natural or Bio-Identical Progesterone. The term *natural progesterone*, now more popularly

called *bio-identical progesterone*, refers to progesterone made from derivatives found in the Mexican wild yam or in soybeans. It is important to realize that commercial bio-identical progesterone is made in a manufacturing laboratory by extracting either diosgenin from Mexican wild yam or beta-sitosterol from soybeans, then converting the natural substance into progesterone through various enzymatic and biochemical reactions. This progesterone is biochemically identical to the progesterone produced by a woman's ovaries. Because of this, it is called bio-identical or natural progesterone. This is distinctly different from synthetic progestational agents, properly called *progestins*, the most common of which is medroxyprogesterone acetate (MPA).

Accelerated bone loss has been shown to occur after menopause, but evidence also exists indicating that normal menstruating women begin to lose spinal bone prior to menopause.[123–127] Evidence also exists that this bone loss prior to menopause is related to progesterone deficiency and that progesterone, like estrogen, plays an important role in bone metabolism.[128–130] Dr. Jerilyn Prior postulated a hypothetical relationship between phases of the bone remodeling cycle and the normal menstrual cycle. Ovarian steroid levels are low at menstruation, so increased bone resorption occurs at this time. As estrogen production increases before ovulation, resorption begins to reverse. Finally, bone remodeling begins as progesterone levels peak in the mid part of the second half of the menstrual cycle.[131]

Dr. Prior and colleagues went on to study 66 premenopausal women over one year.[128] In these women, 29 percent of all menstrual cycles were disturbed by a lack of ovulation or short luteal phase (number of days between ovulation and onset of menses), even though nearly all of these women continued to have regular 30-day cycles. These subtle ovulatory disturbances did not result in any symptoms, but they did correlate with decreases in spinal bone density. The women with the shortest luteal phases, and therefore with decreased progesterone production, had the greatest decline in spinal bone density, losing 2 to 4 percent of bone per year. These results have been cited as a strong suggestion that the maintenance of peak bone density throughout a woman's adult life requires normal ovarian production of progesterone as well as estrogen.

Dr. Prior and colleagues also studied the effects of synthetic progestin, medroxyprogesterone acetate (MPA, also called Provera), 10 mg for 10 days each month, in athletic women who had stopped having a menstrual cycle. The regimen led to significant increases in spinal bone density.[132] These studies indicate that progesterone and MPA appear to have osteotropic (bone-building) effects. This is some of the research that alternative practitioners cite when making a case for administering natural progesterone for the treatment and prevention of osteoporosis. An error is often made when practitioners assume that administering bio-identical progesterone is the same as administering the synthetic analogue MPA, and this often occurs when advocates of bio-identical progesterone attempt to make a case for its use in osteoporosis management.

There is good theoretical evidence from these studies and additional laboratory and animal studies that the body's progesterone and MPA have a stimulatory effect on bone formation and reduce bone turnover. What is not clear is whether giving bio-identical progesterone in a pill or cream has similar effects. When it comes to preventing or reversing osteoporosis, no other product has been the subject of as much controversy as the use of topically applied bio-identical progesterone. A large segment of women seeking alternatives to conventional hormone replacement therapy and many alternative practitioners have accepted the premise, most often promoted by the late Dr. John Lee, that topically applied natural progesterone cream will not only prevent osteoporosis but will actually increase bone min-

eral density and prevent fractures. In his publications, Dr. Lee had become the strongest advocate of the role of progesterone in preventing and reversing osteoporosis. He asserts that almost all women can successfully prevent and reverse osteoporosis and improve their bone density by as much as 15 percent with this cream and that estrogen replacement therapy is very seldom a necessary component.

Although I respect much of the groundbreaking work done by Dr. Lee, this particular premise is based almost exclusively on a hypothesis that lacks adequate scientific evidence. Other researchers have investigated the therapeutic effects of natural progesterone cream, including its effects on bone in menopausal women. One randomized clinical trial compared the effect of a transdermal natural progesterone cream (32 mg daily) with a placebo cream. Eighty postmenopausal women in Australia were randomly assigned to each group. Women were evaluated using the familiar Greene Climacteric Scale and the Menopause Quality of Life Questionnaire, as well as blood lipids and bone markers, over 12 weeks.[133] No detectable change was seen in vasomotor symptoms, moods, libido, lipids, or metabolic markers of bone turnover. There was a slight elevation of blood levels of progesterone. The authors concluded that the use of 32 mg of transdermal progesterone was not sufficiently absorbed into the bloodstream to achieve biological effects.

At least two studies, though, have shown that transdermal natural progesterone of 30 mg per day[134] and 40 mg per day[135] did modestly elevate levels of progesterone in the blood after 15 days and 42 days respectively. A transdermal cream of 20 mg daily in a randomized clinical trial resulted in statistically significant improvement in vasomotor symptoms, but no improvement in mood or bone mineral content.[136]

Transdermal progesterone cream for vasomotor symptoms does have efficacy, which is discussed in the chapter on menopause (Chapter 12). That said, too many women are inappropriately selecting natural progesterone cream as their main and possibly only treatment intervention for osteoporosis. A careful process of sifting through the benefits of alternative and conventional medicine and the weaknesses or downside of any natural or conventional therapy is especially warranted when it comes to osteoporosis.

Another way to take bio-identical progesterone is as oral micronized progesterone (OMP). It is also often used in menopause management, although it has not received the attention and commercial interests for general consumer use because it is available only by prescription. Results from the Postmenopausal Estrogen/Progestin Interventions Trial (PEPI) have also provided us with some insight on natural progesterone and bone density.[137] Participants in the placebo group lost an average of 1.8 percent of spinal bone density and 1.7 percent of hip bone density by the 36-month visit, while those assigned to one of the four treatment groups gained bone density at both sites ranging from 3.5 to 5.0 percent and a total increase of 1.7 percent bone density in the hip. Although the changes in bone density were significantly greater in the treatment groups when compared to placebo, the results among the treatment groups were not significantly different from each other.

Treatment groups were either (1) 0.625 mg conjugated equine estrogens (CEE) daily alone; (2) 0.625 mg CEE and 10 mg MPA per day for 12 days per month; (3) 0.625 mg CEE and 2.5 mg MPA daily; or (4) 0.625 mg CEE and 200 mg OMP per day for 12 days per month. I am presenting this in some detail because, in this study, it appears that it was the estrogen therapy component that increased bone density and not the various progestogen regimens, either synthetic or natural.

So does natural progesterone alone, without estrogen, either topically or orally, have an ability to increase bone density? From the data we have so far, I would have to say no, it does not seem

to. Estrogen, not progesterone, is the main hormone that provides benefits for the bone.

Natural or Bio-Identical Estrogens. Natural or bio-identical estrogens are made in the same way as natural or bio-identical progesterone, except that the end product is either estrone, estradiol, or estriol. Compounded estrone used by alternative practitioners is the same hormone that is used in at least two prescription conventional estrogens (Ogen and Ortho-est), with the caveat that the prescription drug has fillers, binders, preservatives, and/or excipients. These are added in order for the particular product to receive a patent; a particular individual may absorb and tolerate one form better than another.

Bio-identical estrone is also available, by prescription, from a compounding pharmacy. These pharmacies are able to formulate the dose requested by the practitioner and adjust the dosing and the delivery method based on very individual needs. Bio-identical estrogens are free of unnecessary fillers and available in individualized doses and delivery forms (capsules, tablets, sublingual tablets, lozenges, creams, gels), an important advantage in using natural estrogens. In addition, estrone can be used either alone or in combination with estradiol and estriol as is appropriate to each woman and each set of circumstances.

Bio-identical estradiol is also available from a compounding pharmacist and also individualized by dose and delivery for each woman. Bio-identical estradiol is the same hormone as the estradiol that is used in many conventional prescription estrogens (Estrace, Gynediol, and all the current estrogen patches on the market such as Estraderm, Climara, Vivelle, Alora, and Menostar). Again, the difference in the compounded bio-identical estradiol is that it is devoid of the binders, fillers, preservatives, and adhesives found in the patented product. As with compounded bio-identical estrone, compounded bio-identical estradiol also carries with it the extra advantage of very individualized dosing, combined options with estriol or estrone, and numerous delivery methods depending on patient preference or tolerance.

Whether it is compounded estrone/estradiol or the commercial pharmaceutical company form, these forms of estrogen have bone mineral density effects similar to those of conventional conjugated equine estrogens (CEE). A study of 32 postmenopausal women compared 0.625 mg CEE and 5.0 mg MPA with micronized 1.0 mg estradiol (considered to be an equivalent dose to 0.625 CEE) and 200 mg OMP, administered daily and continuously for 13 cycles.[138] Lumbar bone density improved by 5 percent in the CEE/MPA group and 3.8 percent in the micronized estradiol/OMP group. Hipbone density improved by 2.6 percent in the CEE/MPA group, and 3.1 percent in the micronized estradiol/OMP group. Statistically, the numbers for the two groups are considered similar. Low-dose estradiol (0.5 mg), equivalent to 0.3 mg of CEE, has also been shown to be effective in maintaining vertebral mass.[139] Although the authors of this study were able to show that 0.5 mg of estradiol effectively preserved spinal bone density, more traditional (1.0 mg) and higher-dose (2.0 mg) estradiol actually increased spinal bone mass by 1.8 percent and 2.5 percent, respectively.

Based on this information, it seems that 0.5 mg estradiol can be used to maintain bone mass, whereas 1.0 mg of micronized 17 beta-estradiol is considered the optimal dosing for enhancement of bone mass in postmenopausal women. No significant differences were seen with using the synthetic progestin (MPA) compared with the natural progesterone (OMP). Even the new lowest dose transdermal patch, Menostar 14 mcg patch (.014 mg), which delivers one-quarter of an average dose of estradiol, shows some ability to slow bone loss, although not to as great a degree as the average-dose patches of .05 mg.

Most people have not heard much about estriol, and I discuss it in more detail in Chapter 12. The question in this chapter is whether

estriol will effectively prevent bone loss. A few studies done in the last couple of years in other countries have been able to shed some light on the effects of estriol on bone. Although not all estriol studies have shown positive results with bone mass, several Japanese studies have. Seventy-five postmenopausal women with bone densities at least 10 percent or more below peak bone density were given estriol, 2 mg/day, with 800 mg daily of calcium lactate. After 50 weeks, an average increase in bone mineral density of 1.79 percent was seen on the routine DXA scan.[140]

In another Japanese study, 17 women who were 10 years postmenopause were given estriol, 2 mg/day, and 2 g/day of calcium lactate for one year. Another group was given only the calcium lactate. Bone density was significantly reduced after one year in the calcium-only group, while the estriol-plus-calcium group had a 1.66 percent increase in bone density, using the DXA scan again.[141] A third Japanese study compared 50- to 65-year-old women and elderly women who received either estriol, 2 mg/day, plus 1 g/day calcium lactate or 2 mg/day of estriol alone for 10 months.[142] Increases of about 5 percent in the lumbar spine were seen in both age groups of women who took the estriol and the calcium. Women of both age groups in the calcium-alone group had a decrease in bone mineral density of the lumbar spine. High doses of estriol, one at 4 to 6 mg/day and one as high as 12 mg/day, were studied in Scotland, but they were not proved protective against bone loss.[143]

As with bio-identical progesterone, studies on estriol also leave us with a lack of sufficient confirmation about its bone-protective benefits.

Exercise

When bones are stressed by weight, the bone cells (osteocytes) sense it. Osteocytes, in cooperation with other bone cells, initiate a cascade of events leading to increased bone mass that limits the deformation to a predetermined set point (0.1 to 0.5 percent) in any given dimension. When the load on bone exceeds the set point, more bone is deposited than removed. When the load is below the set point, the opposite effect takes place, and bone is lost.[144, 145]

This statement explains why swimming and moderate walking generally do not lead to increased bone mineral density (BMD),[146] but weight lifting,[147–149] jogging/running,[150] gymnastics,[151, 152] and certain sports like basketball do. The set point theory of bone mass increase in response to strain also explains why a few studies showed no effect[153] or a negative effect[154] of exercise on BMD—a load below the set point fails to trigger a response.

Regular physical exercise of appropriate intensity and duration that overloads the skeletal system above its set point increases BMD in women of all ages within the limits set by hereditary factors, nutrition, and the hormonal status of the individual. In children and adolescents;[155] in college-age women;[156, 157] in women in their 40s; and in young,[158, 159] older,[160, 161] and very old[162] postmenopausal women, exercise has been shown to be essential to the development and maintenance of bone health.

In sedentary women, trabecular bone loss begins to occur in the third decade of life and cortical bone loss in the sixth.[163, 164] The 35 to 45 percent reduction in muscle strength observed in women at 80 years of age parallels the observed bone loss at that same age.[165] Conversely, the age-related loss of bone parallels decreased physical activity.[166] Moreover, women who exercise retain bone mass throughout life,[167] achieve greater peak bone mass that contributes to the consolidation and strength of bone following the end of linear growth,[168] and have significantly lower risk of fractures in later life.[154, 169]

Furthermore, Recker and associates demonstrated that, independent of calcium intake or oral contraceptive use, the more college-age women exercised, the greater BMD they achieved. These increases were highly significant despite relatively small increments in exercise. A

1996 review of the literature on peak bone mass and exercise confirms these results and adds that exercise can maintain normal bones sufficiently strong until very old age and can strengthen weak bones when used in concert with adequate nutrition.[170] The author of this review concludes—as is the case in many studies—that even small increases in initial bone mass grow to a substantial difference if the increased bone mass is maintained by a lifetime of regular exercise.

Exercises that involve weight training can increase the mass of bones if the exercise also increases muscle mass and muscle strength.

Therapeutic Scheme for Management of Osteoporosis

- Determine risk for osteoporosis: mild, moderate, or severe.
- Be aware of seven levels of intervention that cover the majority of clinical situations:

Level 1: Diet, exercise, lifestyle, and stress management
Level 2: Nutritional supplementation
Level 3: Botanicals
Level 4: Compounded bio-identical hormones
Level 5: Pharmaceutical company bio-identical hormones (Use with oral micronized progesterone if uterus is still intact.)
Level 6: Synthetic and semisynthetic non-bio-identical hormones in cases that do not respond to other medicines (Use with oral micronized progesterone if uterus is still intact.)
Level 7: Prescription bone-specific medications

- Recommendations according to risk:

Level	Mild	Moderate	Severe
1.	X	X	X
2.	X	X	X
3.	X		
4.		X	X
5.		X	X
6.		X	X
7.		X	X

Exercise Recommendations

If you are not already exercising regularly, consult with your licensed health-care professional in cooperation with a qualified exercise expert. Together with them establish:

- A schedule of exercise
- The types, intensity, and duration of exercise

Consider the following guidelines:

- Begin slowly.
- Increase intensity very gradually.
- Train with weights for six weeks before introducing intensive aerobic exercise (such as running or speed walking) into your program.
- Begin each exercise session with joint warming exercises (see Appendix A) for 5 minutes.
- End each exercise session with 5 to 10 minutes of stretching exercises.
- Use caution and moderation throughout your lifetime of exercise.

Women who are in the early postmenopausal years can achieve small but statistically significant benefits on bone mass from strength training.[171] A meta-analysis found that women who exercised could increase their spinal BMD by approximately 2 percent.[172] Menopausal women who use estrogen along with weight training have better BMD increases than do women who use estrogen alone.[173]

Strength or weight training can be done as little as twice a week to achieve these benefits and can be done on very inexpensive home equipment that includes as little as a chair, a bench, and some hand weights. One word of caution is for women who already have osteoporosis. Heavy weight-bearing exercises and vigorous stretching and lifting can be enough to trigger a fracture of the spine.

One of the more important aspects of physical activity, especially in women who are 75 and older, is its role in reducing the risk of falls. Muscle strengthening and exercises to improve balance have been shown to reduce the risk of falls and related injuries by 75 percent.[174]

Sample Treatment Plan for Osteoporosis Prevention

See the conventional medicine section if you have a diagnosis of borderline osteoporosis or osteoporosis or have already had a fracture postmenopause. The dietary and nutritional supplement recommendations should then be used in combination with conventional therapy. If you do not want to take or are not able to take hormone therapy or conventional osteoporosis-specific medications despite a diagnosis of osteoporosis, this sample treatment plan may not be adequate to prevent bone loss or reduce the risk of fracture. Continue to see a licensed health-care practitioner and monitor bone density.

Dietary Recommendations

- Soy foods: 1 to 2 servings per day
- Dark leafy greens: 1 to 3 servings per day
- Low-fat dairy, especially low-fat cultured yogurt: 1 serving per day
- Decrease animal meats (except for fish) and substitute vegetarian choices, but with adequate vegetarian and/or fish protein
- Avoid alcohol, caffeine, and sugar

Regular Exercise

- Weight-bearing and aerobic exercise 150 minutes per week
- Weight training twice per week
- Most important, keep finding ways to motivate yourself:

  Be moderate—avoid burnout.
  Form a circle of friends who also love to exercise.

Nutritional Supplementation

- Calcium: 1,200–1,500 mg per day
- Magnesium: 400–750 mg per day
- Vitamin D: 400–800 IU per day minimum for women 51 to 70 and 800 IU per day for women over 70; consider even higher amounts of 1,000–2,000 IU if you have been tested and have a vitamin D deficiency
- Trace minerals: boron (3 mg), zinc (15 mg), chromium (100 mcg), manganese (15 mg), and copper (1.5 mg)
- Other nutritional cofactors such as vitamin K_2, 45 mg per day
- Essential fatty acid supplement: 2–4 g fish oil or 4 g fish oil/evening primrose oil per day
- Women at low risk: recommended diet, regular weight-bearing exercise, nutritional supplementation, no hormone therapy necessary
- Women at medium risk: recommended diet, daily weight-bearing exercise, nutritional supplementation, natural hormones (estriol, estradiol, and progesterone or estriol, estrone, estradiol, and progesterone; dose equivalent to 0.3 mg or 0.625 mg Premarin, depending on individual—see Appendix C), or conventional HRT or bone-specific medications
- Women at high risk: recommended diet, daily weight-bearing exercise, nutritional supplementation, conventional estradiol (1 mg per day) and oral micronized progesterone (200 mg per day for 12 days per month or 100 mg daily), or conventional HRT or bone-specific medications

Exercise throughout life is as critical as a lifetime of adequate nutrition. The important question for doctors is not to help their female patients of any age decide whether or not to exercise. It is rather to study ways to personalize the exercise prescription and motivate the patient to begin and continue exercising for life.

Numerous books are now available that provide an excellent introduction to your lifetime of exercise. Use simple low-impact exercises and stretching for two or three months before you branch out into the more comprehensive exercise program described in Appendix A.

If you are already exercising regularly, consider introducing into your program:

- Variations of speed in your aerobic exercises
- Different exercise positions, particularly in weight training, that challenge your bones from different angles
- Alternating practicing sports such as basketball, volleyball, tennis, and so on with a regular exercise routine

CONVENTIONAL MEDICINE APPROACH

Once the diagnosis of osteoporosis has been made, the most frequently instituted medications are the bisphosphonates, nonhormonal inhibitors of bone resorption that act by decreasing osteoclast activity (the cells that destroy bone). These drugs have very poor gastrointestinal absorption and can cause esophageal ulcers, gastric ulcers, and possibly gastrointestinal bleeding. The instructions for the use of these medications are very specific: the patient should take the medication immediately upon awakening and with an empty stomach, following the ingestion of the medication with a full glass of water. It is important that she remain upright for 30 to 45 minutes to prevent reflux and medication problems in the esophagus. Initially, these medications were used daily, and patient compliance was quite poor; being able to take these medications weekly or monthly has been one of the biggest advances in bisphosphonate therapy.

The medications that are most commonly used these days are alendronate (Fosamax), a 70-mg tablet once weekly for treatment or a 35-mg tablet once weekly for prevention in patients who are at very high risk for osteoporosis and have rapid bone loss but have not actually been diagnosed as having osteoporosis yet. The next in order of frequency of use is risedronate (Actonel), a 35-mg tablet once weekly. The newest is ibandronate (Boniva), which is a 150-mg pill once monthly. There are intravenous forms of bisphosphonates that can be used on a quarterly basis, but because of their cost and the need for IV administration, they are not frequently used.

Concerns have been raised about bisphosphonates causing osteonecrosis of the jaw. While a serious problem, it is incredibly rare. Approximately 150 cases of osteonecrosis of the jaw associated with bisphosphonate therapy have now been reported. Most of these patients, but not all, have received intravenous therapy, have malignancies, and have had dental intervention. Dental implant failures have also been seen in patients receiving oral bisphosphonates for osteoporosis. It could be, especially in those patients who have suffered necrosis after dental procedures, that there is compromised postoperative healing of the bone due to the inhibition of bone turnover caused by the bisphosphonate. A nonhealing wound could then lead to osteomyelitis, and then necrosis. Another mechanism may be that the bisphosphonates are decreasing the levels of vascular endothelial growth factor. Assuring dental health and dental status may be smart preventive advice prior to even oral bisphosphonate therapy, especially in those patients who have metastatic cancer, for whom oral or IV bisphosphonate therapy may slow their disease progression in the bones.

Estrogen and/or progestin therapy works in the same manner by decreasing the activity of the cells (osteoclasts) that remove bone. Hormone therapy was a mainstay for more than 40 years for prevention of bone loss, treatment of osteoporosis, and reduction of fracture risk. In the aftermath of the Women's Health Initiative study in 2002, more women have changed to bisphosphonate use due to fears about hormone therapy. Currently, however, hormone therapy is FDA-approved for treatment of osteoporosis in women who do not tolerate the bisphosphonates, such as women who have had esophagitis, gastric ulcers, or GI bleeds and women whose bone density doesn't improve on bisphosphonates. Some women are changed to a selective estrogen receptor modulator (SERM) also.

None of these agents will work optimally without the presence of an adequate amount of calcium, and in order to absorb the calcium, one needs an adequate amount of vitamin D. New studies suggest that 400 units of vitamin D daily are not adequate for calcium absorption and that 800 to 1,000 units per day may be more effective. Vitamin D deficiency is a leading cause of osteoporosis. When women present with postmenopausal osteoporosis, it is assumed that it is

related to being female and postmenopausal with low estrogen, but it is also important, as discussed earlier, to rule out other causes of osteoporosis such as parathyroid hormone problems, concomitant steroid use, and vitamin D deficiency.

Calcium is also very important, and many women do not tolerate the most common and least expensive form of calcium, calcium carbonate. All calciums appear to be absorbed equally well when taken with food and in the presence of vitamin D, but calcium carbonate seems to create more gastrointestinal symptoms. When bloating, constipation, diarrhea, or gas is present, the citrate variety is frequently substituted. The recommended daily dosage of calcium between diet and supplements remains 1,000 mg in women under 50 and 1,200 to 1,500 mg in women over 50.

Androgens have had renewed interest as a therapy for osteoporosis. Tibolone, an anabolic steroid, has been used in many years in Europe for treatment of osteoporosis and is being studied in the United States. There is concern about effects on lipids and the endometrium, as well as basic side-effect profiles that present with androgens, such as acne, facial hair growth, and body hair loss. Typically, androgens are not recommended for osteoporosis treatment.

Calcitonin is a less well-known medication that is primarily used for vertebral compression fracture pain. It is a peptide that inhibits bone resorption and causes a modest increase in vertebral bone. Calcitonin does not seem to have any significant effect on trabecular bone. Initially, it was very difficult to obtain, but recombinant DNA production of the medication has increased its availability. It is an intranasal medication used once daily, but its ability to treat general skeletal osteoporosis is limited. It has a very significant effect, however, on pain improvement in vertebral compression fractures.

SERMs are selective estrogen receptor modulators. They have estrogen-like effects in select tissues while not actually being estrogen. They are called selective receptor modulators because they have a proestrogen effect on certain tissues such as bone and endometrium and an antiestrogen effect on other tissues such as breast tissue. Clomiphene citrate used for infertility is essentially a SERM. Tamoxifen is probably the most widely recommended SERM. It has been used for many years in breast cancer treatment. It improves skeletal bone density in the same way that estrogen works, by decreasing osteoclast activity, but it does have a significant stimulatory effect on endometrium and has increased endometrial cancer in patients.

The third and currently recommended osteoporosis treatment SERM is raloxifene (Evista). It differs from tamoxifen in that it has no activity on the endometrium. It stimulates bone growth by reducing the activity of the osteoclasts and reduces serum lipids just like estrogen, but it does not stimulate the endometrium or the breast and has actually been shown in several studies to reduce lifetime risk of breast cancer by 50 to 74 percent. The side effects of raloxifene are vasomotor symptoms, unexplained leg cramps, and a risk of deep vein thrombosis (DVT) approximately equal to that of estrogen.

The newest, but very limited, drug for osteoporosis treatment is parathyroid hormone. It is called teriparatide (Forteo), and it actually stimulates osteoblast activity, the cells that build bone. Its effect on the bone is uniquely different from any of the other medications. It is a daily subcutaneous injectable medication that is moderately expensive and used for severe osteoporosis in patients who are not responding to the other medications or are having a lot of fractures. The main side effects are dizziness, nausea, joint aches, and leg cramps.

For perimenopausal and young postmenopausal women with osteopenia and a T-score not worse than −2.0, I would consider the use of any of these conventional approaches overtreatment. Other prevention strategies include dietary advice, exercise including strength training, vitamin D, calcium, trace minerals and nutrients,

and low alcohol intake. The practitioner should monitor the bone density over time. For women of this age who actually have osteoporosis, bisphosphonates may be a good choice. Calcium and vitamin D have important but modest benefits in women who already have osteoporosis.

Older postmenopausal women (over 65) who have either significant osteopenia or osteoporosis are more certain candidates for bisphosphonates and other conventional treatments, which are proven to reduce the risk of fracture by 50 percent. Hopefully, research will determine the shortest amount of time that is necessary to be treated and the lowest dose that is required to achieve this significant benefit, which is not currently known for some of these medications. Fortunately, there is no rapid bone loss after discontinuing bisphosphonate treatment, compared to the rapid loss that does occur after discontinuation of estrogen.

Also in time, research on natural medicines can be expanded to include the role of nutrients not only in bone density, but in bone strength and bone architecture. Some of these areas could be the use of significantly higher doses of vitamin D, as well as red clover isoflavones, soy isoflavones, manganese, boron, fish oils, and more. In this way, natural therapies could play an increasingly important role in slowing bone loss and reducing fracture rates.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

Osteoporosis is one of the most important age-associated disorders and should be considered a potentially disabling disease that warrants substantial preventive efforts and management interventions. Early identification of risk factors for osteoporosis, prevention strategies, vitamin D status, and assessment of calcium metabolism and bone density provide the basis for determining what is appropriate for each woman. A licensed health-care practitioner who is educated about when to rule out secondary causes of bone loss and the importance of early identification, prevention, and treatment, and who is also aware of the spectrum of alternative and conventional options, is especially crucial for women who are at higher risk or who already have osteoporosis. Your family physician, internist, or endocrinologist is probably the cornerstone for medical therapy. Some gynecologists can provide advice and treatment as well. Some licensed alternative practitioners may have expertise in osteoporosis management as well.

Many physicians do not even discuss osteoporosis, and you may have to insist on a DXA scan to measure bone density. An ultrasound test of the heel, which is much less expensive, may be a helpful screening test for some women. There is some evidence that a heel test is 85 to 90 percent accurate compared with the bone density of the hip on a DXA scan. Many insurance companies do not cover routine osteoporosis screening for women under 65 unless they have significant risk factors, but if you have a heel test that shows your bone density is below normal, this can be the stimulus for obtaining a DXA scan. Some practitioners recommend screening women with heel ultrasounds, but by and large the heel test is not yet considered an accurate test to replace DXA scans for either early detection or monitoring.

The more risk factors you have for osteoporosis, the greater the need to have laboratory and bone density testing. Women are especially encouraged to seek a licensed health-care practitioner who is well educated in the diagnosis and management of osteoporosis.

PELVIC INFLAMMATORY DISEASE

CHAPTER 15

OVERVIEW

Pelvic inflammatory disease (PID) includes a spectrum of infections of the upper genital tract. These include endometritis (infection of the lining of the uterus), salpingitis (infection of the fallopian tubes), tubo-ovarian abscess, and pelvic peritonitis (infection of the serous membrane lining the abdominal and pelvic walls). More than one million women in the United States develop PID each year, and one-fourth of them require hospitalization.

The infection typically results from the spread of microorganisms that ascend from the endocervix (the canal leading from the cervix into the uterus) to the upper genital organs. The most common organisms are *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. Chlamydia causes 50 percent of PID in Europe and 20 to 30 percent of cases in the United States, though the real incidence may be even higher. Gonorrhea remains the single most frequent cause in the United States. Additional organisms implicated in PID include bacterial vaginosis organisms (*Mycoplasma* spp., *Peptostreptococcus* spp., *Prevotella* spp.), *Haemophilus influenzae*, *Streptococcus pyogenes,* and *Streptococcus pneumoniae*. PID is considered a polymicrobial infection due to the many organisms involved. Bacterial vaginosis (BV) produces enzymes that dissolve cervical mucous, and therefore if you have BV, there is an increased risk of endometritis (PID in the uterus), and women with the highest bacterial loads have increased risk of PID of at least twofold.

The problems associated with PID involve its ability to ascend from the lower to the upper genital tract. How it ascends is not exactly clear. Uterine contractions may be responsible, and even sperm may play a role in enhancing the spread of the organisms. Another possibility is that the bacteria may be transferred into the fallopian tube due to the common occurrence of retrograde menstruation. The pathogenic organisms may spread along with the blood, contributing to PID.

Once the pathogen ascends to the uterus or fallopian tubes, it adheres to mucus-secreting cells and then invades just below the epithelial surface (the surface of the tissue lining the fallopian tubes). An acute inflammatory response occurs, causing cell death and tissue damage, and can result in scarring and tubal adhesions.

One in four women diagnosed with PID may develop complications, including ectopic pregnancy, infertility, recurrent pelvic pain, and recurrent PID. It is important to recognize the possibility of PID because of its potential for developing into a lethal condition, a more complicated condition, or a condition with long-term consequences. It is also important to be alert to possible surgical emergencies. Sometimes PID can be elusive, and there is little clinical evidence to support a suspicion of PID, especially when the symptoms are mild and insidious. The classic symptoms of lower abdominal pain and tenderness with examination or motion of the cervix occurs in only 20 to 25 percent of patients. A much more common presentation is often a mild or subtle pelvic pain. Some women with PID will have discomfort with urination and urinary frequency as well as other urinary tract symptoms. An increased number of risk factors for PID increases the suspicion. These may include the following:

- Age 14 to 24
- Heterosexual and sexually active

- Multiple heterosexual sex partners
- New heterosexual sex partner
- Low socioeconomic status
- History of sexually transmitted disease
- History of PID
- Oral contraceptive users have increased risk of acquiring gonorrhea or chlamydia if exposed but a decreased risk of upper tract infection
- Use of IUD for contraception
- Never having been pregnant
- Cigarette, alcohol, or illicit drug use
- Any instrumentation of the uterus—such as a uterine biopsy, diagnostic scope, or surgical abortion
- Pelvic or bowel surgery

Adolescents and young single heterosexual adults have the highest incidence of gonorrhea. This organism is believed to be the cause in 33 to 80 percent of the PID cases, although mixed gonorrhea and chlamydial infections occur frequently. About 15 percent of endocervical gonorrhea infections result in PID. A diagnosis of PID in children warrants an evaluation for child abuse.

PID symptoms more often occur during or within one week of menses because the opening of the cervix is wider due to menstruation. Microorganisms can then more easily ascend into the upper genital region and use the flow of blood as nutrition for their growth.

Women with new heterosexual partners within the last 30 to 60 days or multiple sex partners are more likely to develop PID. If a woman's partner is not monogamous, then she is also at increased risk. A history of a sexually transmitted infection (STI) increases the likelihood of contracting subsequent STIs, as does a history of PID.

Barrier contraceptive methods such as condoms, diaphragms, and cervical caps (FemCap) reduce the risk of STIs, PID, and infertility.[1] Their protective benefit comes from decreasing the risk of acquiring a STI. In addition, the condom may decrease the risk for developing PID by eliminating the sperm as the method in which the STI can ascend.

Intrauterine devices (IUDs) are associated with an increased risk of PID, particularly in the first four months after insertion, but then risk returns to normal at five months.[2] The thinking is that microorganisms in the vagina and cervix are introduced into the uterus during the IUD insertion. The incidence of PID in IUD users is two to nine times that of nonusers in most populations of women studied.[1] If a woman with suspected PID has an IUD, it must be removed. Oral contraceptives (OCs) have both a positive and a negative effect on the risk of PID. They can increase the risk of chlamydia infecting the cervix (mucopurulent cervicitis), but they are also associated with a decreased risk of symptomatic PID. It is thought that the progestin component in the OCs causes the cervical mucus to become thicker and the STI cannot penetrate this. OCs also decrease the heaviness of the menstrual flow, and this decreased blood may result in less retrograde menstrual flow, making it harder for the bacteria to ascend and cause PID. If a woman using oral contraceptives does acquire PID, it is often milder or possibly even asymptomatic.[3]

Use of illicit drugs (especially crack cocaine), alcohol, or cigarettes has been associated with an increased risk of STDs and PID. Substance abuse also increases the potential for HIV infection. Women with HIV are far more likely to have PID.

Vaginal douching may be associated with PID and even ectopic pregnancy. In several studies, women with PID are more likely to use douching than women without PID. One study found that douching within the previous two months was associated with a 70 percent increase in PID.[4]

Diagnosis of PID starts with a combination of a good medical history and physical exam. The medical history should include a thorough sexual history. Symptoms include but are not limited to vaginal discharge, fever, chills, urinary symptoms, heavy menstrual bleeding, intermenstrual bleeding, and lower abdominal/pelvic pain. A

PREVENTION

- Use barrier methods of contraception.
- Avoid illicit drugs and cigarettes, and limit alcohol.
- Treat previous STIs with appropriate therapy and be certain of resolution.
- Avoid douching. (It is possible that douching will cause a vaginal infection of GC, CT, or BV to ascend into the uterus and/or the fallopian tubes.)
- Know the sexual history of your partner.
- Heterosexual women who have multiple partners and do not use condoms, cervical caps, or diaphragms are at higher risk for PID.
- Women with HIV are at even higher risk and need to practice even greater caution.

KEY CONCEPTS

- Acute or chronic pelvic pain warrants a visit to a qualified licensed health-care practitioner for diagnosis.
- PID must be differentiated from other causes of pelvic and abdominal pain.
- PID should be treated primarily with antibiotic therapy, while alternative medicine can offer supportive and adjunct therapies to conventional treatment.
- Seek prompt medical attention if you have the symptoms described in this chapter or suspect you have PID.
- The sex partner must also be evaluated and treated. Reinfection will almost certainly occur if the sex partner is not treated.

physical exam includes taking the temperature; a pelvic and abdominal exam with any tenderness of the uterus, fallopian tubes, or cervix serving as a red flag; observing the cervix and looking for redness, swelling, and friability (easy bleeding) of the cervix; and evaluating genital tract secretions, particularly for mucopurulent (green or yellow) discharge.

The vaginal secretions should be evaluated for the presence of white blood cells during microscopy. Laboratory testing includes cervical samples for *Neisseria gonorrhoeae* (GC) or *Chlamydia trachomatis* (CT); a pelvic ultrasound showing thickened, fluid-filled tubes or tubo-ovarian mass; and acute and/or chronic endometritis on endometrial biopsy. The gold standard in diagnosing PID is a laparoscopy. During this surgical procedure, the surgeon looks for swelling of the fallopian tubes, tubal adhesions, tubal erythema (redness), tubal purulent or serous discharge, and/or a tubo-ovarian mass.

OVERVIEW OF ALTERNATIVE MEDICINE

Gonorrhea is a reportable disease. This means that a practitioner must call the public health department and report the disease if this organism has been cultured. Due to the potential complications and seriousness of PID, in concert with a lack of proven therapeutic results in using natural treatments for this disorder, alternative therapies should be seen as secondary to conventional treatment. Women who suffer from PID and have strong opinions about not being treated with antibiotics should be fully educated and informed so that their decision to decline antibiotic therapy can be fully considered. A short course of antibiotic therapy is rarely detrimental to one's health. In this case, the benefit of the therapy far outweighs the risk of its use. Likewise, alternative practitioners should understand that the integration of antibiotic therapy for the benefit of the patient is not a failure of natural medicine. There are old texts that make reference to treating PID with natural therapies, but they lack modern methods of evaluation and follow-up. It could be that botanicals used in India, China, or elsewhere have a tradition substantiated by modern confirmation testing, but I am not aware of any confirmed treatments.

Using alternative therapies to support the immune system, assist in managing pain and

discomfort, reduce inflammation, and counteract some of the side effects of the antibiotics are the main priorities. Drinking plenty of water, getting rest, eating simple light foods, and avoiding stimulants are basic guidelines during any acute infection, including pelvic infections.

General immune support to complement conventional antibiotic treatment is just good plain common sense. Nutritional and botanical support can stimulate white blood cells that engulf and destroy bacteria. Herbs and nutrients can enhance the function of T cells, B cells, and natural killer cells that support the immune system's response to infection. Vitamin A, vitamin C, the carotenes, vitamin E, zinc, and the B vitamins all play an important role in immune enhancement. Increasing antibody response, stimulating helper T cells, enhancing white blood cell response and function, and directly killing the virus or bacteria are just some of the ways in which these supplements can be helpful during an infection of any kind.

Many herbs have also been shown to have antimicrobial and immunostimulating effects. Allicin extracts from garlic may hold the most promise for inhibiting bacterial infections. Goldenseal and Oregon grape root also have the ability to inhibit the overgrowth of numerous organisms, although this does not include BV and CT. The most commonly used herb for immune support is echinacea. Echinacea can increase the production of T cells, stimulate the white blood cells that engulf and destroy bacteria, stimulate natural killer cell activity, and increase the number of circulating white blood cells in order to deal with the infection.[5] The end result is a strengthened immune system. Curcumin is one of the best herbs to reduce inflammation.

The best complement to counteract the side effects of antibiotic use is to add or increase the intake of *Lactobacillus acidophilus* to help prevent a vaginal yeast infection. This can be accomplished by eating yogurt daily or by taking oral capsules of *Lactobacillus acidophilus*. Four to eight ounces of unsweetened acidophilus yogurt or at least three capsules of *Lactobacillus acidophilus* daily for two weeks may be able to prevent the overgrowth of vaginal yeast that often occurs when taking antibiotics. Additional dietary advice, plus botanical and nutritional therapies for the prevention and treatment of yeast vaginitis, is discussed in Chapter 20.

Ice packs over the pelvic region can reduce inflammation and pain in cases of acute PID. Cold or ice packs placed over the region of the uterus while putting the feet in a tub of hot water can further assist in reducing the inflammation, congestion, and pain in the pelvic area. Alternating hot and cold sitz baths can also be used to improve circulation in the pelvic area and improve the healing time from the infection. This is done by sitting in a bath of hot water, with the water level just above the waist, for three minutes, followed by sitting in a small second portable metal or plastic tub of ice cold water for

Sample Adjunct Treatment Plan for Pelvic Inflammatory Disease

This plan should be used as a complement to antibiotic therapy.

- Eat a light diet during acute infection: vegetable broths, steamed vegetables, salads, and fruits
- Acidophilus yogurt: 4–8 oz per day as a preventive of yeast vaginitis
- Vitamin E: 400 units twice daily
- Vitamin C: 1,000–2,000 mg 3 times daily
- Vitamin A: 25,000 units per day and up to 50,000 units for a maximum of 2 weeks
- Zinc: 45–60 mg per day
- Ice pack over the uterus with a hot footbath
- Echinacea: ½ tsp liquid extract or 2 capsules/tablets every 3 hours during course of infection
- High-dose allicin extract: 2 capsules 4 times daily for the first 3–6 days, then 2 capsules twice daily for 1 week, and then 2 capsules daily until infection is gone

one minute. This procedure is repeated three times in succession, once or twice daily throughout the course of the pain and infection.

CONVENTIONAL MEDICINE APPROACH

Conventional practitioners rely on their judgment in assessing the severity of the disease and the ability of the patient to carry out the treatment successfully. It is essential for the practitioner to educate the patient about the exact treatment regimen. If she is able to comply with the recommendations, she may be a candidate for outpatient treatment. Infertility may be more successfully prevented by prompt administration of IV (intravenous) antibiotics, even if the woman is not acutely ill. In the case of outpatient treatment, once antibiotics are administered, the patient must have a follow-up visit within 72 hours. With the advent of home IV therapy, sometimes IV antibiotic treatment can be received at home.

PID therapy must provide broad-spectrum coverage of the most likely offending organisms. Although several antimicrobial regimens have been effective in achieving cure in randomized clinical trials, few studies have been done to assess and compare elimination of infection of the lining of the uterus and the fallopian tubes or the incidence of long-term complications such as infertility and ectopic pregnancy. No single antibiotic regimen has been established. Healthcare providers select treatment regimens based on drug availability, cost, the patient's tolerance of the drug, and other individuating factors. Most practitioners follow the Centers for Disease Control treatment guidelines, which were updated in 2006:

Regimen A

- Levofloxacin (500 mg orally once daily for 14 days) *or*
- Ofloxacin (400 mg orally once daily for 14 days)

Regimen B

- Ceftriaxone (250 mg intramuscularly in a single dose) plus doxycycline (100 mg orally twice a day for 14 days) *or*
- Cefoxitin (2 g intramuscularly in a single dose) plus probenecid (1 g orally administered concurrently in a single dose) plus doxycycline (100 mg orally twice a day for 14 days) *or*
- Another parenteral third-generation cephalosporin (for example, ceftizoxime or cefotaxime) plus doxycycline (100 mg orally twice a day for 14 days)

These regimens can be used with or without metronidazole (500 mg orally twice a day for 14 days). The addition of metronidazole should be considered, as anaerobic organisms are suspected in the majority of PID cases. Metronidazole will also treat bacterial vaginosis, which is frequently associated with PID and/or follows antibiotic therapy.

It is important to realize how critical it is to follow the practitioner's directions and to complete the drug regimen as prescribed on the bottle. There may be side effects about which the patient should be informed to improve compliance.

There are certain criteria for hospitalization of a woman with PID that include but are not limited to:

- Concern about the ability of the patient to comply with treatment and to follow up
- A fever greater than 101 degrees
- Signs of an acute abdomen (acute onset of abdominal pain/tenderness/bloating, nausea, vomiting)
- Lack of improvement within 72 hours

If hospitalization occurs, a more complex regimen is administered with several combinations of IV antibiotics. After the patient leaves the hospital, two weeks of doxycycline is given.

Intravenous treatment recommendations of PID are as follows:

- Levofloxacin (500 mg IV once daily) with or without metronidazole (500 mg IV every 8 hours) *or*
- Ofloxacin (400 mg IV every 12 hours) with or without metronidazole (500 mg IV every 8 hours) *or*
- Ampicillin/sulbactam (3 g IV every 6 hours) plus doxycycline (100 mg orally or IV every 12 hours)

These medications are used in the hospital until the patient's fever has been absent for one or two days, her pelvic pain has dramatically reduced, she is taking oral food and able to get up and out of bed and take care of herself, and any of the other criteria that a physician chooses to release the patient from the hospital.

Treatment of a tubal ovarian abscess, which is a common complication of PID, is more complex. If the patient has a fever, with an acute abdomen, the first line of treatment is surgical drainage of the tubal ovarian abscess followed by multiple IV antibiotics. Sometimes, if a patient has minimal tenderness, does not have a fever, and is a good candidate for outpatient therapy, she can be given oral medications for two to three weeks and followed in the office.

Treatment of PID should eliminate signs and symptoms of the infection and eradicate the microorganisms while minimizing the damage to the fallopian tubes as well as long-term complications. Follow-up for outpatient treatment is critical within 72 hours to assure that the patient is taking the medicine accurately and to evaluate the effectiveness of the treatment.

Pregnant women with suspected PID should be seen immediately and have an ectopic pregnancy ruled out. PID in pregnancy is uncommon and is more likely to occur when HIV is present. Hospitalization and IV antimicrobial therapy are recommended.

Conventional practitioners take great care in educating the patient about the disease; the importance of treatment; the possible consequences; the importance of treating her male partners, if applicable; and the importance of barrier contraceptives and other methods to reduce the risk of STIs. To a patient not accustomed to dealing with severe infections and the need for antibiotics, some practitioners may seem overly aggressive in their recommendations and insistence. Although this may offend some women, it is important that they do not let a less-than-optimal bedside style distract their attention from the value of what physicians know and have to offer.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

Women with pelvic pain need to consider not only PID but also other conditions that can occur with similar discomfort. Ectopic pregnancy, tubo-ovarian abscess, ruptured ovarian cysts, appendicitis, inflammatory colitis, pancreatitis, cholecystitis (inflammation of the gallbladder), cystitis (inflammation of the bladder), diverticulitis (inflammation of a small pouch along the border of the colon), hepatitis, and a twisted fallopian tube are among the other potentially serious disorders that require differentiation from PID.

Women with PID typically describe pain that is sharp, localized, and on both sides of the body. They may also have an oral temperature above 101 degrees. Ectopic pregnancy typically presents with one-sided pain but no fever.

If you have these symptoms, call your doctor immediately. A licensed health-care practitioner (naturopathic doctor, medical doctor, osteopathic doctor, nurse-practitioner, or physician's assistant) will proceed with a history, physical examination, and diagnostic testing, including blood work, cultures, and possible pelvic ultrasound. An abdominal exam will be done to check for pain in various locations. A pelvic exam will check the external genital region; a speculum exam will check for inflammation and discharge. A thick, transparent, yellow, gray, or brown discharge coming through

Diagnostic Criteria for Pelvic Inflammatory Disease

All three criteria must be present for a clinical diagnosis (without the use of tests) of PID:

- Lower abdominal tenderness
- Bilateral adnexal tenderness
- Cervical motion tenderness

Additional criteria useful in diagnosis:

- Oral temperature greater than 101°F
- Mucopurulent cervical or vaginal discharge
- Palpable pelvic mass
- Elevated sedimentation rate or C-reactive protein—both markers of inflammation
- White blood cell count greater than 10,000
- Evidence of cervical infection with *Neisseria gonorrhoeae* or *Chlamydia trachomatis*
- Tubo-ovarian abscess or fluid-filled tubes on pelvic ultrasound
- Acute and/or chronic endometritis on endometrial biopsy
- Laparoscopic abnormalities consistent with PID

the cervix suggests a chlamydial or gonococcal infection. An internal exam will check for an enlarged uterus or pain and tenderness. Cultures for the infectious agents require two to three days to process and are important in confirming a diagnosis, but severe symptoms and the potentially serious consequences of acute PID require immediate treatment even if confirmation has not yet been obtained.

Since more than one organism can cause PID, a negative culture result can be misleading. Newer and more accurate tests using antigen detection methods or fluorescence antibody marker techniques are available for the rapid detection of chlamydial infection. They can be especially useful in detecting mild cases or cases that have no symptoms. Pelvic ultrasound examinations are performed when a pelvic mass or abscess is suspected. They may be able to reveal a cyst, an ectopic pregnancy, an abscess, or an enlarged tube.

Laparoscopy is considered to be the gold standard for diagnosing PID. Because diagnostic laparoscopy is expensive and invasive, requires special training, and may not affect the decision to treat the patient for pelvic infection, it is not routinely used in the emergency management of patients with PID. A procedure called culdocentesis aspirates fluid that has collected behind the uterus. It is rarely used unless the diagnosis is uncertain or a complication is suspected. The presence of blood in the fluid sample suggests an ectopic pregnancy or a ruptured ovarian cyst. Cloudy or purulent fluid suggests an infection, and the fluid is then tested with cultures for PID.

About 25 percent of women with PID will require hospitalization. Criteria for hospitalization have been established by the CDC. If your practitioner recommends that you be admitted to the hospital, I would urge you to entrust yourself to his or her care. You can always use natural therapies to augment the treatment. The CDC criteria for hospitalization include:

- Adolescent patient
- A surgical abdomen, a serious condition characterized by sudden onset of abdominal/pelvic pain, tenderness, and muscular rigidity (possibility of appendicitis)
- HIV infection
- The diagnosis of PID is uncertain
- The patient has not responded to outpatient treatment
- The patient has not been able to tolerate or follow the outpatient regimen
- A surgical emergency is possible
- Pregnancy
- The patient has a septic appearance (fever, chills, shaking, or other flu-like symptoms)
- Severe illness or nausea and vomiting
- Suspected pelvic abscess

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PREGNANCY

CHAPTER 16

OVERVIEW

All women want to do everything they possibly can to optimize the health and well-being of themselves and their children. There is no other condition that inspires women to care for themselves as well as pregnancy. That said, Mother Nature's talent in producing healthy babies is awesome indeed, and no matter the range of one's individual decisions regarding optimal health care, most babies arrive intact and healthy. Women who receive prenatal care enjoy the lowest risk of maternal and infant mortality in history.

It is important to recognize those things we have control over and those we don't. While women should do their best to take excellent care of themselves during pregnancy, they must not assume personal responsibility for vagaries of biology like miscarriages and rare abnormalities. Ninety-eight percent or more of babies are born healthy. Keep that number in mind as you read through this information. Remember that fetuses are strong little creatures. They pull what they need from our bodies pretty effectively. It is the woman carrying the child, in all but extreme cases, who suffers from any deficiencies in nutrition or health—the fetus gets preferential treatment. Welcome to motherhood!

Pregnancy and birthing are normal physiological processes that can be positively supported through adequate rest, preventive nutrition, and the avoidance of harmful substances. Minimizing stress, getting plenty of low-impact exercise and fresh air, and sleeping well are important factors leading to a positive overall experience of pregnancy and birth. The important thing to remember is that each pregnancy is unique, and although there are certain universal factors to consider, the most important preventive medicine is the mother's relationship to her own body and her emotional and physical connection to the child she is carrying.

During pregnancy, hormone secretion changes radically, causing the physical and emotional changes experienced by most women fairly early in the first trimester. Estrogen and progesterone levels are about 100 times higher than usual during pregnancy, dropping immediately after birth to prepregnancy levels as prolactin (the pituitary hormone) is produced to stimulate the production of breast milk. Throughout pregnancy, the placenta produces a hormone called relaxin, which softens the connective tissues and ligaments that support the uterus, allowing it to expand. The production of endorphins (morphine-like hormones that are the body's natural painkillers and tranquilizers) is increased during pregnancy and continues to rise during labor, when they reach peak levels.[1] These hormonal changes can lead to the experience of morning sickness or nausea in the first trimester, especially when there are nutritional deficiencies as well.

OVERVIEW OF ALTERNATIVE MEDICINE CONSIDERATIONS

Nearly all pregnant women can benefit from nutritional and multivitamin supplementation one year before and all during pregnancy, as well as throughout labor, delivery, and breast-feeding. The effects of poor nutrition during pregnancy can be seen in the increase of birth defects during times of famine.[2] But a standard Western diet (high in fats, salt, and sugar and low in complex carbohydrates) also lacks essential vitamins and minerals needed during pregnancy and breast-feeding, which can compromise your baby's health.[3] The appropriate

diet is well balanced and varied and includes fresh fruits, vegetables, whole grains, legumes, beans, and fish, with a limit on refined sugars, processed foods, and saturated fats. Organically grown produce, meats, and poultry are preferable, or inorganic produce that has been carefully washed to remove agricultural chemicals.[4]

In an observational study involving 76 healthy pregnant women, 78 percent had "one or more glaring nutritional deficiencies."[5] Another study showed an "overall apparent protective effect of peri-conceptual multivitamin use" for prevention of certain pregnancy-related illnesses and birth defects.[6] Of special importance are folate (folic acid) and calcium intake, since the requirement for both of these doubles during pregnancy.

One study found that "The fetus, the neonate, and the pregnant woman have an increased requirement for folic acid and vitamin B_{12}, and are more likely to suffer from a deficiency of these vitamins."[7] Nutrients such as folic acid and vitamins B_6 and B_{12} have been correlated with prevention of the more common pregnancy complications, such as spontaneous abortion, placental abruption, preterm delivery, low infant birth weight, and neural tube defects (such as spina bifida and anencephaly).[8] Supplementation with calcium—the only mineral whose requirement doubles during pregnancy[9]—has been positively correlated with prevention of pregnancy hypertension,[10] preeclampsia,[11, 12] preterm delivery,[13] and low birth weight,[14] as well as puerperal psychosis (postpartum depression).[15] Magnesium supplementation has also been shown to reduce the complications of pregnancy and improve the health of the infant.[16]

In addition to taking nutritional supplements, certain substances should be avoided in preparation for and during pregnancy. Smoking during pregnancy increases the incidence of premature labor,[17] low birth weight,[18] and infant complications.[19] These complications may not be alleviated by increased maternal caloric intake. In addition, women who abuse alcohol and use illicit drugs are more likely to have inadequate nutrition as well as birth abnormalities and developmental problems in the infant.

KEY CONCEPTS

- Eat a healthy, whole foods diet, high in healthy oils (low-mercury fish high in omega-3 oils), complex carbohydrates, fruits, vegetables, organic meats and dairy, legumes, and nuts and seeds.
- Avoid situations that would increase risk of acute illness.
- Manage medical problems safely and effectively, as necessary.
- Have regular prenatal health checks.
- Seek assistance from a qualified health-care practitioner.

TO PREVENT COMPLICATIONS

- Avoid alcohol.
- Avoid nicotine.
- Reduce exposure to mercury-containing foods.
- Avoid recreational drugs.
- Avoid over-the-counter drugs, prescription drugs, and herbs that may adversely affect the fetus. Consult with knowledgeable medical personnel about these choices.
- Exercise regularly; avoid injuries, falls, and high-risk athletics.

Nutrition

During pregnancy, a woman's physiology changes dramatically to allow for the development of a healthy fetus. To support the rapidly growing fetus, changes in metabolism, biochemistry, and hormone status are needed to provide the environment and energy required. Appropriate nutrition is important for both the mother and child during pregnancy and plays a pivotal role in a healthy pregnancy. Members of the health-care team assess maternal nutritional risk, assign goals for weight gain, and recommend dietary changes to achieve

those goals. Prenatal evaluation and continued health care are important to monitor the progress of the pregnancy and intervene with corrective changes when needed.

The nutritional assessment includes information about diet, eating habits, daily activities, medical and medication history, and the use of tobacco, alcohol, and recreational drugs. An initial physical examination followed by ongoing exams is essential in assessing the mother's body mass index (BMI) and appropriate weight gain and fetal growth. BMI relates weight to height and thus provides a better estimate of body fat distribution than weight alone. The practitioner uses the BMI to determine whether the mother is underweight, normal weight, overweight, or obese. Weight is a very important indicator of fetal health and requires precise and regular measurement. At each visit with your prenatal health-care worker, you should be weighed to assess your weight gain compared to the target goals.

Low prepregnant weight and inadequate weight gain during pregnancy are dominant contributors to intrauterine growth retardation[20] and low birth weight.[21] Maternal prepregnant weight and weight gain in pregnancy also have an impact on early infant death rates. For women who are underweight prior to pregnancy, the perinatal mortality risk at birth is lowest when their weight gain during pregnancy is greater than 37 pounds. For women who had normal weight prior to pregnancy, the lowest risk is with a weight gain of 30 to 37 pounds.[22] Women who are obese prior to pregnancy need to gain less weight for an optimal fetal outcome. Significant risk occurs in obese women if there is a greater than 25-pound weight gain during the pregnancy.[23] Weight loss in obese women is not recommended during pregnancy. Teenagers, especially, often need careful education about the importance of nutrition, nutritional choices, the importance of healthy weight gain, and guidance throughout the pregnancy.

All pregnant women will benefit from prenatal nutritional education that focuses on healthy nutritional practices. Women with limited or potentially imbalanced dietary habits (vegetarians, vegans, anorexics, and women consuming macrobiotic, high-protein, weight-loss, high-fat, or high–junk food diets) should receive special attention and be educated on the potential complications and risks of these habits to both the mother and the fetus. Women with a history of anorexia, bulimia, obesity, diabetes, chronic kidney disease, chronic gastrointestinal disease, or extreme diets may need more individualized education and nutritional therapy. Vegetarian, vegan, and macrobiotic diets are not necessarily inappropriate as long as certain parameters are monitored. These include regular physical exams and prenatal checks, appropriate weight gain, and laboratory testing. Even women that have done well or seemingly well on these diets prior to pregnancy may not do well when pregnant or nursing.

Other women may suffer from an inadequate caloric intake because of their fear of weight gain, inadequate education about pregnancy, or insufficient money to purchase enough nutritious food. For low-income pregnant and postpartum lactating women, for infants, and for children up to the age of five years at nutritional risk, assistance is available through the federal Supplemental Food Program for Women, Infants and Children (WIC). Food stamp programs and Aid to Families with Dependent Children may also be available for women. Other local, private, church, county, and state organizations may also be a source of assistance.

Some women are potentially at nutritional risk. These include women who have had several full-term pregnancies, previous low birth weight deliveries, and short intervals between births. Women with medical conditions such as diabetes, chronic renal disease, anemia, and phenylketonuria all require special attention to dietary counseling. Use of prescribed medications, over-the-counter drugs, vitamin and mineral supplements, laxatives, and diet aids should all be reviewed by a qualified health-care practitioner.

The average amount of weight gain is 28 pounds. The maternal component of weight accumulation starts in the first trimester and is most prominent in the first half of the pregnancy. The growth of the fetus is most rapid in the second half of the pregnancy. In the last 12 weeks, the weight of the fetus more than triples.

Optimal health during pregnancy not only helps to ensure a healthy baby but also helps to ensure good health for the mother after the birth. A strong nutritional foundation during pregnancy can provide mothers necessary support in the postpartum period, throughout breast-feeding, and during the years to come when the demands of raising young children are high. When contemplating pregnancy, the first step a woman needs to take is to commit to eat healthfully. Support of family and friends during days of not feeling well along with assistance with shopping and cooking can help in keeping that commitment. Almost every pregnant woman will experience cravings. The main problem with cravings arises when cravings for chocolate, sodas, sweets, and ice cream become substitutes for nutritious foods. Cravings often can also be clues about specific nutritional needs. A craving for ice cream may indicate an increased need for protein, fat, or calcium. A craving for acidic foods like pickles may be a clue to increased need for calcium or salt. A craving for sweets may indicate a need for more protein in the diet. Cravings for chips can indicate a need for more salt and fats. A continued effort should be made to replace these junk foods with healthier nutritious choices.

The best way to ensure that you are eating well is to establish a balanced, wide variety of foods, including whole-grain cereals and breads, vegetables and fruits, nuts, seeds, legumes, and complementary amounts of dairy products and meats, especially fish and poultry. If you are unfamiliar with natural foods, try to find a nutritional practitioner who can advise you and begin to make appropriate changes in your diet. Books on nutrition and cooking also can be of help as you incorporate healthy foods into your diet. If you already eat a very healthy diet, then it is important to ensure that you are eating adequate amounts of food. If you are on a restricted diet or follow a specific dietary system, I advise you to seek the advice of a health-care practitioner knowledgeable in the area of nutrition. Generally this would be a licensed naturopathic physician or a nutritionist/dietitian. The following general guidelines for daily food servings have been proposed as the "daily dozen" in the book *What to Eat When You're Expecting*.[24]

- Calories: plenty of healthy foods to ensure adequate calories (2,300 daily)
- Protein: four servings (either vegetable or animal sources—74 g total)
- Calcium foods: four servings daily (dairy and nondairy sources)
- Vitamin C–rich fruits and vegetables: two servings
- Green leafy vegetables and yellow fruits and vegetables: three servings
- Other veggies and fruits: one or two servings
- Whole grains and other complex carbohydrates: four to six servings
- Iron-rich foods: one or more servings daily
- High-fat foods: two servings
- Salt: in moderation, to taste
- Fluids: at least six to eight glasses
- Supplements: nutritious herbs, highly concentrated food supplements (soy or green drinks), and a prenatal vitamin-mineral supplement

The Food and Nutrition Board of the Institute of Medicine has published recommended dietary allowances (RDAs) periodically since 1943. The RDAs are listed by nutrient in the nutritional supplement section that follows.

The question of how many calories per day to consume is dependent upon many variables. The input portion of the energy equation includes the consumed food plus the amount of stored fuel in the body. The output variable in the equation includes the metabolic rate, thermogenesis (heat

production), and physical activity. The caloric content of the diet required to supply daily energy needs and achieve optimal weight gain can be estimated by multiplying your optimal body weight in pounds by 15.9 and adding 300 to the total. (Alternatively, you can multiply your optimal weight in kilograms by 35 and add 300 to the total.)

The postnatal period is another time when the physiological demands of lactation and breast-feeding put additional nutritional strain on the mother. Optimal milk production requires a total daily caloric intake of at least 1,800 calories. The energy sources are fat stores and diet, which need to supply an additional 500 calories per day. Intake of water, juice, and milk (this can be cow, goat, almond, soy, oat, or rice milk) to satisfy thirst is sufficient for breast milk production needs.

The well-balanced, varied whole foods diet that was consumed prenatally should be maintained postnatally. The monthly loss of iron with breast-feeding is about half that of regular menstruation, and because women do not menstruate during breast-feeding, their iron stores are usually replenished. Some vitamins and other minerals, however, may be depleted during lactation. Continued nutritional supplementation with a prenatal vitamin or, even better, a postnatal vitamin, can prevent deficiencies and is important even if the diet is sufficient.

After rapid weight loss in the first month, the lactating mother of normal weight may lose weight at a rate of about two pounds a month without affecting milk volume. For the obese woman, losing four pounds a month is also safe. Intentional weight reduction diets or rapid weight loss during lactation are not advisable. At one year after delivery, a two-pound residual additional weight is considered average.

Nutritional Supplements

Folic Acid. Folate is the only vitamin whose requirement doubles in pregnancy.[9] Deficiencies of folic acid have been linked in studies to low birth weight infants and neural tube defects. According to one controlled study, women at high risk (having previously given birth to babies with neural tube defects) who were given folate supplementation showed a 72 percent protective effect compared to the placebo group.[25] In one study, a group of pregnant women given folate supplementation gave birth to infants with increased birth weight and Apgar scores and had a decreased incidence of fetal growth retardation and maternal infections.[26]

Other studies also showed significant prevention with supplementation.[27–30] Because of firmly established connections between deficiencies of folic acid and low–birth weight infants and neural tube defects, the U.S. Public Health Service recommends that all women of childbearing age take daily folic acid supplementation to reduce the risk of congenital birth defects.

Dietary folic acid is a mixture of folates in the form of polyglutamates, which are readily destroyed by cooking. Higher levels of dietary folate intake has been shown in some cases to decrease the incidence of neural tube defects, but women hereditarily predisposed to such defects may need to take in more folic acid through supplements in order to reach optimal levels.[31] Folic acid can be found in green leafy vegetables, nuts, whole grains, liver, watercress (avoid in first trimester), parsley, and dandelion. With artificial supplementation, care must be taken, because large doses of folic acid have been associated with a decrease in zinc absorption, a mineral required for proper fetal growth and immunity,[32] as well as with maternal infection and abnormally slow fetal heart rate.[33]

Folic Acid

Recommended dietary allowance (RDA):
Pregnant: 600 mcg per day
Nursing: 500 mcg per day
Food sources: green leafy vegetables, nuts, whole grains, liver, watercress (avoid in first trimester), parsley, dandelion

Vitamin B_3 (Niacin, Nicotinic Acid). Vitamin B_3 (niacin) supplementation in the first trimester has been positively correlated in studies with higher birth weight, longer length, and greater newborn head circumference, all signs of healthier infants.[34] Good food sources of niacin are wheat germ, fish, and garlic. Herbal sources are alfalfa, burdock root and seed, dandelion, and parsley.

Vitamin B_3 (Niacin)

Recommended dietary allowance (RDA):
Age 18 and younger, pregnant or nursing: 30 mg per day
Age 19 and older, pregnant or nursing: 35 mg per day
Food sources: wheat germ, fish, garlic
Herbal sources: alfalfa, burdock root and seed, dandelion, parsley

Vitamin B_2 (Riboflavin). Studies show that vitamin B_2 (riboflavin) depletion is common during pregnancy (up to 40 percent less at term than nonpregnant women and men), so riboflavin supplementation is recommended to prevent metabolic disturbances.[35] Good sources of riboflavin are watercress (avoid in first trimester) and brown rice. Herbal sources include rose hips, parsley, saffron, dandelion, dulse (seaweed), kelp, and fenugreek.

Vitamin B_2 (Riboflavin)

Recommended dietary allowance (RDA):
Pregnant: 1.4 mg per day
Nursing: 1.6 mg per day
Food sources: watercress (avoid in first trimester), brown rice
Herbal sources: rose hips, parsley, saffron, dandelion, dulse (seaweed), kelp, fenugreek

Vitamin B_1 (Thiamine). Direct correlation has been shown between supplementation of vitamin B_1 (thiamine) early in pregnancy and higher infant birth weight and size.[34] Thiamine depletion is common during pregnancy, and supplementation is recommended.[36] Food sources are green peas, bell peppers, and sunflower seeds. Herbal sources include alfalfa, dandelion, fenugreek, raspberry leaf, red clover, and seaweed.

Vitamin B_1 (Thiamine)

Recommended dietary allowance (RDA):
Pregnant or nursing: 1.4 mg per day
Food sources: bell peppers, green peas, sunflower seeds
Herbal sources: alfalfa, dandelion, fenugreek, raspberry leaf, red clover, seaweed

Vitamin B_6 (Pyridoxine). Vitamin B_6 is "marginally deficient" in about 50 percent of pregnant women.[37] Supplementation has been linked to relief of nausea and morning sickness, especially in extreme cases that include vomiting.[38, 39] In one experimental study, 75 percent of women taking vitamin B_6 experienced complete relief from symptoms of morning sickness.[40] Higher doses were used for treatment of first trimester morning sickness (25 to 200 mg three times daily), but are not recommended before delivery, as higher doses may shut off breast milk in nursing mothers or cause the baby to have withdrawal seizures if commercial formula is given that does not include enough pyridoxine (B_6).[41, 42] However, when given during labor, vitamin B_6 may prevent many postnatal adaptation problems by increasing the oxygen-carrying capacity of the blood that supplies the fetus.[43]

Vitamin B_6 (Pyridoxine)

Recommended dietary allowance (RDA):
Pregnant: 1.9 mg per day
Nursing: 2.0 mg per day
Tolerable upper intake level (UL):
Age 18 and younger, pregnant or nursing: 80 mg per day
Age 19 and older, pregnant or nursing: 100 mg per day
Food sources: whole grains, wheat germ, egg yolk, peas, carrots

Local application of B_6 as a lozenge provided women with protection from dental cavities, which are more common during pregnancy.[44] Supplementation may also prevent toxemia of pregnancy (preeclampsia).[45] Food sources are whole grains, wheat germ, egg yolks, peas, and carrots.

Vitamin B_{12} (Cobalamin). The coenzyme form of vitamin B_{12} is a very complex molecule containing cobalt, designated in humans as cobalamin, which is required for proper homocysteine metabolism. At least 12 different inherited inborn errors of metabolism related to cobalamin are known; low plasma vitamin B_{12} levels have been shown to be an independent risk factor for neural tube defect in one study.[46] Supplementation is recommended and may also help prevent anemia. Food sources are cauliflower and broccoli. Herbal sources are alfalfa, comfrey, miso, seaweed, and catnip.

Vitamin B_{12} (Cobalamin)

Recommended dietary intake (RDA):
Pregnant: 2.6 mcg per day
Nursing: 2.8 mcg per day
Food sources: cauliflower, broccoli
Herbal sources: alfalfa, catnip, comfrey, miso, seaweed

Vitamin A. It is important to avoid oversupplementation of vitamin A during pregnancy. Daily doses of 40,000 units or more of vitamin A during pregnancy may be toxic,[47] while doses lower than 10,000 units appear to be safe.[48] In a study of 22,000 pregnant women, those who consumed more than 15,000 units of vitamin A per day from food and supplements, or 10,000 units as a supplement, showed a significant increase in birth defects associated with cranial-neural-crest tissue (several-fold higher incidence of birth defects).[49] Most of these women consumed the vitamin A before the seventh week of pregnancy. Rat studies show a possible link to folic acid metabolism.[50] Elevated levels of vitamin A in the blood have also been correlated with low birth weight.[51]

Vitamin A

Recommended dietary allowance (RDA):
Age 18 and younger, pregnant: 2,500 IU per day
Age 18 and younger, nursing: 4,000 IU per day
Age 19 and older, pregnant: 2,600 IU per day
Age 19 and older, nursing: 4,300 IU per day
Tolerable upper intake level (UL):
Age 18 and younger, pregnant or nursing: 9,000 IU per day
Age 19 and older, pregnant or nursing: 10,000 IU per day
Beta-carotene:
No recommended doses or insufficient reliable information. Consider UL to be 10,000 IU per day. Anywhere between 10 IU and 10,000 IU per day is an option.
Food sources: yellow and orange fruits and vegetables
Herbal sources: alfalfa, cayenne, comfrey, dandelion, elderberries, lamb's quarters, seaweed

Preterm infants have been shown to be deficient in vitamin A, which may predispose them to development of chronic lung disease.[52] Healthy pregnant women who developed preeclampsia were shown to be deficient in vitamin A (but not beta-carotene).[53] Preeclampsia is a potentially dangerous condition characterized by high blood pressure, swelling, and/or protein spilling into the urine.

To avoid complications, supplementation with no more than 6,000 units of vitamin A is optimal and recommended.[54] Beta-carotene, which has the same positive effects as vitamin A, has not been associated with toxicity or teratogenicity in humans or animals.[55] Plant sources of the nontoxic "provitamin A" beta-carotene are organic fruits and vegetables, especially yellow and orange ones; for example, one sweet potato or one cup of carrot juice contains 25,000 IU of beta-carotene.[56] Herbal sources are alfalfa, cayenne, comfrey, dandelion, elderberries, lamb's quarters, and seaweed.

Vitamin C. Vitamin C plays a vital role in the formation of collagen—a major protein found in connective tissue, cartilage, and bone. It is essential to the nerves, healthy gums, and teeth and prevents infection. Although one study showed that women who took 5,000 mg of vitamin C daily during pregnancy delivered healthy infants who developed scurvy,[57] this "rebound scurvy" is very rare, and the infant recovers quickly without treatment. Supplementation with vitamin C may be as effective as calcium for leg cramps during pregnancy.[58]

Food sources of vitamin C are fruits (particularly citrus), green chilies, tomatoes, honey, cabbage, cucumbers, and prunes. Herbal sources include elderberries, rose hips, parsley, dandelion greens, nettles, alfalfa, and cayenne.

Vitamin C

Recommended dietary allowance (RDA):
Age 18 or younger, pregnant or nursing: 115 mg per day
Age 19 and older, pregnant or nursing: 120 mg per day
Tolerable upper intake level (UL):
Age 18 or younger, pregnant or nursing: 1,800 mg per day
Age 19 and older, pregnant or nursing: 2,000 mg per day
Food sources: fruits (especially citrus), green chilies, tomatoes, cabbage, cucumbers, and prunes
Herbal sources: elderberries, rose hips, parsley, dandelion greens, nettles, alfalfa, and cayenne

Vitamin D. The absorption of vitamin D (as well as calcium, which vitamin D helps metabolize) is enhanced during pregnancy, and since vitamin D tends toward toxicity, supplementation should be judicious to prevent excessive amounts of it from spilling into the urine. Fish oil and sunshine are good sources of natural vitamin D, which benefits the development of good teeth and bones. Herbal sources of vitamin D are alfalfa and nettles.

Vitamin D_3

Adequate intake (AI):
Pregnant or nursing: 200 IU per day
Tolerable upper intake level (UL):
Pregnant or nursing: 2,000 IU per day
Environmental source: sunshine
Food sources: fish
Herbal sources: alfalfa, nettles

Vitamin E. Vitamin E declines during pregnancy, creating deficiencies, and fetal vitamin E levels are usually low.[59] Lower plasma levels in the mother may be associated with increased risk of preeclampsia, as well as premature and low–birth weight infants.[60] Supplementation has been shown to be effective in preventing chronic miscarriages.[61] Good food sources are parsley, brown rice, and wheat germ. Herbal sources include alfalfa, rosehips, raspberry leaf, dandelion, and seaweed.

Vitamin E

Recommended dietary allowance (RDA):
Pregnant: 15 mg or 22 IU per day
Nursing: 19 mg or 28 IU per day
Tolerable upper intake level (UL):
Pregnant or nursing: 400 IU per day and up to 900 IU per day during the last two months of pregnancy
Food sources: brown rice, parsley, wheat germ
Herbal sources: alfalfa, rosehips, raspberry leaf, dandelion, seaweed, watercress (avoid in first trimester)

Vitamin K. Vitamin K is necessary for bone metabolism. In most states it is required by law that vitamin K be given to newborns in the hospital by injection in the foot immediately after birth or a shot during labor to prevent hemolytic disease, which is characterized by anemia, jaundice, enlargement of the liver and spleen, and generalized edema. Naturopathic doctors recommend checking the pregnant mother's diet for vitamin K deficiency and adding oral supplementation of vitamin K in the last month of

pregnancy, if needed, rather than automatically giving the shots, which have been shown in some studies to link with childhood cancer.[62]

Vitamin K (along with vitamin C) is effective in preventing the nausea and vomiting of early pregnancy, and it may reduce the risk of intraventricular hemorrhage in premature infants.[63] Some food sources are parsley and brown rice. Nettle or alfalfa leaf infusion or tea taken throughout the pregnancy will increase available vitamin K and hemoglobin in the blood; kelp is also helpful.

Vitamin K

Recommended dietary allowance (RDA):
Pregnant or nursing: 65 mg per day
Food sources: parsley, brown rice
Herbal sources: alfalfa, nettles, kelp

Calcium. Calcium is the only mineral whose requirement doubles during pregnancy. Low dietary intake is associated with preeclampsia,[64, 65] a potentially dangerous (but preventable) condition characterized by high blood pressure (hypertension), swelling, and/or protein spilling into the urine. Supplementation with calcium may reduce the risk of preterm delivery, often associated with preeclampsia, and may also prevent the hypertensive disorders of pregnancy.[66] Calcium supplementation can also help to ease leg cramps during pregnancy.[67]

Excessive levels of calcium in the body, however, can result in spillage into the urine and an increased possibility of kidney stones. Supplement with the form of calcium that does not cause you indigestion or constipation. And attention must be paid to the relationship between calcium and other minerals, such as magnesium and zinc.

Raspberry leaf infusion contains calcium in its most absorbable form, as do nettle infusions, fresh parsley, and watercress. Other food sources of calcium include milk products (although consumption of these can lead to allergies in the baby), dark green leafy vegetables, asparagus, and pumpkin seeds. Avoid bone meal or oyster shell calcium tablets, which have been found to be high in lead, mercury, cadmium, and other toxic metals.

Calcium

Adequate intake (AI):
Age 18 or younger, pregnant or nursing: 1,300 mg per day
Age 19 and older, pregnant or nursing: 1,000 mg per day
Food sources: parsley, watercress (avoid in first trimester), dairy products, dark green leafy vegetables, asparagus, pumpkin seeds
Herbal sources: raspberry leaf, nettles, horsetail

Chromium, Cobalt, and Copper. These three trace minerals were positively associated in studies with higher infant birth weights, and supplementation is therefore recommended.[68]

Chromium

Adequate intake (AI):
Age 18 and younger, pregnant: 29 mcg per day
Age 18 and younger, nursing: 44 mcg per day
Age 19 and older, pregnant: 30 mcg per day
Age 19 and older, nursing: 45 mcg per day

Cobalt

Adequate intake (AI):
Pregnant or nursing: presumably as part of B_{12}, 2 mcg per day, and sufficient if you are taking vitamin B_{12}

Copper

Adequate intake (AI):
Pregnant or nursing: 2 mg per day

Iron. Some researchers have concluded that iron supplementation is essential during pregnancy in order to maintain adequate maternal iron stores. However, because iron supplementation can exacerbate zinc depletion, supplementation is only warranted if iron deficiency is detected and routine iron supplementation during pregnancy is clearly indicated.[69]

If a woman gets sufficient iron in the first trimester of pregnancy, studies show a definite positive association with infant birth weight and

size, although the same is not true for the second and third trimesters.[34] Good food sources are almonds, honey, beets (including greens), and high-quality protein foods like egg yolks and organ meats (liver, kidney, heart), preferably organic. Herbs high in iron are nettles, dandelion, and alfalfa, as well as kelp.

Iron

Recommended dietary allowance (RDA):
Pregnant: 27 mg per day
Age 18 and younger, nursing: 10 mg per day
Age 19 and older, nursing: 9 mg per day
Tolerable upper intake level (UL):
Pregnant or nursing: 45 mg, if not iron deficient
Food sources: almonds, beets (including greens), egg yolks, honey, organ meats (liver, kidney, heart)
Herbal sources: alfalfa, dandelion, nettles, kelp

Magnesium. Magnesium deficiencies are associated with preeclampsia[70, 71] and preterm labor.[72] Supplementation must be in the first trimester to positively affect birth weight and size. Researchers think that magnesium may act by opposing calcium-dependent arterial vasoconstriction and may also prevent cell damage and death, making magnesium sulfate the "drug of choice" in the treatment of preeclampsia.[73] In general, supplementation may reduce the complications of pregnancy and improve infant health.[74] In studies, magnesium-treated women had a 29.5 percent reduction in the risk of hospitalization, as well as a 37 percent reduction in days spent in the hospital. Food sources are honey, almonds, barley, dried fruits, and potatoes. Herbs are dandelion, alfalfa, and watercress (avoid in first trimester), as well as seaweed (also called dulse).

Magnesium

Recommended dietary allowance (RDA):
Age 18 and younger, pregnant: 400 mg per day
Age 18 and younger, nursing: 360 mg per day
Age 19–30, pregnant: 350 mg per day
Age 19–30, nursing: 310 mg per day
Age 31–50, pregnant: 380 mg per day
Age 31–50, nursing: 320 mg per day
Tolerable upper intake level (UL):
Do not exceed 400 mg per day during pregnancy
Food sources: honey, almonds, barley, dried fruits, potatoes
Herbal sources: alfalfa, dandelion, seaweed (dulse), watercress (avoid in first trimester)

Potassium. Potassium levels may be deficient in pregnancy, with the lowest concentrations in women with preeclampsia.[75] Supplementation is recommended. Food sources are bananas, potatoes (especially peels), olives, bran, and green leafy vegetables. Herbs are nettles, dandelion, alfalfa, and chamomile.

Potassium

Recommended dietary allowance (RDA):
Pregnant or nursing: 99 mg per day; should not be taken unless prescribed by your practitioner
Tolerable upper intake level (UL):
Pregnant or nursing: 99 mg per day; should not be taken unless prescribed by your practitioner
Food sources: bananas, potatoes (especially peels), olives, bran, green leafy vegetables
Herbal sources: nettles, dandelion, alfalfa, chamomile

Zinc. Zinc is required for proper fetal growth and immunity. Plasma zinc levels decline about 30 percent during pregnancy,[76] and low zinc intake is associated with spontaneous abortion and premature delivery,[77] as well as complications and labor abnormalities.[78] Low zinc was also associated with the specific complication of fetal distress[79] and may be associated with central nervous system abnormalities in infants, including neural tube defects,[80 81] as well as low birth weight infants[82–84] and toxemia of pregnancy.[85] Supplementation, especially if zinc levels are low, is recommended to reduce the risk of fetal and maternal complications.[86] In one study, labor complications (vaginal bleeding, fetal acidosis, uterine inertia) were improved.[87] Another study

showed a lower incidence of pregnancy-induced hypertension (which is associated with pre-eclampsia and preterm labor).[88] Some food sources of zinc are oysters, beets, broccoli, wheat germ, wheat bran, fish, lentils, and watercress (avoid in the first trimester). Herbs are garlic, ginger root, and parsley.

Zinc

Recommended dietary allowance (RDA):
Pregnant: 15 mg per day
Nursing: 15 mg per day
Tolerable upper intake level (UL):
Age 18 and younger, pregnant or nursing: 34 mg per day
Age 19 and older, pregnant or nursing: 40 mg per day
Food sources: beets, broccoli, fish, lentils, oysters, wheat bran, and wheat germ
Herbal sources: garlic, ginger root, and parsley

Bioflavonoids. Bioflavonoids are beneficial for women who have recurring miscarriages. When placed on citrus bioflavonoids daily as soon as a period was missed, many stopped aborting.[89] One study demonstrated that previously Rh-immunized mothers treated with bioflavonoids during their pregnancy delivered babies who were less erythroblastotic than expected.[90]

Omega-3 and Other Fatty Acids (EFAs). There is a growing body of evidence about the importance of omega-3 fats for human health and development, not the least of which starts with infant exposure during fetal development. Docahexaenoic acid (DHA) is an important component of phospholipids in the central nervous system and is found in high amounts in the retina, about 25 percent. DHA makes up 12 to 20 percent of the fatty acids in the gray matter of the cortex of the brain and in the brain stem. Inadequate intake of omega-3s has significant implications for both mother and infant. The development of the central nervous system, the brain, the eyes, and the immune system have all been associated with adequate intake of docahexaenoic acid (DHA) during the development of the fetus.

Essential fatty acids have a unique role during pregnancy because of the rapid cell growth and development of new tissues and new organ systems in a developing fetus. Fetal development is associated with a high EFA requirement, and this supply is dependent on the amount and availability of EFAs from the mother. Infants born of mothers with low DHA levels have shorter attention spans,[91] and this may have long-term effects on future learning, development, and performance. Children born to mothers who had taken 10 ml per day of cod liver oil during their pregnancy and lactation had higher IQs at age four compared to those born to mothers who had taken corn oil or placebo.[92]

Maternal levels of omega-3 fatty acids, especially DHA, decrease during pregnancy.[93] EFAs are components of breast milk, and maternal levels may be reduced further in nursing women. For the fetus, a deficiency of EFAs, particularly eicosapentaenoic acid (EPA) and DHA, may lead to a poorly developed central nervous system. EFA deficiency may also lead to intrauterine growth retardation leading to a lower body weight and slower growth of the brain. Supplementation with a daily complex of essential fatty acids and fish oils during pregnancy provides vital nutrients that supply the necessary EFAs for the increased nutritional and metabolic demand throughout the nine months of gestation. Fish oil supplementation has been shown to improve the DHA status of not only infants at birth but mothers too.[94] Other research has shown that supplementation with fish oils is a good means of improving omega-3s in pregnant women[95] and of improving the DHA status in breast milk.[96]

Trials on omega-3 fatty acids conducted in pregnant women have shown a significant reduction in the incidence of premature delivery.[97] In one such study, fish oil was investigated for its effects on pregnancy duration, birth weight,

intrauterine growth restriction, and pregnancy-induced hypertension.[98] Omega-3 fatty acid supplementation of 2.7 grams per day was compared to olive oil and/or no supplement. The fish oil–supplemented pregnancies lasted four days longer and birth weight was 107 g greater. In another study, infants born of mothers who had been given cod liver oil had higher levels of DHA in their umbilical cord, longer gestational length (longer to develop in the uterus), and more mature brain functioning measurements on the second day of life.[99] Fish oil also appeared to be related to a reduction in the risk of preterm delivery in those women who had had a previous preterm delivery. There was no effect of fish oil on intrauterine growth restriction or pregnancy-induced hypertension.[100] In addition, this study reported that preterm delivery and low birth weight of the infants occurs when little to no omega-3 fats from fish or fish oil are consumed.

A more recent study of pregnant women in Iceland showed that consuming liquid cod liver oil in the first 15 weeks of pregnancy resulted in babies with higher birth weight.[101] Higher infant birth weight is related to a lower prevalence of cardiac disease, high hypertension, and glucose intolerance in the future.[102, 103] Additional good news was that the women did not gain more weight, despite their consumption of increased calories and fat from the oil.

Hormone-like substances called prostaglandins are also involved in the development and clinical expression of preeclampsia. These prostaglandins are modulators of vascular smooth muscle tone and platelet aggregation (blood platelets sticking together). Preeclampsia is characterized by increased vasoconstriction, frequently associated with increased platelet aggregation, reduced uteroplacental blood flow, and premature delivery. In a placebo-controlled clinical trial, a group of pregnant women receiving a combination of evening primrose oil and fish oil had a significantly lower incidence of edema.[104] Evening primrose oil has also been shown effective in preventing pregnancy-induced hypertension[105] (associated with preeclampsia and preterm labor).

There is some evidence that evening primrose oil (EPO), taken both orally and vaginally, can be used to promote the preparation of the cervix for the birth (cervical ripening). Clinically, EPO supplementation during pregnancy has been found by practitioners of natural childbirth to be an efficacious method to stimulate cervical ripening during labor, and the prostaglandin PgE1 is known to stimulate cervical ripening and hasten the progression of labor.[106] Although practitioners using this supplement report no adverse effects, a retrospective trial comparing the oil to no supplement did not note a difference between groups, and there was a suggestion that there was an increased incidence of premature rupture of membranes, labor augmentation, and assisted vaginal delivery in the evening primrose oil group.[107]

The main food sources of essential fatty acids are raw seeds and nuts or fish. Whole and ground flaxseed and purified flaxseed oil are excellent sources of the two essential oils, linoleic acid and linolenic acid. Borage oil and black current oil can be taken in capsule form as nutritional supplements. It should be stated, though, that all seed oils are not the same in their makeup of essential fatty acids, and substituting a seed oil does not necessarily give the same benefits as the fish oils and vice versa.

Although research clearly shows that moderate EFA supplementation is beneficial and safe for pregnant women, caution should be exercised when consuming large doses. Also, there may be some caution about increased fish intake and environmental contamination. The U.S. Food and Drug Administration and the Environmental Protection Agency advise that pregnant and nursing mothers and young children avoid certain types of fish and shellfish and limit others. In part, this may be due to the methylmercury content in fish such as albacore tuna, shark, swordfish, king mackerel, and tilefish. Methylmercury is a known neurotoxin.

Supplementing with fish oils should be done with purified fish oil supplements, which can reduce or practically eliminate exposure to mercury, PCBs, dioxins, and pesticides. Due to how we have contaminated our ocean waters and the wildlife that inhabits these waters, high-quality fish oils supplements may in fact be a safer alternative to fish in food form and enable us to gain the benefits of omega-3s while reducing the risk of toxicity.[108, 109]

Omega-3 Fatty Acids

No recommendations have been established by the FDA but the International Society for the Study of Fatty Acids and Lipids recommends 2.87 mg per day of omega-3 fatty acids with a minimal intake of 300 mg per day of DHA for pregnancy or lactation.

Food sources: fish high in omega-3 fatty acids include tuna, salmon, sardines, mackerel, and herring (see precautions in text); other sources include flaxseed, hemp seeds, sunflower seeds, walnuts, almonds, and filberts

Coenzyme Q10. Coenzyme Q10 is a fat-soluble quinone occurring in the mitochondria of every cell that is a cofactor in the electron transport chain on which most cellular functions rely, making it essential for the health of virtually all human tissues. Plasma levels of this enzyme rise during normal pregnancy, reaching highs of 50 percent above normal by the 36th week. Decreased levels have been linked in studies to spontaneous abortion and threatened abortion, particularly before 12 weeks.[110]

No recommended dose available.

Methionine (SAM). Methionine is a component of many proteins, serving as a source of available sulfur for synthesizing both cysteine and taurine, crucial to cellular metabolism. Supplementation with methionine in mice reduced neural tube defects by 47 percent[111] and also positively affected birth weight and size.[112]

No recommended dose available.

Phosphatidylcholine (PC). PC is a primary component of lecithin, sometimes referred to as pure lecithin, from which dietary choline is derived. Dietary choline, after absorption by the intestinal mucosa, is metabolized in the liver to choline, a critical nutrient for brain and nerve development and function. In mammals, amniotic fluid has a tenfold greater concentration of choline than that in maternal blood,[113] and at birth, all mammals studied have plasma choline concentrations much higher than those found in adults.[114] When rats were supplemented with choline, the spatial memory of their offspring was permanently enhanced, and they showed more accurate performance on both working and reference memory components of tasks. From these studies,[115] researchers believe that choline is critical for optimal brain development, and therefore supplementation is suggested.

No recommended dose available.

Lecithin. Lecithin, a derivative of the soybean, is needed by the brain to function properly and helps to break down fatty cholesterol deposits in the body. Lecithin contains phosphorus and stimulates the metabolism. Lecithin is also found in fertile eggs, soy products, and, in small amounts, in all vegetables that have been vine ripened.

No recommended dose available.

Taurine. Taurine is an amino acid found widely distributed in foods of animal origin (but not milk or milk products). Taurine is biosynthesized from methionine or from cysteine during the metabolic process, and disturbances in enzymatic reactions that take place in this process can lead to mental retardation. Vegetarian mothers who consume no meat products during their pregnancy, and therefore have a low-taurine diet, as well as others on a protein-, methionine-, or vitamin B_6–deficient diet might be at particular risk.[116]

Although dietary deficiency of taurine has not been demonstrated to impact fetal develop-

ment in humans, researchers recommend that vegetarian women who intend to have children optimize dietary levels of protein and vitamin B_6, since there is no taurine present in plants and vegetables. Meat eaters are advised to eat only organic or "free-range" animals in order to avoid the high concentrations of hormones and pesticides found in animal products in industrialized countries.

No recommended dose available.

Botanicals

There are many herbs that can be used safely during pregnancy. Some herbs are characterized as tonics, others are spices that improve taste and digestion, other herbs contain specific vitamins and minerals that aid different organ systems, and still others can be used as medicines to intervene and treat conditions or illnesses related to the pregnancy. However, there are some herbs that are commonly contraindicated for use during pregnancy. Although some of these herbs may be used in very small amounts for specific conditions, it is prudent to avoid them unless under the supervision of an expert in herbal medicine. Some of these contraindicated herbs can be used safely late in the pregnancy or during labor with the guidance of an experienced practitioner (see the following sidebar).

The following herbs are some of the most common medicinal plants used in traditional herbal practice for promoting and maintaining health during pregnancy.

Dandelion Leaf and Root (*Taraxacum Officinale*). Dandelion is a potent source of vitamins and minerals, especially vitamin A, calcium, potassium, and iron. Mildly diuretic and stimulating to bile flow, dandelion leaf helps with the inevitable digestive complaints of pregnancy, and its root cleanses and tones the liver.[117] In early pregnancy, dandelion can help to alleviate nausea, upset stomach, and indigestion. As a diuretic, the most active part of the plant is the leaf. The root or the leaf can be taken as a tea, in capsule form, or as a liquid tincture (a mixture of plant, alcohol, and water). It can be safely taken throughout pregnancy as a tonic or to address one of the indicated specific problems associated with pregnancy.

False Unicorn (*Chamaelirium Luteum*). False unicorn has traditionally been used as a uterine tonic before, during, and after pregnancy, especially for women who have a history of miscarriage. Similar to dandelion, it is used to support liver and digestive function. Due to its bitter taste, this herb is probably best tolerated in capsule or tincture form rather than as a tea.

Ginger (*Zingiber Officinale*). Ginger is probably best known for its treatment of nausea and vomiting, whether pregnant or not. There have been several good scientific studies on the use of ginger in nausea of pregnancy and the more severe state called hyperemesis gravidarum (severe nausea and vomiting during pregnancy). In these studies, ginger brought about a significant reduction in both the severity of the nausea and the number of attacks of vomiting in the majority of the patients. In all of these studies, there were no adverse effects on pregnancy and pregnancy outcome. In fact, in the most recent study of 70 women, there were three spontaneous abortions in the placebo group and only one in the ginger group. More full-term pregnancies occurred in the ginger group than in the placebo group as well. No infants had any congenital anomalies.[118]

In a double-blind, randomized, crossover trial that studied the effectiveness of ginger in hyperemesis gravidarum, the most severe form of pregnancy-related nausea and vomiting, early in pregnancy, 250 mg of ginger root powder taken four times a day significantly reduced the severity of the nausea and the number of attacks of vomiting in 19 of 27 women.[119] Ginger is safe to use at any time during pregnancy and is a welcome alternative to some of the antinausea pharmaceu-

Herbs Contraindicated During Pregnancy

The following herbs should not be taken during pregnancy:

- Alder buckthorn (*Rhamnus frangula*)
- Aloe (*Aloe vera*)
- Angelica (*Angelica archangelica*)
- Arnica (*Arnica montana*)
- Autumn crocus (*Colchicum autumnale*)
- Barberry (*Berberis vulgaris*)
- Bethroot (*Trillium* spp.)
- Black cohosh (*Cimicifuga racemosa*)
- Blessed thistle (*Carbenia benedicta*)
- Bloodroot (*Sanguinaria canadensis*)
- Blue cohosh (*Caulophyllum thalictroides*)
- Broom (*Sarpthamnus scoparius*)
- Butternut (*Juglans canadensis*)
- Calamus (*Acorus calamus*)
- Calendula (*Calendula officinalis*)
- Cascara sagrada (*Rhamnus purshiana*)
- Coltsfoot (*Tussilago farfara*)
- Cowslip (*Primula veris*)
- Damiana (*Turnera aphrodisiaca*)
- Dong quai (*Angelica sinensis*)
- Ephedra (Ma huang) (*Ephedra vulgaris*)
- Feverfew (*Tanacetum parthenium*)
- Ginseng (*Panax quinquefolium*)
- Goat's rue (*Galega officinalis*)
- Goldenseal (*Hydrastis canadensis*)
- Gotu kola (*Hydrocotyle asiatica*)
- Ipecac (*Ipecac ipecacuanha*)
- Juniper berry (*Juniperis communis*)
- Licorice (*Glycyrrhiza glabra*)
- Lily of the valley (*Convallaria majalis*)
- Lobelia (*Lobelia inflata*)
- Male fern (*Dryopteris filix-mas*)
- Mandrake (*Podophyllum peltatum*)
- Mistletoe (*Viscum album*)
- Mugwort (*Artemesia vulgare*)
- Nutmeg* (*Carum petroselinum*)
- Pennyroyal (*Mentha pulegium*)
- Periwinkle (*Vinca* spp.)
- Peruvian bark (*Cinchona* spp.)
- Pleurisy root (*Aesclepius tuberosa*)
- Poke root (*Phytolacca americana*)
- Rhubarb (*Rheum palmatum*)
- Rue (*Ruta graveolens*)
- Sage* (*Salvia officinalis*)
- Sarsaparilla (*Smilax officinale*)
- Senna (*Cassia senna*)
- Shepherd's purse (*Capsella bursa-pastoris*)
- Stillingia (*Stillingia sylvatica*)
- Tansy (*Tanacetum vulgare*)
- Thuja (*Thuja occidentalis*)
- Wormwood (*Artemesia absinthinum*)
- Yarrow (*Achillea millefolium*)

*Small amounts of nutmeg and sage used in cooking are OK.

Note: Some of the herbs listed may be recommended by a licensed practitioner with expertise in the use of botanicals during pregnancy and labor.

ticals, which may be associated with teratogenicity (physical defects in the fetus in utero).

Information that has appeared in the writings of traditional herbalists and the lay press or herbal resources about the danger of ginger during pregnancy appears to be out of date and not based on scientific facts. Select sensitive individuals may get some stomach-burning sensations when using ginger. Taking it with food will most likely relieve that discomfort.

Nettle (*Urtica Dioica*). Nettle is one of the best herbs to use in pregnancy due to its appreciable amounts of vitamins and minerals, including calcium and iron. Used throughout the pregnancy, nettle can help to improve energy, strengthen the blood vessels, reduce varicose veins, alleviate leg cramps, prevent anemia, and decrease the likelihood of hemorrhage during childbirth. This is an herb that can be taken in all forms, including freshly picked young leaves and as a leafy green addition to steamed vegetables or salads.

Partridgeberry (*Mitchella Repens*). Partridgeberry or squaw vine is considered one of the best uterine tonics. It should be taken for several weeks before the due date. Squaw vine is often used in combination with raspberry leaf. It can be taken as a tea, in capsule form, or as a tincture.

Red Raspberry (*Rubus Idaeus*). Red raspberry leaf is the most often mentioned traditional herbal tonic for general support of pregnancy and breast-feeding. Rich in vitamins C and E and minerals, especially high in naturally chelated iron (which is well assimilated), it tones the uterus, increases the flow of milk, and restores the reproductive system after childbirth. Raspberry leaf contains fragrine, an alkaloid that gives tone to the muscles of the pelvic region, including the uterus itself. In addition to tonifying the uterus, raspberry is used to prevent hemorrhage. It deserves its reputation as a pregnancy herb par excellence.

Wild Yam (*Dioscorea Villosa* and *Barbasco*). Wild yam can be used to help prevent miscarriage due to its calming and antispasmodic action on the uterus. Even though wild yam has acquired a considerable reputation as a "female herb," perhaps its most traditional uses are as a digestive aid in treating nausea, as an antispasmodic for intestinal and gallbladder colic, and as a liver herb. This herb is best used in capsule or tincture form. To help prevent miscarriage, higher doses of the tincture can be used (¼ to ½ teaspoon every three to four hours).

SUBSTANCES TO AVOID DURING PREGNANCY

Besides supplementing with multivitamins, minerals, and other appropriate nutrients, a pregnant woman improves her chances for a complication-free pregnancy and birth by avoiding harmful substances such as alcohol, caffeine, nicotine, and recreational and prescription drugs. Teratogens are substances that cause birth defects, miscarriage, or pregnancy complication when a pregnant woman is exposed to them, especially in the early stages of pregnancy. Environmental chemicals such as mercury and lead, many prescription drugs such as Dilantin and Accutane, recreational drugs including cocaine and alcohol, and even some illnesses including rubella, diabetes, and herpes are all potentially teratogenic agents and able to cause loss of a pregnancy, birth defects, or pregnancy complications. Pesticides and other contaminants found in the environment (including our food and water) can disrupt the hormonal and chromosomal cycles, leading to breaks in the DNA and a wide range of deformities and abnormalities in all animal species, including humans.

Alcohol

Alcohol consumption during pregnancy is an established cause of serious birth defects and developmental delay, described as fetal alcohol syndrome (FAS). FAS is caused by in utero alcohol-induced damages and results in mental retardation. Infants born with FAS have facial abnormalities and slow growth. They show impairment in their intellectual development and have difficulties in learning, memory, problem solving, and attention span. They can also experience mental health problems and difficulties with social behaviors.[120] It is estimated that the prevalence of FAS in the United States ranges between 0.3 to 2.2 per 1,000 live births. Much higher rates can occur in some communities. The focus should be on prevention and aggressively promoting no alcohol use during pregnancy.

Even mild alcohol ingestion during pregnancy is said to result in hyperactivity, short attention span, and emotional problems in children.[121] Alcohol consumption during pregnancy contributes to birth abnormalities whether the mother drinks a little or a lot.[122] There are two periods of pregnancy when the maternal consumption of alcohol is particularly threatening to the development of the fetus: from the 12th to the 18th week and from the 24th to the 35th week. Three or four beers or glasses of wine a day can cause any one or more of the following defects: mental retardation, hyperactivity, a heart murmur, facial deformity such as a small head, or low-set ears.[123]

Cigarettes

The sad news is that more than 20 percent of women in the United States smoke. The numbers are similar in other developed countries and only slightly lower in developing countries. Unfortunately, many of these women also smoke during pregnancy—about 11 percent. Not only does smoking harm a woman's long-term health, it can increase numerous complications and cause serious problems for newborn infants. According to statistics, we could reduce the rate of stillbirths by 11 percent, and newborn deaths by 5 percent, if all pregnant women stopped smoking.[124]

Cigarette smoke contains more than 2,500 chemicals, and both nicotine and carbon monoxide are thought to be related to adverse outcomes in pregnancy. Smoking nicotine has been associated with several complications of pregnancy. It appears to double a woman's risk of developing placental problems,[124] including placenta previa (a low-lying placenta that covers part or all of the opening of the uterus), placental abruption (the placenta peels partially or completely away from the uterine wall prior to delivery), and premature rupture of the membranes. Cigarette smoking is known to cause lower birth weight and size; mothers who smoke 13 or more high-tar cigarettes a day have smaller babies in poorer condition than those of nonsmoking mothers.[125] Smokers have a miscarriage rate twice as high as that of nonsmokers,[126] and babies born to mothers who smoke have more than double the risk of dying of sudden infant death syndrome.[127]

Women who smoke may experience more ectopic pregnancies (a potentially dangerous situation in which the fertilized egg attaches to, and grows on, the fallopian tube outside the uterus). Children of smokers may have far more respiratory illnesses (like asthma) than those of nonsmokers. Even secondhand smoke is seriously harmful to mother and baby and should be avoided when possible.

The more a woman smokes, the greater the risk to her baby. However, if she stops smoking before the end of her first trimester, she is no more likely to have a lower birth weight baby than a nonsmoking woman. Even stopping by the third trimester can improve the baby's growth.

The good news is that it is possible to stop smoking and there are numerous resources to help you. The National Partnership to Help Pregnant Smokers Quit provides information for women and resources for health-care professionals. The American Legacy Foundation is another organization that helps smokers quit. Smokefree.gov is an online resource for individuals who want to stop smoking that is sponsored by the federal government. The American College of Obstetricians and Gynecologists provides good information for health-care providers to offer assistance to their patients. There are many other additional resources as well, and some may be local to your community.

Caffeinated Beverages

A small amount of caffeine will probably not be harmful for most women and their infants. However, there are some studies of concern. Caffeine has been shown to contribute to growth-retarded or low–birth weight infants.[128] Researchers have suggested that women limit their intake of caffeine to approximately 300 mg per day during pregnancy, and since caffeine is known to enter breast milk, that level might be appropriate for nursing mothers as well.[129] One cup of regular coffee contains about 120 mg of caffeine. Even with this limited amount, the coffee or tea should be organic in order to avoid the pesticides used in agricultural processes.

Pesticides and Environmental Hazards

Environmental factors are becoming more and more problematic to each generation of pregnant women, as many artificial compounds (such as PCBs from plastics) build up in the environment

over time without degrading, become part of the food chain, and are incorporated into our bodies. Theo Colburn's groundbreaking study of the links between pesticides, PCBs, and other organochlorides in the food chain and hormonal disruption and birth defects makes clear that whatever an individual woman can do to avoid these compounds in her food and water is well worth doing.[130] Because humans are high on the food chain, the effects of these compounds on human reproduction are potentially exponential and devastating.

Hazardous substances such as pesticides, lead, and other chemicals brought home from the work environment on a parent's clothing can harm an unborn child.[131] Also potentially harmful to the fetus are the mother's exposure to x-rays during pregnancy or the father's preconception exposure to x-rays.[132] One study showed that high amounts of lead and barium in drinking water caused an increased risk of miscarriages.[133] Elevated lead in the body has also been linked to preeclampsia[134] and lower birth weight.

Mercury has received perhaps the most attention of any of the pesticides and heavy metals. Methylmercury crosses the placenta and can impair the development of the central nervous system in the fetus. As a result, the federal government has issued guidelines regarding fish intake for pregnant women and for all age groups. The intake of fish appears to be strongly correlated with the concentration of mercury in hair, and it has been observed that women in states with fish advisories who ate 20 or more servings of fish in a three-month time span had mercury concentrations in their hair that was sevenfold higher than those of women who ate no fish. The majority of these women exceeded the recommended limit for lead.[135] Canned albacore tuna (or white tuna) and tuna steaks are generally considered to be higher in mercury than light canned tuna. The USFDA currently recommends that pregnant women eat no more than six ounces of fish per week.

Over-the-Counter and Prescription Drugs

Seemingly harmless over-the-counter drugs like aspirin, taken by mothers in the first half of the pregnancy, have been linked to lower-than-average IQs in their offspring.[136] Valium oil administered to egg-laying chickens induced impaired muscle cell development, suggesting potential harm from the use of Valium in pregnancy.[137] Medications such as lithium (used to treat bipolar disorder, formerly called manic depression) and tetracycline (an antibiotic) can harm the fetus; if at all possible, avoidance of these substances is recommended. Some anti-seizure medications are folate antagonists and, as such, can increase the risk for fetal neural tube defects unless folic acid supplementation is implemented along with the medication.[138, 139]

In addition to the products already mentioned, herbalist Susun Weed provides the following list of products to avoid: DES (diethylstilbestrol), laxatives, pHisoHex (or anything else containing hexachlorophene), hair dyes, phenobarbital, barbiturates, tranquilizers, epinephrine (adrenaline) shots, sulfa drugs, antibiotics, vaccines, anesthetics, mercury vapors in dentists' offices, steroids, hormones, and Accutane (an acne medication).[140]

Your health-care practitioner can make available a full list of over-the-counter and prescription medications rated in terms of safety and side effects for the fetus during pregnancy and for the infant during lactation. Please ask your health-care provider(s) before taking any over-the-counter medication, prescription medication, or herbal and nutritional supplements.

Recreational Drugs

Before conception and during pregnancy, especially the first trimester, it is important to avoid using recreational drugs, even those that may seem harmless at other times, as consequences to a developing fetus may be serious. Genetic mate-

rial can be damaged by marijuana, for example; in animals, it has been linked to an increase in fetal deaths and malformations.[141] Cocaine may decrease sperm concentration in semen, induce deformities in the shape of the sperm, and reduce the motility after ejaculation.[142] Men's preconceptual use of cocaine has been linked to cases of neurological damage in children.

EXERCISE

The appropriate take-home message on exercise during pregnancy is not that women *should* exercise during pregnancy but that they *may*. Too often, women have heard that maybe they should limit their exercise. It is not necessary to be so restrictive in exercise during pregnancy, although certain precautions should be observed. Despite conflicting opinions, information on exercise and pregnancy is plentiful, and its message is clear: low-impact, moderate exercise is safe during pregnancy.

In certain instances, exercise can prove beneficial to the pregnant woman and her child. Exercise can reduce the length of hospitalization, reduce the incidence of cesarean section, and result in a healthier baby with a higher birth weight. The advantages also extend to the pregnant mom to be. Women who exercise during pregnancy seem to do a better job at maintaining their ideal body weight after pregnancy and have less discomfort during their pregnancy.

See the sidebars for some helpful guidelines for exercising during pregnancy.

Contraindications to Exercise During Pregnancy

There are instances when exercise should be avoided during pregnancy. These include: preeclampsia, pregnancy-induced hypertension, toxemia, preterm rupture of membranes, history of preterm labor, persistent second or third trimester bleeding, incompetent cervix, or signs of intrauterine growth retardation.

COMMON COMPLAINTS AND DISORDERS OF PREGNANCY

Most problems experienced during pregnancy are a result of the immense hormonal changes, nutritional deficiencies, and shift in weight distribution that happens as a result of sudden weight gain. Backache, digestive discomfort, fatigue, swelling, and mood changes are almost inevitable.

With the judicious use of rest, exercise, and nutrition, most women can successfully weather the hormonal roller coaster ride of pregnancy. Walking a mile a day is unanimously recom-

Safety Tips for Exercising While Pregnant

1. Drink enough water or other fluids during and after exercise to prevent dehydration and hypovolemia.
2. Wear clothing that allows for adequate ventilation and prevention of hyperthermia while exercising.
3. Your exercise regimen should emphasize low-impact activities, such as stationary bicycling, swimming, walking, and low-impact aerobics.
4. Do not exercise if you have a fever.
5. Supine exercise (exercises in which you lie on your back) should be avoided, especially in the third trimester, as they may reduce blood supply to the fetus.
6. Exercises that require repetitive bouncing and jerky movements and exercises requiring balance should be avoided, especially in the third trimester.
7. Activities that involve potential low-oxygen states, such as scuba diving and mountain climbing, are contraindicated.
8. Be sure to follow a diet that emphasizes complex carbohydrates to replace muscle glycogen lost during exercise, thereby minimizing the risk of fetal ketosis (elevated ketones in the body tissues).
9. Participation in competitive team sports is acceptable in the first 15 weeks of pregnancy, although there are potential but unproved risks for fetal loss from pelvic trauma, abdominal trauma, or both.
10. Avoid exercises such as weight lifting, especially in the third trimester.

Tips for Safe Weight Training During Pregnancy

1. Do not compete, not even with yourself.
2. Begin with very light weights.
3. Avoid holding your breath while lifting. Breathe in during relaxing part of exercise and breathe out during effort part of exercise.
4. Rest between exercises.
5. Take a mouthful of pure water between exercises.
6. Do not lift while lying on your back. Pregnant women should not lie on their backs while exercising, especially after the sixth month, because blood supply may be reduced to the fetus.
7. Stay cool. Exercise increases body temperature, which may threaten the health of the fetus. Keep your temperature below 100 degrees. Dress lightly in warm weather.
8. Warm up for three to five minutes before performing weight-lifting exercises. (See "Joint Warming Exercises" in Appendix A.)
9. Perform a few basic stretches of muscles used during the exercise session at the end of the workout. (See Appendix A.)
10. See Appendix A for the "Speak Pregnancy Exercises."

Summary of Exercise Guidelines

1. Regular frequency of exercise is preferable to sporadic physical activity.
2. Guidelines for exercising safely during pregnancy should be followed. (See other sidebars in this section.)
3. Intensity of exercise should be monitored according to symptoms, and exhaustive exercise should be avoided.
4. Adequate caloric and nutrient intake should be maintained.
5. Adequate hydration, proper clothing, and avoidance of hot, humid environments should augment heat dissipation, especially in the first trimester.

mended by researchers and birth supporters, as is eating healthy (preferably organic) foods every day (including protein, whole grains, fruits, and vegetables). I recommend that if a pregnant woman eats meat and/or dairy products, these should be "free range" and organic, or at least free from the artificial hormones and pesticides used in the agricultural processes. Dairy products have some of the highest concentration of estrogen-mimicking artificial compounds and growth hormones. Xenoestrogens from pesticides are also suspected of causing genetic damage.

Morning Sickness

One of the first and perhaps most annoying complaints of pregnancy is the nausea (and vomiting) of "morning sickness," which generally stops being a problem after the first trimester. No one really knows what causes morning sickness, although it may be linked to an increase in thyroid hormone (T4) effects on smooth muscle relaxation in the stomach. Physical exercise, especially walking, is recommended for morning sickness. Low blood sugar is implicated in the nausea of early pregnancy and can be regulated by eating smaller meals more often, eating high-protein snacks before sleeping, and eating unsalted crackers or matzo before getting out of bed in the morning.

Insufficient B vitamins may be associated with morning sickness; pregnant women are often deficient in B_6 as well as folic acid (the need for which increases during pregnancy). Foods rich in B vitamins—such as nutritional yeast, yogurt, bee pollen, spirulina, wheat germ, whole grains, egg yolk, cabbage, and organic organ meats—might be sufficient to alleviate morning sickness; if not, a B-50 vitamin supplement may be needed during the first trimester.

Anise, fennel, peppermint, chamomile, or spearmint teas are all helpful; raspberry leaf tea, sipped before getting out of bed in the morning, may help. Wild yam root, according to herbalist Susun Weed, is "specific and powerful for nausea of pregnancy."[140] As we discussed earlier in this chapter, studies have shown ginger root to be extremely effective in the treatment of the nausea

and vomiting of severe morning sickness. Start with 250 mg of ginger root powder four times daily; increase if necessary. Fresh ginger root tea can be made by simmering slices of ginger root in boiling water for 15 minutes. Add honey to taste.

Chronic Miscarriage/Abortion

Ten percent of first trimester pregnancies end in spontaneous abortion or miscarriage. Women who miscarry always feel guilty; they often feel responsible for the miscarriage. The fact is, however, that nature is not perfect; all conceptions are not destined to become a child. Having two miscarriages—even in a row—is not necessarily abnormal. The causes of miscarriage include unknown factors, stressors, environmental factors (toxic substances in food, water, and air and pollutants in the workplace), smoking, drinking alcohol, dietary deficiencies, and fetal abnormalities. As discussed earlier in the nutrition section, low zinc intake has been associated with spontaneous abortion and premature delivery, and vitamin E supplementation and bioflavonoids may help to prevent miscarriage. In addition, Susun Weed lists the following herbs as being used in traditional herbal medicine for preventing miscarriage:[140]

- **Black haw root.** This is especially effective. Drink one or two cups of tea or one-half cup of infusion daily as soon as pregnancy is known; use throughout entire pregnancy if desired.
- **False unicorn root.** This is recommended especially for women who have experienced repeated miscarriages. Take three drops of tincture four to five times daily from preconception through the first trimester.
- **Wild yam root.** For threatened miscarriage, make a strong tea by steeping one teaspoon of wild yam root in two cups hot water for 15 minutes; take two to four ounces every 30 minutes. The tincture is less effective and may induce nausea or vomiting.

Preeclampsia or Eclampsia (Toxemia)

Preeclampsia is a dangerous condition that may develop in the third trimester of pregnancy. It includes hypertension (high blood pressure), edema, and protein in the urine. About 6 percent of all pregnant women will develop preeclampsia sometime after completing 20 weeks of gestation; eclampsia occurs in 0.1 percent of cases.[143]

Western medicine believes that there is no way to prevent preeclampsia but that it can be kept from progressing to eclampsia with good prenatal care. Herbalist Susun Weed disagrees, calling preeclampsia "the result of malnutrition during pregnancy," and says it is easily prevented by eating 60 to 80 grams of protein daily, getting enough salt, foods high in calcium, adequate calories, and nourishing herbal supports like raspberry, nettle, and dandelion leaves throughout pregnancy.[140] The *Harvard Guide to Women's Health* links preeclampsia to very young or much older women (over 45), women with underlying medical problems (high blood pressure, kidney disorders, autoimmune disorders, and diabetes), and multiple births.[144]

Once preeclampsia is diagnosed, a skilled professional must be called in to help manage the treatment, since the condition is serious enough to threaten the mother's life and damage the fetus. Potassium levels must be increased (in addition to prescription potassium, eating potato peels and bananas helps; also mint, chicory, and dandelion leaves). The sodium-potassium ratio needs balancing (drink raw beet juice, up to four ounces daily); supplement with B_6 in conjunction with a high-potency B-complex vitamin; eat spirulina; and add seaweed to your daily diet.

The *Harvard Guide* expresses the current allopathic medical perspective when it states unequivocally: "The only definitive cure for preeclampsia is delivery of the baby."[144] However, women with preeclampsia are generally sent to bedrest unless the diastolic blood pressure is greater than 100 with bedrest. If significantly preterm, efforts are

made to confirm fetal maturity or mature fetal lungs medically before delivery. Usually the earlier in the pregnancy that pregnancy-induced hypertension occurs, the more severe it becomes. The majority of cases at term are usually benign and easily managed. Catastrophic outcomes of toxemia include seizures, strokes, and failure of the heart, liver, lungs, or kidneys.

Since preeclampsia is characterized by high blood pressure, it stands to reason that yoga, meditation, and stress reduction techniques would be a useful complement to nutritional, botanical, and conventional medications.

Heartburn, Gas, and Constipation

Hormonal imbalances during pregnancy may result in softening of the smooth muscle found in the walls of the digestive tract. The consequent reduction in peristaltic movement causes food to pass more slowly through the esophagus, stomach, and small and large intestines to the rectum, inducing gas and constipation. Heartburn can be caused by the softening of the muscular valve between the esophagus and the stomach so that partially digested, acidic food may leak back up into the esophagus, causing a burning sensation in the chest. Heartburn and constipation are generally experienced in the later stages of pregnancy.

Susun Weed[140] and Rosemary Gladstar[145] emphasize eating small meals frequently, chewing food carefully, and avoiding acid-causing and greasy foods. Both recommend papaya (especially raw, but also in tablets and papaya leaf) for the enzymes, as well as fennel and anise seeds; Gladstar also recommends cumin and dill seeds in addition to the fennel and anise, suggesting an old-fashioned remedy for digestive disturbances: combine these four seeds and chew them before and after meals.

Be aware that coffee and cigarettes increase heartburn by irritating the stomach, and remember that whole grains, fresh fruits, and vegetables combined with nonstressful exercise are the best solutions to constipation.

Varicose Veins

Varicose veins can occur in the legs or in the anal or vulvar areas in pregnancy, due to hormonal softening of the muscular walls of the veins combined with the extra weight of pregnancy. Simple yoga and other nonstressful exercise can help by improving circulation from the lower body up to the trunk; it is also good to get your weight off your legs and put your feet up whenever possible.

A lack of nutritional elements in the diet, especially vitamin C, rutin, and other bioflavonoids, combined with the extra stress on the circulatory system, can cause the fragile capillaries to break. A tendency toward varicose veins and hemorrhoids may also be inherited. Eat foods high in vitamin C and bioflavonoids, such as buckwheat, nettles, rose hips, oranges, lemons, grapefruit, peppers, whole grains, hibiscus flowers, and the white rinds of organically grown citrus fruits; also include garlic, onion, chives, and leeks. These help maintain elasticity in the veins and capillaries. Lecithin, vitamin E, and rutin supplements are also recommended for preventing and repairing varicose veins.

Backache

It may not be possible to find an herb that is safe during pregnancy that is also a good treatment for backache. Gentle yoga stretches; walking and swimming; chiropractic adjustments; physical therapy; sleeping with pillows to support the legs, back, and belly; wearing flat heels; and getting plenty of minerals can all help in easing backache.

Bladder Infections

Blood volume increases 50 percent during pregnancy, causing the kidneys to work harder and making the urinary system more vulnerable to stress and infection. Especially in the last trimester, burning or frequent urination or cramping in the abdomen may indicate a bladder infection. Many herbs and nutrients can be used to treat urinary tract infections, although not all of them are safe while pregnant.

Uva ursi is safe and is one of the most effective herbs to prevent recurrent bladder infections while also having antimicrobial activity in acute infections. Used in leaf form, place the leaf in a tea ball and place in water that has already come to a boil. Let it steep for five minutes, then drink one cup every three hours for two days, then one cup three times a day for an additional week.

Vitamin C and unsweetened cranberry juice can be used to acidify the urine and fight the infection by interfering with the ability of the bacteria to stick to the bladder wall. Take 1,000 mg of vitamin C three to four times per day for up to one week. Eight to sixteen ounces of unsweetened cranberry juice per day is recommended. Mannose, the simple sugar contained in cranberries, is a very effective and safe treatment during pregnancy. D-mannose adheres to the bladder epithelium and interferes with the ability of infection-causing bacteria such as *E. coli* to adhere to the bladder wall.[146]

Lactobacillus supplements are also safe in pregnancy. From the studies that are available, probiotics appear to be beneficial for preventing recurrent bladder infections in women. See Chapter 5 for further directions on treating bladder infections.

CONVENTIONAL MEDICINE APPROACH

Nothing would be better in the realm of childbirth than for peace to be made between those who endorse modern obstetrics and hospital births and those who applaud the naturalness of pregnancy and labor and prefer home birth when uncomplicated. There is merit in both approaches. Like all options in health care, only the pregnant woman can decide which is right for her—but with better cooperation between the groups, her choice would be easier.

When childbirth goes normally—which is most of the time—it can be safely managed at home. Unfortunately, we have no way of knowing if a low-risk birth will go awry, and home births are not equipped to handle complications such as profound fetal distress, prolapsed umbilical cords, and maternal hemorrhage. Moreover, these complications can be significantly worsened during emergency transport to the hospital.

Modern obstetrics was born after a time when all births occurred at home, no matter what, and maternal mortality was substantially higher than now. Forceps—we now groan at their mention—were a lifesaving invention for mothers as well as their babies, because prior to their use, both mother and baby sometimes died of the "obstructed" pelvis, often after laboring for days. Life without cesarean sections was also life with many more maternal deaths.

Where is the happy medium? How can we avail ourselves of the truly lifesaving aspects of obstetrics and eliminate the excess? The best answer I have is to be as educated as possible about options and be open to the obstetrical reality that things do not always go as we hope and plan. Be flexible. If possible, have a relationship with a conventional provider that you see at least once during your pregnancy.

One good option is to consider hospital-based midwife services. The midwives are very committed to natural childbirth and, unlike the typical hospital birth, are present and supportive throughout your whole labor. They work with a backup physician, someone presumably of their choosing. Even if the physician is called, the midwife will continue to attend you as her primary patient and advocate for your wishes. The C-section rates for midwife-assisted births are low, their respect for the birthing process high. If you choose an out-of-hospital birth, be aware that the main reasons women eventually come to the hospital are for prolonged labor and/or pain—not emergencies. Have a plan worked out for what you will do in that situation.

Conventional obstetrics need not be as off-putting as many assume. There are providers who support a woman's wish to have her birth naturally. They also support women who choose to

have their labor pains assuaged. Women are offered the choice of intravenous medication or epidural medication. When an epidural is given at no sooner than 4 to 5 cm dilation in a woman delivering her first child, the cesarean section rate is not increased over the rate of those women who go without epidural anesthesia.

Cesarean section rates vary among physicians and institutions; it is reasonable to ask a provider for numbers. Around 15 percent is acceptable, although some will be as high as 20 percent; it depends somewhat on how "high-risk" the practice is. Moms or babies at higher risk may need to be delivered more urgently, and therefore more often by C-section. Most doctors do not take the decision to operate lightly, and your doctor should always discuss the issues with you clearly. Nothing will ever happen without your informed consent. You never need to have the drug Pitocin to stimulate labor or any other adjunct to labor unless you are in agreement. I encourage women to make their needs and wishes known in all aspects of their health care. That is the only way the system can become responsive to the evolving and varied needs of women.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

Healthy women with normal pregnancies have the lowest risk of complications, so medical management choices are largely personal. Most non-M.D. providers use a list of criteria to determine the low-risk or high-risk status of a pregnant woman. The criteria should address the mother's blood pressure, the risk of bleeding, and the lie or position of the baby in the uterus, as explained in the following sections.

Blood Pressure

Hypertensive disorders are the most common disorder of pregnancy, affecting as many as 5 to 10 percent of pregnant women.[147] One of the main reasons practitioners see pregnant women so often is to check their blood pressure. Most women's blood pressures goes way down in pregnancy. Women with chronic hypertension that does not stabilize at a safe level during pregnancy have a higher risk of smaller, more at-risk babies. The women themselves are at risk of developing the complications of hypertension, such as renal disease. Labor is sometimes induced at term—38 weeks or so—to lighten the load on mother and baby.

Preeclampsia is a different hypertensive disorder of pregnancy. It is most often a mild disease, characterized by the development of hypertension toward the end of pregnancy. At its worst, it can cause seizures or eclampsia and significant hematological abnormalities, including loss of the ability to clot blood. Kidney failure can occur. Usually none of these things happen, but because the severity of disease does not predict which women will have seizures, women with preeclampsia require protection against this risk with magnesium sulfate that is given during labor and for 24 hours afterward.

Mild forms of preeclampsia are treated with bedrest. Severe forms are treated with bedrest in the hospital. All efforts are made to avoid delivering babies very prematurely. However, when maternal health is significantly compromised, this measure may need to be taken. When severe, there is no cure for this disorder but delivery. It is thought to be caused when the mother's immune system is intolerant of the fetus's foreign genetic makeup, and thus it is extremely rare to have a second severe case in subsequent pregnancies with the same partner.

Bleeding

Bleeding is never normal in pregnancy. Although it doesn't necessarily indicate a serious problem, it must be assumed to do so until proven otherwise. Placental abruption is a disorder in which the placenta pulls away from the uterus prematurely, causing bleeding and contractions that can be life threatening to both the woman and

the fetus. Because the placenta is so large, a lot can pull away before things are hugely compromised, but an evaluation is in order.

Placenta previa—in which the placenta covers the opening to the cervical canal—can also cause significant hemorrhage and is classically heralded by a small, otherwise insignificant "sentinel bleed." Ultrasound can diagnose this easily. No pregnant woman should have a vaginal exam in the third trimester without first using ultrasound to locate the placenta. Digital exploration can cause significant blood loss in the case of placenta previa.

Abnormal Lie

Many hospitals will support the vaginal birth of a healthy frank breech infant (butt first). Footling breech—with the feet first—is unsafe vaginally, because the feet can come down through the partially dilated cervix—as can the cord—before the entire infant will fit. An alternative to delivering an infant in the frank breech position is to rotate the fetus, or rather coax the fetus to rotate, from outside, which is successful about half the time. Neither of these procedures should be undertaken at home.

If the fetus measures significantly large or small at any point, this should prompt at least an ultrasound. Fetal abnormalities associated with poor growth or too much or too little fluid can present this way, and these are best prepared for in advance of delivery. Size discrepancy is often as simple as an error in dating, but figuring out the right due date is still very helpful.

The pregnancies of women with any major underlying health problem—such as diabetes or heart or respiratory disorders significant enough to require ongoing surveillance in the nonpregnant state—should be managed with input from a licensed provider. So should those of women with kidney disease or autoimmune disorders like lupus or rheumatoid arthritis. All of these conditions can make a pregnancy much riskier for both mother and child. Ultrasound can be invaluable in assessing fetal growth and well-being. Ongoing surveillance of the pregnancy can alert the woman to any medical problems as early as possible.

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PREMENSTRUAL SYNDROME

CHAPTER 17

OVERVIEW

When finally we understand premenstrual syndrome (PMS), we will have gone a long way toward understanding the interplay between the cultural, physiologic, and emotional factors that regularly affect women's lives during the premenstruum. A huge piece of work will have been done toward improving women's health.

Dr. Maria Gurevich has written, "The persistence of PMS as a medical category despite the inconclusiveness of the research, suggests that PMS is not simply a biomedical entity . . . it is also a complex, ideologically and culturally constructed category . . . predicated on a number of unarticulated, well-entrenched beliefs about the nature of science, biology, health and femaleness."[1]

Maintaining good health and attitude through all phases of the menstrual cycle is just not as simple as correcting female physiology gone awry but also involves on some level transforming our cultural image of women's reproductive health, specifically menstruation, from negative (the "curse") to positive.

However far-reaching these ideals, what we are after is practical help for the woman who suffers premenstrually. While precisely defining PMS remains scientifically challenging, any woman can tell you what it is, and a great many will tell you that they have it. Defining terms carefully helps to extract "pure" PMS from an assortment of overlapping conditions.

Eighty percent of women experience premenstrual emotional or physical changes, whereas only about 20 to 40 percent of these women have difficulties as a result. A much smaller number, about 2.5 to 5 percent,[2] feel these changes have a significantly negative impact on their lives to the point where work, relationships, or home life are jeopardized. Most women who have symptoms do not seek medical care but instead self-treat, making this an ideal arena for natural self-care.

Some 150 symptoms have been ascribed to PMS—most commonly feelings of anxiousness (premenstrual tension was the first name given to this syndrome), irritability, and anger or moods vacillating unpredictably among the three. Some women feel predominantly sad or self-deprecating, others simply fatigued and lethargic. Physical changes include bloating, breast tenderness, food cravings, headache, and gastric upset. No particular assortment of symptoms is diagnostic; it is the regular recurrence of symptoms on a monthly basis, just before the menstrual period, that matters. Symptoms usually last a few days to a week before menses, sometimes two weeks, beginning at midcycle with ovulation and lasting until the menses starts or into the first few days of the flow.

As important as the regular timing of the arrival of these symptoms is the predictable relief and complete resolution experienced with the onset of menses or within one to two days of the menstrual flow beginning. PMS symptoms, whatever they may be for a particular woman, go away completely just as regularly as they arrive. Most who study this entity require that a woman be able to predict in advance for at least a couple of cycles when symptoms will come and when they will leave to warrant a diagnosis of PMS.[3]

It is important to check for other possible sources of the symptoms that might indicate medical conditions a woman may suffer from even more dramatically in the premenstruum. Women who are afflicted with asthma, migraines, epilepsy, herpes, or disordered eating,[4] for example, often note a cyclic worsening, a premenstrual magnifica-

tion, if you will, but this is not considered to be PMS. In addition, obesity has been found to be an independent risk factor for PMS, and those with a body mass index of greater than 30 had a threefold increase in risk for PMS.[5] Treatment for the underlying condition in these cases is more likely to eliminate the premenstrual aggravation than is treatment aimed solely at PMS.

Among women self-presenting to PMS clinics for medical care, fully 75 percent had another diagnosis that contributed significantly to their symptoms—major depressive or other mood disorders being most prominent.[6] About 10 percent had early menopausal symptoms, 10 percent were affected by hormonal contraceptives, and about 5 percent each were found to have eating disorders or substance abuse issues predominating. Anyone who considers her PMS to be significantly bothersome might be wise to check with her practitioner should her efforts with self-care fail. There may be other, more effective treatments, either for the PMS itself or for an underlying condition.

Most women feel different emotionally and physically during the premenstruum. The term *molimina* refers to those changes women notice that let them know their menses is approaching: appetite changes, swelling, or menstrual-like cramps. A recurrent pattern of mild but noticeable changes provides evidence that cycles are ovulatory. Some women enjoy positive changes: enhanced creativity, heightened sexual desire, intellectual clarity, and feelings of happiness and well-being.[7]

It is difficult to identify cause in a condition that overlaps so broadly with normal physiology, affects so many, and has such a wide array of symptoms. Many theories have been explored and none found completely satisfying. Most likely this is because there is such a complex interaction of factors both physiologic and social. While absolute levels of estrogen and progesterone are no different in PMS sufferers, we know that in women in whom both hormones are pharmaceutically blocked, PMS diminishes by 75 percent.[3] Blocking progesterone only using Ru-486 did not have this effect, nor did it worsen symptoms.[8] It is likely that ovarian hormones affect the neurotransmitter, neuroendocrine, and circadian systems that influence mood and behavior differently in each of us. As research continues, we are learning more about the role of neurotransmitters, neurophysiology, and electrical conduction in the brain in the development, severity, and treatment of PMS.

It is interesting to look at the work done on serotonin to appreciate the role our social environment may have on PMS. Anita Rapkin, M.D., studied serotonin levels in women with and without PMS and found that serotonin levels fell after ovulation in women with PMS.[9] Those without PMS had much higher levels of serotonin during the last half of the menstrual cycle. Abnormal serotonin metabolism has long been linked to depression. Elevating serotonin levels is how the popular antidepressant Prozac works.

There is evidence that estrogen levels affect the serotonin system. More interesting, studies in animals and humans have demonstrated how social interactions in groups can affect our serotonin levels. Dominant animals in groups have higher levels of serotonin, which then fall if they are removed from their prominent position. Serotonin levels rise in the animals that replace them in dominance.[9] Rapkin postulates that women without PMS may offset ovulation-induced susceptibility to low serotonin and isolation behavior through interacting more with "desirable others." In other words, women able to manipulate their social environment successfully are less susceptible to the mood consequences of low serotonin.

One begins to see how our culture's historical attitude of embarrassment or distaste around menstruation might contribute to susceptible women's neurotransmitters being adversely affected at a physiologically critical time, resulting in mood swings, anger, and irritability. This is congruent with the views of feminist writers who criticize the

medicalization of PMS symptoms as disease, arguing that medicine has tended to pathologize behaviors that do not conform to the unnatural yet pervasive female stereotype. Certainly, no other named condition in women is so common and so little understood and yet contains so many significant pieces to our lives.

In the last few years, premenstrual dysphoric disorder (PMDD) has been proposed by some to be a distinct entity clinically different from PMS. Many consider it a new psychiatric disorder. Other experts believe that PMDD is simply severe PMS with more impairment of normal life functions. However it is classified, PMDD is more severe than PMS, and the diagnostic criteria for this severity are met by only 3 to 8 percent of women. PMDD includes a minimum of five specific symptoms that occur during the latter part of the luteal phase of the menstrual cycle, right before the onset of menses.[10]

According to the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*, a woman would be diagnosed with PMDD if she experienced five or more of the following symptoms during most of the week before her menses, they interfere significantly with daily life and relationships, and they have occurred in the last year. At least one of the first four symptoms must also be present to lead to a diagnosis of PMDD.

1. Significantly depressed mood, hopelessness, self-defeating thoughts
2. Significant anxiety, tension, feeling irritable, uptight
3. Sudden mood changes of sadness, weepiness, or easily feeling rejected
4. Anger or irritability or increased conflict with others
5. Lack of motivation for usual activities
6. Difficulty concentrating
7. Lethargy, easily fatigued, low energy
8. Changes in appetite, overeating, food cravings
9. Hypersomnia or insomnia
10. Overwhelmed, feeling out of control
11. Additional physical symptoms: breast tenderness, swelling, headaches, joint or muscle pain, bloating, weight gain

KEY CONCEPTS

- PMS is characterized by cyclic symptoms during the second half of the menstrual cycle with a symptom-free phase during the first half of the cycle.
- Premenstrual magnification may manifest as an increase in chronic symptoms during the second half of the cycle.
- Premenstrual dysphoric disorder (PMDD) is thought by some to be distinct from PMS, and by others to be a more severe form of PMS. The hallmarks are when a woman experiences 5 or more of 11 key symptoms.
- The best evaluation and determination of PMS is a symptom diary relating symptoms to the menstrual cycle.
- Testing should be limited but should rule out thyroid problems and blood sugar problems in particular.
- Medical evaluation should be done to reveal concurrent disorders of depression and anxiety.
- Treatment should provide symptom relief while also addressing any need for lifestyle changes and treating problems in the neuroendocrine connections (central nervous system brain chemistry as it is affected by estrogen and progesterone in particular).

PREVENTION

- A whole foods diet with minimal intake of sugar, refined carbohydrates, dairy products, caffeine, and saturated fats
- Increase dietary fiber including whole grains
- Increase essential fatty acids from nuts, seeds, and fish
- Stress management
- Regular aerobic exercise
- Weight loss

The specific cause of PMDD has not been determined, but the dysregulation of serotonin appears to be a key feature.[11]

OVERVIEW OF ALTERNATIVE TREATMENTS

Historically, conventional mainstream medicine has not been able to offer women a known cause for PMS, nor has it been able to offer a management approach short of pharmaceuticals with as many side effects as relief. Fortunately, new research has led to a better understanding of PMS and to new and more successful conventional and natural treatments. Self-care with natural therapies is the dominant method women use to manage PMS. Women have clearly taken this familiar monthly problem into their own hands and more often than not have determined what works for them. Fortunately, PMS is a condition for which inadequate self-treatment yields dissatisfaction rather than dangerous side effects or progression of a serious disease.

In an attempt to offer women rationales for viable natural treatments for the relief of PMS, many theories have been offered. While comforting in their attempts to analyze the syndrome, these theories are poorly confirmed in research studies yet are still used as a basis for many natural therapies. Popular models such as hormonal-based therapeutics, including elevated estrogen levels and reduced progesterone levels; elevated prolactin; and increased aldosterone are not adequately confirmed in research. Even though a given therapy may work for a number of women, its mechanism may still elude our true understanding. These models are tidy and convenient for a logical train of thought, but, due to their limited ability to help many women, they distract us from potentially having a more accurate understanding and more effective treatment options.

Clinically, I have not usually found it useful to use classification systems commonly used by alternative practitioners like PMS-A (anxiety), PMS-C (carbohydrate craving), PMS-D (depression), or PMS-H (hyperhydration). Yes, women may have one or more of these symptoms characterized in the particular classification, but treating women for the correlating hormonal imbalance has not typically been productive in my experience. In the more difficult cases, it is often necessary to expand one's thinking, however, and it may occasionally be helpful to explore some of these theories.

Another basic foundation for many alternative practitioners in treating PMS is the concept of the liver's role in the detoxification process. If the liver function is compromised, then estrogen metabolism is inadequate, leading to excess estrogen levels and what is often described as estrogen dominance. A "sluggish liver" is then addressed with various dietary, nutrient, and herbal interventions. It is important to understand that this is a theory with much speculation and minimal scientific support in its connection with PMS. One cannot argue, however, about the central role of the liver and its varied metabolic processes with subsequent influence on the biochemistry of hormone and enzymatic pathways. There may in fact be a role for liver function in PMS, but what that is remains unknown. On the other hand, improving liver function pays off in other ways, like exercise does, with many positive health benefits to numerous body systems.

Numerous natural alternative therapies are available, including lifestyle changes, vitamin and mineral supplementation, herbal medicines, and natural hormones. Many of these have demonstrated their effectiveness in standard scientific studies. But at least an equal number have either shown no effect or an effect that was not significantly greater than the placebo effect. Herein lies one of the curiosities of medicine, elegantly portrayed with PMS: why do conventional scientific studies fail to demonstrate success with many of these natural therapies that women consistently rely on for successful monthly treatments?

Perhaps the answer is as simple as that statistically significant is not the same as clinically

relevant: what works for one person is different than what works for another. We are truly individuals with our own unique physiology, stressors, and psychological makeup. Double-blind, placebo-controlled scientific studies attempt to find what works for as many people as possible, not what works best for an individual.

Even in studies where the placebo response is given credit, perhaps the belief that the mind can heal the body is the real explanation. The interaction between neurotransmitters, neurophysiology, the body's steroids, circadian systems, mood, and behavior plus plants and nutrients from nature may remain scientifically elusive, but, to the credit of women, we have instinctually come upon safe and effective natural solutions.

One of the significant benefits of treating PMS naturally is that it serves as a touchstone to motivate women to make lifestyle changes that have a positive cascade effect on their general health.

Nutrition

Women who have PMS typically have dietary habits that are worse than the standard American diet. In a nutritional analysis published in 1983, Guy Abraham reported that PMS patients consumed 62 percent more refined carbohydrates than women who did not have PMS, 275 percent more refined sugar, 79 percent more dairy products, 78 percent more sodium, 53 percent less iron, 77 percent less manganese, and 52 percent less zinc.[12] A diet higher in dairy products can also contribute to PMS symptoms such as anxiety, irritability, and nervous tension. A dietary survey of 39 patients with PMS and 14 women with no PMS found that the women with PMS consumed fivefold more dairy products and threefold more refined sugar than those women without PMS.[13] Dairy products and calcium interfere with magnesium absorption, and refined sugar increases the urinary excretion of magnesium.[14]

Further data confirm these findings by showing that women with PMS have increased consumption of dietary fat, carbohydrates, and simple sugars and decreased consumption of protein. This study also showed that PMS sufferers had a higher number of "eating incidences" than women who did not meet the criteria for PMS.[15] These increases in eating incidence and carbohydrate craving in general during PMS may be due in part to a decrease in serotonin during the luteal phase in PMS sufferers, and it follows that serotonergic treatments like SSRIs or 5HTP may be helpful in controlling not only mood changes during this period but also food cravings.[16]

It is these same food cravings that often serve to worsen PMS symptoms, leading to a vicious cycle of poor dietary choices and mood disturbance. It has been suggested, however, that ingesting high amounts of carbohydrates may be a form of "self-medication" in that it leads to a transient increase in tryptophan, a precursor to serotonin, and a resultant improvement in mood and energy.[17] Choosing high-quality carbohydrates (including whole grains such as oatmeal, brown rice, barley, rye, and whole wheat) throughout the luteal phase may help decrease PMS mood symptoms.

Another nutritional factor in PMS is the effect of refined sugars on the retention of sodium. After a large intake of sugar, insulin increases quickly, which causes sodium and water retention. Symptoms such as swelling in the hands and feet, abdominal bloating, and breast engorgement and tenderness result. Complex carbohydrates are preferred over simple sugars (white sugar, white flour, white rice, etc.) because they stimulate insulin release much more slowly and in a more sustained manner, thereby preventing many of these water-retention symptoms. In fact, one study found that consumption of a low-fat, high complex carbohydrate diet alleviated premenstrual breast tenderness.[18] Many other symptoms of PMS may be exacerbated by the intake of sugary foods and beverages.[19]

Excessive and incorrect prostaglandin (PG) synthesis has been implicated in the pathogenesis of PMS, and a deficiency of prostaglandin E1

(PgE1) in the central nervous system has been proposed to be involved in PMS.[20] Many nutrients are important for the synthesis of PgE1. These include magnesium, linoleic acid (an essential fatty acid), vitamin B_6, zinc, vitamin C, and vitamin B_3. On the other hand, arachidonic acid is a precursor to PgE2, which has antagonistic effects with regard to PgE1. Think of PgE1 as the good guy and PgE2 as the bad guy. Vegetable oils are rich sources of linoleic acid, and animal fats are the main dietary sources of arachidonic acid; therefore, patients with PMS would be wise to decrease their consumption of animal fats and increase their consumption of polyunsaturated vegetable oils so that they have more of the good guy, PgE1. A diet high in the other nutrients mentioned would also promote the synthesis of PgE1. We will discuss these more in the nutritional supplement section.

A recent study showed that an increase in C-reactive protein, a marker of inflammation, was positively correlated with the severity of both physical and psychological symptoms of PMS,[21] providing more support for the use of anti-inflammatory dietary choices for PMS sufferers. Foods that can stimulate inflammatory pathways include, among others, sugar, poultry, eggs, cheese, milk, white flour, white rice, and partially hydrogenated oils. Foods that can reduce inflammation include fresh fruits and vegetables, fish, grass-fed beef, nuts, seeds, curry powder, garlic, and onions.

Limiting the dietary intake of salt can be helpful to some women. Table salt enhances the response to the ingestion of glucose, consequently increasing the insulin response. As mentioned earlier, an increase in insulin causes swelling through water retention.

Many women with breast symptoms in their premenstrual phase benefit from avoiding caffeine. Even though scientific studies are controversial on this subject, the practical results speak for themselves. Restricting the intake of coffee (both caffeinated and decaffeinated), black tea, chocolate, and caffeine-containing soft drinks will especially benefit those with fluid-retention symptoms. (See Chapter 7 on fibrocystic breasts for more information about the detrimental effects of caffeine.)

Dietary Recommendations

- Reduce the intake of alcohol, caffeine, salt, sugar, refined carbohydrates, and dairy products.
- Increase the intake of fruits, vegetables, legumes, nuts, seeds, fish, soy, and healthy oils such as fish, flaxseed, and olive oils.

It is estimated that there are two million alcoholic women in the reproductive age group in the United States.[22] Sixty-seven percent of these women relate their drinking to their menstrual cycles, and drinking bouts occur usually during the premenstrual phase.[23] Alcohol may also play a role in the reactive hypoglycemia of PMS as well as worsening a variety of other PMS-related symptoms.[24]

Soy isoflavones may be beneficial for PMS in addition to the other women's health conditions they seem to positively affect. A recent study suggests that increased consumption of dietary soy may be related to a reduction in PMS symptoms.[25] Another study compared the effect of isolated soy protein containing 68 mg/day soy isoflavones with a placebo in a double-blind fashion and found that the soy protein was effective at reducing headache, breast tenderness, cramps, and edema after two cycles of treatment.[26]

Nutritional Supplements

It has been hypothesized that women with PMS are deficient in certain nutrients. Nutritional profiles and biochemical and hematological evaluations in 11 women with PMS showed that they did indeed have various nutritional deficiencies.[27] Other biochemical investigations have found no evidence that premenstrual symptoms are caused by either absolute or relative nutritional deficiencies.[28, 29]

Nutritional supplements are widely used in the treatment of PMS despite the inconsistent evidence to support their use. Again we have a discrepancy between scientific information and what a significant number of women report. A possible explanation for this discrepancy might be that vitamin and mineral levels in the peripheral blood (which is measured in a laboratory) do not parallel the levels in the central nervous system (CNS). Researchers J. C. Chuong and E. B. Dawson state, "It is possible that the bioavailability of vitamins and minerals in the CNS, which is related to the activities of several neurotransmitters (including serotonin), could change during the luteal phase in some patients with PMS. As a result, premenstrual symptoms occur. However, these changes in vitamin and mineral levels in the CNS may not show up in the peripheral blood levels."[30]

Positive results seen in some studies with nutritional supplementation most likely represent a pharmacological response to therapeutic doses of vitamins or minerals rather than reversing an underlying deficiency.

Multiple vitamin and mineral supplements may be helpful for women with PMS. A study was done in 1985 of Optivite, a rather typical multiple vitamin/mineral supplement. The quantities and proportions of vitamins and minerals in this supplement either met or exceeded the recommended daily allowances except for calcium and vitamin D. In a double-blind, placebo-controlled crossover study, 16 of 23 subjects reported feeling better during the cycles in which they took the supplement, and 7 reported feeling better during the placebo cycles.[31] These researchers also classified the patients into four different subgroups (PMS-A, PMS-C, PMS-D, PMS-H) and found that only two of the four subgroups responded to this particular supplement.

A second study on the same product was done in 1991[32] to assess the effectiveness of a vitamin/mineral supplement in controlling symptoms of premenstrual syndrome. This double-blind, randomized study of 44 women divided women with PMS into four subgroups depending on their symptoms. Subjects were randomly assigned to receive either placebo or 6 or 12 tablets of the supplement a day for three menstrual cycles. All subjects had significant differences in severity of symptoms between the follicular and luteal phase of the control cycle. Two PMS subgroups especially improved: PMS-A (nervous tension, mood swings, irritability, anxiety) and PMS-C (headaches, craving for sweets, increased appetite, heart pounding, fatigue). Supplementation with six tablets of Optivite daily was associated with significant reduction in all symptom categories, including those with PMS-D (depression, insomnia, forgetfulness, crying, and confusion). Those with PMS-H (premenstrual weight gain, breast tenderness, abdominal bloating, and swelling of the arms and legs) did not receive any benefit. If 12 tablets were taken, then there were significant reductions of symptoms in all groups.

When selecting a multiple vitamin and mineral supplement, I recommend one that has been formulated especially for women, as these take into account the special nutritional needs of women.

Vitamin B_6. A rational basis for the use of vitamin B_6 (pyridoxine) in the treatment of PMS was first indicated by the work of Adams and his colleagues in 1973,[33] although it had been prescribed since the 1940s. They reported successful treatment with vitamin B_6 of patients complaining of depression associated with oral contraception. Since that time there have been over one dozen studies on vitamin B_6 and PMS. Some of these have shown no effect from vitamin B_6, but most of the studies have shown that there was a substantial and broad effect on the whole range of PMS symptoms. An overview of these studies has been published in the *British Journal of Obstetrics and Gynaecology*.[34] The studies have used anywhere from 50 to 500 mg per day.

Vitamin B_6 is thought to be unique in its ability to increase the synthesis of several neurotransmitters in the brain. These neurotransmitters include serotonin, dopamine, norepinephrine, epinephrine, taurine, and histamine.[35] Lower levels of brain neurotransmitters such as serotonin and dopamine have been implicated in the etiology of PMS.[36] In fact, a double-blind crossover trial demonstrated that 50 mg of B_6 per day was effective at decreasing premenstrual depression, fatigue, and irritability.[37] In addition, another study showed a synergistic effect of 50 mg of B_6 combined with 200 mg of magnesium in reducing premenstrual anxiety.[38]

Vitamin B_6 supplementation is generally considered safe in dosages of 50 to 100 mg daily. When using dosages greater than 50 mg, it may be important to divide it into 50 mg dosages throughout the day to assure appropriate utilization by the liver. One should not exceed 200 mg total in one day in order to assure safety. Chronic intake of dosages greater than 500 mg per day can be toxic if taken daily for many months or years. There are also a few rare reports of toxicity at chronic long-term dosages of 150 mg per day.[39]

Vitamin B_6

50 mg 2–4 times per day

Vitamin D. We don't normally think of vitamin D as a treatment for PMS. Recent research has shown, however, that increased intake of vitamin D in both dietary and supplement forms is inversely related to PMS symptoms.[40] A combination of vitamin D and calcium decreased the frequency and severity of menstrual migraines and other PMS symptoms.[41]

Vitamin D

Age 19–50: 200 IU per day
Tolerable upper limit: 2,000 IU

Vitamin E. Vitamin E is probably not a big player in PMS relief, although some studies have demonstrated a reduction in premenstrual nervous tension, headache, fatigue, depression, insomnia, and breast tenderness.[12, 42] Aberrant prostaglandin (PG) synthesis has been implicated in PMS, and a deficiency of prostaglandin E1 (PgE1) has been proposed to be involved in PMS as well as an increase in another prostaglandin called PgF2-alpha. It has been hypothesized that vitamin E inhibits the negative prostaglandin (PgF2) and increases the PgE1. Women continue to use vitamin E to relieve the symptoms of breast tenderness before the period. Despite science that does not confirm a statistically significant benefit, vitamin E remains an important part of self-care. This is discussed more in Chapter 7.

Vitamin E

400–800 IU per day

Essential Fatty Acids. The main strategy of supplementing with essential fatty acids is an attempt to raise the body's own formation of PgE1. The most popular method of doing so has been to supplement with evening primrose oil (EPO) products in order to supply increased levels of gamma linolenic acid. Although there are several studies that show positive results, some of the studies did not include a placebo group, and other studies did not show a statistically significant difference between the treatment group and the placebo group.[43–45]

Four double-blind, crossover, controlled trials of EPO have demonstrated a significant effect over the placebo group.[46–49] One of these studies used three grams of EPO per day; the others used four grams per day. EPO has been shown to be most effective for relieving clumsiness and headaches, although all symptoms, including depression, irritability, bloating, and breast tenderness, showed a marked improvement. Other sources of oils that contain gamma linolenic acid (GLA) and raise PgE1 levels include borage oil, black currant oil, and canola oil. Hemp oil contains a very small amount of GLA.

Another study looked at krill oil and its effectiveness at reducing symptoms of PMS. Krill oil is derived from plankton and is high in omega-3 fatty acids, bioflavonoids, and vitamins E and A. This study looked at two 1-gram capsules of krill oil versus fish oil in the management of PMS symptoms and found it to be comparable at decreasing swelling, bloating, and weight gain and superior to fish oil in decreasing analgesic use, breast tenderness, joint pain, dysmenorrhea, and emotional symptoms after 45 to 90 days of treatment.[50]

Evening Primrose Oil

3–4 g per day

Krill Oil

2 g per day

Magnesium. Magnesium has shown some beneficial effect in the treatment of PMS. Magnesium is depleted by changes in the female sex hormones in the luteal phase leading to a variety of PMS symptoms, notably migraines and bloating.[51] One study suggests that 200 mg of magnesium daily may reduce premenstrual fluid retention and resultant symptoms like breast distension, peripheral edema, and abdominal bloating after two months of treatment.[52]

In another study involving 32 women with PMS, 360 mg of magnesium three times daily was given from midcycle to the onset of menstrual flow.[53] In menstrual distress questionnaire scores, relief of premenstrual mood fluctuations and depression during magnesium treatment was significant. Although blood serum levels of magnesium are not found to be different between women who have PMS and women who don't, it seems there is a significant decrease in red blood cell magnesium levels in PMS patients.[54]

The mechanism of magnesium and its possible role in PMS are not well understood, but we do know that magnesium is involved in essential fatty acid metabolism and B_6 activity. In fact, as mentioned in the section on vitamin B_6, one study showed a synergistic effect of 50 mg of B_6 combined with 200 mg of magnesium in reducing premenstrual anxiety.[38] In addition, another study suggests that cyclical hormonal changes may cause a relative deficiency state that can exacerbate symptoms associated with PMS.[55]

Magnesium

300 mg 1–3 times per day

Calcium. Reports have suggested that problems in calcium regulation and frank calcium deficiency actually mimic many PMS symptoms[56–58] and may underlie some of the symptoms of PMS. Therefore, dietary and supplemental forms of calcium may have a therapeutic benefit.[40, 59]

An important randomized, double-blind, placebo-controlled, multicenter clinical trial was conducted to test this hypothesis. A group of 479 women were given either 1,200 mg of calcium carbonate or a placebo for three menstrual cycles.[60] During the luteal phase of the treatment cycle (from ovulation to menses), a significantly lower symptom complex score was observed in the calcium group for both the second and third months. By the third month, calcium effectively resulted in a 48 percent reduction in total symptom scores from baseline compared with a 30 percent reduction in the placebo group. All four symptom factors (negative mood affect, water retention, food cravings, and pain) were significantly reduced by the third treatment cycle.

In addition, as mentioned earlier in the nutritional supplement section, research suggests that a combination of vitamin D and calcium may decrease the frequency and severity of menstrual migraines and other PMS symptoms with only two months of treatment.[41]

Calcium

1,200 mg per day

Tryptophan. As alluded to previously, decreased serotonin and its precursor tryptophan

may exacerbate PMS mood changes, including depression, anxiety, and aggression.[61, 62] In addition, trials done in recent years to test the effectiveness of supplementation of L-tryptophan in reducing symptoms of PMS have shown promising results. These studies, which used daily doses of 6 grams for 17 days from ovulation to day 3 of menses led to significant reductions in mood swings, insomnia, carbohydrate craving, tension, irritability, and dysphoria.[63, 64]

Tryptophan

6 g per day for 17 days, from ovulation to day 3 of menses

Botanicals

Chaste Tree (*Vitex Agnus Castus*). The single most important plant for the treatment of premenstrual syndrome is *Vitex agnus castus*, also known as chaste tree. The fruits of chaste tree contain essential oils, irridoids, pseudoindicans, and flavonoids. The effect of chaste tree is on the hypothalamus-hypophysis axis. It increases secretion of luteinizing hormone (LH) and also has an effect that favors progesterone.[65–67] Chaste tree has also been substantiated in its ability to inhibit prolactin.[68] Elevated prolactin levels may be a factor in PMS. Studies of chaste tree for cyclic breast tenderness confirm its effectiveness in this disorder.[69, 70] Chaste tree is also thought to positively influence PMS symptoms by affecting opioid receptors in the brain.[71]

Three studies found that chaste tree reduced a variety of premenstrual symptoms after three cycles of active treatment in a large number of women.[72–74] An additional study looked at the effectiveness of chaste tree versus fluoxetine (Prozac) in decreasing PMS symptoms and found the two treatments comparable, except that fluoxetine was more effective with psychological symptoms and chaste tree was more effective with physical symptoms.[75]

Older research led up to these more recent and rigorous studies. Two surveys were done covering 1,542 women with premenstrual syndrome who had been treated with a German liquid extract of chaste tree for periods of up to 16 years. The mean duration of treatment was 166 days, and the average dose was 42 drops daily. Effectiveness as recorded by the patients' doctors was either very good, good, or satisfactory in 92 percent of the cases.[76] Only 2.1 percent of the women noted side effects during treatment, and 1.1 percent of them discontinued the medicine because of them.

Chaste tree has also been found to be safe for use with most patients, but caution should be exercised with those on medications that inhibit dopamine. A recent review of research found that the most frequent adverse events reported were headache, gastrointestinal disturbances, menstrual disorders, acne, itching, and rash, and no known drug interactions were reported.[77]

Chaste Tree (*Vitex Agnus Castus*)

40 drops liquid or extract per day *or*
Capsules of standardized extract: 175 mg per day

Ginkgo (*Ginkgo Biloba*). We don't normally think of ginkgo for PMS. But when you consider that some PMS symptoms have to do with congestion, it makes sense that it might be useful. A double-blind, placebo-controlled study was done in 1993 to determine the effectiveness of ginkgo extract on PMS symptoms. A group of 165 women between the ages of 18 and 45 who had fluid retention, breast tenderness, and vascular congestion were studied. The patients were assigned to receive either a ginkgo extract of 24 percent ginkgo flavonglycoside content at 80 mg twice daily or a placebo from day 16 of their cycle to day 5 of the next cycle. Based on symptom evaluation by both

Ginkgo (*Ginkgo Biloba*)

80 mg standardized extract twice daily

patient and doctor, ginkgo extract was effective against the congestive symptoms of PMS, particularly breast pain or tenderness.[78]

Saint John's Wort (*Hypericum Perforatum*). Saint John's wort has shown promise in preliminary studies of its effectiveness at alleviating PMS mood dysfunction, but more research is still needed.[79–81] In one observational pilot study, Saint-John's-wort standardized extract was given at a dose of 300 mg three times daily.[81] Nineteen women with PMS underwent a preliminary screening interview and completed a daily symptom rating for one cycle. After taking the Saint John's wort for two complete menstrual cycles, daily symptoms were rated again. The degree of improvement in overall premenstrual syndrome scores between baseline and the end of the trial was 51 percent, with more than two-thirds of the sample demonstrating at least a 50 percent decrease in symptom severity. The mood subscale showed the most improvement (57 percent), and the symptoms with the greatest reductions in scores were crying (92 percent), depression (85 percent), confusion (75 percent), feeling out of control (72 percent), nervous tension (71 percent), anxiety (69 percent), and insomnia (69 percent).

Saint John's Wort

300 mg 3 times daily

Additional Herbs. Many other herbs that have not been subjected to scientific research have also been used successfully by women and practitioners for decades. These include many species of wild yam, licorice root, dong quai, black cohosh, and more. One study on black cohosh and PMS demonstrated that it was effective in improving anxiety, tension, and depression.[82] Currently, there is some thought that black cohosh may act as a mild serotonin reuptake inhibitor, which would make it an appealing option for PMS.[83]

Other plants are used because of their benefit with specific symptoms; for example, kava extract for anxiety, dandelion leaf for water weight gain, valerian for sleep problems, and lemon balm for herpes eruptions. You will often find one or more of these herbs in combination herbal and nutritional products that have been specifically formulated for PMS symptom relief.

Exercise

Specific exercises are conspicuously absent from scientific studies looking at the effects of exercise on PMS. In contrast, although mechanisms of action remain elusive, general regular physical exercise has been the subject of several controlled trials. In all of these, the results show that women who exercise regularly have less strong or fewer PMS symptoms.

Aerobic training (walking, jogging, swimming, cycling) appears more effective at reducing PMS symptoms than strength training (weight lifting).[84] Frequency of exercise, but not intensity, relates to decreased rating of selected menstrual distress symptom clusters;[85] gradual increase in running distances correlates directly with greater reductions in PMS symptoms.[86] Regular exercisers show improvement in all PMS parameters, including concentration, affect, pain, hostility, fear, guilt, and sadness.[87]

Regularly exercising women report a significant decrease in anxiety following baseline relaxation but show greater increase in anxiety during a stress task than nonexercisers.[88]

Two reviews of the literature on exercise and PMS emphasize the obvious fact that controlled trials of exercise training and PMS cannot be performed under double-blind conditions, making it difficult to formulate probable mechanisms for the observed effects of regular training on PMS symptoms. According to L. Gannon, exercise may reduce PMS symptoms by (1) decreasing estrogen levels, (2) improving glucose tolerance, (3) decreasing catecholamines, and (4) elevating endorphins.[89] Gannon concludes, "If PMS symptoms are caused or exacerbated by dramatic

Exercise Recommendations

- Follow the "General Exercise Program" and exercise instructions outlined in Appendix A.
- The key words in exercising are regularity and diversity.
- It is important to schedule exercise along with the other vital activities of the day—meals, sleep, and rest.
- Equally important is to enjoy the exercise you choose, remembering that best results are obtained from a combination of types of exercise—flexibility, stretching, strength, and cardiovascular.

variations in endorphin levels, exercise may serve to prevent exaggerated elevations and abrupt declines and, ultimately, to reduce symptoms."

Yoga postures are another form of exercise that appears to have benefit and may suit some women more. A study of 40 women was done for almost one year to investigate the effect of yoga in relieving premenstrual and menstrual problems.[90] The women assigned to the treatment group did yoga postures and meditation. At the end of the 10 months, there were significantly lower scores on the menstrual distress questionnaires for those in the yoga group compared to those in the control group.

Progressive muscle relaxation and deep breathing can also significantly reduce the mood symptoms associated with PMS.[91]

Natural (or Bio-Identical) Progesterone

Perhaps no other PMS therapy has been the target of so much controversy as natural progesterone. This has as much to do with the lack of scientific research and agreement to support a unified theory as to the cause of PMS as it has to do with the efficacy of natural progesterone itself. Raymond Green and Katharina Dalton advanced a theory in the 1950s that PMS was caused by unopposed estrogen during the luteal phase (second half) of the menstrual cycle. Dr. Dalton's original work with progesterone therapy is the historical root on which the use of natural progesterone is based today. Research scientists, and therefore the majority of the conventional medical community, ultimately did not embrace Dr. Dalton's conclusions about the efficacy of progesterone therapy for PMS. This was largely based on what they thought to be inadequate scientific research studies, although it is also fair to speculate that other matters of medical politics and the business of medicine were at play here as well.

Natural progesterone (also called bio-identical progesterone) is a white crystalline powder derived from extracts of the Mexican wild yam or soybean. It requires laboratory manufacturing processes and is something altogether different than what we know as botanical medicine. What makes natural progesterone natural is not so much the original plant material but rather that the progesterone molecules that result are chemically identical to the progesterone hormone produced by a woman's own ovaries and adrenal glands.

Confusion exists when people think that bio-identical progesterone is found in wild yam and soybeans or that the human body can convert wild yam and soybean extracts to natural progesterone. Neither of these is true. Further confusing the issue is that many people mistakenly call synthetic progestogens or progestins progesterone. Progestins are chemically different than progesterone and also chemically different than bio-identical progesterone.

Dr. Dalton reports that she has used natural progesterone via injections (25 to 100 mg daily), vaginal and rectal suppositories (400 to 1,600 mg daily), and subcutaneous pellets (500 to 1,600 mg every 3 to 12 months) with results as good as complete relief of PMS symptoms in 83 percent of women.[92] There have been several studies that demonstrated a lack of efficacy of rectal and vaginal suppositories in the treatment of PMS. Sampson and Freeman found these forms of progesterone to be no better than placebo.[93, 94]

Although the suppository method of delivering natural progesterone for PMS has not held up to scientific scrutiny, oral micronized natural progesterone has. A study by Dennerstein and colleagues in 1985 found an overall beneficial effect of using 300 mg per day (100 mg in the morning and 200 mg in the evening) for 10 days of each menstrual cycle starting three days after ovulation.[95] After only one month of treatment, those receiving progesterone could be clearly distinguished from those receiving placebo on measures of stress, anxiety, and concentration. Most other symptoms also continued to improve with each menstrual cycle. The only premenstrual complaint not consistently improved by progesterone was arousal. A 1993 study also reported successful use of progesterone in doses of 300 mg oral micronized progesterone daily or 3 cc rectal solution twice daily.[96]

More recently, Dr. John Lee had become the most outspoken proponent of the use of natural progesterone by using transdermal creams that are applied to specified areas of the skin. He reported significant success in his medical practice and has written about it in his treatise on natural progesterone.[97]

The availability of natural progesterone in transdermal creams in the retail over-the-counter market has created perhaps the greatest confusion yet in the use of this valuable medicine. It is important for the consumer and practitioner to understand the difference between wild yam and soy extracts versus natural progesterone products derived from these extracts. Wild yam extracts do not contain natural progesterone unless they say that natural progesterone has been added. Also, different products contain different amounts of progesterone. The range is as little as 2 mg per ounce to more than 400 mg per ounce. The rule is user beware and be educated. These products all have their value, but not necessarily for the treatment of PMS.

In my clinical practice, I largely use the transdermal creams that contain at least 400 mg progesterone per ounce of cream. For severe PMS symptoms that have not responded to nutritional, botanical, and lifestyle changes, and for those whose symptoms start from a few days to one week before the menses, I recommend applying one-quarter teaspoon natural progesterone cream twice daily starting at midcycle and stopping the day before the menses is due. For women whose significant symptoms begin at ovulation, I recommend one-quarter teaspoon per day from day 8 to day 14 (do not use during days 1 to 7 while bleeding), and then one-quarter teaspoon twice daily until the menses begins, as described above. The best sites for rubbing in the cream include the palms, inner forearms, chest, and inner thighs. Also, it is best utilized when rotating sites of application. Individual uses may vary depending on symptoms or menstrual pattern.

Since bio-identical progesterone is a hormone, I think it is best to seek the advice of a qualified health-care practitioner who is experienced with its use for those who use it long term. This assures proper usage and therefore maximum results. Oral micronized progesterone and some of the other delivery methods of progesterone are prescription items. These products are used mainly by licensed naturopathic physicians but also by progressive medical doctors and a growing number of chiropractors and acupuncturists.

Natural (Bio-Identical) Progesterone Cream

- If symptoms start from a few days to 1 week before the menses, apply ¼ tsp twice daily beginning at midcycle (day 15) and stopping approximately day 26 or a day or two before the menses is due.
- If symptoms begin at ovulation, apply ¼ tsp per day on days 8–14 (do not use during days 1–7 while bleeding), and then ¼ tsp twice daily until the menses begins.

Oral Micronized Progesterone

50–200 mg per day on days 15–26

Sample Treatment Plan for Premenstrual Syndrome

3-Month Plan

- Reduce the intake of alcohol, caffeine, salt, sugar, refined carbohydrates, and dairy products.
- Increase the intake of fruits, vegetables, legumes, nuts, seeds, soy, fish, and flaxseed oil.
- Exercise regularly, focusing especially on aerobic exercise.
- Take a combination nutritional/botanical PMS product (available at natural food stores or alternative health practitioners). It should include vitamin B_6; magnesium; gamma linolenic acid from borage, evening primrose, or black currant oil; chaste tree (vitex); vitamin E; Saint John's wort; and possibly some traditional herbs for PMS, including dandelion leaf, dong quai, black cohosh, and wild yam. (See the Resources section for formulation sources.)
- Take a multiple vitamin/mineral supplement, 1 to 6 capsules per day.
- Take 1,000–1,200 mg of calcium per day.
- If this plan doesn't relieve PMS after three cycles, then use bio-identical progesterone creams with greater than 400 mg per ounce or prescription oral micronized progesterone.

CONVENTIONAL MEDICINE APPROACH

In perhaps no other diagnostic category has the advice of conventional physicians so overlapped with that of their naturopathic colleagues. All are searching! Basic lifestyle issues such as exercise, diet, nutritional supplements, and stress and mood assessment have all been studied and are always the starting point of treatment. Probably in part because we had no consistently effective therapy, conventional physicians have borrowed eagerly from natural medicine, and enthusiastic interest in natural progesterone occurred in the early 1980s.

The first, and most important, step in treating PMS is recognizing it. The woman should undergo accurate assessment for other mental and physical diseases, and then do at least three months of symptom charting, possibly with help from her partner. Once the diagnosis of PMS is made, then the therapy consists of the following:

1. **Lifestyle therapies.** Nonpharmacological therapies are more effective in less severe PMS/PMDD. The first is making lifestyle changes that support the use of aerobic exercise to maintain a normal BMI and possibly increase endorphins that may be lacking in the luteal phase. Next are dietary modifications that include having small, frequent meals; reducing intake of caffeine, sugar, alcohol, artificial sweeteners, salt, red meat, saturated fat, and simple carbohydrates; and increasing the intake of complex carbohydrates; and foods that are rich in calcium and magnesium. A general multivitamin supplement is also recommended.
2. **Cognitive-behavioral therapy (CBT).** Cognitive-behavioral therapy is a short-term, structured psychotherapeutic treatment that helps emphasize the role of the patient's current thinking in determining behavior. The patient is taught behavioral techniques to help alter her response to the premenstrual symptoms. CBT helps in stress management and in teaching the woman how to alter or cope with her lifestyle.
3. **Pharmacological therapies.** The most common medication recommended for PMS/PMDD of moderate to severe intensity is an SSRI. These medications can be used just on the severe-symptom days each month. They are effective the day they are taken, which suggests that SSRIs in this case are not helping by increasing neurotransmitters. They seem to work in PMS by altering the neurophysiology and electrical conduction in the brain. Several SSRIs have been used. Suggested doses are fluoxetine (20 mg a day) or the once-weekly tablet sertraline or paroxetine controlled-release (12.5 to 25.0 mg per day). The biggest problem with

the use of these drugs is the high incidence of side effects that can include nausea, headache, fatigue, hyperexcitability, and sexual dysfunction as well as weight gain. The new serotonin and norepinephrine reuptake inhibitor venlafaxine, with doses anywhere from 50 mg to 200 mg per day, was shown to have a better effect than the placebo in reducing PMDD.

Spironolactone is an aldosterone antagonist, used as a diuretic. It has been successful in treating symptoms of irritability, depressed mood, edema, breast tenderness, and food craving.

Oral contraceptives are commonly prescribed for PMS/PMDD and have reports of as many failures as successes. Probably the most significant problem with oral contraceptives is the current regimen of taking them 21 days on and 7 days off. The 7-day drug-free interval allows for less suppression of ovulation. During that 7-day pill-free interval, follicle-stimulating hormone (FSH) rises, follicles begin to grow, and ovulation frequently occurs. Since PMS is only seen in ovulating women, this lack of ovulation suppression may be the reason for the frequent failure of OCs in PMS. There are several new studies that show that a 4-day pill-free interval reduces the FSH volumes by 50 percent, helps suppress the development of new follicles, and appears to significantly suppress ovulation. A shorter hormone-free interval may thus be more effective in treating PMS. There is also a birth control pill that contains drospirenone, which is derived from 17 alpha-spironolactone and has antimineralocorticoid and antiandrogen effects. It helps prevent fluid retention, and studies have shown excellent efficacy in symptom relief of PMS.

Uncommonly prescribed medications for PMS/PMDD are the GnRH agonists that suppress ovulation and make women in effect temporarily menopausal. The use of GnRH agonists places women in a low estrogenic state that functions like a reversible medical removal of ovaries. These agents have been shown to decrease symptoms of severe PMS, but they cannot be used for extended periods of time and have a high incidence of side effects. Add-back therapy with estradiol or a progestogen to reduce the side effects also seems to reduce the effectiveness for treatment of PMS.

Short-acting, water-soluble sedatives such as alprazolam and lorazepam have also been useful either in a scheduled dosing (for example, a small dose three times daily from cycle day 20 until menses) or on an as-needed basis to reduce anxiety and agitation.

Correction of PMS through surgical removal of the ovaries has been done and remains a very high-risk, symptomatic (due to the abrupt loss of estrogen), and expensive treatment for PMS. It is done only in the most extreme circumstances after extensive consultations.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

PMS is an excellent condition for self-treatment most of the time. Mild to moderate PMS is well addressed by lifestyle changes and safe and effective nutritional and botanical supplements most of the time. When these measures are not effective or when the symptoms are severe, a licensed naturopathic physician can readily utilize natural progesterone therapy, more aggressive dosing of nutritional and botanical supplements, or selected nutrients that specifically and more assertively target serotonin and other neurotransmitters and neurophysiology.

Few conventional medical doctors are trained in these therapies, although increasing numbers are integrating them into their practice. Severe symptoms of depression, headaches, breast pain, or others may require the use of pharmaceutical intervention, although this is rarely necessary. In these cases, temporary use of such drugs must be recommended judiciously, while the continued use of natural medicines is integrated into the long-term plan. Only rarely will PMS not respond to a comprehensive natural medicine approach.

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SEXUALLY TRANSMITTED INFECTIONS

CHAPTER 18

OVERVIEW

Sexually transmitted infections (STIs) and their complications continue to infect women at epidemic rates. Each year, more than 15 million American men and women contract an STI.[1] Worldwide, the estimated incidence of STIs is over 250 million cases per year. All women who are sexually active are at risk for acquiring infection and related reproductive tract problems, although heterosexual women are at substantially increased risk compared to lesbian women. Gonorrhea and chlamydial infections may produce urethritis, cervicitis, and pelvic inflammatory disease (PID) and are the two types of bacteria that most frequently cause PID. Human papillomavirus (HPV) is the cause of genital warts and cervical dysplasia. Syphilis is responsible for myriad systemic and tissue abnormalities. Herpes simplex virus (HSV) infection is associated with small blisterlike skin eruptions and ulcerations. Scabies and pediculosis are fraught with itching of the skin. As many as 60 percent of hepatitis B cases are sexually transmitted. HIV infection and AIDS (the most advanced stage of HIV infection) are sexually transmitted diseases as well. Less common STIs, such as lymphogranuloma venereum and chancroid, present as pimple-like or ulcerative genital lesions.

The purpose of this chapter is to discuss some of the alternative approaches and conventional therapies used in the treatment of chlamydia and gonorrhea. Please refer to Chapter 20 (vaginitis), Chapter 3 (cervical dysplasia), Chapter 8 (genital herpes), and Chapter 15 (pelvic inflammatory disease) for further information and treatment recommendations regarding other conditions that can be transmitted through sexual contact.

Chlamydia Trachomatis

Chlamydia trachomatis infection is the most common STI causing a female pelvic infection in the United States. The infection rate is considered epidemic in women and is estimated at four million new cases each year. Chlamydia is evident in about 20 to 40 percent of sexually active women in the United States.[2] It can be deceptive because as many as 80 percent of women with this infection do not exhibit symptoms.[3] This is of particular concern, because chlamydia can progress to an asymptomatic pelvic infection resulting in infertility. Women between the ages of 15 and 25 are at greatest risk of chlamydia, but all heterosexually active women are at risk.[4, 5] The rate of *C. trachomatis* pelvic infection among sexually active women is from 5 to 20 percent.[6] The chlamydia organism invades the columnar cells of the cervix, invades the immune system, and can either lie in a latent state in the cervix for months, create asymptomatic cervical infection, or ascend to the upper genital tract, where it can also be asymptomatic or cause infections of the fallopian tubes or uterus. When symptoms do occur, it commonly causes urethritis, cervicitis, and PID in women. Common symptoms that occur include uncomfortable urination, frequency of urination, vaginal spotting, increased discharge that may be yellowish, pelvic pain, and pain or spotting with intercourse.

Due to the high incidence of chlamydia and the high rate of asymptomatic infections, it is recommended that all heterosexually active women between ages 15 and 25 be screened yearly. By screening regularly, the incidence of PID can be reduced significantly. Chlamydia is diagnosed on physical examination, with a smear of the dis-

charge from the urethra and cervix viewed under a microscope and with special tests and cultures of the same discharge. The rectum should also be examined for a purulent discharge. The vaginal discharge should also be tested for the presence of bacterial vaginosis, trichomoniasis, and gonorrhea. The cervix is also examined for hypertrophy (enlargement) of the endocervical epithelium (the cells in the cervical canal), looking for intense erythema (redness) and friability (bleeds easily when it is touched with a cotton-tipped applicator). The presence of a mucopurulent discharge from the cervix is a tip-off to a cervical infection. This yellow discharge is then tested for chlamydia and gonorrhea.

Being infected with chlamydia is of special concern for the pregnant woman because it can cause spontaneous abortion, premature rupture of the membranes, premature labor and delivery, and postpartum endometritis (infection of the uterus). Due to the frequent asymptomatic nature of chlamydia infection, examinations of all women suspected of having an STI during pregnancy should include testing for chlamydia and gonorrhea. About 60 to 70 percent of untreated cases in pregnant women result in neonatal infection in the eyes or lungs.[2]

Due to the ability of chlamydia infection to be asymptomatic, it is a particularly problematic pelvic infection. It can ascend to the upper genital tract without detection and then cause significant damage to the reproductive tract affecting fertility. Lower abdominal or pelvic pain in a heterosexually active woman may be a symptom of pelvic inflammatory disease (PID), especially when it occurs with cervical inflammation and vaginal and/or purulent endocervical discharge. Pain and tenderness on the physical exam in addition would be enough to have a clinical diagnosis of PID and should be followed with appropriate testing. (See Chapter 15 for more information on PID.)

Because of the number of women who have contracted chlamydia and do not exhibit symptoms, many women go untreated. Unfortunately, many of these women find out later that their fallopian tubes have been scarred, which leads to infertility.

Neisseria Gonorrhoeae

Neisseria gonorrhoeae is the second most common STI causing a female pelvic infection. In 2003, the rate of reported cases in the United States was 116.2 cases per 100,000 individuals. Rates have been decreasing each year since 1999, and we are currently at our lowest reported rate. Approximately 75 percent of the cases occur in women, and the highest rate is among women aged 20 to 24 years.[7] The highest group at risk is heterosexually active women aged 15 to 19.[8]

The southern United States has the highest rates of gonorrhea, and the rates are 20 times higher for African-Americans than for Caucasians. Young women (and men) who are nonwhite, unmarried, less educated, and who live in urban settings are the group most commonly affected.[9]

Gonorrhea is most easily transmitted from males to females assuming lack of condom use. Oral gonorrhea occurs in about 20 percent of women who practice fellatio with males who have an infection of their urethra. Transmission between women is not impossible, but extremely rare. The incubation period of gonococcal infection averages 3 to 5 days, with a range of 1 to 14 days. The majority of women with gonorrhea have no symptoms, but one-third of women observe a vaginal discharge. Urethritis with uncomfortable urination and frequency, cervicitis, a puslike discharge, abdominal or pelvic pain, vaginal spotting, and pain with intercourse are symptoms that warrant a suspicion of gonorrhea.

Mucopurulent cervicitis is the most common STI pelvic infection in women. Cervicitis is usually caused by gonorrhea, chlamydia, herpes simplex, or a combination, with chlamydia infections being the most common cause. A vaginal infection along with cervicitis may be due to

candida or trichomonas, or the candida or trichomonas may coexist along with the other organisms.

Symptoms often do not show up until PID develops. Abdominal pelvic pain is generally an indication of endometritis, salpingitis, or an abscess, and it generally develops a few days following the onset of menses. The physical exam of a woman with gonorrhea reveals a mucopurulent discharge from the cervical opening, a swollen and friable cervix, and/or bleeding from the cervical canal.

Infected mothers may transmit gonorrhea to their babies during pregnancy or at the time of delivery. It most commonly causes conjunctivitis in the baby and can also cause blindness in newborns. Other complications can include increased risks of spontaneous abortion, premature labor, early rupture of the fetal membranes, and perinatal infant mortality.

As many as 30 to 60 percent of women with gonorrhea are also infected with chlamydia,[10] and therefore gonorrhea and chlamydia should be tested together.

Testing for Chlamydia and Gonorrhea

The U.S. Preventive Services Task Force (2001) and the Centers for Disease Control (CDC) (2006) provide the following guidelines and recommendations for who should be tested for chlamydia and gonorrhea. Their guidelines are slightly different, so I have combined them for optimal recommendations. The following women should be tested for chlamydia:

- Women with mucopurulent cervicitis or PID
- All sexually active or pregnant women 25 years old or younger
- Any woman who is at risk, defined liberally as inconsistent condom use and having a new partner or multiple partners
- Pregnant women at increased risk for chlamydial infection, including women who are unmarried, are African-American, have a prior history of STI, have new or multiple heterosexual partners, have cervical ectopy (a change in the cervix exposing more columnar cells to potential infection), or show inconsistent use of barrier contraception

Women who are treated for chlamydia should be rescreened three to four months after treatment.

The optimum frequency of how often to screen for chlamydia is uncertain. For women who have previously tested negative during a screening test, rescreening should occur if there is a change in sexual partners. Once older than 25, or for women who are in a mutually monogamous relationship and have a history of negative screening tests for chlamydia infection, screening can be much less frequent and based on clinical judgment. Women who have a history of being previously infected need to be rescreened every 6 to 12 months due to high rates of reinfection. As stated earlier, women with positive infections should be treated and retested after treatment.

According to the U.S. Preventive Services Task Force (2005), the following women should be tested for gonorrhea:

- All sexually active women age 25 or younger
- All women, especially pregnant women, who are at higher risk, including women who are unmarried, are African-American, have a prior history of STI, have new or multiple heterosexual partners, are sex workers, use drugs, have cervical ectopy (a change in the cervix exposing more columnar cells to potential infection), or show inconsistent use of barrier contraception
- All pregnant women who are 25 years old or younger or are at risk (screen at the first prenatal visit)
- Women who live in communities with a higher prevalence of gonorrhea

Using cultures to test for *C. trachomatis* and *N. gonorrhoeae* has historically been the gold

KEY CONCEPTS

- All heterosexually active women age 25 or younger should be screened annually for gonorrhea and chlamydia.
- Any sexual contact with a person with gonorrhea or chlamydia warrants a visit to the doctor for a physical exam and tests.
- Antibiotic treatment of chlamydia and gonorrhea should be considered the primary treatment, with alternative treatments used as complements.
- Complications of gonorrhea and chlamydia can be serious and even life threatening, and a pregnant woman can pass the infection to her baby.
- Symptoms of chlamydia and gonorrhea include cervical discharge, difficult or painful urination, bleeding between periods or after intercourse, pain in the pelvic area during sex, a swollen cervix and/or bleeding from the cervix, and acute or chronic pelvic pain. However, many women have no symptoms at all.
- Appropriate management of an STI includes seeing a health-care practitioner who can identify the disease and treat the woman and her current sexual partner.

PREVENTION

- Know the sexual disease history of your potential sexual partner.
- The best protection against acquiring a sexually transmitted disease is for the male partner to use latex condoms.
- All heterosexual women who engage in unprotected sex with one or more men are at risk for STIs. Women with frequent partners or multiple partners have more STIs.
- Oral contraceptive use may predispose women to chlamydial infection.[11]
- Patients diagnosed with one STI should be screened for other common STIs.
- IV drug users should avoid sharing needles.
- Health-care workers should be focused and careful and practice universal precautions in their workplace.

standard and the reference against which all other tests have been compared. However, these culture methods are more difficult and expensive, so new testing methods have been sought. The first nonculture screening tests that were developed included enzyme immunoassays (EIAs), which detect specific chlamydial or gonococcal antigens, and direct immunofluorescent antibody (DFA) tests for *C. trachomatis*. Nucleic acid hybridization tests followed, which detect *C. trachomatis*–specific or *N. gonorrhoeae*–specific deoxyribonucleic acid (DNA) or ribonucleic acid (RNA) sequences. The main disadvantage of these tests, especially for *C. trachomatis*, is that they aren't able to detect a fair number of the infections. This has led to a new generation of tests, called nucleic acid amplification tests (NAATs), that are significantly more sensitive than previous nonculture tests in detecting DNA or RNA sequences. The Gen-Probe PACE 2 and the Digene Hybrid Capture II can detect for both organisms in a single specimen. Rapid in-office tests may be used by some clinics to test for chlamydia; liquid-based Pap smears and urine tests can also be used to detect chlamydia.

Hepatitis B

Hepatitis B (HBV) is a virus that infects more than 300,000 Americans annually. It is estimated that 1.5 million people in the United States are carriers of the disease but experience no symptoms at all. Sexual contact, especially anal sex, is the leading method of transmitting HBV. Other methods of transmission include the sharing of needles among drug users, exposure to infected body tissues or fluids through an open cut or sore, and infected mothers who pass the virus on to their babies. The most common early symptoms are flulike. Symptoms that arise later include jaundice (yellowing of the skin and whites of the eyes), abdominal pain, and dark and foamy urine. With treatment, most people

begin to feel better within two to three weeks and recover within four to eight weeks. A very small percentage of people who are chronic carriers of HBV will develop potentially severe and fatal liver diseases such as active hepatitis, cirrhosis, or cancer. Blood tests are used to diagnose both the active form of HBV and the carrier state. Pregnant women can be screened for the virus during their prenatal care.

OVERVIEW OF ALTERNATIVE MEDICINE

Due to potential infertility from the scarring of acute PID as well as some of the other complications of chlamydial infection and gonorrhea, my advice is to consider alternative medicine as an adjunct to conventional antibiotics rather than a primary treatment. Using alternative therapies to support the immune system, to assist in managing pain and discomfort, and to counteract some of the side effects of the antibiotics are the main priorities. Drinking plenty of water, getting enough rest, eating simple light foods, and avoiding stimulants are basic guidelines during any acute infection, including pelvic infections.

General immune support to complement conventional antibiotic treatment is just good plain common sense. Nutritional and botanical support can stimulate the white blood cells that engulf and destroy bacteria and enhance the function of T cells, B cells, and natural killer cells that modulate the immune system in reaction to bacteria and viruses. Such supplements as vitamin A, vitamin C, the carotenes, vitamin E, zinc, and the B vitamins play an important role in immune enhancement. Increasing antibody response, stimulating helper T cells, enhancing white blood cell response and function, and directly killing the virus or bacteria are just some of the ways in which these supplements can be helpful during an acute infection of any kind.

Many herbs have also been shown to have antibacterial, antiviral, and immunostimulating effects. The most commonly used herb for immune support is echinacea. Echinacea can increase the production of T cells, stimulate phagocytosis of bacteria, stimulate natural killer cell activity, and multiply the number of white blood cells that circulate in order to deal with the infection.[12] Many herbs have also been shown to have antimicrobial and immunostimulating effects. Allicin extracts from garlic may hold the most promise for inhibiting bacterial infections. Goldenseal and Oregon grape root also have the ability to inhibit the overgrowth of numerous organisms, although this does not include bacterial vaginosis or chlamydia. Curcumin is one of the best herbs to reduce inflammation. The end result is a strengthened immune system.

The best complement to counteract the side effects of antibiotic use is to add or increase the intake of *Lactobacillus acidophilus* to support intestinal health and to help prevent a vaginal yeast infection. This can often be accomplished by eating yogurt containing *Lactobacillus acidophilus* daily or by taking oral capsules of *Lactobacillus acidophilus*. Four to eight ounces of unsweetened acidophilus yogurt or at least three capsules of *Lactobacillus acidophilus* daily for two weeks should prevent the overgrowth of vaginal yeast that often occurs when taking antibiotics. In addition, *Lactobacillus* has been shown to inhibit both gonorrhea and chlamydia and to be inversely related to PID.[13–16]

Ice packs over the pelvic region can reduce inflammation and pain in cases of acute PID. Cold or ice packs placed over the region of the uterus while putting the feet in a tub of hot water can further assist in reducing the inflammation, congestion, and pain in the pelvic area. Alternating hot and cold sitz baths can also be used to improve circulation in the pelvic area and improve the healing time from the infection. This is done by sitting in a bath of hot water, with the water level just above the waist, for three minutes, followed by sitting in a small second portable metal or plastic tub of ice cold water for one minute. This procedure is repeated three

times in succession, once or twice daily throughout the course of the pain and infection.

Nutrition

The nutritional goals during an active STI are to eat health-promoting and immune supportive foods. Generally, this refers to a diet that is high in fiber, plant-based foods, essential fatty acids, and antioxidant nutrients and low in saturated fat and refined sugar.

The best dietary sources of antioxidants, and especially the carotenes, are green leafy vegetables and yellow-orange fruits and vegetables such as carrots, apricots, peaches, mangoes, yams, and squash. Beans, whole grains, and many seeds are also good sources of carotenes.

Eliminating refined sugar and simple sugars (corn syrup, honey, fructose, maple syrup, white grape juice concentrate, and others) will help to assure optimal immune function. Eliminating saturated fats such as red meat, butter, cheese, and ice cream, even in the short run, will enable the body to utilize essential fatty acids such as the fats from olive oil, canola oil, and ocean fish. These essential fatty acids are important in the promotion of the anti-inflammatory prostaglandins PgE1 and PgE3; reducing inflammation is a primary goal in healing a sexually transmitted infection.

Keeping the digestion in order with regular bowel habits and free of constipation can be accomplished with a high-fiber diet rich in whole grains, fruits, vegetables, and beans. This will not only minimize digestive side effects if antibiotics are used in the STI treatment, but will also maximize the elimination of metabolic toxins that are increased during the infection.

Some naturopathic physicians advocate a very light diet or even fasting during an active acute infection. The rationale is to minimize the burden on the body so that all of its resources can be utilized for an immune response to fight the infection. Fasting is also presumably a more efficient way of eliminating the metabolic toxins. If you're not used to fasting, I would not suggest trying this approach for any longer than three days on your own. Drink plenty of water as well. Better yet, you may want to seek advice from a knowledgeable practitioner about this approach.

If you are taking antibiotics, be sure to eat eight ounces of unsweetened lactobacillus yogurt daily to help maintain intestinal health and to help prevent the possibility of a yeast vaginitis infection caused by the antibiotics.

Botanicals

An Indian study of *Azadirachta indica* (neem seed oil), *Sapindus mukerossi* (reetha saponin extract), and quinine included 58 women who presented to a gynecology clinic in India with an

Sample Treatment Plan for Chlamydia and Gonorrhea

This plan should be used as a complement to antibiotics.

- **Vitamin A:** 50,000 IU per day for up to 1 week and 25,000 IU for 1 additional week (Do not exceed 6,000 IU if pregnant.)
- **Vitamin C:** 500 mg every 2 hours for 2 days followed by 1,000 mg 3 times daily for 2 weeks
- **Carotenoids:** 50,000 IU per day for 2 weeks
- **Zinc:** 30 mg per day for 2 weeks
- **Echinacea:** 2 capsules every 2 hours for 2 days followed by 2 capsules 3 times daily for 2 weeks; or ¼ tsp tincture every 2 hours for 2 days followed by ½ tsp 3 times daily for 2 weeks
- **Lactobacillus:** 4–8 oz *Lactobacillus acidophilus* yogurt daily for 2 weeks or 24 billion or more *Lactobacillus acidophilus* organisms daily for 2 weeks
- **High-dose allicin extract:** 2 capsules 4 times daily for the first 3 to 6 days, then 2 capsules twice daily for 1 week, and then 2 capsules daily until infection is gone
- **Ice packs** over the uterus with a hot footbath or hot water bottle to the feet; repeat twice daily as needed

abnormal discharge. They were tested and were found to have chlamydia, candidiases, trichomoniasis, bacterial vaginosis, or mixed infections. The women were randomized to receive either a cream containing neem seed oil, reetha saponin extract, and quinine or a placebo cream. The creams were applied intravaginally at bedtime for 14 days. Ten of the 12 patients with chlamydia who received the treatment cream recovered within two weeks. Ten of the 17 women with bacterial vaginosis who received the treatment cream recovered within two weeks. There was no benefit in women with candidiasis or trichomoniasis. There was no improvement in symptoms or lab test results in any of the women in the placebo group. Although there were not enough women to achieve statistical significance, the cream showed encouraging results and should clearly be investigated further. It would be very appropriate to try this cream in bacterial vaginosis. In chlamydia infection, it could be used as an adjunct treatment along with antibiotics or following the antibiotics to help prevent recurrence.[17]

CONVENTIONAL MEDICINE APPROACH

Chlamydia is the most common reportable sexually transmitted infection in the United States, with gonorrhea following second. Both of these bacterial illnesses can be present without symptoms, and they are highly transmittable. Both are very preventable with the use of a condom. The current CDC guidelines (2006) recommend that all women under the age of 25 have annual screenings for both chlamydia and gonorrhea, and then anytime a woman has a new partner, screening is recommended. Return visits for a repeat test for cure were recommended in the past, but now they are only done in the cases of pregnant women. Single-dose therapy is highly effective, especially when administered in the provider's office. It is thus recommended that, if possible, providers carry a supply of medications for administration to the patient before she leaves the office or clinic. The sexual partner should be tested if at all possible, but the partner should also be treated with antibiotics, regardless of testing. Current CDC recommendations are that any partner exposure within 60 days should be evaluated and then treated. It is often the case that partner evaluation does not occur or is not economically feasible, so many providers routinely treat the partner as well. The ability to test for chlamydia and gonorrhea has significantly improved and now can be done using vaginal, cervical, or rectal swabs, as well as urine testing. Some labs can now also test for chlamydia and gonorrhea on the liquid left over from a liquid Pap test. Pregnant women should always be screened for chlamydia and gonorrhea.

The CDC now recommends that all women with positive chlamydia tests have a reevaluation and testing at three months after their therapy to look for reinfection. This differs from the test-of-cure evaluations that have been done extensively in the past and are currently not recommended. Repeating the test in three months to make sure that the patient is not reinfected is important for preservation of future fertility and prevention of tubo-ovarian abscesses. Treating infected patients prevents transmission to sex partners. Also, treating pregnant women often prevents transmission of chlamydia to infants during birth. Treatment of sex partners also helps to prevent reinfection of the initial patient and the infection of other partners. Coinfection with chlamydia and gonorrhea occurs frequently, and patients should be treated for both diseases when one is found unless testing for the other is negative when tested for both.

The standard antibiotic regimen for treatment of chlamydia would include one of the following:

- Azithromycin (1 g orally in a single dose)
- Doxycycline (100 mg orally twice a day for 7 days)

Alternative antibiotic regimens would include one of the following:

- Erythromycin base (500 mg orally 4 times a day for 7 days)
- Erythromycin ethylsuccinate (800 mg orally 4 times a day for 7 days)
- Ofloxacin (300 mg orally twice a day for 7 days)
- Levofloxacin (500 mg orally once daily for 7 days)

Since doxycycline, ofloxacin, and levofloxacin are contraindicated in pregnant women, azithromycin is probably the drug of choice.

The standard antibiotic treatment of uncomplicated gonorrhea infections involves one of the following:

- Ceftizoxime (125 mg intramuscularly in a single dose)
- Cefixime (400 mg orally in a single dose)
- Ciprofloxacin (500 mg orally in a single dose)
- Ofloxacin (400 mg orally in a single dose)
- Levofloxacin (250 mg orally in a single dose)

Quinolone-resistant gonorrhea is on the rise, and quinolones are not recommended for the treatment of gonorrhea in regions where the rate of resistant gonorrhea is high. The main areas in the United States where quinolones use is not recommended are California and Hawaii. Some inner-city areas and other regions also have these warnings, so it is important for the practitioner to be aware of regional resistance patterns. The CDC recommends the following treatment for patients at high risk for quinolone resistance:

- Ceftriaxone (125 mg intramuscularly in a single dose)
- Cefixime (400 mg orally in a single dose)

Other antibiotic regimens for gonorrhea treatment include single-dose injectable cephalosporin regimens such as one of the following:

- Ceftizoxime (500 mg intramuscularly)
- Cefoxitin (2 g IV) administered with probenecid (1 g orally)
- Cefotaxime (500 mg administered once intramuscularly)

None of the injectable cephalosporins offers any advantage over ceftriaxone, which is more commonly stocked in offices and clinics. Azithromycin (2 g orally) is effective against uncomplicated gonorrhea, but it is expensive and causes significant gastrointestinal distress and therefore is not currently recommended for treatment of gonorrhea. The gonorrhea in the United States is not adequately susceptible to penicillins, tetracyclines, and macrolides (erythromycin) for these to be used in treatment.

Again, a person being treated for gonorrhea would also be treated for chlamydia, unless tests have shown that chlamydia is not present.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

If you have unprotected sexual contact with someone who has chlamydia, gonorrhea, or hepatitis B, I strongly urge you to see a licensed practitioner (naturopathic doctor, medical doctor, osteopathic doctor, nurse-practitioner, or physician's assistant) who is trained and qualified to perform a physical exam and take samples for testing and also capable of administering or making available prescription antibiotics and vaccine. This does not necessarily require a gynecologist or other conventional practitioner. Licensed naturopathic physicians are trained to perform and provide these services. State law determines which antibiotics naturopathic physicians may prescribe. If a practitioner cannot prescribe a particular antibiotic, he or she can either refer you to a conventional practitioner or work in cooperation with a conventional practitioner who can make a prescription available to you. Nutritional and herbal supplements can then be used in addition to your conventional treatment.

A naturopathic physician can also provide natural therapies to augment your immune support, prevent side effects from the medications, and help you to recover optimally from the infection.

If you have severe liver disease due to hepatitis B, I would strongly consider alternative treatments as the primary treatment, with careful monitoring of liver enzymes and liver biopsy with the help of a specialist.

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UTERINE FIBROIDS

CHAPTER 19

OVERVIEW

Uterine fibroids (also known as leiomyomas or myomas) occur in 20 to 25 percent of women by age 40,[1] more than 50 percent of women overall. They are the most common solid pelvic tumors in women and the most common indication for major surgery in women, and they account for approximately one-third of hysterectomies each year.[2] According to some studies, in African-American women the incidence of fibroids is three to nine times higher and the fibroids' rate of growth is increased.[3, 4]

You would think for a condition as common as this that we would have a good understanding of the cause and cure. Nevertheless, the cause of fibroids remains poorly understood. Uterine fibroids are not actually fibrous but consist of muscle, probably uterine smooth-muscle cells but possibly connective tissue or the smooth-muscle cells of uterine arteries. The growth of fibroids may be stimulated by estrogen. The tendency of fibroids to arise during the reproductive years, grow during pregnancy, and regress postmenopausally does implicate estrogen as one factor in the cause and growth of fibroid tumors. A growth spurt in fibroids is frequently seen in the perimenopausal period and is likely due to anovulatory cycles with a relative estrogen excess that commonly occur during this period. Pregnancy is a condition of elevated estrogen and progesterone, and even though progesterone is an antiestrogen, the increased blood supply during pregnancy leads to an overall stimulating effect on the uterine fibroids.[5]

There have been reports that concentrations of estrogen receptors in fibroid tissue are higher than in the surrounding uterine muscle tissue (myometrium)[6] but lower than in the uterine lining (endometrium). Although these findings may help to explain why fibroids are sensitive to estrogen, they have not been consistently substantiated in other studies.[7, 8] This higher concentration of estrogen receptors may be due to changes in estrogen metabolism within the fibroid itself. Pollow and colleagues[8] demonstrated a significantly lower conversion of estradiol into estrone in fibroids than in the myometrium, suggesting that local, concentrated estradiol increases within the fibroid may play a role in the cause and growth of fibroids.

The prevalence and size of fibroids are greater in women who do not ovulate or who have endometrial hyperplasia or a granulosa cell tumor of the ovary. Even though fibroids do not lead to cancer and are not a cause of uterine cancer, they are associated with a fourfold increase in the risk of endometrial carcinoma. This is probably because too much estrogen without any or enough progesterone (called unopposed estrogen) is a contributing factor in both conditions.

Fibroids come in all sizes and shapes and usually occur as multiple tumors, although each fibroid is discrete. Most discernible fibroids are between the size of a walnut and the size of an orange, but unusual tumors have been reported up to 100 pounds. Fibroids are classified according to their location. They are either submucosal (just under the endometrium), intramural (within the uterine muscle wall), or subserosal (from the outer wall of the uterus). They can also be intraligamentous (in the cervix between the two layers of the broad ligament), pedunculated and dangling from a stalk into the uterine cavity (pedunculated submucous), or pedunculated on the outside of the uterine wall (pedunculated subserous). The pedunculated submucous fibroids

can on occasion protrude through the cervix into the vagina. Other pedunculated fibroids on a long stalk outside the uterus can be mistaken for an ovarian mass or attach to the bowel.

The majority of fibroids (an estimated 50 to 80 percent)[9] don't cause any symptoms, but when symptoms do occur they often begin as a vague feeling of discomfort and may include a feeling of pressure, congestion, bloating, heaviness, pain with vaginal sex, urinary frequency, backache, abdominal enlargement, and abnormal bleeding. Abnormal bleeding occurs in only 30 percent of women with fibroids. Heavy bleeding (menorrhagia) results when intramural tumors enlarge the endometrial cavity and increase the surface area of endometrium and blood supply to the uterus. Intermenstrual bleeding (metrorrhagia) results when submucous fibroids ulcerate through the endometrial lining or cause congestion of the surrounding blood vessels.

Fibroids can undergo degenerative changes. One type of degenerative change is when the continued growth of the fibroid outgrows the blood supply. A more common type of degenerative change is when there is a loss of cellular detail (hyaline degeneration) as a result of a decrease in the vascularity of the tumor. Necrosis (cell death) results in cystic degeneration, which lends itself to a softer than usual consistency and can be confused with an ovarian mass on exam or pelvic ultrasound. Calcification can occur over time and is usually seen in postmenopausal women.

The historical perspective has been that fibroids are not usually associated with pain except when degeneration occurs or when the uterus contracts in its efforts to expel a submucous fibroid. Feelings of pressure pains may develop if the uterus becomes excessively enlarged with fibroids, or if a single fibroid is larger than 5 cm at its greatest diameter.[10] However, if we look a little harder at some of the research, clinic-based studies suggest that gynecologic pain is often related to the presence of fibroids.[11–15] Fibroids are commonly found in women with chronic pelvic pain, although they may not be the cause or the only cause of the pain.[16, 17]

There may also be racial differences when it comes to pelvic pain and uterine fibroids. One study reported that 41 percent of white and 59 percent of black hysterectomy patients with a presurgical diagnosis of fibroids reported severe pelvic pain.[18] Another study reported a series of studies in which pelvic pain and/or menstrual pain was experienced in 34 percent of patients with fibroids.[19] In a recent study, the first population-based study of gynecologic pain symptoms and fibroids, dyspareunia (pain with vaginal sexual activity) and noncyclic pelvic pain, but not dysmenorrhea (menstrual pain), increased in severity with the presence of uterine fibroids.[20] Pregnant women with fibroids also have reported pelvic pain more frequently, and it seems that the pelvic pain is related to the size of the fibroid(s) and their location.[21, 22]

So you might now be confused: do fibroids cause pelvic pain or not? The majority of the time, uterine fibroids do not cause pelvic pain; however, if you have chronic pelvic pain, fibroids may in fact be a cause of that chronic pelvic pain, especially if they can be palpated on the pelvic exam. Some of the urinary complications that occur in 5 percent of fibroids are cause for concern because they may be due to compression of the ureter (outflow tract from kidney to bladder) that can cause enlargement of the kidneys and compromise of kidney function.

Fibroids are thought to be the cause of 2 to 10 percent of cases of infertility. There are several possible reasons for this. The tumors may interfere with implantation of the fertilized ovum, they may cause compression on the fallopian tubes and interfere with motility of sperm or egg, or they may cause early miscarriage. They may also cause periodic anovulation or abnormal uterine blood flow and may obstruct sperm. Large fibroids may affect pregnancy by interfering with the fetus growth, leading to potential intrauterine growth retardation, premature rupture of membranes, retained

KEY CONCEPTS

- Uterine fibroids are benign and common.
- We do not know what causes fibroids.
- Fibroids are estrogen dependent (some may even be progesterone dependent).
- The majority of the time there are no symptoms, but when there is pelvic pain, abnormal bleeding, or infertility, uterine fibroids must be considered.
- Abnormal bleeding may be caused by uterine fibroids.
- Abnormal bleeding warrants a visit to your health-care practitioner.
- There are several kinds of fibroids based on location.
- An enlarged uterus or abnormal finding on a pelvic exam may require further testing to determine the diagnosis.
- Less than 1 percent of fibroids are malignant, but rapidly growing fibroids warrant further exploration.

PREVENTION

- Ensure regular ovulation.
- Avoid situations that promote lack of ovulation, such as stress.
- Avoid estrogen-only medications.
- Dietary phytoestrogens (soy, flax, red clover) do not appear to stimulate the growth of fibroids.
- Practice good nutritional habits with a diet that is higher in complex carbohydrates, higher in fruits and vegetables, and low in saturated fats, alcohol, sugar, or other foods that interfere with the liver's role in metabolizing hormones.
- Maintain a healthy weight. Obesity can lead to higher estrogen effects on the uterus.

placenta, postpartum hemorrhage, abnormal labor, or an abnormal lie of the fetus. Not all practicing obstetricians would agree with these reports, and their main observations with pregnant women and large fibroids are an abnormal lie or postpartum hemorrhage. The incidence of miscarriage due to fibroids is unknown but estimated to be two to three times greater than normal.

If a fibroid uterus is present, it can often be felt during a pelvic examination. It usually feels firm but can vary from soft to rock-hard. The uterus can be irregularly shaped or irregularly enlarged and often feels like it has protrusions. Most of the time it is not painful during the exam. Many times women don't realize they have a fibroid until the practitioner finds it. This is not cause for alarm. Fibroids are benign growths most of the time. The worrisome fibroid is a rapidly growing one; the rare malignant uterine sarcoma may have to be considered in these cases.

After the pelvic exam, a pelvic ultrasound is the most useful tool in diagnosing a fibroid. This imaging test is able to identify fibroids and delineate the size and to some degree the location, as well as identify that the ovaries are normal in size. The ultrasound detects the contours of the uterus, the fibroids (called hypechoic masses), compression of the ureters, any potential enlargement of the kidneys caused by the compression, and, of course, the presence of an enlarged uterus. It is difficult for the ultrasound to detect fibroids smaller than 2 cm. A magnetic resonance imaging (MRI) test is more accurate in assessing the number, size, and location of fibroids, but it does not provide significant enough additional information to be worth the cost. A hysteroscopy can detect submucous tumors. An x-ray can diagnose calcified fibroids.

The main diagnostic consideration is differentiating a possible fibroid from the following conditions: ovarian malignant tumor, an abscess in the fallopian tube/ovarian region, a diverticulum from the colon, a pelvic kidney (rare), endometriosis, adenomyosis (endometriosis within the muscle wall of the uterus), congenital anomalies, adhesions in the pelvis, or a rare retroperitoneal tumor. Not all of these considerations can be distinguished from the medical history, physical exam, and pelvic ultrasound. Surgery may be required to distinguish one condition from the

other. Laparoscopy is the definitive method of excluding these other diagnoses from fibroids, even though laparoscopy is not typically done to diagnose fibroids. Only when there is great concern or lack of clarity about the diagnosis will the procedure be warranted.

OVERVIEW OF ALTERNATIVE MEDICINE

Over the more than 23 years I have been in clinical practice, not many health problems have eluded successful treatment as consistently as uterine fibroids. Women who are seeking an alternative to drug or surgical treatment for uterine fibroids will not find an easy, reliable alternative to shrink the tumors with natural medicine. Using the protocols in this book, we are usually able to successfully resolve or improve most symptoms that relate to the fibroids such as abnormal bleeding, pelvic pain or pressure, and backache. In addition, there are natural therapies that may be able to slow the growth of the fibroids to avoid further problems.

When it comes to shrinking fibroids, especially the large ones, natural therapies can only significantly shrink a small minority of cases. There are individual cases that report reduction in size on pelvic ultrasound, disappearance of symptoms, and even total disappearance of any evidence of fibroids. I myself can report cases where fibroid growth and the size of the uterus have been significantly reduced. The problem is that the results are very inconsistent. Often the cases that have shown the most dramatic improvements are the women who are nearing menopause or postmenopausal whose fibroids shrink because of the natural decrease in their estrogen levels.

It may be possible to reduce uterine fibroids through alternative means and avoid a surgery or drug treatment that your gynecologist has recommended, but, more likely than not, large fibroids that are causing symptoms that have not been successfully dealt with will indeed require some kind of conventional intervention. My main goals with women who have large fibroids are to (1) deal with problem symptoms, (2) try to stabilize the situation and hold out until menopause, and (3) recognize the clinical situations when conventional treatment intervention is appropriate and reasonable.

One aspect of being a naturopathic physician is to more fully educate patients about their health and health problems so that they can make informed decisions about their health care. With uterine fibroids, I have often been in the position of discussing surgical options or procedures that not all gynecologists discussed with their patients. Educating the woman who is faced with a possible hysterectomy and finding a surgeon or gynecologist who is skilled in these alternatives may be the most important service an alternative provider can offer. There are many new conventional therapies that can be alternatives to a hysterectomy in many cases. These new therapies include hysteroscopic resection, embolization, and laparoscopic surgery. However, not all cases of fibroids may be successfully treated with these methods.

Nutrition

Even though diet changes alone are unlikely to shrink fibroids, good dietary habits are still important. Clinical observation has taught me that all natural therapies work best in the context of a healthy lifestyle. Improving one's diet may help in small ways, to decrease heavy bleeding or the pain and discomfort caused by the fibroids. Besides these potential benefits, dietary improvements will improve your general well-being.

Also, women with uterine fibroids may be at higher risk for endometrial cancer due to the higher estrogen levels. A diet high in saturated fats is associated with higher blood levels of estrogen, potentially exacerbating the problem. Low-fiber diets are associated with elevated estrogen levels and poor excretion of estrogen. Poor nutritional habits can also lead to dysfunctional estrogen

metabolism and inhibit the body's ability to break down and excrete excess estrogen.

The tradition of naturopathic medicine holds that the health and vitality of an individual depends on the health of the liver and the whole digestive system. The liver's basic functions are vascular, secretory, and metabolic. As a vascular organ, the liver is a major reservoir of blood and filters over one quart of blood per minute. The liver removes bacteria, endotoxins, antigen-antibody complexes, and other particles from the circulatory system. The liver's secretory functions are the synthesis and secretion of bile. The liver manufactures about one quart of bile daily. Bile is required for the absorption of fat-soluble substances, including some vitamins. The majority of the bile secreted from the liver into the intestines is reabsorbed. The metabolic functions of the liver are involved in carbohydrate, fat, and protein metabolism; the storage of vitamins and minerals; the formation of numerous biochemical factors; and the detoxification or excretion into the bile of hormones such as estrogen as well as histamines, drugs, and pesticides.

The liver not only has to process the foods that we eat every day but also detoxifies harmful substances, both those we produce from normal metabolism and those we are exposed to in our environment. In addition, it metabolizes and deactivates hormones. The liver metabolizes estrogen so it can be eliminated from the body by converting it to estrone and finally to estriol, a weaker form of estrogen that has very little ability to stimulate the uterus. If the liver cannot effectively metabolize estradiol, the uterus may become overestrogenized and respond with fibroid growths.

Saturated fats, sugar, caffeine, alcohol, and junk foods are unhealthy and problematic for two reasons: (1) they interfere with the body's ability to metabolize estradiol to estrone to estriol, and (2) some of these foods are deficient in B vitamins or interfere with B-vitamin metabolism. If B vitamins are lacking in the diet, the liver is missing some of the raw materials it needs to carry out its metabolic processes and regulate estrogen levels. A recent animal study suggests that lycopene supplementation (high in yellow/orange fruits and vegetables and especially high in tomatoes, tomato sauce, and tomato juice) may decrease the incidence and size of leiomyomas.[23] Another study extolled the benefits of a vegetarian diet by finding that women who suffered from fibroids were more likely to have high consumption of red meat and ham and have low consumption of fruits and green vegetables.[24]

Whole grains such as brown rice, oats, buckwheat, millet, and rye are excellent sources of B vitamins. Whole grains also help the body to excrete estrogens through the bowel. The role of whole-grain fiber in lowering estrogen levels was first reported in 1982.[25] This study found that vegetarian women who eat a high-fiber, low-fat diet have lower blood estrogen levels than omnivorous women with low-fiber diets. Once again, we can see why a high-fiber diet might prevent and perhaps reduce uterine fibroids through the estrogen connection.

A high-fiber diet may also help relieve some of the bloating and congestion associated with fibroids. By bulking up the stool and regulating bowel movements, some of these symptoms may improve. Some women have a hard time tolerating increased fiber in their diet because of compromised digestive function. In these cases, it may be necessary to increase fiber slowly and include digestive support such as enzymes or acidophilus.

Because there is an association between having uterine fibroids and a fourfold increase in the risk of endometrial cancer,[1] three dietary recommendations stand out above all else: increase fiber, decrease dietary fat, and increase soy products and other legumes. Researchers at the Cancer Research Center at the University of Hawaii published a case-controlled, multiethnic (Japanese, Caucasian, Native Hawaiian, Filipino, and Chinese) population study to examine the

role of dietary soy, fiber, and related foods and nutrients on the risk of endometrial cancer.[26] The diets of 300 women with endometrial cancer were compared with women in the general multiethnic population. The researchers found that high fat intake was positively associated with endometrial cancer, whereas a diet rich in fiber, soy, and other legumes reduced the risk of endometrial cancer. The study concluded that plant-based diets low in calories from fat, high in fiber, and rich in legumes (especially soybeans), whole-grain foods, vegetables, and fruits reduce the risk of endometrial cancer.

While I can't say that lowering fat and increasing soy and fiber intake will definitely prevent or treat fibroids, these nutritional habits do lower the risk of endometrial cancer. Since uterine fibroids are associated with an increase in the risk of endometrial cancer, it logically follows that these diet recommendations could help with fibroids.

Some people have raised the concern that women with uterine fibroids should avoid soy foods for their high content of phytoestrogens (specifically isoflavones) because phytoestrogens may have a weak estrogenic effect. The answer appears to be that this is not necessary. Soy phytoestrogens do not have an estrogenic effect on the uterus, at least in the usual doses. This was most recently confirmed in a Chinese study.[27] This population-based, case-controlled study obtained detailed information from a food-frequency questionnaire on soy food intake over five years. The participants were 832 women, ages 30 to 69, who were diagnosed with endometrial cancer from 1997 to 2001. This group was compared with 846 control-matched women selected from the Shanghai Residential Registry, who had an average intake of 42.5 mg of soy-based isoflavones per day.

This study demonstrated that regular consumption of soy foods, as either soy protein or soy isoflavones, was inversely associated with the risk of endometrial cancer. Moreover, this study indicated that isoflavones are selectively estrogenic and antiestrogenic; they have an estrogenic effect on some tissues and organs and an antiestrogenic effect on others. Soy foods may be analogous to a class of drugs called selective estrogen receptor modulators (SERMs). In the uterus, soy isoflavones appear to have an antiestrogenic effect, with the possible exception of when they are used in high doses daily for a longer term.

Long-term high-dose use of soy may be different than the usual average typical daily consumption of soy. In one study, one group of postmenopausal women were given soy tablets containing 150 mg of soy isoflavones per day for five years.[28] The second group received an identical placebo tablet for five years. Results of endometrial biopsies were obtained at baseline, 30 months, and five years after the beginning of the treatment. At the five-year endpoint, 70 percent of the women on the 150 mg of soy isoflavones had atrophic tissue versus 81 percent who received the placebo. After five years, the incidence of endometrial hyperplasia was significantly higher in the isoflavone-treated group, 3.37 percent versus 0 percent. There were five cases of simple hyperplasia and one of complex hyperplasia. No cases of atypical hyperplasia or endometrial cancer occurred during the five years. This is the first study that raises concerns about long-term, high-dose isoflavone supplementation and its effects on the endometrium. It would typically take three to five servings of soy foods per day to achieve 150 mg. One serving per day of soy foods is only 25 to 60 mg per day, depending on the soy food item.

Isoflavones appear to be able to act as a partial agonist, binding to the estrogen receptor. Because the action of isoflavones is weaker than that of endogenous estrogens at low doses and for short durations, these phytoestrogens seem to be antagonistic. They are able to counteract the effects of endogenous estrogens. When treatment is prolonged and at a higher dose, the agonist effects are more evident and the isoflavones have

an estrogenic effect. It is important to note that at 30 months there was no difference between the isoflavone-treated group and the placebo group. It was only after five years that the dose of 150 mg per day produced an estrogenic effect in a small number of women.

The subject of phytoestrogens is discussed in more detail later in this chapter and in Chapter 12 in the discussion of menopause.

Nutritional Supplements

As mentioned earlier, many of the symptoms of enlarged fibroids can be effectively treated using natural therapies. For abnormal bleeding and pelvic pain, refer to Chapters 1 and 13. In this section, I will largely be discussing the traditional naturopathic methods of trying to reduce the size of uterine fibroids or to inhibit their growth. These recommendations are based more on tradition, theory, logic, and clinical experience than on scientific evidence.

Lipotropic Factors. Supplements such as inositol and choline exert a lipotropic effect, meaning they promote the removal of fat from the liver. Lipotropic supplements are usually a combination vitamin and herbal formulation and sometimes an animal liver extract designed to support the liver's function in removing fat, detoxifying the body's wastes, detoxifying external harmful substances (pesticides, fossil fuels, etc.), and metabolizing and excreting estrogens. These lipotropic products vary in their formulations depending on the manufacturer, but they are all similar and have the same uses in mind. Because the liver is the most important organ of metabolism, naturopathic physicians believe that when the liver function improves, metabolism improves, making this treatment fundamental to the treatment of many chronic diseases.

Lipotropic Factors

1–4 tablets per day with meals

Pancreatic Enzymes. There are three categories of pancreatic enzymes:

- **Lipases:** enzymes that help digest fats along with bile. A deficiency of lipase results in malabsorption of fats and fat-soluble vitamins.
- **Amylases:** enzymes that break down starch molecules into smaller sugars.
- **Proteases:** trypsin, chymotrypsin, and carboxypeptidase break down protein molecules into single amino acids.

Supplementation with pancreatic enzymes is usually done to treat pancreatic insufficiency. Pancreative insufficiency manifests itself in symptoms of abdominal bloating, gas, indigestion, undigested food in the stool, malabsorption, and nutrient deficiencies. Other clinical uses of pancreatic enzymes are for treatment of cystic fibrosis, rheumatoid arthritis, athletic injuries, and—one of the most controversial uses—the treatment of cancer.

The logic for the treatment of uterine fibroids is similar to the logic for the treatment of cancer. Enzyme preparations have been used at the Contreras Clinic in Mexico and by Drs. William Kelley and Nicholas Gonzalez as part of a cancer treatment protocol. There is little evidence in the scientific literature to support their use, but the logic is that the pancreatic enzymes will digest the protein cell membrane surrounding the malignant cells. By doing so, the immune cells will then be able to enter the cancer cells and alter the abnormal cell division of the cancer cells. In the case of uterine fibroids, the belief is that the pancreatic enzymes will help to digest the fibrous/smooth muscle tissue and dissolve the fibroids. When used for this purpose, the pancreatic enzyme supplement must be taken between meals rather than with meals.

Pancreatic Enzymes

2–4 capsules 3 times per day between meals

Botanical Medicines

Traditional Herbs. Many plants have been used in traditional herbal medicines designed to treat women with uterine fibroids. The plants and herbal formulations talked about here are used to try to shrink uterine fibroids; herbs used to deal with abnormal bleeding and uterine cramping are discussed in Chapters 1 and 13.

Scutellaria barbata, commonly used in traditional Chinese medicine for its purported antitumor properties, was shown to inhibit the proliferation of uterine smooth muscle cells and act as an aromatase inhibitor contributing to decreased fibroid growth in vitro.[29–31] Other botanicals used in traditional Chinese medicine that show some promise in treating fibroids in vivo include poria and cinnamon.[32]

Traditional herbalists have developed various botanical uterine fibroid protocols and report modest success in reducing the size and number of uterine fibroids. I have used many herbs and herbal formulations over the years in an attempt to shrink fibroids, and I present the protocol below from one of the traditional herbalists, Rick Scalzo, as an option for your consideration. (See the Resources for a listing of herbal companies.)

Scalzo's Protocol

Scudder's Alterative

Corydalis tubers (*Dicentra canadensis*)
Black alder bark (*Alnus serrulata*)
Mayapple root (*Podophyllum peltatum*)
Figwort flowering herb (*Scrophularia nodosa*)
Yellow dock root (*Rumex crispus*)

Add 30–40 drops to a small amount of warm water and take 3 times daily.

Echinacea/Red Root Compound

Echinacea (*Echinacea* spp)
Red root (*Ceanothus americanus*)
Baptisia root (*Baptisia tinctoria*)
Thuja leaf (*Thuja occidentalis*)
Stillingia root (*Stillingia sylvatica*)
Blue flag root (*Iris versicolor*)
Prickly ash bark (*Xanthoxylum clava-herculus*)

Add 30 drops to a small amount of warm water and take 3 times daily.

Fraxinus/Ceonothus Compound

Mountain ash bark (*Fraxinus americanus*)
Red root (*Ceanothus americanus*)
Life root (*Senecio aureus*)
Mayapple root (*Podophyllum peltatum*)
Helonias root (*Chamaelirium luteum*)
Goldenseal root (*Hydrastis canadensis*)
Lobelia (*Lobelia inflata*)
Ginger root (*Zingiber officinale*)

Add 30 drops to a small amount of warm water and take 3 times daily.

Turska Formula

Gelsemium root (*Gelsemium sempervirens*)
Poke root (*Phytolacca americana*)
Aconite (*Aconitum napellus*)
Bryonia root (*Bryonia dioica*)

Add 5 drops to a small amount of warm water and take 3 times daily.

Other Herbal Extracts to Consider

Chaste tree (*Vitex agnus castus*)
Nettle (*Urtica dioica*)
Burdock root (*Arctium lappa*)
Dandelion root (*Taraxacum officinale*)
Oregon grape (*Berberis aquifolium*)

Topical Preparations

Poke root oil: rub onto the belly over the uterus nightly before bed.
Castor oil packs: apply over pelvis 3–5 times per week. (See Appendix D for instructions.)

Herbal Phytoestrogens. There are three types of naturally occurring estrogen-like substances called phytoestrogens found in plants: resorcylic acid lactones, steroids and sterols, and phenolics. Phytoestrogens are present in virtually every plant in at least modest levels, with some plants having particularly high levels. Resorcylic acid lactones are not true phytoestrogens but are mycotoxins produced by soil-dwelling molds. Their presence in plants is the result of contamination with molds. Steroids are the classic steroidal estrogens (estradiol and estrone) and are found in very minute amounts in a few plants such as apple seed, date palm, and pomegranate seed in the range of one to ten parts per billion.[26, 33, 34] Diosgenin is a steroid derivative and is found in at least 20 plants, including wild yam species. Beta-sitosterol is the most common phytosterol and is distributed widely through the plant kingdom. It is found in plant oils such as wheat germ oil, cottonseed oil, and soybean oil. Beta-sitosterol is the dominant phytosterol found in garlic and onions. Herbal sources include licorice root, saw palmetto, and red clover. Stigmasterol is closely related to beta-sitosterol. Soybean oil is an important source of stigmasterol and is a better source for laboratory synthesis of progesterone than is beta-sitosterol. Some herbal sources include burdock, fennel, licorice, alfalfa, anise, and sage.

The phenolic phytoestrogens are members of the flavonoids, the largest single family of plant substances, which has over 4,000 individual members. The term *flavonoid* derives from the Latin *flavus* meaning "yellow" because the flavonoids are responsible for the yellow, red, white, and blue pigments in plants. Phenolics include isoflavones, which are higher in legumes and especially soybeans than any other plants; coumestans, with one known estrogenic member (coumestrol) that is approximately six times more estrogenic than the isoflavones;[35, 36] and lignans, high in grains and cereals and highest in flaxseed.

There has been some concern and controversy about how phytoestrogens affect the uterus; if they have an estrogenic effect, they should be avoided by women with uterine fibroids or endometrial cancer. We talked earlier about soybeans and how they are actually associated with a reduced incidence of uterine cancer.[26] I do not believe that eating a high soy diet is something to be concerned about; in fact I recommend increasing the soy foods in the diet in order to reduce the estrogen burden in the body.

Most of the research on the effects of phytoestrogens on the uterus is found in relationship to the agricultural industry and the health of grazing animals. In the 1940s, it was reported that the red clover sheep grazed on in Australia was responsible for their infertility.[37] A Finnish study of pasture legumes determined that red clover contained the highest concentrations of phytoestrogens[38] and that abundant intake of red clover resulted in fertility problems in cattle.[39]

In one study on the effects of phytoestrogens in sheep, it was noted that both coumestans and isoflavones produce changes in the typical stimulation with steroidal hormones such as estradiol in all of the target organs.[40] Among these changes was an increase in uterine weight. Other investigators have examined the binding of phytoestrogens to the uterus and vagina. Coumestrol has temporarily enhanced the uptake of estradiol by the uterus and vagina only one hour after being injected into mice.[41] Researchers also noted that coumestrol actually inhibited the uptake of estradiol by the uterus over the long term, and they postulated that there was actually an inhibitory effect at the estradiol receptor sites. Other researchers have noted that coumestans and isoflavones compete with estradiol for uterine receptor sites but have less affinity for them than estradiol.[42]

Coumestrol has been found to increase uterine weight at a 100 mcg dose when given to rats at a certain time in the development of glands.[43] It appears that the weak estrogenic effect of phytoestrogens is variable and can even be weakly antiestrogenic. Variability is based on dose, target tissue, the woman's hormonal environment, and more.

Higher does of phytoestrogens have stimulated some concern. However, it is reassuring that in countries with a high intake of phytoestrogens (Japan, Thailand, China), women do not have an increase in uterine fibroids. However, they do have a four- to sixfold lower incidence of breast cancer[44] (also an estradiol target tissue), although how a substance affects one tissue is not necessarily translated to how it affects another.

Again, though, I must come back to the effects of soy on the endometrium, which may be different than some of the other plants, most notably red clover. Like data on breast cancer, data on women of different cultures support the conclusion that soy phytoestrogens are not an estrogen stimulus for the endometrium. Rather, they probably act as an estrogen antagonist and are associated with low rates of endometrial cancer in countries where soy phytoestrogen intake is high.[45]

Based on these studies, my recommendation to those with uterine fibroids is to eat a diet high in soy products; however, my current cautionary advice would be to avoid the use of red clover.

In cases where conventional treatment with GnRH inhibitors is needed, thus causing a pharmaceutically induced menopause, Ipriflavone (a semisynthetic soy derivative) supplementation has been helpful at preventing side effects such as bone loss and increased LDL.[46, 47]

Natural (Bio-Identical) Progesterone. Historically, studies have suggested that progesterone may inhibit growth of uterine fibroids. A. Lipschutz demonstrated that progesterone administered to guinea pigs prevented formation of tumors that had been induced by estrogen.[48] In 1946, A. Goodman reported six cases of clinically diagnosed uterine fibroids that regressed after using progesterone therapy.[49]

Dr. John Lee proposes that because uterine fibroids are a result of estrogen stimulation and what he calls estrogen dominance, progesterone is the solution. He asserts that estrogen dominance is a much greater problem than is recognized by conventional medicine. "Since many women in their mid-thirties begin to have nonovulating cycles, they are producing much less progesterone than expected, but still producing normal (or more) estrogen. They retain water and salt, their breasts swell and become fibrocystic, they gain weight (especially around the hips and torso), they become depressed and lose sex drive, their bones suffer mineral loss, and they develop fibroids. All are signs of estrogen dominance relative to a progesterone deficiency. When sufficient natural progesterone is replaced, fibroid tumors no longer grow in size (they generally decrease in size) and can be kept from growing until menopause, after which they will atrophy. This is the effect of reversing estrogen dominance."[50] The preferred form of natural progesterone for treating fibroids (unless heavy bleeding is involved) is a topical cream with at least 400 mg of progesterone per ounce.

Be advised, however, that there is a counter theory about the relationship of progesterone to uterine fibroids. Dr. Mitchell Rein and his colleagues at Brigham and Women's Hospital published a report in 1995 stating that not only is there no evidence that estrogen directly stimulates myoma growth, but that it is actually progesterone and progestins that promote the growth of fibroids.[51] The authors cite the biochemical, histologic, and clinical evidence that supports an important role for progesterone and progestins in the growth of uterine myomas. Their comprehensive hypothesis is based on an analysis of many different technical studies, which they conclude suggest that the development and growth of myomas involves a multistep chain of events.

Since both of these schools of thought are theoretical, I encourage all women and their health-care practitioners to educate themselves so as to make the best individual decision. Fibroids are generally not urgent or life threatening, so there is room for experimentation and observation to determine the best course of treatment.

Sample Treatment Plan for Uterine Fibroids

Diet

- Eat a high-fiber, low-fat diet.
- Eat a diet high in whole grains (brown rice, oats, buckwheat, millet, rye, whole wheat).
- Eat a diet high in fruits and vegetables.
- Eat a diet high in flaxseed, particularly ground flaxseed.
- Eat a diet high in legumes, especially soy products, 1 serving per day.
- Avoid saturated fats, sugar, caffeine, alcohol, and junk foods.

Nutritional Supplementation

- Lipotropic factors: 1–2 tablets twice daily with meals
- Pancreatic enzymes: 2–3 capsules 3 times per day between meals

Botanicals

See the Resources section for sources.

- Scudder's Alterative: 30 drops 3 times per day
- Echinacea/Red Root Compound: 30 drops 3 times per day
- Fraxinus/Ceonothus Compound: 30 drops 3 times per day
- Gelsemium/Phytolacca Compound (Turska Formula): 5 drops 3 times per day

See Chapter 1 for abnormal bleeding problems. See Chapter 13 for pelvic and menstrual pains.

Natural (Bio-Identical) Progesterone Cream

¼ tsp of a cream containing at least 400 mg/oz 1 to 2 times daily for 1 week after menses; ¼ to ½ tsp twice daily for the next 2 weeks. Discontinue for 1 week during menses. Apply the cream to the inner arms, chest, inner thighs, and/or palms.

CONVENTIONAL MEDICINE APPROACH

Small fibroids that cause few symptoms require no treatment, only observation of growth, which can be done with annual pelvic exams. If the patient notices new symptoms, or the physician thinks there is a change in the fibroid, ultrasound can follow and assess the location and size of fibroids. Because there is some concern about estrogen's role in promoting the growth of fibroids, use of oral contraceptives in premenopausal women and hormone therapy in postmenopausal women should be prescribed with care, close follow-up, and the lowest doses possible.

In cases of fibroids where heavy bleeding exists, progestogens or estrogen is used to manage the bleeding, and any anemia is treated with iron supplements. Treatment of fibroids with progestational agents (norethindrone, megestrol, medroxyprogesterone acetate) has been used, but there is no consensus regarding the routine use of these drugs to shrink fibroids. The progestational agents produce a hypoestrogenic effect by inhibiting gonadotropin secretion and suppressing ovarian function. They may also have a direct antiestrogen effect. Even though estrogen and progestogens may be necessary to control bleeding from fibroids, most practitioners do not consider them useful in shrinking fibroids. When used to control bleeding, there is always a concern about the possible effect on the increase in growth of the fibroid, so fibroids need to be periodically evaluated by physical exam and/or pelvic ultrasound.

Agents such as leuprolide acetate (Lupron) have been used to temporarily control bleeding, correct anemia, and shrink tumors. This allows a large tumor to shrink to a more manageable size.

Lupron can be used to change the need for an abdominal hysterectomy to a vaginal or laparoscopic type, which shortens patient recovery. Lupron suppresses ovarian estrogen secretion, thereby causing temporary and reversible medical menopause. The use of GnRH analogs has successfully reduced uterine and tumor size by 40 to 65 percent. Most reduction occurs within 8 weeks, and maximum reduction occurs within about 12 weeks. After the treatment is discontinued, the uterus and fibroids often return to their original size within three months. On occasion, the use of Lupron may make surgical treatment unnecessary, but usually the solution is temporary and surgery is inevitable.

One of the most significant disadvantages of Lupron is that it is expensive, costing approximately $600 per month. The other is that it puts the patient into an instant menopausal state with hot flashes and other side effects, which can be controlled with very small add-back doses of either estrogen or a progestogen. The GnRH analogs cannot be used long-term (more than six months) because they can lead to irreversible bone loss and elevated total cholesterol.

The standard surgical treatments for uterine fibroids are a hysterectomy or a myomectomy. Hysterectomy, the removal of the uterus, is the only approach that provides a permanent solution for fibroids. Myomectomies are surgeries that remove the fibroids but leave the uterus. There are two basic approaches: abdominal myomectomies, which are used primarily for the removal of subserous, pedunculated, or intramural fibroids, and a hysteroscopic myomectomy, which is used for removal of submucous myomas.

Hysterectomies can be done with an abdominal incision, a vaginal incision, or by laparoscopy. Except in vaginal hysterectomies, it is possible to leave the cervix, removing the uterine fundus (body) only, which contains the uterine fibroids. There is really no reason to remove either ovaries or cervix to treat the symptoms of fibroids. By leaving the cervix, the normal length and sensations of the vagina are maintained. With a vaginal hysterectomy, the entire uterus, including the cervix, is removed. In either case, the decision to leave the ovaries depends on the patient and her doctor. Most doctors would recommend leaving ovaries in women under 45 and might recommend removing them in women over 45 because they will soon be menopausal, oftentimes to prevent ovarian cancer. However, we cannot remove all of our organs to reduce the risk of cancer. Since the lifetime risk of ovarian cancer is 1 in 70, women with healthy ovaries should be encouraged to leave them in place when possible. Special circumstances, such as a strong family history of ovarian cancer, might warrant their removal.

Myomectomies are particularly appropriate for women who wish to retain their childbearing option or in women with a small submucous myoma that causes a bleeding problem. Most myomectomies for large intramural fibroids are done abdominally. Laparoscopic myomectomies for intramural or subserosal fibroids are very rare, and there are only a few physicians in the United States capable of performing them. Abdominal myomectomies have many of the same risks associated with a hysterectomy and can often be associated with more blood loss. Many women feel much more comfortable with retaining their reproductive organs and should be encouraged to find a physician who is comfortable with the concept of myomectomy when the patient prefers that approach.

Hysteroscopic myomectomies are done with an instrument inserted through the vagina, up the cervical canal, and into the uterine cavity, providing a view of the interior of the uterus and an instrument that can slice or cauterize the submucous fibroid. Sometimes, when a woman is past childbearing age, an associated destruction of the uterine lining tissue is performed at the same time. This is called an ablation and further helps to reduce menstrual flow.

There are other treatments for fibroids, some of which are gaining more popularity and some

of which are still experimental. Uterine artery embolization is designed to reduce fibroids by obstructing the blood supply that nourishes them. The procedure is done by a radiologist in the x-ray department. It entails making a small incision in the groin and threading a small catheter into the femoral artery. The doctor works the catheter up to the vessels that supply the uterus under guidance with dye and x-rays. Microscopic plastic particles are injected to close off the uterine vessels, temporarily creating a condition of shock for the uterus. Because fibroids only have one blood supply, the shock is often enough to cause them to begin to degenerate (necrose). The uterus, however, has blood supply through the uterotubal ligaments and vaginal arteries as well and recovers from the initial loss of blood flow most of the time.

Embolizations have been done for about 10 years, and now there is enough data to indicate that there is a less than 1 percent chance that a woman will need an emergency hysterectomy because of uterine necrosis after an embolization. There is a 1 to 5 percent chance that the patient could become menopausal because of a decrease in the blood supply to the ovaries occurring unintentionally at the time of the embolization. The patient can expect significant pain or cramping for up to six months, treatable with pain medications and anti-inflammatories, and most fibroids will reduce approximately 50 percent in their size. This is more successful for treatment of pain from fibroids than bleeding, but it can improve bleeding.

The new fibroid treatment that conventional medicine is investigating is selective progesterone receptor modulators (SPRMs). Ru-486, the only currently used SPRM, is in investigative trials for treatment of fibroid pain and bleeding and helps by reducing the size of fibroids. Most of these trials suggest that the medication is well tolerated with minimal side effects. A second SPRM called asoprisnil has been shown to significantly shrink fibroids with minimal side effects and is currently in phase III trials. It is not known if this is a temporary or permanent treatment.

The other area of medical research involves antifibrinolytic agents. There are other fibrin deposition diseases such as keloids (excessive growth of scar tissue) and pulmonary fibrosis that serve as fibrin disease models. Researchers are beginning to look at medications that reduce the growth and deposition of fibrin for treatment of fibroids. There are no significant investigational trials underway at the present time.

The newest nonmedical technique being used to treat fibroids is high-intensity focused ultrasound. This is done in the radiology department with MRI-guided high-intensity focused ultrasound. The uterus is scanned for fibroids and divided into plains at different depths, and the ultrasound is directed in small increments into the fibroid. It is completely noninvasive and is just beginning to be used. The setups are very expensive and the machines are few and far between at this point.

The thermal ablation treatment techniques that transfer laser, radio frequency, microwave, or cryotherapy through either a percutaneous or a transvaginal probe (which were evaluated between 2000 and 2003) are largely outdated now and are not thought to be an effective form of treatment.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

Four clinical problems that require special consideration in fibroid cases are heavy, prolonged, or frequent bleeding; infertility; enlarged kidneys; and pregnancy complications.

Menstrual flows that are longer than 7 days in duration, more frequent than every 21 days, involve intermenstrual spotting/bleeding or excessive blood loss (more than 80 ml per cycle compared to the normal average of 33 ml) deserve a visit to your licensed primary care practitioner. It is difficult to quantify the number of

pads or tampons used as a criterion for determining excessive blood loss. Bleeding that meets or exceeds saturation of a super tampon or heavy pad every hour for six to eight hours or more requires immediate intervention. Bleeding that exceeds this deserves an immediate phone call to your practitioner and urgent management for hemorrhage. Some women tolerate excessive blood loss better than others. If you are feeling lightheaded, this is cause for concern. A hemoglobin and hematocrit test can determine if you are anemic from blood loss. Additional tests may be done to determine if your iron stores are low.

Infertile women who have uterine fibroids may need to consider the causal relationship. Even though fibroids may be a cause of only a small percentage of infertility cases, if it is the cause, the solutions aren't particularly optimistic. It is reported that only a 16 percent pregnancy rate follows myomectomy for infertility. Postoperative adhesions and the low return question the value of myomectomy for this set of circumstances.

Pregnancy in women with uterine fibroids is generally problem-free, but each situation is different. Even though fibroids can grow during pregnancy, only a very few actually do have continued growth. Six weeks after delivery, many uterine fibroids will decrease in size to become similar to the size it was prior to pregnancy.

That said, some complications can occur during pregnancy. An enlarging fibroid during pregnancy can degenerate and cause pain, infection, and fever. Though debatable, the presence of fibroids can also affect implantation of the fertilized egg with the potential for an early miscarriage, bleeding later in the pregnancy, premature rupture of membranes, and postpartum hemorrhage. Other potential complications include a decrease in the ability of the uterus to contract during labor or obstruction of the birth canal. In women who have previously had a myomectomy, the safety of a vaginal delivery is controversial. One school of thought holds that if there has been an incision into the uterine cavity, the delivery must be by cesarean section. Other practitioners believe that if there was no infection after the myomectomy, the incision into a nonpregnant uterus is of no concern in subsequent vaginal deliveries.

Remember, the mere presence of uterine fibroids does not require treatment. If you have symptoms, they can most often be managed with alternative therapies, although excessive bleeding may require drug or surgical intervention. Even if you have no symptoms, a licensed primary health-care practitioner should examine you every six months to rule out rapid enlargement. This is especially true for women who are planning pregnancies or approaching menopause. Rapidly enlarging fibroids warrant special attention because of the potential for malignancy. A young woman whose uterus is larger than a 12- to 14-week pregnancy should carefully monitor the fibroid growth and consider the need for surgical intervention, because there are many more years for potential further growth and the bigger the uterus and fibroids, the more technically difficult the surgery.

Women rarely need to rush to any decision about surgical intervention, except in the case of excessive bleeding problems, a rapidly enlarging fibroid uterus, or prolonged or severe pain. If surgical intervention becomes appropriate, remember that you may have a number of surgical options and explore some of the newer techniques. If a hysterectomy is indeed the best option, and sometimes it is, then be sure to discuss with your surgeon whether you would like to keep your ovaries; most of the time, there is no pressing medical need to remove them.

VAGINITIS

CHAPTER 20

OVERVIEW

Vaginal infections are responsible for an estimated 10 percent of all women's visits to health-care practitioners. There are three general categories of vaginitis: hormonal, irritant, and infectious. Hormonal vaginitis, also called atrophic vaginitis, is usually found in postmenopausal or postpartum women, but occasionally in young girls before puberty. (Atrophic vaginitis in menopausal women is addressed in greater detail in Chapter 12.) Irritant vaginitis can be due to allergies to such substances as latex in condoms, spermicides, deodorants, soaps, perfumes, semen, or douches.[1] Irritation may also be due to hot tubs, mechanical abrasion, sanitary napkins, tampons, toilet tissue, or topical medications.

However, most vaginitis is due to a vaginal infection. More than 90 percent of vaginitis in reproductive-age women is caused by bacterial vaginosis, candidiasis, or trichomoniasis. There are other less common infectious causes of vaginitis like gonorrhea, chlamydia, mycoplasma, campylobacter, and even parasites like pinworms and giardia. Among these, gonorrhea, chlamydia, and trichomona are sexually transmitted. Women who have sexually transmitted vaginitis require treatment with antibiotics to prevent pelvic inflammatory disorder; testing and treatment should be offered to partners as well. To learn more about sexually transmitted infections, see Chapter 18.

General symptoms of infectious vaginitis include a vaginal discharge, irritation, itching, and odor. Not all infectious causes of vaginitis have the same symptoms, but they all are associated with a vaginal discharge. Though vaginitis is often easily treated, some women may experience chronic or recurrent infections that may be resistant to usual treatments. In addition, untreated vaginitis may result in more serious complications such as acute or chronic pelvic inflammatory disease (PID), chronic pelvic pain, and infertility. Vaginitis may also increase the transmission of other sexually transmitted infections like human immunodeficiency virus (HIV) and genital herpes.

Vaginitis is most often a disorder of imbalance of the normal vaginal flora. Many of the organisms that are responsible for vaginitis, like gardnerella, mycoplasma, staph, *E. coli*, and candida are naturally occurring in the healthy vagina. These organisms only become problematic when the delicate balance of the beneficial bacterial, like aerobic lactobacillus, is disrupted. There are a number of factors that may adversely affect this balance by reducing the lactobacilli population, such as lubricants, nonoxynal-9 (spermicide), oral contraceptives (OCs), hormonal changes, and antibiotics.

Though self-diagnosis is common, it is not recommended, because it is difficult to make an accurate diagnosis based on discharge, itching, and odor and because of the possibility of dual infection. To properly treat vaginitis and avoid potential treatment complications, it is essential to know the exact diagnosis.

Bacterial Vaginosis

Bacterial vaginosis (BV) is the most common cause of vaginal infections and abnormal vaginal discharge and odor. Unfortunately, it can also be one of the infections most resistant to treatment. BV consists of a significant polymicrobial overgrowth. It is the result of alterations in the vaginal ecosystem rather than an infection caused by any single microorganism. In BV, the ordinarily lactobacilli-dominant vaginal environment is overgrown with anaerobes (mainly *Prevotella*,

Peptostreptococcus species, *Eubacterium* species, and *Mobiluncus*) and facultative bacteria (*Mycoplasma* species, *Staphylococcus epidermidis*, *Streptococcus* species, and *Gardnerella vaginalis*). This overgrowth results in the degradation of the mucus membrane and shedding of the vaginal epithelium, resulting in a discharge, and may lead to potential complications in the uterus and fallopian tubes. The destruction of these mucins exposes the epithelium to other organisms, with the subsequent appearance of clue cells (cells that line the vagina and now have clusters of bacteria adhered to their surface).[2] These are visualized with microscopy and are unique to BV.

BV is characterized by decreased or absent *Lactobacillus* species and increased concentrations of potentially pathogenic bacteria. Other characteristic changes include elevated pH, greater than 4.5; formation of clue cells; odor due to increased vaginal fluid concentrations of diamines, polyamines, and organic acids;[3–5] an upregulation of inflammatory cytokines such as interleukin (IL)-1beta, a noticeable absence or rare presence of white blood cells in the vaginal discharge; and a decrease in naturally protective molecules like secretory leukocyte protease inhibitor. Four diagnostic criteria, of which three must be present, confirm a diagnosis of bacterial vaginosis.

There are three main factors that are responsible for the decline of lactobacilli and consequential BV:

1. Intercourse without condoms: sperm alkalinizes the vagina, which depletes lactobacilli.
2. Douching, which also depletes lactobacilli.
3. The absence of the kind of lactobacilli that produce peroxide. Broad-spectrum antibiotics can also eliminate healthy vaginal lactobacilli.[6]

Bacterial vaginosis may be merely an acute or episodic condition, may become persistent, or may resolve itself spontaneously.

Diagnostic Criteria

Three of the following criteria must be present to confirm a diagnosis of bacterial vaginosis.

1. A thin, frothy, gray, odorous discharge
2. Vaginal pH greater than 4.5 with pH paper
3. A wet-mount lab sample that reveals clue cells
4. A positive whiff test (a fish odor detected when 10 percent potassium hydroxide is added to the discharge)

More than 50 percent of women with BV are asymptomatic. BV most often occurs among heterosexual, sexually active women, but is not considered a sexually transmitted disease.[7, 8] Among those who are heterosexually active, BV is more frequent in women who have had intercourse at an early age, those with more sexual partners, and among women with concurrent or prior sexually transmitted diseases.[9] BV can also exist among sexually abused children and lesbian partners of women with bacterial vaginosis.[10, 11] Several factors have been associated with the development of BV, such as cigarette smoking and racial background. Hispanic women are 50 percent more likely than Caucasian women to develop BV, and African-American women are twice as likely as Caucasian women to have BV.[12] The reasons for these differences are not clear but may be due to less condom use in Hispanic women and increased douching in African-American women.

The alterations in vaginal immune response and vaginal microflora associated with BV leave women more susceptible to other infections, including HIV and gonorrhea.[13–16] Women with BV are also more likely to shed HIV, and therefore BV may increase the transmission of HIV.[17] There are some potential consequences of untreated or undertreated BV.[18] The bacteria can migrate into the uterus and the upper genital tract and cause pelvic inflammatory disease in a minority of women who have the infection. The loss of lactobacilli and the resulting degradation of the mucin layer, as well as loss of the local

immune response, may allow pathogens to ascend to the uterus and fallopian tubes. In pregnant women, BV can cause premature rupture of membranes and premature labor, and it is responsible for 70 to 80 percent of all perinatal deaths.[19] BV is also responsible for approximately one-third of postpartum endometritis (infection of the uterus).[20] Additionally, women with suboptimal vaginal flora are at increased risk for infections following gynecologic surgery.

It has been estimated that about 30 percent of women experience a recurrence of symptomatic BV within 30 to 90 days of treatment, and 70 percent will have a recurrence within nine months.[21] With BV, it may not be clear whether the repeat episode is a reinfection or a relapse. Reinfection implies that the original problem was reversed and the patient was completely asymptomatic before recurrence; relapse indicates that the symptoms and microbiology have never returned to normal even though there may have been improvement or a period of improvement. Reinfection is a possibility due to exposure to the same factors that caused the first episode. In heterosexual women not using condoms, reinfection may be due to the alkalinizing effect of semen. This alkaline environment fosters overgrowth of BV. The treatment for recurrent BV should focus on preventing relapse, as this is the most common cause of recurrence. Possible reasons for relapse include (1) lack of reestablishing the lactobacillus-dominant vaginal flora, (2) persistent overgrowth of pathogenic bacteria, and (3) some of the pathogens have sequestered themselves in inaccessible sites such as the endometrial cavity.

A simple and useful method for monitoring patients during treatment for BV is pH paper. If a woman has a vaginal pH of less than 4.5 (some say of less than or equal to 5.0), she has adequate numbers of lactobacilli and does not have BV.

The goal of treatment is to restore the vaginal pH to less than 4.5 and reestablish normal vaginal ecology. Treatment is considered successful if it clears up the clue cells and amine fishy odor and restores the vaginal flora to healthy levels of lactobacilli. Reexamination following treatment is fundamental to assure that the pH has decreased to less than 4.5. If it has not, then you are at risk for developing a recurrence. If pH remains greater than 4.5 following treatment, more aggressive use of lactobacillus and/or vaginal boric acid suppositories should be utilized. The first follow-up should occur after the designated treatment time of usually 7 to 14 days, then again in one month.

Treatment of BV in nonpregnant women will reduce vaginal symptoms, lower the risk of postabortion and posthysterectomy infectious complications, and may reduce transmission of and infection with other sexually transmitted infections. Women should refrain from sexual

Prevention of Bacterial Vaginosis

- Practice safe sex, which is helpful in preventing even infections not clearly considered to be sexually transmitted, such as bacterial vaginosis.
- Consider regular condom use to prevent vaginitis and maintain a normal pH.
- Use condoms until treatment regimen is complete to prevent recurrence.
- Eat a diet rich in whole foods with little to no sugar or refined carbohydrates.
- Determine possible allergies to food, pollen, clothing detergent, and semen for recurrent cases.
- Determine possible infection with other organisms for recurrent cases.
- Increase intake of acidophilus yogurt and/or take supplemental lactobacillus supplements, especially when using antibiotics.
- Vaginal estrogen may be necessary to maintain an acidic vaginal environment in postmenopausal women.
- In cases of relapse, take boric acid and lactobacillus vaginally for 1 to 2 weeks, plus lactobacillus orally for 2 to 6 months.

intercourse during the treatment period and until their vaginal ecology is normal. Women who have recurrent BV following intercourse may need to use condoms or consider having the sexual partner treated at the same time. Unfortunately, BV can be the most difficult vaginal infection to treat satisfactorily with alternative treatments. However, even conventional treatments can be insufficient without a lot of patience and time.

Candida Vaginitis

Although vulvovaginal candidiasis (VVC), more commonly known as a candida or yeast infection, is often assumed to be the cause of vaginitis, only 33 percent of vaginitis cases are in fact VVC. VVC is frequently misdiagnosed by both patients and practitioners. It encompasses a broad range of issues, ranging from those who have colonization of yeast but are asymptomatic to those who have frequent, recurrent, and symptomatic episodes. It is estimated that 75 percent of all women will have at least one VVC infection in their life, 45 percent will have multiple episodes, and 5 to 8 percent will have recurrent episodes (RVVC, defined as four or more episodes within one year).[22]

Studies throughout the world have shown that *Candida albicans* is the most common cause of VVC. It is the organism identified in 85 to 90 percent of positive vaginal yeast cultures. However, there are infections with nonalbicans species such as *C. glabrata*, *C. tropicallis*, and *C. krusei*, which are becoming more prevalent in the United States. Of the nonalbicans species, *Candida glabrata* is the most common. The number of VVC cases that are due to nonalbicans species is increasing and rose from 9.9 percent in 1988 to 17.2 percent in 1995.[23] It is thought that this increase is due at least in part to the increased use of over-the-counter treatment medications and that nonalbicans species are becoming less and less susceptible to these agents.[24]

A diagnosis of VVC is made by a combination of history, clinical examination, microscopy, and, if necessary, a culture. The usual symptoms of VVC are acute itching and vaginal discharge. The discharge is typically described as cottage cheese–like in character, but it may actually vary from watery to thick. Symptoms may also include vaginal soreness, irritation, vulvar burning, inflammation and swelling of both the internal and external genital tissue, redness, pain with vaginal sexual activity, and urinary discomfort. The symptoms are often worse the week preceding the onset of menses with some relief after the menstrual flow.

Self-diagnosis of VVC is unreliable and often results in misdiagnosis. There is even a concern that physicians are frequently inaccurate in diagnosing vaginal infections.[25] The most candida-specific symptom is itching without discharge, and even this criterion correctly predicts VVC in only 38 percent of patients.[26]

The greatest concern in self-diagnosing and self-treating VVC is in women who have recurrent VVC, defined as four or more candida-confirmed episodes of symptomatic infection within one year. This occurs in approximately 5 percent of women[27] and can be dangerous, as the underlying condition could go undiagnosed because the woman is repeatedly treating what she thinks are simple vaginal yeast infections. Recurrent VVC commonly affects women who are immunocompromised as the result of AIDS or other predisposing conditions such as diabetes, Cushing's disease, Addison's disease, hypo- or hyperthyroidism, or leukemia. There are other predisposing factors in recurrent infections that may also need to be addressed: high-estrogen medication, antibiotics, hormones, contraceptive devices, cytotoxic drugs, immunosuppressive drugs, radiotherapy or chemotherapy, tight clothing, nylon underwear, pregnancy, and excessive sugar in the diet.

Reinfection may also come from extravaginal sources. Although the sexual transmission of candida is still controversial, there is evidence that sexual transmission might be a likely source of

recurrent infection. In one study, the researchers found identical strains of candida in the male sexual partners of 48 percent of women with recurrent VVC.[28, 29] Reservoirs of infection were found in the oral cavities of 36 percent of 33 heterosexual couples, the rectums of 33 percent, and the ejaculate of 15 percent of the men.[30] This data suggests that oral-genital contact constitutes a probable mode of sexual transmission. Many alternative practitioners treat the overgrowth of candida in the digestive track as well to address the possibility of migration from rectum to vagina. In fact, a 1977 study found that in 98 women with recurrent VVC, candida was always found in the feces of women with current VVC and was not found in women without VVC.[31] Although numerous studies have failed to yield definitive results, it may provide a useful avenue of treatment in especially chronic and resistant cases.[32]

The first step in the physical evaluation is to determine if there is a vulvitis (inflammation of the external genital tissue) and/or vaginitis. Some women may have vulvar hyperplasia (proliferative cell growth), vestibulitis (inflammation of the tissue surrounding the opening to the vagina), genital ulcerations, lichen sclerosis, or other dermatitis conditions. A thorough examination of the external genitalia involves looking for erythema, hypopigmentation, hyperpigmentation, fissures, vesicles, ulcerations, thinning, and thickening. A woman with VVC will often have vulvar and vaginal redness, swelling, and itching. A thick white discharge may be present, but many women with VVC do not have a discharge or do not have the typical thick and white discharge.

The diagnosis can often be made in the practitioner's office by using 10 percent potassium hydroxide (KOH) and microscopy that demonstrates features of yeast. Another diagnostic tool is pH paper. A vaginal pH of less than 4.5 helps to exclude bacterial vaginosis, trichomoniasis, atrophic vaginitis, or a mixed bacterial/yeast infection. A vaginal culture may help to establish that yeast is in fact present for symptomatic women with negative microscopic findings and to identify the genus and species.

It cannot be overemphasized how the health of the entire body affects the internal ecosystem of the vagina. The vaginal pH and microflora, the hormonal cycles, and the vaginal immune tissue are all influenced by our general health and dietary habits, and this in turn determines our susceptibility to vaginitis. A healthy diet assures our body's defense system. A diet low in sugars and refined carbohydrates is particularly important in preventing candida vaginitis. In fact, a recent study confirmed that women with impaired glucose tolerance were at higher risk for recurrent vaginal candidiasis.[33] In general, a well-balanced whole foods diet that is low in fat, sugars, refined foods, and alcohol is optimal in preventing all infections.

Some women who have severe, stubborn cases of chronic candida vaginitis may benefit from stricter diets that avoid fermented foods. However, many "anti-candida" diets can be rigorous and unnecessarily stressful. Some of these diets are so restricted that they actually cause other health problems. Women who have self-diagnosed or who have been diagnosed with "systemic candida" by an alternative practitioner might want to make sure of this popular overused diagnosis. Conventional medicine uses the term *systemic candidiasis* to describe the situation when candida contaminates the blood stream and spreads throughout the body, causing profound illness affecting a wide variety of organ systems. This state, according to this definition, only occurs in seriously immunocompromised patients, such as HIV-positive individuals. In individuals who have no serious immune deficiency, any exposed warm, moist part of the body is susceptible to candida infection. Common examples of this would include vulvovaginitis, oral thrush, conjunctivitis (infection of the inner eyelid), diaper rash, and infections of the nail, rectum, and other skin folds. In immuno-

compromised individuals, systemic illnesses such as myocarditis (infection of the heart muscle), hepatosplenic abscess, pulmonary infection, central nervous system (CNS) infection, and chronic disease states may occur.

Alternative medicine has used the term *systemic candidiasis* to describe less intense situations, in an attempt to explain a multitude of general symptoms such as headache, fatigue, gas and bloating, depression, and more. Perhaps a better term for this would be *systemic candida syndrome*. Ruling out other causes of these general symptoms is important, and testing the stool and vaginal secretions for candida overgrowth and the blood for the candida antigen provides the best hope for accurately diagnosing true systemic candida infections.

The main concepts of managing VVC are accurate diagnosis, management of other influences, and being creative and persistent when treatment does not provide relief or recurrences occur. Taking shortcuts in history, physical exam, and testing can result in misdiagnosis, unnecessary treatments, and delays in effective treatment. Most cases of VVC will be very effectively treated with natural methods. When this does not work, there are various oral and vaginal regimens including butoconazole cream, clotrimazole cream or vaginal tablet, miconazole cream or suppository, terconazole cream or suppository, fluconazole oral medication, and nystatin vaginal tablets. Treatment options for nonalbicans candida infections include more aggressive fluconazole and terconazole regimens, flucytosine vaginally, and boric acid vaginal capsules.

While VVC may seem trivial to many, for some the discomfort, the chronicity, and the health-care costs incurred are excessive. Treatment strategies for candida vaginitis with natural therapies will focus on maintaining a normal vaginal pH, restoring normal ecology of the vagina, reducing inflammation, relieving symptoms, and using natural antifungal agents.

Prevention of Candida Vaginitis

Preventing infections is almost always easier than treating them. Here are some simple strategies:

- Avoid wearing tight clothing.[34]
- Avoid wearing pantyhose.[35]
- Consider using condoms to prevent all types of vaginitis and maintain a normal pH in the vagina.
- Eat a whole foods diet with very little to no sugar and refined carbohydrates.
- Determine possible allergies to food, pollen, clothing detergent, and semen for recurrent cases.
- Determine possible infection with other organisms for recurrent cases.
- Increase intake of acidophilus yogurt and/or take lactobacillus supplements, especially when using antibiotics.
- Vaginal estrogen may be necessary to maintain an acidic vaginal environment in postmenopausal women.

Trichomonas Vaginalis

Trichomonas vaginalis is a motile, flagellate, anaerobic protozoan and is a far more prevalent sexually transmitted infection than either *Chlamydia trachomatis* or *Neisseria gonorrhoeae*. About 6 percent of all cases of a vaginal discharge are due to trichomoniasis, and about 5 million new cases appear annually.[36, 37] The prevalence of disease varies widely by population. Multiple sexual partners, African-American race, previous history of sexually transmitted diseases, coexistent infection with *Neisseria gonorrhoeae*, and nonuse of either barrier or hormonal contraceptives are known risk factors for acquisition of trichomoniasis.[38] Trichomoniasis is associated with several significant health consequences, including the transmission of the human immunodeficiency virus (HIV), infertility, atypical pelvic inflammatory disease (PID), increased risk of postoperative infection, preterm births, and cervical dysplasia as well as adverse pregnancy outcomes such as

preterm delivery, premature rupture of membranes, and low–birth weight infants.

The sexual transmission rates are higher from man to woman than from woman to man, and transmission is considered rare from woman to woman. Trichomoniasis is rarely transmitted to infants born to infected mothers, and although the trichomonas organism can survive for short periods on moist objects (toilet seats, benches, towels) or exposed bodily fluids (urine, vaginal exudate, semen), no cases of transmission by indirect or inanimate exposure have been documented. Prevalence of trichomoniasis is highest among women with multiple sexual partners and in women with other sexually transmitted infections.[39–41]

The most common complaints associated with trichomoniasis are vaginal discharge and vulvovaginal irritation and itching. Discharge is present in 50 to 75 percent of infected women and is classically described as frothy or bubbly and yellow-green. Other associated symptoms include dyspareunia (pain with vaginal sexual activity), dysuria (painful urination), and, in a small number of patients, some degree of lower abdominal pain. Vulvar redness is an uncommon finding, but vaginal redness is noted in as many as 75 percent of patients. A "strawberry cervix" is created by dilatation of capillaries on the cervix with small hemorrhages and is seen through a magnification device called a colposcope in as many as 90 percent of cases.[42] With the naked eye it is seen in only 2 percent of cases, but when it is seen it is an almost sure sign of trichomoniasis. As these clinical signs and symptoms are not sensitive enough or specific enough to be used alone, it's most important to somehow identify the organism.

The time-honored method for diagnosing trichomonal infections has been microscopic (wet prep) evaluation. The diagnosis is made by directly observing the motile parasite. This procedure detects 60 to 80 percent of cases. The advantage of the microscopic examination of the vaginal discharge is that it can be done in the practitioner's office; it's fast, easy, and low cost; and an immediate diagnosis can be made.

If the trichomonad was not seen, a culture is more sensitive for diagnosis. A culture in Diamond's medium is both sensitive and specific. However, there is a diagnostic delay because of the time it takes for the culture to detect the organism. Pap smears are not very sensitive in testing trichomoniasis, only 56 percent effective in one study,[43] and are therefore not a very reliable method.

Newer tests are available now that increase accuracy and ease diagnosis. A DNA-based test

KEY CONCEPTS

- Diagnosis is necessary to determine the cause of the vaginal infection.
- Be aware of underlying metabolic or immune problems in chronic resistant cases of candida vaginitis.
- In recurrent cases of candida vaginitis and bacterial vaginosis, consider the possibility of sexual transmission, even though they are not typically considered STIs.
- The sexual partner should be treated in all cases of trichomoniasis.
- Consider additional testing methods such as cultures and DNA probes in cases that elude diagnosis.
- Self-diagnosis is usually inaccurate and can inhibit successful treatment.

PREVENTION

- Use condoms to prevent all types of vaginitis and maintain a normal vaginal pH.
- Eat a whole foods diet with very little to no sugar and few refined carbohydrates.
- Determine possible infection with other organisms for recurrent cases.
- Increase intake of acidophilus yogurt and/or take lactobacillus supplements.

called the Affirm VP system uses a probe inserted in the vagina that can detect trichomoniasis, bacterial vaginosis, and candida species from a single vaginal swab. Additional diagnostic methods include polymerase chain reaction tests, but most doctors' offices do not yet use these. A new 10-minute antigen test for trichomonas is also available. Women who are found to have an infection of *T. vaginalis* should also be tested for *Neisseria gonorrhoeae* (GC) and *Chlamydia trachomatis* (CT) and, if positive for one or both, should then be screened for additional sexually transmitted infections, including syphilis, hepatitis B and C, HIV, herpes type 2 virus, and human papillomavirus.

The treatment strategy is to kill the trichomonads, reduce inflammation, support the vaginal ecology and immune system, and prevent recurrence.

OVERVIEW OF ALTERNATIVE TREATMENTS

An important aspect of treating vaginal infections is looking at the problem holistically and systemically rather than just finding drug alternatives to kill unwanted organisms. To this end, we try to improve the vaginal immune system, support the systemic immune system, restore the proper balance of normal microflora in the vagina, restore the normal pH of the vagina, decrease the inflammation and irritation of the tissue itself, provide symptomatic relief, and, when necessary, curb the overgrowth of the offending organism.

Although this approach sounds basic and logical, it is radically different than the conventional approach, which is essentially to kill the overgrowth of the causative organism. Although in severe acute cases pharmaceutical antifungals may ultimately be necessary, organisms are becoming resistant to these products due to their overuse, and newer, stronger treatments are continually developed to address these resistant strains. Thus, even when the pharmaceutical over-the-counter or prescription medications need to be used, the principles and methods of the natural treatments can be an important part of ensuring a healthy vaginal ecosystem and immunity for the future.

The health of the ecosystem of the vagina is the most important concept in treating vaginitis. While the vaginal flora and ecosystem is in a variable state throughout a woman's lifetime, largely affected by hormonal influences, nothing is more key to this ecosystem than lactobacillus. The vaginal microflora of healthy asymptomatic women consist of a wide variety of anaerobic and aerobic bacteria dominated by lactobacillus. The first extensive study of the human vaginal microflora was published in 1892 by Doderlein.[44] Since then we have learned that a wide variety of microorganisms are present in a healthy vaginal ecosystem. The range of bacterial types is immense, including *Staphylococcus* species, *Gardnerella vaginalis*, *Streptococcus* species, *Bacteroides* species, *Lactobacillus* species, *Mobiluncus*, even *Candida* species, most commonly *Candida albicans*, and more. Yet the predominant organisms are members of the *Lactobacillus* genus.

The body's ability to control the vaginal microflora is no easy feat. The normal vaginal microflora defend against abnormal vaginal colonization. Factors controlling this defense system include the content of the vaginal tissue itself (called the squamous epithelium), the dominance of lactobacilli, the subsequent low or acidic pH balance, hydrogen peroxide production, and hormonal influences (over one's lifetime as well as monthly cyclic changes). High or low estrogen states such as pregnancy or menopause; hormonal medications such as contraceptive devices, including OCs; feminine hygiene products; and vaginal sexual activity, including friction, lubricants, and semen can all create a challenge for the vaginal ecology to maintain homeostasis.

Nutrition

I cannot overemphasize how the health of the entire body affects the internal ecosystem of the vagina. The pH of the vagina, the microflora that live there, the hormonal cycles, and the immune tissue in the vagina are all influenced by our general health and dietary habits, and this in turn determines how susceptible we are to vaginitis. A generally healthy diet—well balanced, rich in whole foods, and low in fat, sugars, refined foods, and alcohol—is optimal in preventing infections. A diet low in sugars and refined carbohydrates is particularly important in preventing candida vaginitis. Some women who have severe, stubborn cases of chronic candida vaginitis may benefit from stricter diets that avoid fermented foods; however, most of the time these "anti-candida" diets are not necessary.

Nutritional Supplements

Vitamin E. We most often think of using nutritional supplements orally, but in this case I recommend the use of vitamin E intravaginally and topically. This use of vitamin E dates back at least to 1954.[45] As demonstrated then as well as in my practice, vitamin E provides a very soothing effect. The tissue becomes less irritated with a decrease in redness, swelling, and congestion. Vitamin E usually relieves burning and itching within one to three days. It can be administered as either a suppository or from a gelatin capsule that is inserted into the vagina once or twice daily for seven or more days. Vitamin E oil or ointment can also be applied externally to the vulvar tissue to relieve discomfort there. Vitamin E is especially useful in cases of allergic and irritant-induced vaginitis because it is so soothing.

Nutrition

- Avoid sugar, refined carbohydrates, fruit juice, and alcohol.
- Reduce fats.
- Eat 8 oz of unsweetened acidophilus yogurt daily.
- Increase garlic in the diet.

Vitamin E

Intravaginal suppository or gelatin capsule once or twice daily for 7 or more days

Vitamin C. Vitamin C has long been touted for its beneficial effects on the immune system. According to a recent study, administering 250 mg of vitamin C vaginally for six days significantly improves both subjective and objective parameters of vaginitis, like eradicating bacteria and clue cells, increasing lactobacilli, and lowering pH.[46]

Vitamin C

Insert 250 mg vitamin C tablet in the vagina for 6 days

Vitamin A and Beta-Carotene. Both vitamin A and beta-carotene are necessary for the normal healthy growth of epithelial tissues that make up the vaginal mucosa. Vitamin A and beta-carotene enhance the immune response in epithelial tissues and thereby help mucous membranes resist infection. Vitamin A and beta-carotene can be used orally to enhance the immune response, and vitamin A can be used intravaginally to stimulate the local immune tissue of the vaginal mucosa. Vitamin A in a capsule can suffice, but vitamin A suppositories are available in higher doses than a standard capsule. Vitamin A intravaginally is useful in cases of infectious vaginitis as well as allergic and irritant-induced vaginitis. Daily use for up to one week is

Vitamin A

Intravaginal suppository or gelatin capsule once daily for 7 days; use vitamin E, lactobacillus, or mixed herbal suppository daily for 1 week before repeating this dosage.

typical. It can be repeated after one week without suppositories or one week of some alternate like vitamin E, lactobacillus, or a mixed herbal suppository to avoid any possible side effects.

Botanicals

Garlic (*Allium Sativum*). Garlic extracts have been shown to inhibit the growth of *Candida albicans* by blocking the lipid production.[47, 48] The major growth inhibitory component in garlic extract is allicin, and garlic products that have the highest amount of allicin are the most desirable for treatment. Look specifically for products with high allicin and the stabilized form of allicin. Garlic is diverse in its uses for vaginitis because it is both antibacterial and antifungal.[49, 50] I recommend garlic vaginal suppositories for both candida (yeast) vaginitis and bacterial vaginosis. A clove peeled carefully so as not to nick the garlic can be inserted into the vagina for 6 to 8 hours. The garlic can be threaded like a necklace so that it can be easily removed like a tampon. Garlic or garlic capsules can be inserted intravaginally in the evening, and then lactobacillus capsules can be inserted in the morning to inhibit growth of the offending organism and repopulate the healthy microflora.

Goldenseal (*Hydrastis Canadensis*) and Oregon Grape Root (*Berberis Vulgaris*). Goldenseal and Oregon grape root contain a substance called berberine that acts both as an antibacterial and as an immune enhancer. This immune effect is especially specific in epithelial mucus membrane tissue as is found in the vagina, mouth, and even the stomach. Berberine has been shown to possess antimicrobial activity against a wide variety of microorganisms, including those found in the vagina, such as *Candida albicans*, *Escherichia coli*, *Staphylococcus aureus*, and others.[51] Preparations of goldenseal and Oregon grape root have been used both orally in teas, caps, and liquid extracts and intravaginally in douches and suppositories. Because of their ability to affect both yeast and bacteria, these two herbs would seem a logical choice in cases where multiple infectious agents are involved.

Goldenseal or Oregon Grape Root

Orally (capsules or liquid extracts) or intravaginally in suppositories

Tea Tree (*Melaleuca Alternifolia*). Tea tree oil has been studied for trichomoniasis, candidiasis, and other vaginal infections. Most of the evidence supports its use against candida species.[52–54] One study found tea tree effectively inhibited both fluconazole-susceptible and fluconazole-resistant cases of candidiasis in vitro and in animals.[55, 56] Perhaps the most impressive study used an emulsified 40 percent solution of Australian tea tree oil with 13 percent isopropyl alcohol. In the 96 cases of trichomonal vaginitis, clinical cures were seen with the application of six treatments applied once weekly with a solution-saturated tampon left in place for 24 hours (see "Sample Treatment Plan for *Trichomonas Vaginalis*" sidebar later in this chapter for specifics).[57] Various tea tree oil preparations have demonstrated antimicrobial activity against *Staphylococcus aureus* and *Candida albicans*, thereby showing its usefulness in diverse situations.[58]

Tea Tree Oil

Emulsified 40 percent solution of *Melaleuca alternifolia* oil with 13 percent isopropyl alcohol: wash vaginal canal for 30 seconds once a week for 4 weeks, then use vaginal tampon saturated with solution for 24 hours following each washing.

Other Therapeutic Agents

Lactobacillus. Several species of lactobacillus populate the vagina. Although we often think of *Lactobacillus acidophilus* as being the most dominant, other species, such as *L. crispatus*, *L. jensenii*, *L. fermentum*, and *L. gasseri* are at least as or more dominant than *Lactobacillus acidophilus*.

Several factors explain how and why lactobacillus does its remarkable job. Through its production of lactic acid, lactobacilli contribute to the low vaginal pH that is instrumental in maintaining a healthy vaginal microflora. Because vaginal infections are associated with a loss of lactobacilli, it seems logical and hopeful that lactobacilli would make for a good treatment.[59] Lactobacilli thrive at an acidic pH of 3.5 to 4.5, levels that are found in the healthy, normal vagina throughout the menstrual cycle. Lactobacilli have also been shown to interfere with the adherence and colonization of pathogenic (disease-causing) bacteria.[60] In addition, strains of lactobacilli that inhabit the vagina produce hydrogen peroxide (H_2O_2), another well-recognized antagonist to problematic bacterial populations. Lactobacilli also act directly as antibacterials[61] and may function as a local immune stimulant in controlling microbial levels in the vagina.

For these reasons, administering lactobacillus orally and intravaginally is one of the most important aspects of effectively treating and preventing yeast and bacterial vaginitis, although the scientific literature has inconsistent results. Women who have hydrogen peroxide–producing lactobacilli in the vagina are less likely to have bacterial vaginosis or candida vaginitis.[62] These same lactobacilli are also toxic to *Gardnerella vaginalis*, the predominant organism in the vagina of women with BV.[63] In addition, the bacteria that cause bacterial vaginosis thrive in a higher pH of 5.0 to 6.0 and cannot readily survive in the lower pH, more acid environment that lactobacilli promotes.

The concept that lactobacilli might be useful when supplemented in the diet or administered intravaginally dates back to the 1890s. While scientists have vacillated on the value of lactobacilli in prevention or in treatment, patients in need have not. It has been difficult to confirm the "ifs, ands, or buts" in using *L. acidophilus* in the prevention and treatment of infectious vaginitis because there are few clinical trials. When you consider the logic, the safety, the affordability, the lack of side effects, the ease, and the research that does confirm a benefit, continuing to promote the use of *L. acidophilus* is a compelling one. Lactobacillus therapy is quite popular both with alternative practitioners and with women who seek simple self-treatment methods.

A study was done in 1992 on the daily ingestion of yogurt containing *Lactobacillus acidophilus* in pregnant women with recurrent candidal vaginitis. The women who ate eight ounces daily of the yogurt had a threefold decrease in infections when compared to the women who did not eat the yogurt.[64] It is now also popular to ingest *Lactobacillus acidophilus* supplements in oral form in place of or in addition to eating yogurt or to apply lactobacilli directly into the vagina.

A number of studies have supported the use of lactobacillus in preventing and treating vaginitis. A recently published study on treating BV found that both vaginal administration and oral-plus-vaginal administration of lactobacilli were effective at reducing the vaginal pH, treating the current infection, and preventing recurrence over the subsequent three months.[65] Another study examined the effectiveness of weekly intravaginal *Lactobacillus acidophilus* versus clotrimazole (antifungal) tablets in HIV-positive women, a group highly susceptible to recurrent yeast vaginitis, and found the two treatments to be similarly effective at preventing candidiasis.[66] After any conventional treatment with antibiotics, vaginal lactobacillus can be restored by the coadministration of lactobacillus and low-dose vaginal estriol.[67] This is especially important for preventing VVC after conventional treatment of BV.

A review of lactobacillus treatments for VVC in 2003[68] found that vaginally administered or orally ingested lactobacillus is able to colonize the vaginal ecosystem and that most supplementation needed to continue for two to six months

in order to sustain continued colonization. The author also concluded that controlled trials are encouraging but few, and that these trials had small numbers of women, inadequate controls, lack of blinding, high attrition rates, and were not consistent in the form of lactobacillus used. In addition, they had conflicting results.

Douching used to be a popular method of administering lactobacillus, but research has shown that douching may contribute to infertility and pelvic infections. A safer and more convenient method is to administer lactobacillus capsules or tablets intravaginally.[69]

I believe that lactobacillus, alone or in combination with other vaginal or oral therapies, is the key to establishing normal vaginal microflora and preventing recurring infections, as well as treating acute candida and bacterial infections of the vagina. A word to the wise, however, is buyer beware. There is a great deal of variability in lactobacillus products. For yogurt, make sure the label lists lactobacillus, and choose a brand without sweeteners. Some yogurts and encapsulated products make claims that they contain *L. acidophilus* but, when tested,[70] they did not; moreover, they contained contaminants. When purchasing encapsulated products, it may be worth requesting product analysis information to assure quality and choosing human strain lactobacillus to enhance adherence to the intestinal and vaginal mucosa.

Lactobacillus

Prevention

- Eat 8 oz unsweetened live-culture acidophilus yogurt daily.
- Oral *Lactobacillus acidophilus* or combination multispecies of probiotics daily. Doses may range from 2 to 10 billion organisms per day for as short as 2 weeks and as high as 24 to 48 billion organisms per day for 2 to 6 months to maintain vaginal colonization.

Treatment

- For acute infections: intravaginal tablet, gelatin capsule, or suppository once or twice daily for a few days to 2 weeks.

Vaginal Estrogen. One of my most reliable treatments for chronic or chronic recurring yeast vaginitis or bacterial vaginosis is the use of vaginal estrogen. This is best seen in peri- and postmenopausal women, but it can be used for difficult cases in younger women as well. Sufficient estrogen promotes the growth of the lactobacillus species that maintain the normal vaginal ecology. Using this concept as a treatment was well illustrated in a randomized, placebo-controlled study of 32 premenopausal women with bacterial vaginosis[71] that used hydrogen peroxide–producing lactobacillus vaginal tablets delivered with 0.03 mg of vaginal estriol (a European product called Gynoflor). The study found that estrogen enhances the acid production of the lactobacilli and assists in their proliferation, in addition to helping maintain normal vaginal tissue health. At two weeks, a 75 percent cure rate occurred in the treatment group compared with a 25 percent cure rate in the placebo group. At four weeks, there was an 88 percent cure rate versus a 22 percent placebo rate.

Although this product is not available in the United States, vaginal estriol is available by prescription from a compounding pharmacy. Your practitioner could either request that the pharmacy formulate an estriol/*Lactobacillus acidophilus* suppository or cream, or a vaginal estriol cream (0.03 mg/g; insert one gram daily for two weeks) and *L. acidophilus* capsule or suppository (one daily for two weeks) could be inserted separately.

Boric Acid. The most successful natural treatment for VVC that I've encountered is boric acid suppositories. Laboratory tests and human trials support its use for both *Candida glabrata* and *albicans*, even in cases of resistance to antifungal prescription drugs.[72, 73] Several studies

confirm its success, ranging from 64 to 98 percent effective.[74–76] In one study, 100 women with chronic resistant yeast infections who had failed extensive and prolonged conventional therapy were treated with 600 mg boric acid vaginal suppositories twice a day for two or four weeks; the regimen was effective in curing 98 percent of the women.[77] Once daily boric acid suppositories used for four days per month during the menses for four consecutive months was also clearly indicated as the treatment of choice for preventing recurrence.

Clinical effectiveness doesn't really get any better than this. Boric acid works most of the time, it's inexpensive, and it's easy to use. The only downside I have observed is that if the tissue has been irritated by the infection, the boric acid may burn during urination. Using vitamin E oil, lanolin, or even Vaseline on the external genitalia protects the tissue from the boric acid and averts any significant discomfort. In a study that compared boric acid with the more conventionally prescribed nystatin, the boric acid cured 92 percent after 10 days and 72 percent after 30 days, compared to 64 percent and 50 percent, respectively, of nystatin.[78]

Boric Acid

Acute: 600 mg vaginal suppositories twice a day for 3–7 days

Chronic: 600 mg vaginal suppositories twice a day for 2–4 weeks

Prevention: 600 mg vaginal suppositories 4 days per month during menses for 4 consecutive months

Arden's Powder. A colleague of mine has been using a vaginal douche powder called Arden's Powder for over 20 years. She attributes its antifungal properties to the essential oils of eucalyptus, thyme, and boric acid powder. The menthol crystals in the oils provide quick relief from itching and burning even before the infec-

Sample Treatment Plan for Bacterial Vaginosis

Guidelines

- Provide systemic and local immune enhancement.
- Restore vaginal flora and normal vaginal pH.
- Use natural antimicrobials.
- Relieve symptoms.

2-Week Minimum Regimen

See the Resources section for natural products and formulations used in this regimen.

- Avoid refined foods and simple carbohydrates.
- Avoid vaginal sexual activity during course of treatment to avoid reinfection and reduce irritation.
- Insert one herbal suppository (containing myrrh, echinacea, slippery elm, golden seal root, marshmallow, geranium, and yarrow) into vagina every evening, 5 days per week for 2 weeks.
- Insert a more potent suppository containing a combination of thuja oil, tea tree oil, bitter orange oil, and vitamin A (as palmitate) 2 days per week for the same 2 weeks as the herbal suppositories.
- Follow with vaginal lactobacillus suppository: insert daily for 6 days.
- Oral lactobacillus: take 1 daily for 2 to 6 months to restore normal vaginal ecology.
- If there is a recurrence, add boric acid suppositories; insert 1 daily for 2 weeks.

Other Considerations

- Use boric acid suppositories (600 mg) to acidify the vagina either as a primary treatment or after antibiotic regimens.
- Paint the cervix and vagina with povidone-iodine twice each week. (A speculum exam would be the most desirable method of doing this.)

tion is cleared. Although I have not been a strong proponent of douching, this old-fashioned approach can most likely be used safely for yeast vaginitis.

Arden's Powder

Mix 1 tsp Arden's Powder in 1 pint warm water; douche with 2 applications daily for the first 2 days, then reduce to 1 application daily for 5 more days. Avoid during menstrual period or during pregnancy.

Herbal Combinations. Many different herbs can be prepared in combinations for suppository use or even douching. In vitro research supports the effectiveness of propolis, cayenne, clove, and bergamot oil against a number of *Candida* species.[79] Other in vitro evidence showed bergamot oil alone and in combination with boric acid to be effective against *Candida* species, suggesting a potential role for topical treatment of candida infections.[80]

Powdered herbal mixes of myrrh, echinacea, usnea, goldenseal, marshmallow, geranium, yarrow, and calendula are often used by herbalists and naturopathic physicians. Each herb has its own special feature, whether antimicrobial,

Sample Treatment Plan for Candida Vaginitis

Guidelines

- Provide systemic and local immune enhancement, especially in chronic cases.
- Restore vaginal flora and maintain normal vaginal pH.
- Natural antifungal agents will be effective in most cases.
- Relieve symptoms.

Acute Infection

Follow these guidelines for a minimum of 1 week:

- Avoid sugars, refined carbohydrates, and alcohol.
- Eat 8 oz unsweetened acidophilus yogurt daily.
- Lactobacillus species capsules: 8 billion or more organisms per day.
- Boric acid powder capsules: insert morning and evening for 3–7 days in mild cases and up to 14 days for resistant cases.

Chronic Infection

- Avoid sugars, refined carbohydrates, alcohol, and fermented foods.
- Eat 8 oz unsweetened acidophilus yogurt daily.
- Lactobacillus species capsules: 8–48 billion organisms per day.
- Garlic (allicin) capsules: 1–2 capsules 2 to 4 times daily.
- Boric acid powder capsules: insert morning and evening for 14 days; repeat for an additional 14 days if responding but not completely resolved after the first 2 weeks.

Prophylaxis for Prevention of Recurrence

- Avoid sugars, refined carbohydrates, alcohol, and fermented foods.
- Eat 8 oz. unsweetened acidophilus yogurt daily.
- Lactobacillus species capsules: 8–48 billion organisms per day.
- Boric acid powder capsules: insert 1 capsule once daily at bedtime during menstruation only for 4 consecutive months.

During Pregnancy

Avoid boric acid suppositories, herbal suppositories, and garlic during pregnancy. Consult your alternative and conventional medical practitioner for safe options. The following guidelines are generally safe for pregnant women:

- Avoid sugars, refined carbohydrates, alcohol, and fermented foods.
- Eat 8 oz unsweetened acidophilus yogurt daily.
- Lactobacillus species capsules: 8 to 48 billion organisms per day.

immune enhancing, soothing to the membranes, or antifungal. These suppositories can be made at home with powdered herbs and cocoa butter or can be purchased from a natural food store or alternative health-care practitioner.

Gentian Violet. Most herbal suppositories, including boric acid and tea tree oil, should be avoided during pregnancy. However, gentian violet is effective for the mother-to-be and safe for the fetus. In the 1950s, this was the most commonly used and favorite treatment of gynecologists. It can be painted onto the cervix and the vaginal wall, but leaves a disconcerting, signature blue stain; moreover, it requires a speculum insertion to apply. A gentian violet gel made up according to the following formula is more desirable and appropriate for home use: 0.2 percent gentian violet; 3.0 percent lactic acid; 1.0 percent acetic acid; and polyethylene glycol base. This preparation was proven effective in a 1950 study.[81] Of 191 cases studied, 78 percent were considered cured, 12 percent were significantly improved, 3 percent had modest improvement, and 7 percent showed no improvement.

Gentian violet is available only by prescription in certain states. You may be able to find a milder strength available without a prescription. Put a few drops of the over-the-counter concentration onto a tampon if you want to try using it on your own.

Gentian Violet

See a licensed health-care practitioner for a prescription. Use 1 vaginal applicator daily at bedtime for 12 days.

Iodine. Yeast and trichomonal vaginitis infections can often occur simultaneously. Moreover, after treatment for trichomoniasis, a yeast infection may flare up. Local therapy that can treat both would obviously be desirable. Iodine in the form of povidone-iodine preparations is a logical solution. This is another example of an older successful treatment that got left behind in the face of more

Sample Treatment Plan for *Trichomonas Vaginalis*

Guidelines

- Provide systemic and local immune enhancement.
- Restore vaginal flora and normal vaginal pH.
- Use natural antimicrobials.
- Relieve symptoms.
- Treat sexual partner(s).

Treatment

- Avoid sugars, refined carbohydrates, and alcohol.
- Tea tree oil: 40% water-miscible emulsified solution with 40% *M. alternifolia* oil and 13% isopropyl alcohol.
- Repeat the following treatment once per week for up to 6 weeks: Thoroughly wash the vulva and vagina with pHisoHex followed by a thorough water rinse. Dry the area and swab the vulva and vagina with a 1% solution of the basic medication (i.e., 0.4% *M. alternifolia* oil), using approximately 15 cc. Then insert a tampon that has been saturated with the solution and keep it in place for 24 hours.
- Douche daily for up to 7 weeks with a solution of 1% of the basic *M. alternifolia* oil solution in 1 quart of water (0.4% oil).
- Eat 8 oz unsweetened acidophilus yogurt daily for 1 month.
- Lactobacillus species capsules: 8 to 48 billion organisms per day.
- Garlic (allicin) capsules: 1–2 capsules 2 to 4 times daily.
- Consider goldenseal, echinacea, garlic, licorice, and myrrh for systemic botanical immune support.

modern, mass-market pharmaceuticals. In addition to candidiasis and trichomoniasis, povidone-iodine has been proven effective against potentially pathogenic microorganisms like *Gardnerella*, *Bacteroides,* and *Enterobacteria* without adversely affecting the lactobacillus population.[82, 83]

One study combined a povidone-iodine solution for swabbing, a povidone-iodine vaginal gel for application at night, and a povidone-iodine douche for use in the morning in 93 courses of treatment in 87 patients with yeast or trichomonal vaginitis, or a combination of both. In the yeast vaginitis cases, symptoms were cleared in one to three weeks in all 74 courses of treatment. In four of five patients with trichomonal vaginitis, symptoms were cleared within three weeks. In 14 courses for combined infections, symptoms were cleared within three weeks in 13 patients.[84] Another study found that nearly 75 percent of cases (trichomoniasis, candidiasis, and nonspecific vaginitis) had complete resolution with povidone-iodine treatment.[85]

Iodine

See licensed health-care practitioner for 6-day regimen using povidone-iodine preparations.

CONVENTIONAL MEDICINE APPROACH

The accurate diagnosis of vaginitis is critical. Incorrect self-diagnosis or guesswork by the practitioner can lead to unnecessary and ineffective treatment, thus prolonging the symptoms.

Bacterial Vaginosis

Bacterial vaginosis is more common than candidiasis and is frequently overlooked or misdiagnosed. The initial evaluation suggests candidiasis; the candidiasis is treated and the bacterial vaginosis is overlooked, left untreated, and continues to provide a hospitable environment for candida (yeast). Again, an accurate diagnosis is important, and risk factors for BV should be discussed.

The mainstay of therapy is metronidazole, either orally or in a vaginal gel. Other treatment regimens involve clindamycin, either orally or in a vaginal cream. Tinidazole, FDA-approved for the treatment of trichomoniasis, has also been used for treatment of BV in patients who have failure of clindamycin and have nausea and vomiting problems with metronidazole. This should not be used in people who are allergic to metronidazole because they are members of the same class of drugs. Alcohol intake should be avoided while using metronidazole due to a drug interaction causing violent vomiting.

Recurrent BV is common and is often associated with high levels of stress. Recommended prevention regimens include metronidazole (0.75 mg gel, or one full applicator) one to two times per week for six months or metronidazole gel for 10 days on the initial treatment. There is no need to treat the sexual partner.

Candida Vaginitis

Uncomplicated, acute candidal infections can be treated with one of a variety of products. Currently, there are over 100 prescription and over-the-counter preparations that are marketed to

Treatment of Acute Bacterial Vaginosis

Recommended Oral Medications

Oral metronidazole: 500 mg twice daily for 7 days
Oral metronidazole: 250 mg 3 times daily for 7 days
Clindamycin: 300 mg orally twice a day for 7 days

Recommended Vaginal Medications

Metronidazole gel (0.75%): 5 g vaginally once daily at bedtime for 5 days
Clindamycin cream (2%): 1 full applicator (5 g) intravaginally at bedtime for 7 days
Sustained-release clindamycin (2%): 1 full applicator 1 time only (7-day duration)
Clindamycin ovules (100 g): intravaginally once at bedtime for 3 days

deal with this problem. Despite the latest "third-generation" anticandidal preparations, women continue to be plagued by the occurrence and recurrence of candidal vulvovaginal infections. While this is sometimes because of undiagnosed and untreated bacterial vaginosis, chronic yeast infections do occur. The 2006 CDC recommendations for treatment of candidiasis are listed in Table 20.1.

Topical azoles are more effective than nystatin and provide for symptom relief and complete treatment in 80 to 90 percent of patients who follow recommended treatment guidelines. Creams and suppositories are oil-based and can weaken latex condoms and diaphragms, however, so it is important to be warned of this possibility. For recurrent vulvovaginal candidiasis, extend the initial topical or oral therapy. The first treatment of recurrence would involve a longer 7- to 14-day topical therapy regimen or a dose of fluconazole orally every three days for a total of three doses. If this does not work, then consider oral fluconazole once weekly for six months. If this treatment is not feasible, one can also use topical clotrimazole (200 mg twice a week) or once-weekly clotrimazole (500 mg) vaginal suppositories for six months.

Emergence of azole-resistant candidiasis is increasing. For non-albicans candidiasis, the recurrence treatment recommendation is 600 mg of boric acid in a gelatin capsule vaginally once daily for two weeks following the original oral or vaginal treatment. Sometimes adding oral *Lactobacillus acidophilus*, especially for women who are using oral contraceptives, daily or every other day helps to reduce recurrences. This is discussed in more detail in the alternative medicine section of this chapter. Instruction in proper hygiene (in terms of always wiping from front to back) is also helpful. There is no need to treat the sexual partner.

Trichomoniasis

The treatment of trichomoniasis has not changed very much over time; it calls for treating the patient

Table 20.1 CDC Guidelines for Intravaginal Treatment of Yeast Vaginitis

Intravaginal Drug	Regimen
Butoconazole 2% cream	5 g single intravaginal application
Clotrimazole 1% cream (OTC)	5 g intravaginally for 7–14 days
Clotrimazole 100-mg vaginal tablet	2 per day for 3 days
Miconazole 2% cream (OTC)	5 g intravaginally for 7 days
Miconazole 100-mg vaginal suppository (OTC)	1 per day for 7 days
Miconazole 200-mg vaginal suppository (OTC)	1 per day for 3 days
Miconazole 1200-mg vaginal suppository (OTC)	1 in a single dose
Nystatin 100,000-unit vaginal tablet	1 per day for 14 days
Tioconazole 6.5% ointment (OTC)	5 g intravaginally in a single application
Terconazole 0.4% cream	5 g intravaginally for 7 days
Terconazole 0.8% cream	5 g intravaginally for 3 days
Terconazole 80-mg vaginal suppository	1 per day for 3 days
Oral Drug	**Regimen**
Fluconazole 150-mg oral tablet	1 in a single dose

and her partner with oral metronidazole. Recommended medications are metronidazole 2 g orally in a single dose; the new Tindamax (tinidazole) 2 g orally in a single dose; or metronidazole 500 mg orally twice daily for seven days. For pregnant women, metronidazole is the safe treatment of choice with 2 g metronidazole in a single oral dose during pregnancy. Nursing women should withhold breast-feeding for 12 to 24 hours after the dose of metronidazole. If you are taking Tindamax, practitioners recommend that you interrupt breast-feeding for three days after the dose.

SEEING A LICENSED PRIMARY HEALTH-CARE PRACTITIONER (N.D., M.D., D.O., N.P., P.A.)

The most appropriate way to assure an accurate diagnosis is to see a licensed health-care practitioner (naturopathic doctor; medical doctor; osteopathic doctor; nurse-practitioner, or physician's assistant) who is familiar with the clinical picture of various forms of vaginitis, can perform a physical exam, knows what to test for, and can collect those samples during your exam. Accurate diagnosis is the most important key to efficient and appropriate treatment, whether the therapies are natural or pharmaceutical. If you know what kind of infection you currently have and choose self-treatment, it is essential to recognize when and if self-treatment isn't working and to seek professional care at that time. It is most important to seek professional care when infections recur more than three times per year, if you have a chronic infection that doesn't fully resolve, or when you are pregnant. Specific testing can be done, but, more important, a licensed practitioner can help determine if underlying disorders are contributing to the vaginal infection. All the alternative therapies discussed in this chapter are generally safe for home use, except for pregnant women.

GENERAL EXERCISE PROGRAM

APPENDIX A

There is strong and rapidly accumulating evidence that muscular exertion reduces cancer risk. The following recommendations are based on a review of recent scientific literature on physical exercise and cancer risk reduction:

1. To prevent injuries, begin each exercise session with Joint Warming Exercises and end each exercise session with Basic Stretches (see the following pages).
2. Exercise six days a week. Walk or do moderate hiking on your day off.
3. Alternate aerobic (cardiovascular) with strength (weight lifting) exercises.
4. Take one day off each week:
   - Forget about your work, your bills, your problems. Seek peace in the woods or mountains.
   - Refresh your being with pure air, pure water, simple food, and communion with nature.
   - Hike moderately, read a good book, lie down and look at the sky or the birds, or take a nap.
   - This is your day of recreation. Let nothing interfere with it.
5. Calculate your training heart rate (THR) for aerobic exercise. THR is defined as the range of heart rates that is safe for your heart and will strengthen it. To do this, first calculate your maximum heart rate (MHR):

   MHR = 220 − your age (in years)

   Next calculate your training heart rate (THR) as a percentage of MHR. If you are just beginning, multiply MHR by 60 percent and 70 percent to get the bottom and top of the range:

   Bottom THR = MHR × .60

   Top THR = MHR × .70

   Otherwise, multiply MHR by 70 percent and 85 percent:

   Bottom THR = MHR × .70

   Top THR = MHR × .85

   Divide the results by 6 to calculate THR per 10 seconds.

   As an example, let us calculate THR for a 50-year-old woman who is beginning to exercise.

   MHR = 220 − 50 = 170 beats per minute

   Bottom THR = 170 × .60 = 102 beats per minute

   Top THR = 170 × .70 = 119 beats per minute

   To calculate THR per 10 seconds:

   102 ÷ 6 = 17

   119 ÷ 6 = 20

   THR range = 17–20 beats per 10 seconds

   For this example, the recommendation would be, after three minutes of aerobic exercise, check your pulse for 10 seconds. If it is less than 17, increase your pace. If more than 20, reduce your pace. Repeat this procedure every three minutes or so throughout your exercise session.

JOINT WARMING EXERCISES

The following exercises are designed to protect the joints against injury from weight-bearing exercise. These exercises should be performed before any cardiovascular or strength workout.

1. **Neck**
   Rotate neck gently to left 5 times, then to right 5 times.
2. **Shoulders**
   Rotate shoulders forward 10 times, then backward 10 times.
3. **Elbows, Wrists, and Fingers**
   Begin with arms bent, elbows against the sides of body, hands forming a fist against shoulders. Then extend arms fully, directly in front of you, while opening hands and extending fingers. Return to initial position. Repeat 10 times.

   Repeat motion, but this time raise your hands above your head. Don't forget to open your hands and your extend fingers as you extend your arms above your head. Repeat 10 times.
4. **Trunk and Waist**
   Bend your trunk at the waist from right to left and from left to right. Avoid stiffening your muscles or applying force as you do this exercise. Perform the exercise as a gentle rocking movement from side to side. Alternate right to left for 20 counts.
5. **Hips**
   "Hula-hoop" exercise. Perform full circles with your hips rotating clockwise 10 times. Repeat rotating counterclockwise 10 times.
6. **Hips and Knees**
   Bring right knee close to chest by using both hands around knee and gently pulling with your arms. Count to 20. Repeat with left knee.
7. **Knees**
   Standing on left leg, gently bend and extend the right leg 20 times. Repeat exercise with the left leg, 20 times while standing on right leg.
8. **Ankles**
   Standing on left foot, rotate right ankle inward 10 times and then outward 10 times. Repeat exercise with left ankle while standing on right foot.

BASIC STRETCHES

Here are some general guidelines for stretching:

- Stretch at the end of the exercise session, when muscles are warm.
- Hold stretch steadily—do not bounce.
- Accept a bit of discomfort but avoid pain—do not push.

1. **Calves, Hamstrings, Back, Neck**
   - Stand, feet apart about shoulder width, toes pointing forward, knees straight.
   - Let head and trunk fall forward and down. Let arms hang down. Allow gravity to push down your trunk so that your fingertips will get closer and closer to your toes, without forcing.
   - Relax in this position for 30 seconds (over several weeks, increase gradually to 60 seconds).
2. **Inner Thigh, Low Back**
   - Standing, separate feet as much as possible, knees straight.
   - Bend trunk forward at the hips, let arms and head hang down comfortably.
   - Relax in this position for 20 seconds.
3. **Inner Thigh, Right Side of the Body, Left Hamstrings**
   - Same position as in stretch 2. Rotate trunk over left leg and let your trunk and arms hang along the left leg with hands trying to reach the left foot.
   - Relax in this position for 20 seconds.
   - Repeat with trunk and arms hanging along the right leg.
   - Relax in this position for 20 seconds.

4. **Tibialis, Quadriceps, Abdominals, Chest, Front of Neck**
   - Kneel on hands and knees, with thighs and arms perpendicular to the floor.
   - Keeping hands and knees in place and arms extended, move trunk forward until your abdomen touches the floor. Then raise your head up and back so that you can see the ceiling.
   - Hold this position for about 20 seconds.
   - Keeping hands and knees in place and arms extended, move trunk backward until your buttocks touch your heels. Let head down, forehead against the floor.
   - Relax in this position for 20 seconds.

PREVENTING EXERCISE INJURIES

Prevention of exercise injuries revolves around several guidelines:

1. Stretching. Stretching exercises should be engaged in *after* every exercise session, especially concentrating on the muscle groups that have been utilized during the exercise session. For walkers and runners, this means concentrating on posterior leg muscles, the lower back, and the front of the chest. For cyclers, this means the quadriceps, posterior leg muscles, and upper back. For swimmers, the shoulder joints especially should be stretched as well as the lower back and calves.

2. Strengthening. Often muscle imbalances can create injury problems. For knee problems in runners, for example, often the hamstrings are too strong and the quadriceps are too weak, so progressive resistance exercises for the knee (extension) can be performed, both for prevention and treatment. If the shin area is giving problems or might potentially be a future problem, the anterior leg muscles can be strengthened through toe-raising resistive exercises (with stretching of the calf muscle, which is often too strong).

3. Warming up and down. Slow aerobic exercises should always precede and follow hard aerobic exertion. Five- to ten-minute transition periods between rest and exercise and then rest are important to help the metabolic, circulatory, and neuromuscular systems adapt without injury or trauma. A recommended warm-up is Joint Warming Exercises (see instructions).

4. Proper equipment. Safety equipment and quality footwear are important for all sports. For the runner this may mean reflective tape and $50 to $100 shoes; for the cycler, this means a hard helmet; for the racquetball player, goggles, etc.

5. Gradual progression. The number-one cause of musculoskeletal problems is overuse—too much, too fast, too soon. A conservative beginning, with gradual progression, is the most important injury-prevention practice and is readily available. Many beginner exercisers are overzealous initially and soon acquire injuries that thwart future exercise.

6. Moderation. Avoid too much of any one activity. Engaging in several different activities can help prevent overspecialization and resulting muscle imbalances and overcompulsion.

7. Responsibility of the individual. The individual's responsibility is to stay within the tolerance of her or his own musculoskeletal system. Individual judgment and common sense should be utilized to "listen" to one's body, making adjustments when necessary. This can mean avoiding that extra three miles of running or that extra set of squats, being regular in training, obtaining adequate rest and optimal nutrition, and seeking a balanced approach.

8. Be willing to rest. An important equation in exercise is "Exercise plus rest equals fitness." In other words, it takes both exercise and adequate rest to build fitness. Either alone will not do it. Often beginner exercisers will sacrifice sleep time to get up and exercise. Chronic fatigue may result, and the whole purpose of exercise—to feel better—is negated. It's important to get both rest and exercise.

9. Exercise technique. Various aerobic activities require special techniques to avoid injury. Flexibility exercises demand stretching below the pain threshold. Regarding aerobic activities such as running or jogging, it is important to keep the body in an upright posture and the arms at a 90-degree angle, swinging from the shoulder. The feet should land almost flat-footed with the weight well back toward the heel. Only sprinters should run on their toes. Breathing should be through the mouth and nose in a regular fashion. Overall, the body should be loose, natural, and poised. Each sport should be studied to ensure adequate technique.

ABBREVIATED GENERAL EXERCISE PROGRAM

Aerobic Exercise

Beginner

- Allow at least 6 weeks for conditioning of your heart: exercise very moderately.
- Exercise at a training heart rate (THR) that is 60–70 percent of your maximum heart rate (MHR).
- Walk for 15 minutes. Increase time of exercise gradually to 30 minutes over the 6-week period.

More Advanced

- For 10 weeks, increase THR to 65–75 percent of MHR.
- Walk for 30–45 minutes.

Advanced

- Increase THR to 70–85 percent of MRH.
- Walk for 45–60 minutes.
- Introduce variations in program. For example, do interval training: walk fast for 5 minutes and then jog for 30 seconds. Repeat combination three times during workout.

Strength Exercise

Beginner

- Follow program of exercise planned for you by an exercise specialist.
- Allow at least 8 weeks for conditioning of your muscles and joints: exercise very moderately and increase weight gradually every week as you get stronger.

More Advanced

- For 6 weeks, do 10 reps, 2 sets.
- Keep increasing weight every week, gradually.

Advanced

- Divide workout into upper body exercises on alternate days.
- Do 10 reps, 3 sets of each exercise.

Preventing Injury from Strength Training

- Work with an exercise specialist who can show you the safe way to use weights.
- Do not compete with anyone but yourself.
- Begin with very light weight, so that you can perform 12–15 repetitions of the exercise easily. Increase weight very gradually.
- Avoid holding your breath while lifting. Breathe in during relaxing part of exercise and breathe out during effort part of exercise.
- Rest and take a mouthful of pure water between exercises.
- Warm up for 3–5 minutes before weight lifting exercises and stretch the muscles used during the exercise session after the workout.

SPEAK PREGNANCY EXERCISES

These exercises for pregnant women are adapted from *Health* magazine (December 1993: 28–30).

1. Cobbler's Pose. This exercise helps the pelvic organs by promoting circulation of blood in this

area. It also helps to assure the correct position of the pelvis. This exercise can be done as often as you like and can be used in general as a sitting position. When sitting in this position, you should be able to feel a stretch on the inside of your thighs, vagina, and hip joints. You may also feel stretching in your knees and ankles.

- Sit on the floor with your back straight and legs stretched out in front. You can sit against a wall to support the lower back.
- Bend your knees and let your knees relax away from each other to each side, bringing the bottom of your feet together. The soles of your feet should now be touching with the outside ankle region resting on the floor.
- Pull your pressed-together feet as close to the opening of your vagina as possible. Open out your thighs and let your knees lower toward the floor. Breathe deeply.

2. Kneeling with Knees Apart. This position helps to alleviate low back pain and decrease tension in the pelvis and pelvic joints. The pelvic joints open and the muscles are able to relax and lengthen in the low back and pelvis. Stretch only as far as you can without bending your back, and then hold this position while breathing deeply. You should be able to feel the stretch in the vaginal region and in the knees and ankles.

- Kneel on the floor with knees as wide apart as possible, the top of your feet on the floor, and your toes pointing in toward each other. Try to sit between your feet with your buttocks on the floor or sit on top of your heels.
- Move slowly forward from the hips, keeping your buttocks down as much as possible and then lean forward and place your palms on the floor in front of you with both arms straight. Try resting on your arms, keeping your back straight. You should feel a stretch in the vagina.
- Try a gently rocking movement, shifting your weight from your arms to your legs.
- Breathe deeply while trying to stay in this position for a minute or longer, and then come up and resume a normal sitting position.

3. Pelvic Floor Exercises. This exercise will help your pelvic floor muscles relax if you do it often enough. This will prove to be helpful in the second stage of labor, and it may prevent a tear when giving birth. This exercise should be done daily, especially in the third trimester.

- Stand with your feet about two feet apart. Squat down and end up squatting on the balls of your feet. Lean forward onto your hands, keeping your arms and back straight, and open your knees wide apart, pointing them to the outside.
- Tighten your pelvic floor muscles, pulling them in as if you are trying to stop yourself from urinating. Hold for several seconds, and then slowly let go. Repeat three to five times.
- Repeat the exercise again, but this time let go in four stages, a little at a time.
- Repeat the exercise again, and this time picture your baby's head passing through your pelvis during the second stage of labor. Each time you breathe out, imagine that your baby is continuing to pass through your vagina as you release your pelvic muscles.

4. Pelvic Tuck-In. One of the health problems during pregnancy can be strain on the lower back due to the extra weight. This exercise strengthens the buttocks muscles, increases support to the lower back, and stabilizes the pelvis, which can help prevent back pain. A gentle rocking movement added to the exercise can be good practice for labor and lessen pain and ease the passage of the baby through the birth canal.

- Position yourself on the floor on your hands and knees. Your knees should be about one foot apart.

- Pull in and tighten your buttocks, pulling your pelvis so that your back arches like a cat's back when it's afraid or angry. Hold this for 10 to 15 seconds, and then let go.
- Repeat this at least six times, and then do the exercise a little bit faster, rocking your pelvis gently up and down along with your back motion.

Sample Conditioning Exercise Program: 8 Weeks

Aerobic (Sunday, Tuesday, and Thursday)

- Joint Warming Exercises (see instructions).
- Walk briskly for 15 minutes. Gradually increase to 30, 45, or 60 minutes over a period of 4 to 6 weeks. (Other possibilities: Jog, run, swim, cycle, row, play a sport such as tennis, skate, ski, or water exercise.)
- Basic Stretches (see instructions).
- Friction entire body, from feet up (30 seconds), with dry washcloth.
- Shower.

Strength (Monday, Wednesday, and Friday)

- Joint Warming Exercises (see instructions).
- Walk briskly for 15 minutes.
- Dumbbell exercises:

  Week 1: begin with a weight that allows you to do 10–12 repetitions (reps) of each exercise easily.
  Week 2: increase weight, 10 reps.
  Week 3: 10 reps, 2 sets per exercise.
  Week 4: increase weight, 10 reps, 2 sets.
  Week 5: increase weight, 10 reps, 2 sets.
  Week 6: increase reps to 12, 2 sets.
  Week 7: increase weight, 12 reps, 2 sets.
  Week 8: increase weight, 12 reps, 2 sets.

- Basic Stretches (see instructions).
- Friction entire body, from feet up (30 seconds), with dry washcloth.
- Shower.

Rest (Saturday)

- See item 4 on page 359.

More Advanced Strength Training: Weeks 9–16

To continue with strength training, it is probably best to join a health club, fitness club, gymnasium, or a similar organization.

Divide your workouts into body parts and do two sets per exercise. Begin each workout by warming up for 5 to 10 minutes and end each workout with 5 to 10 minutes of Basic Stretches.

Day	Part	Exercise (2 sets each)	Reps
Day 1	Chest	Bench press	8–10
	Biceps	Arm curl	8–10
	Abdominals	Easy crunches	8–10
Day 2	Back	Pull-down to chest	8–10
	Triceps	Arm extension	8–10
	Abdominals	Easy crunches	8–10
Day 3	Legs	Squat or leg press	8–10
	Calves	Heel raise	8–10
	Shoulders	Press behind neck	8–10

Weight Lifting Guidelines

1. Work out on alternate days.
2. Take a mouthful of water between sets.
3. For each repetition, breathe out during the effort phase of the repetition, breathe in during the relaxation phase.
4. If, after a workout, the exercised muscles are sore for more than 48 hours, reduce the weight and/or the number of repetitions.
5. Most injuries from exercise result from doing "too much, too fast, too soon."
6. Warm up for 5 to 10 minutes before the workout. Joint mobility exercises are excellent for this purpose.
7. From week to week increase weight slightly so that you can continue to perform the same number of repetitions per exercise as in the previous week.
8. After 16 weeks of this conditioning program, you may

   Increase the number of sets per exercise
   Modify your routine to include other exercises
   Concentrate on body areas that need extra work

BODY MASS INDEX

APPENDIX **B**

	Healthy Weight						Overweight					Obese						
BMI	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
Ht (in)									*Body weight (lb)*									
58	91	95	100	105	110	114	119	124	129	133	138	143	148	152	157	162	167	172
59	94	99	104	109	114	119	124	129	134	139	144	149	154	159	164	169	174	179
60	97	102	107	112	117	122	127	132	138	143	148	153	158	163	168	173	178	183
61	101	106	111	117	122	127	132	138	143	148	154	159	164	169	175	180	185	191
62	103	109	114	120	125	130	136	141	147	152	158	163	168	174	179	185	190	196
63	107	113	119	124	130	135	141	147	152	158	164	169	175	181	186	192	198	203
64	111	117	123	129	135	141	146	152	158	164	170	176	182	187	193	199	205	211
65	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216
66	118	124	131	137	143	149	156	162	168	174	180	187	193	199	205	212	218	224
67	121	127	134	140	147	153	159	166	172	178	185	191	198	204	210	217	223	229
68	125	132	139	145	152	158	165	172	178	185	191	198	205	211	218	224	231	238
69	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236	243
70	133	140	147	154	161	168	175	182	189	196	203	210	217	224	231	237	237	244
71	136	143	150	157	164	171	179	186	193	200	207	214	221	229	236	243	250	257
72	140	148	155	162	170	177	185	192	199	207	214	221	229	236	244	251	258	266
73	143	151	158	166	174	181	189	196	204	211	219	226	234	241	249	257	264	272
74	148	156	164	171	179	187	195	203	210	218	226	234	242	249	257	265	273	281
75	151	159	167	175	183	191	199	207	215	223	231	239	247	255	263	271	279	287
76	156	164	172	181	189	197	205	214	222	230	238	246	255	263	271	279	287	296

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HORMONE REPLACEMENT THERAPY PRESCRIPTIONS

APPENDIX C

The following has been adapted from *The 2004 Guide to Hormone Therapy Products* by Nayahmka McGriff-Lee, Pharm.D., GlaxoSmithKline; and Karim Anton Calis, Pharm.D., M.P.H., Department of Health and Human Services, National Institutes of Health (*Ob/Gyn* Special Edition Spring 2004: North American Menopause Society).

ORAL ESTROGENS

Cenestin 9 synthetic plant-derived conjugated estrogens; slow-release tablet
0.3 mg, 0.45 mg, 0.625 mg, 0.9 mg, 1.25 mg

Enjuvia Synthetic conjugated estrogens
0.3 mg, 0.45 mg, 0.625 mg, 1.25 mg

Estratab Esterified estrogens
0.3 mg, 0.625 mg, 1.25 mg, 2.5 mg

Estrace 17 beta-estradiol; most active form of endogenous estrogen; up to 90% of the oral dose is converted to estrogen by the gut and liver
0.5 mg, 1.0 mg, 2.0 mg

Femtrace Estradiol acetate
0.45 mg, 0.9 mg, 1.8 mg

Gynediol 17 beta-estradiol; micronized formulation; 2 mg tablet contains tartrazine (dye) that may cause allergy in patients with a sensitivity to aspirin
0.5 mg, 1.0 mg, 1.5 mg; 2.0 mg

Menest Esterified estrogens (synthetic plant-derived)
0.3 mg, 0.625 mg, 1.25 mg, 2.5 mg

Ogen Estropipate; 0.625 mg tablet contains 0.75 mg estropipate; 1.25 mg tablet contains 1.5 mg estropipate; 2.5 mg tablet contains 3 mg estropipate
0.625 mg, 1.25 mg, 2.5 mg

Ortho-Est Estropipate; 0.625 mg tablet contains 0.75 mg estropipate; 1.25 mg tablet contains 1.5 mg estropipate
0.625 mg, 1.25 mg

Premarin Conjugated equine estrogens; 50–60% estrone sodium sulfate; 20–35% equilin sodium sulfate and 17 beta-dihydroequilin; small amounts of 17 beta-estradiol and equilenin; contains over 200 compounds, including androgenic compounds
0.3 mg, 0.45 mg, 0.625 mg, 0.9 mg, 1.25 mg

Indications

Moderate to severe vasomotor symptoms
Vulvar and vaginal atrophy
Osteoporosis prevention

Note: Cenestin and Menest are not FDA-approved for the prevention of osteoporosis; Cenestin 0.3 mg is indicated only for vasomotor symptoms; Menest is indicated for atrophic vaginitis.

Adverse Effects

Common: breakthrough bleeding, breast tenderness, nausea, bloating, abdominal cramps, vomiting, headache, dizziness, depression, peripheral edema, weight changes, rash, intolerance to contact lenses, migraine, libido changes
Rare: thromboembolism, stroke, endometrial cancer, breast cancer (when used with a proges-

togen), hepatic adenoma, gallbladder disease, increased blood pressure, myocardial infarction

Dosing

Continuous or cyclic (21 days on, 7 days off)
Add a progestogen 10–14 days of month for women with uterus.

Drug Interactions

Drugs affected by oral estrogens: corticosteroids (increased), levothyroxine (decrease), theophylline (increase), warfarin (decrease), antibiotics (decrease), androgens (decrease), nicotine (eliminates more rapidly)
Drugs that affect oral estrogens: barbiturates (decrease), rifampin (decrease)

TRANSDERMAL ESTROGENS

Alora	17 beta-estradiol (2x/week); 0.05 mg/24-hour patch 0.025 mg, 0.05 mg, 0.075 mg, 0.1 mg
Climara	17 beta-estradiol (1x/week); 0.05 mg/24-hour patch 0.025 mg, 0.0375 mg, 0.05 mg, 0.06 mg, 0.075, 0.1mg
Esclim	17 beta-estradiol (2x/week); 0.05 mg/24-hour patch 0.025 mg, 0.0375 mg, 0.05 mg, 0.075 mg, 0.1 mg
Estraderm	17 beta-estradiol (2x/week);0.05 mg/24-hour patch Includes a drug reservoir of estradiol and alcohol and a copolymer membrane that controls the rate of drug diffusion 0.05 mg, 0.1 mg
Estrasorb	Topical emulsion of estradiol hemihydrate 1 g emulsion = 2.5 mg estradiol; each foil-laminated pouch contains 1.74 g (4.35 mg estradiol hemihydrate); nominal estradiol delivery rate of 0.05 mg/day
Estrogel	17 beta-estradiol; nonaerosol, metered-dose pump; gel dries in as little as 2–5 minutes 1.25 g (0.75 mg estradiol) 1x/day; 1 pump = 0.05 patch
FemPatch	17 beta-estradiol 0.025 mg (2x/week)
Menostar	17 beta-estradiol One patch provides 14 mcg of estradiol per day (1x/week)
Vivelle or Vivelle-Dot	17 beta-estradiol (2x/week); 0.05 mg/24-hour patch 0.025 mg, 0.0375, 0.05 mg, 0.075 mg, 0.1 mg

Indications

Moderate to severe vasomotor symptoms
Vulvar and vaginal atrophy

Note: Alora and Vivelle-Dot are also indicated for the prevention of osteoporosis; Estrasorb is indicated only for moderate to severe vasomotor symptoms.

Adverse Effects

Common: Erythema and skin irritation occurs in 10–17% of patients using reservoir-type patches compared to approximately 5% with newer matrix-type patches, breakthrough bleeding, breast tenderness, nausea, abdominal cramps, headache, peripheral edema, migraine
Rare: rash, thromboembolism, stroke, endometrial cancer, breast cancer (when used with a progestogen), increased blood pressure

Dosing and Administration

Discontinue oral therapy for 1 week before initiating transdermal estrogen.
Patch should be applied to the trunk of the body.
Avoid application on the breasts.
Rotate application site weekly to minimize irritation.
Patch may be worn while showering or swimming.

Drug Interactions

See oral estrogens (except antibiotics and nicotine).

VAGINAL ESTROGENS

Estrace cream 17 beta-estradiol; 0.01% cream; 1 g 1–3x/week 0.1 mg per g
Consider starting with 2–4 g every day intravaginally for 2–4 weeks, and then 1–2 g for 1–2 weeks; maintenance dose usually 1 g 1–3x/week

Estring Alpha estradiol; biologically inert liquid polymer matrix with pure crystalline estradiol; releases 7.5 mcg/24 hours over 90 days
2 mg delivered over 90 days; replace ring every 90 days

Femring Estradiol acetate; device contains 12.4 mg or 24.8 mg estradiol acetate, which releases 0.05 mg/24 hours or 0.1 mg/24 hours; replace every 3 months

Ogen cream Estropipate; 2–4 g 1–3x/ week
1.5 mg per g of cream

Premarin cream Conjugated equine estrogens (CEE)
0.625 mg per g of cream; 0.5–2 g 1–3x/week; applicator marked in 0.5 g intervals; absorbed slower than other estrogen preparations and therefore a longer duration of action

Vagifem Estradiol hemihydrate vaginal tablets; a gel forms when the tablet comes in contact with the vagina; initial dose of 1 tablet 1x/day for 2 weeks, and then maintenance of 2x/week
25 mcg in single use applicator; 1 tablet 2x/week

Indications

Vulvar and vaginal atrophy

Note: Premarin and Vagifem are indicated for atrophic vaginitis; Femring is also indicated for moderate to severe vasomotor symptoms.

Adverse Effects

Common: headache, nausea, vaginal discomfort, vaginal candidiasis
Rare: vaginal trauma from the applicator if patient has severe atrophy

Dosing and Administration

Daily dosing will achieve systemic concentrations.
Low dose, 1–3x/week, will achieve predominantly local effects.

Drug Interactions

See oral estrogens (except antibiotics and nicotine); interactions are based on extent of systemic absorption.

ORAL ESTROGEN-PROGESTIN COMBINATIONS

Activella 1 mg 17 beta-estradiol/0.5 mg norethindrone acetate
Continuous combined regimen, 1 pill daily

Angeliq 1 mg 17 beta-estradiol + 0.5 mg drospirenone

Femhrt 5 mcg ethinyl estradiol/1 mg norethindrone acetate
Continuous combined regimen, 1 pill daily

Prefest 1 mg 17 beta-estradiol + 1 mg 17 beta-estradiol/.09 mg norgestimate 3 days estradiol tablet, and then 3 days norgestimate tablet, alternating continuously; packaged as 2 separate tablets

Premphase 0.625 conjugated equine estrogen (CEE) days 1–14 days and a combo tablet of 0.625 mg CEE/5.0 mg medroxyprogesterone acetate (MPA) days 15–28
Packaged as 2 separate tablets

Prempro 0.625 mg CEE/2.5 mg MPA; or 0.625 mg CEE/5.0 mg MPA; or 0.3 mg CEE/1.5 mg MPA; or 0.45 mg CEE/1.5 mg MPA
A single tablet contains one of the four dosing options; continuous combined regimen

Indications

Combination therapy is indicated for women with an intact uterus

Adverse Effects

See oral estrogens and oral progestins.

Dosing and Administration

Addition of a progestin for at least 10–12 days per month protects against the increased risk of endometrial hyperplasia that occurs with unopposed estrogen use.
Continuous combined therapy is an alternative regimen that reduces and often eliminates withdrawal bleeding when compared to a cyclic regimen.

Potential Drug Interactions

See oral estrogens (except antibiotics and nicotine) and oral progestins.

TRANSDERMAL ESTROGEN-PROGESTIN COMBINATIONS

CombiPatch .05 mg 17 beta-estradiol/0.14 mg norethindrone acetate; 2 patches/week
.05 mg 17 beta-estradio/0.25 mg norethindrone acetate; 2 patches/week

ClimaraPro 0.045 estradio/0.015 mg levonorgestrel; 1 patch/week

Indications

Moderate to severe vasomotor symptoms

Note: CombiPatch is also indicated for vulvar and vaginal atrophy.

Adverse Effects

See transdermal estrogens and oral progestins.

Dosing and Administration

Complete the current cycle of therapy before initiating combination transdermal therapy. Apply to lower abdomen.

Potential Drug Interactions

See oral estrogens (except antibiotics and nicotine) and oral progestins.

ORAL PROGESTINS

Amen Medroxyprogesterone acetate 5.0 mg, 10 mg

Aygestin Norethindrone acetate 5 mg

Cycrin Medroxyprogesterone acetate 2.5 mg, 5 mg, 10 mg

Megace Megestrol acetate 20 mg, 40 mg

Micronor Norethindrone acetate 5 mg

Nor-QD Norethindrone .35 mg

Ovrette Norgestrel 0.075 mg; 19-nor derivative of testosterone with progestogenic, estrogenic, androgenic, and antiestrogenic effects

Provera Medroxyprogesterone acetate 2.5 mg, 5 mg, 10 mg; usual maintenance dose of 5–10 mg daily for 12–14 days per month

Indications

To reduce the incidence of endometrial hyperplasia in nonhysterectomized women receiving estrogen

Adverse Effects

Common: breast tenderness, nausea, irritability, weight change, fluid retention, sleep disturbance
Rare: thromboembolism, edema, rash; increased risk of breast cancer when used with estrogens

Dosing and Administration

Use for 12–14 consecutive days.
Start on day 16 or 21 of cycle when used in combination with estrogen.

Potential Drug Interactions

Drugs affected by oral progestins: warfarin (decrease), digoxin (decrease)
Drugs that affect oral progestins: rifampin (decrease)

PROGESTERONE

Prometrium	Oral micronized progesterone 100 mg, 200 mg; 200 mg daily for 12–14 days, or 100 mg daily
Prochieve	4% vaginal progesterone

Note: Progesterone is generally associated with less nuisance effects than progestins. It is unclear if progesterone has a better safety profile for more serious side effects. Natural progesterone may be used as a sleep aid.

INTRAUTERINE PROGESTINS

Mirena	20 mcg/day approximate release rate 52 mg IU has 5-year use

VAGINAL PROGESTERONE GEL

Prochieve 4%	progesterone; 45-mg applicator

ESTROGEN/TESTOSTERONE

Estratest h.s.	0.625 esterified estrones/1.25 methyltestosterone
Estratest	1.25 esterified estrones/2.5 methyltestosterone

TESTOSTERONE

Androgel 1% gel	10 mg/g (formulated for men)
Testoderm	1 patch delivers 4 mg over 24 hours (formulated for men) 1 patch delivers 6 mg over 24 hours
Androderm	1 patch delivers 2.5 mg over 24 hours (formulated for men) 1 patch delivers 5 mg over 24 hours
Female testosterone patch	300 mcg patch (not commercially available yet)

Indications

Treatment of vasomotor symptoms in patients who do not respond to estrogen alone
Androgens may improve libido, energy, and overall well-being

Adverse Effects

Common: virilization, changes in libido (increased or decreased), nausea, abdominal cramps, headache, breakthrough bleeding, breast tenderness, edema
Rare: increased liver function tests, polycythemia, cholestatic hepatitis, jaundice, hypercalcemia, thromboembolism, stroke, endometrial cancer, breast cancer, hepatic adenoma, gallbladder disease, increased blood pressure

Dosing and Administration

Cycle 21 days on, 7 off
Can be used continuously

Potential Drug Interactions

Drugs affected by oral estrogens-androgens:
warfarin (increase), cyclosporine (increase)
Drugs that affect oral estrogens-androgens:
barbiturates, phenytoin

BREAST SELF-EXAM

The breast self-exam should be done in three steps:*

1. The first step is a visual exam in front of a mirror: Look at your breasts with your arms at your sides, then hold your arms overhead, clasping your hands behind your head. Next place your hands on your hips, roll your shoulders forward, and bow forward slightly as you pull your shoulders and elbows forward. Inspect both breasts for swelling, changes in skin (dimpling, puckering, discoloration, or scaling of skin), or changes in your nipples, including retraction or discharge.

2. The second step is to lie down and place a small pillow or folded towel under your right shoulder and your right arm behind your head. Press firmly with the pads of your fingers and move your left hand over all parts of your right breast in an up-and-down motion as if you are tracking vertical lines in rows next to each other. Pay extra attention to the area between the breast and the armpit, including the armpit itself. Gently squeeze the nipple to check for discharge. Check the left breast with your right hand in the same way.

3. The third step is standing. With your left arm behind your head, use your right hand to examine your left breast. Move your fingers up and down in vertical rows pressing firmly with the pads of your fingers. Repeat this on the right breast.

ALTERNATING SITZ BATHS

Obtain two large tubs that you are able to sit in. Fill one half full with hot water (bath water temperature). Fill the other one half full with ice cold water. Sit in the hot water for three minutes and then quickly sit in the cold for 30 seconds. Repeat this three times in succession. Quickly get dressed or put on a robe or blankets so as not to become chilled. The room where you are doing the treatment should be comfortable and warm.

CASTOR OIL PACK

Materials needed:

1. Wool flannel cloth
2. Plastic sheet (medium thickness)
3. Bath towel
4. Two safety pins
5. Bowl
6. Castor oil
7. Plastic wrap
8. Baking soda
9. Large resealable plastic bag

Instructions

Fold a piece of wool or cotton flannel to make a pack three layers thick and approximately 12 inches square. This size is recommended for abdominal and pelvic applications. Pour castor oil into the bowl. Place the cloth in the bowl to saturate the flannel; wring it out so it is not dripping. Place the plastic sheet on the bed where you will be lying down. Apply the cloth to the designated bodily area and cover it with a piece of plastic wrap. Wrap a towel around the entire area and fasten it with safety pins. Lie down and avoid becoming chilled. The pack should stay in place for a minimum of one hour but may be worn longer. After removing the castor oil pack, clean the skin with soda water (two teaspoons of baking soda added to a quart of warm water).

*Adapted from the American Cancer Society, September 2006, cancer.org.

The castor oil pack may be saved in a resealable plastic bag or container for future use. It can be used repeatedly for a number of treatments.

INFUSIONS

An infusion is a simple tea made with one or more herbs steeped in boiled water. To make an infusion, weigh out one ounce of dry herbs. Add one pint (two cups) of boiling water to the herbs. Some herbs will taste better if you use more than two cups of water. Steep the herbs for ten to twenty minutes. Herbs that are steeped longer will become stronger. Strain the tea through a metal-wire or bamboo tea strainer. Drink throughout the day.

RECOMMENDED SCREENING TESTS AND IMMUNIZATIONS

APPENDIX E

The following charts list recommended screenings and immunizations for women at average risk for most diseases and for women with various risk factors. These are guidelines only. Your health-care provider will personalize the timing of each test and immunization to best meet your health-care needs. The charts are based on the recommendations of the National Women's Health Information Center, U.S. Department of Health and Human Services, Office on Women's Health as of October 2006.

Recommended Screening Tests and Immunizations for Women at Average Risk

Screening Tests	Ages 18–39	Ages 40–49	Ages 50–64	Ages 65 and Older
Full checkup, including weight and height	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.
Thyroid test (TSH)	Start at age 35, and then every 5 years	Every 5 years	Every 5 years	Every 5 years
Blood pressure test	At least every 2 years	At least every 2 years	At least every 2 years	At least every 2 years
Cholesterol test	Start at age 20; discuss with your doctor or nurse.	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.
Bone mineral density test	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.	At least once; talk to your doctor or nurse about repeat testing.	
Blood glucose test	Discuss with your doctor or nurse.	Start at age 45, and then every 3 years	Every 3 years	Every 3 years
Mammogram		Every 1–2 years; discuss with your doctor or nurse.	Every 1–2 years; discuss with your doctor or nurse.	Every 1–2 years; discuss with your doctor or nurse.
Pap test and pelvic exam	Get this test if you have been sexually active or are older than 21.	Every 1–3 years	Every 1–3 years	Discuss with your doctor or nurse.
Chlamydia test	Yearly until age 25 if sexually active; older than age 25, get this test if you have new or multiple partner. All pregnant women should have this test.	Get this test if you have new or multiple partners. All pregnant women should have this test.	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.

(continued)

Recommended Screening Tests and Immunizations for Women at Average Risk *(continued)*

Screening Tests	Ages 18–39	Ages 40–49	Ages 50–64	Ages 65 and Older
Sexually transmitted infection (STI) tests	Both partners should get tested for STIs, including HIV, before initiating sexual intercourse.	Both partners should get tested for STIs, including HIV, before initiating sexual intercourse.	Both partners should get tested for STIs, including HIV, before initiating sexual intercourse	Both partners should get tested for STIs, including HIV, before initiating sexual intercourse.
Fecal occult blood test			Yearly	Yearly
Flexible sigmoidoscopy (with fecal occult blood test)			Every 5 years (if not having a colonoscopy)	Every 5 years (if not having a colonoscopy)
Double contrast barium enema (DCBE)			Every 5–10 years (if not having a colonoscopy or sigmoidoscopy)	Every 5–10 years (if not having a colonoscopy or sigmoidoscopy)
Colonoscopy			Every 10 years	Every 10 years
Rectal exam	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.	Every 5–10 years (with sigmoidoscopy, colonoscopy, or DCBE)	Every 5–10 years (with sigmoidoscopy, colonoscopy, or DCBE)
Eye exam	Get your eyes checked if you have problems or visual changes.	Every 2–4 years	Every 2–4 years	Every 1–2 years
Hearing test	Starting at age 18, and then every 10 years	Every 10 years	Every 3 years	Every 3 years
Mole exam	Monthly mole self-exam; by a doctor every 3 years, starting at age 20	Monthly mole self-exam; by a doctor every year	Monthly mole self-exam; by a doctor every year	Monthly mole self-exam; by a doctor every year
Dental exam	One to two times every year	One to two times every year	One to two times every year	One to two times every year
Mental health screening	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.

Immunizations	Ages 18–39	Ages 40–49	Ages 50–64	Ages 65 and Older
Influenza vaccine	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.	Yearly	Yearly
Pneumococcal vaccine				One time only
Human papillomavirus vaccine (HPV)	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.	Discuss with your doctor or nurse.	
Meningococcal vaccine	Discuss with your doctor or nurse if attending college.			
Tetanus-diphtheria booster vaccine	Every 10 years	Every 10 years	Every 10 years	Every 10 years

The following chart lists screenings or tests you might need more often or earlier due to having high-risk factors or things in your life that increase your chances of developing a condition or disease.

Recommended Screening Tests and Immunizations for Women with High-Risk Factors

Does your family history include?	You may need these tests more often or at a younger age
High blood pressure	Blood pressure test
High cholesterol	Cholesterol test
Heart disease, premature heart disease, or heart attack	Blood pressure test, cholesterol test, exercise stress test
Diabetes	Blood glucose test
Breast cancer	Mammogram, ovarian cancer tests
Cervical, uterine, or vaginal cancer	Pap test, pelvic exam, ovarian cancer tests, colon screening
Ovarian cancer	Pelvic exam, ovarian cancer tests, colon screening, clinical breast exam
Osteoporosis, bone fracture in adulthood	Bone mineral density test
Thyroid disease or thyroid cancer	Thyroid test and/or genetic counseling
Gum (periodontal) disease	Oral exam
Are you?	**You may need these tests or vaccines more often or at a younger age**
African-American	Blood pressure test, cholesterol test, blood glucose test, vision exam, colonoscopy, genetic counseling for sickle cell anemia
Alaska Native or Pacific Islander	Blood glucose test
Ashkenazi Jewish descent	Genetic counseling for Tay-Sachs disease if you want to become pregnant

(continued)

Recommended Screening Tests and Immunizations for Women with High-Risk Factors *(continued)*

Are you?	You may need these tests or vaccines more often or at a younger age
Ashkenazi Jewish with family history of breast or ovarian cancer	Genetic counseling for possible BRCA1/2 mutation
Asian-American	Blood glucose test
Hispanic American	Blood pressure test, cholesterol test, blood glucose test, colonoscopy
Native American	Blood glucose test
Age 65 or older	Bone mineral density test, flu vaccine, pneumococcal vaccine
Between the ages of 60 and 64, weigh less than 154 lbs., and not taking estrogen	Bone mineral density test
College age	MMR vaccine, varicella vaccine, human papillomavirus (HPV) vaccine, meningococcal vaccine
Postmenopausal	Bone mineral density test
Pregnant	Blood pressure test, blood glucose test, urine test, HIV test, STI tests, MMR vaccine, hepatitis B antigen test
A nonpregnant woman of childbearing age	MMR vaccine, varicella vaccine
A smoker	Blood pressure test, cholesterol test, bone mineral density test, oral exam, vision exam
Overweight	Blood pressure test, blood glucose test, weight checked
Living in prison	Tuberculosis (TB) test, HIV test, STI tests, hepatitis A and B vaccines
Living in long-term care	TB test, influenza vaccine, pneumococcal vaccine
A health-care worker	TB test, influenza vaccine, pneumococcal vaccine, MMR vaccine, varicella vaccine, hepatitis B vaccine with post-vaccination testing, HIV test, hepatitis test, hepatitis B vaccine if exposed to blood
Do you have or have you had?	**You may need these tests or vaccines more often or at a younger age**
High blood pressure	Blood pressure test, cholesterol test, blood glucose test
High cholesterol	Blood pressure test, cholesterol test, blood glucose test
Heart disease	Blood pressure test, cholesterol test, blood glucose test, influenza vaccine, pneumococcal vaccine
Diabetes	Blood pressure test, cholesterol test, blood glucose test, vision exam, urine sugar test
Gestational diabetes	Blood glucose test
A baby weighing more than 9 lbs.	Blood glucose test

(continued)

Do you have or have you had?	You may need these tests or vaccines more often or at a younger age
Breast cancer	Mammogram, ovarian cancer tests
Dense breasts	Mammogram, clinical breast exam
Cervical, uterine, vaginal cancer	Pap test, pelvic exam, ovarian cancer tests, colon screening
Ovarian cancer	Pelvic exam, ovarian cancer tests, mammogram, colon screening
Previous abnormal Pap tests	Pap test, pelvic exam, human papillomavirus (HPV) vaccine
Early menopause (natural or surgical), absent or infrequent menstrual periods, bone fracture in adulthood, low calcium intake, little physical activity, low body weight (under 154 lbs.), an eating disorder such as anorexia nervosa	Bone mineral density test
An autoimmune disease (lupus, rheumatoid arthritis, scleroderma, multiple sclerosis, psoriasis)	Thyroid test, TB test, influenza vaccine, MMR vaccine, pneumococcal vaccine, autoimmune screening test, bone mineral density test
Chronic lung disease	Influenza vaccine, pneumococcal vaccine
Chronic liver disease	Hepatitis A and B vaccines
Thyroid disease (if hyperthyroid)	Thyroid test, influenza vaccine, pneumococcal vaccine, bone mineral density test
Gum (periodontal) disease	Oral exam
Colon polyps or inflammatory bowel disease	Colonoscopy
A developmental delay	Vision exam, hearing test
Eye injury or disease	Vision exam
Ear injury or prolonged exposure to loud noise	Hearing test
HIV/AIDS	Oral exam, vision exam, Pap test, pelvic exam, TB test, thyroid test, STI tests, influenza vaccine, pneumococcal vaccine, hepatitis screening, hepatitis A and B vaccines
A blood transfusion or organ transplant before 1992 or received clotting factor concentrates made before 1987	Hepatitis C test
A blood transfusion before 1985	HIV test
Multiple sex partners or a partner who has or has had multiple sex partners	STI tests, HIV test, hepatitis B vaccine, Pap test, pelvic exam, human papillomavirus (HPV) vaccine
Alcoholism	Pneumococcal vaccine, TB test, psychological screening, liver tests
Injection drug use (IDU) or addiction	Hepatitis A and B vaccines, hepatitis C test, TB test, STI tests, HIV test, psychological screening

(continued)

Recommended Screening Tests and Immunizations for Women with High-Risk Factors *(continued)*

Do you have or have you had?	You may need these tests or vaccines more often or at a younger age
A sexually transmitted infection (STI)	STI tests, HIV test, Pap test, pelvic exam, hepatitis B vaccine, human papillomavirus (HPV) vaccine
Lived or worked with someone exposed to tuberculosis (TB)	TB test
A serious injury (cut or laceration)	Tetanus-diphtheria booster vaccine
A baby within the last few months	Postpartum depression screening

HERBAL AND NUTRITIONAL PRODUCTS

Vitanica Formulations Developed by Dr. Tori Hudson

Product	Purpose
Adrenal Assist	Adrenal support, fatigue
Black Cohosh	Menopause symptoms
Breastblend	Breast cancer prevention
Butterbur Extra	Migraine headaches
CandidaStat	Systemic candida syndrome
Cardioblend	Heart disease prevention
Chaste Tree Berry	Abnormal uterine bleeding
Cholestblend	High cholesterol
CoQ10	Heart disease
Cramp Bark Extra	Menstrual cramps
CranStat Extra	Urinary tract infections
Fem Rebalance	Irregular menses, hormonal balance
Fibroblend	Fibrocystic breasts
GABA Ease	Anxiety
Ginger Extract Plus	Nausea, high cholesterol, cramping
Gingko Extract Plus	Memory
Green Tea	Breast health, immune support
HBP Blend	High blood pressure
HepaFem	Liver support, liver detox
Herbal Symmetry	Multiherb daily
Herpblend	Herpes simplex
Horse Chestnut	Varicose veins, lymphedema
HRT Companion	Companion to HRT
IC Blend	Interstitial cystitis
Immune Symmetry	Infections, immune support
Iron Extra	Iron-deficient anemia
Ipriflavone	Bone support
LactationBlend	Breast-feeding support
Luminous	Hair, skin, nails
Lysine Extra	Herpes infections
Maternal Symmetry	Prenatal multivitamin
Mindblend	Memory, focus, concentration
Nausea Ease	Nausea—pregnancy and other
OC Companion	Companion to oral contraceptives
Opti-Recovery	Surgery support
Osteoblend	Osteoporosis prevention
OsteoDrink	Osteoporosis prevention
PCOS Blend	Polycystic ovarian syndrome
PhytoEstrogen Herbal	Phytoestrogen powder
Pregnancy Prep	Fertility enhancement
Red Clover	Hot flashes
Rhodiola	Fatigue, memory, stress
Senior Symmetry	Multiple vitamin-mineral 65+
Sleepblend	Insomnia
Slow Flow	Menstrual flow reduction
Soy Choice	Hot flashes, elevated cholesterol

St. John's Wort	Depression
Thyro Fem	Hypothyroid
Uplift	Depression
Veinoblend	Varicose veins
Woman's Passage	Menopause symptoms support
Women's Phase I	Premenstrual syndrome
Women's Phase II	Menopause symptoms support
Women's Symmetry	Multiple vitamin-mineral
Yeast Arrest	Yeast vaginitis

Companion Products to Conventional Cancer Treatments. The following Vitanica products are available only through licensed practitioners:

AC Blend
TX Blend
R Blend
Base Blend

Environmental Products. The following Vitanica products are available only through licensed practitioners:

Endocrine Disruptor Relief
Neuro Disruptor Relief
Women's Detox Co-Factors

Vaginal Suppositories. The following Vitanica products are available only through licensed practitioners, except Yeast Arrest:

Green Tea
Herbal-C
Papillo
Vag Pak
Vita-A
Yeast Arrest

CLINICAL GUIDE TO VITANICA PRODUCT USAGE

Abnormal Uterine Bleeding: Heavy Bleeding

Slow Flow	*Acute:* 3 caps every 3 hours during heavy flow *Chronic recurring:* 2 caps daily (up to 6 caps daily for 3 months, and then 1 cap daily and/or Chaste Tree Berry 1–2 caps/daily)

Abnormal Uterine Bleeding: Irregular Bleeding

Chaste Tree Berry	1–2 caps daily

Amenorrhea

Rhodiola	100 mg 2 to 3 times daily
Chaste Tree Berry	1 cap daily
Osteoblend	2 caps twice daily to prevent osteoporosis
Ipriflavone	1 cap 3 times daily to prevent osteoporosis

Anemia (Iron Deficiency)

Iron Extra	1–4 caps daily

Anxiety

GABA Ease	2 caps twice daily

Bladder Infections

CranStat Extra	*Acute:* 2 caps every 2 hours for the first 2 days, and then 2 caps 3–4 times daily for 7–14 days or until resolution; for best results, add 1,000 mg vitamin C to each dose *Chronic recurring:* 2 caps daily

Breast-feeding

LactationBlend	1 to 2 caps twice daily

Breast Cancer Prevention

Breastblend	2 caps twice daily
Green Tea	1–3 caps daily
PhytoEstrogen Herbal	1 tbs 1–2 times daily
Soy Choice	1–4 caps daily
CoQ10	1 cap daily

Cholesterol

Cardioblend	2 caps twice daily
Cholestblend	1 cap 3 times daily
CoQ10	1 cap daily
Ginger Extract Plus	1–2 caps daily
PhytoEstrogen Herbal	1 tbs 1–2 times daily
Soy Choice	1–4 caps daily

Depression

Rhodiola	100 mg 1 to 3 times daily
St. John's Wort	1 cap 3 times daily
Uplift	1 cap 3 times daily

Detoxification

Women's Detox Co-factors	4 caps twice daily
Endocrine Disruptor Relief	2 caps twice daily
Neuro Disruptor Relief	2 caps twice daily

Fibrocystic Breasts

Fibroblend	2–4 caps daily throughout cycle; or 2 caps twice daily from day 15 until onset of menstrual flow

General Health

Women's Symmetry	*General:* 1–2 caps daily *Chronic health problem:* 3–4 caps daily *Serious chronic health problem, high stress, or heavy exerciser:* 2 caps 3 times daily
Senior Symmetry	Same regimen as with Women's Symmetry
Herbal Symmetry	2 caps daily

Hair, Skin, Nails

Luminous	2–6 caps daily

Heart Disease

Cardioblend	2 caps twice daily for general prevention
CoQ10	1 cap daily
Ginger Extract Plus	1 cap twice daily
Soy Choice	1–4 caps daily

Hemorrhoids

Horse Chestnut	1 cap twice daily

Herpes (Oral or Genital)

Lysine Extra	*Acute:* 2 caps 2–3 times daily for up to 10 days *Chronic:* 2 caps per day

High Blood Pressure

HBP Blend	1 cap 1–3 times daily
CoQ10	1 cap daily

Hormonal Balance

Fem Rebalance	2 caps daily

Infections

Immune Symmetry	*Acute infections:* 2 caps every 2 hours for 2 days, and then 2 caps 3 times daily for 1–2 weeks *Chronic immune problems:* 2 caps 1–3 times daily as needed

Infertility

Pregnancy Prep	2 caps daily
Chaste Tree Berry	1–2 caps daily
Rhodiola	100–300 mg daily

Insomnia

Sleepblend	1–2 caps 30–60 minutes before bed

Interstitial Cystitis

IC Blend	3 caps 3 times daily

Liver Support

HepaFem	2 caps daily

Lymphedema

Horse Chestnut	1 cap twice daily

Migraines

Butterbur Extra	2 caps twice daily for 1–2 months, and then 2 caps daily

Memory

Mindblend	2 caps daily
Ginkgo Extract Plus	1 cap 3 times daily
Rhodiola	100 mg 1 to 3 times daily

Menopause Symptoms

Black Cohosh	1–2 caps 1–2 times daily
PhytoEstrogen Herbal	1 tbs 1–2 times daily
Red Clover	1 cap daily
Soy Choice	1–4 caps daily
Woman's Passage	1 cap daily
Women's Phase II	2–6 caps daily

Also see Abnormal Uterine Bleeding, Depression, Insomnia, and Memory.

Menstrual Cramps

Cramp Bark Extra	*Acute:* 1–3 caps every 3 hours up to 4 times daily during menses *To prevent recurring cramps:* 2 caps daily; increase to 2 caps twice daily the week before menses
Ginger Extract Plus	1–3 caps daily, for acute or for prevention

Nausea

Nausea Ease	1–2 caps daily
Ginger Extract Plus	1–4 caps as needed throughout the day

Osteoarthritis

Ginger Extract Plus	1–4 caps as needed throughout the day

Osteoporosis

Ipriflavone	1 cap 3 times daily
Osteoblend	2 caps twice daily
OsteoDrink	1 scoop daily
PhytoEstrogen Herbal	1 tbs 1–2 times daily
Soy Choice	1–2 caps daily

PMS

Ginkgo Extract Plus	1 cap 2–3 times daily
St. John's Wort	1 cap 3 times daily
Uplift	1 cap 3 times daily
Chaste Tree Berry	1–2 caps daily
Women's Phase I	*Mild symptoms:* 2 caps daily throughout cycle *Moderate to severe symptoms:* 2 caps twice daily throughout cycle

Polycystic Ovarian Syndrome

Green Tea	1–3 caps daily
PCOS Blend	3–6 caps daily
PhytoEstrogen Herbal	1–2 tbs daily

Pregnancy

Maternal Symmetry	2–6 caps daily

Stress

Rhodiola	100 mg 1–3 times daily

Surgery Recovery

Opti-Recovery	1 cap twice daily

Thyroid (Hypo)

ThyroFem	2 caps daily

Vaginitis (Yeast)

Yeast Arrest	*Acute:* 1 suppository in vagina morning and evening for 3–14 days *Chronic:* 1 cap twice daily for 2–4 weeks, and then 1 cap daily during menses for 4 months
CandidaStat	2 caps 1–2 times daily

Varicose Veins

Veinoblend	1 cap 3 times daily
Horse Chestnut	1 cap twice daily

Weight Loss

Green Tea	2 caps with breakfast, 2 caps with lunch

VITANICA SPECIALTY LINES FOR PROFESSIONALS ONLY

Cancer Support for Cancer Adjunctive Care

AC Blend	4 caps twice daily with adriamycin/cytoxin
TX Blend	5 caps twice daily with taxane family
Base Blend	4 caps twice daily with any chemotherapeutic regimen
R Blend	3 caps twice daily with radiotherapy

Environmental Medicine and Women's Health

Women's Detox Co-Factors	4 caps twice daily
Endocrine Disruptor Relief	2 caps twice daily
Neuro Disruptor Relief	2 caps twice daily

Suppositories for Infections, ASCUS, Cervical Dysplasias, HPV

All suppositories are to be inserted vaginally. For use in escharotic treatments, insert two suppositories after each treatment. Can also be used for vaginal infections and as part of an overall treatment plan for abnormal Pap smears. See clinical indications listed for each suppository in "Product Knowledge" manual for infections, condyloma, cervical dysplasia, and ACUS; also see *Encyclopedia of Natural Medicine* by Tori Hudson, N.D. Suppositories may require use of panty liner due to leakage when suppository dissolves.

Green Tea
Herbal-C
Papillo
Vag Pack
Vita-A
Yeast Arrest

MORE PRODUCT SOURCES

Bio-Identical Hormone Creams	Company
Progest	Emerita/Transitions for Health
Proganol	Bezwecken (available

	through professionals)
Ostaderm	Bezwecken (available through professionals)
Ostaderm V	Bezwecken (available through professionals)
Compounded hormones	Women's International Pharmacy

Fish Oils

Nordic Naturals

Greens Drink

Wellness Naturals

Homeopathic Medicines

Boiron

Standardized Herbal Extracts by Vitanica

Black Cohosh
Chaste Tree Berry
Ginger Extract Plus
Gingko Extract Plus
Green Tea
Horse Chestnut
Red Clover
Rhodiola
St. John's Wort

Other Reputable Suppliers of Standardized Herbal Extracts

Enzymatic Therapies (Retail)
Integrative Therapeutics (Professionals)

Herbal Tinctures

Eclectic Institute
Herb Pharm
Wise Woman Herbals

Probiotics Formulations

Pharmax

Uterine Fibroid Herbal Formulations from Gaia Herbs

Scudder's Alterative
Echinacea/Red Root Compound
Fraxinus/Ceonothus Compound
Gelsemium/Phytolacca Compound (Turska Formula)

NUTRITIONAL AND HERBAL COMPANIES

Vitanica (Dr. Tori Hudson's women's health product line)
P.O. Box 1285
Sherwood, OR 97140
800-572-4712
vitanica.com

Bezwecken
15495 SW Millikan Way
Beaverton, OR 97006
800-743-2256

Boiron USA
98c West Cochran Street
Simi Valley, CA 93065
805-582-9091

Eclectic Institute
14385 SE Lusted Road
Sandy, OR 97055
800-332-4372

Emerita/Transitions for Health
621 SW Alder
Portland, OR 97205
800-888-6814
emerita.com

Emerson Ecologics (distributor of professional products)
7 Commerce Drive
Bedford, NH 03110
603-656-9778
emersonecologics.com

Enzymatic Therapies
825 Challenger Drive
Greenbay, WI 54311
800-783-2286
enzymatictherapy.com

Gaia Herbs
108 Island Ford Road
Brevard, NC 28712
800-831-7780

Herb Pharm
P.O. Box 116
Williams, OR 97544
800-599-2392
herb-pharm.com

Natural Factors
1550 United Boulevard
Coquitlam, BC V3K 6Y7
Canada
604-415-4155

Natural Partners (distributor of professional products)
7949 E. Acoma, Suite 103
Scottsdale, AZ 85260
888-633-7620
naturalpartners.com

Nordic Naturals
94 Hangar Way
Watsonville, CA 95076
800-662-2544
nordicnaturals.com

Pharmax (for professionals)
1233 120th Avenue NE
Bellevue, WA 98005
800-538-8274
pharmaxllc.com

Vital Nutrients (for professionals)
45 Kenneth Dooley Drive
Middletown, CT 06457
888-328-9992
vitalnutrients.com

Wise Woman
P.O. Box 279
Creswell, OR 97426
800-532-5219

COMPOUNDING PHARMACIES

International Academy of Compounding Pharmacists
P.O. Box 1365
Sugarland, TX 77487
713-933-8400
900-927-4227

Women's International Pharmacy
12012 N. 111th Avenue
Youngtown, AZ 85363
800-699-8143

Lloyd Center Pharmacy
1302 Lloyd Center
Portland, OR 97232
800-358-8974

LABORATORY TESTING

Metametrix Clinical Laboratory
4855 Peachtree Industrial Boulevard
Norcross, GA 30092
800-221-4640, ext. 373
Fax: 770-441-2237
metametrix.com

SKIN CARE PRODUCTS FOR WOMEN

Emerita/Transitions for Health
621 SW Alder
Portland, OR 97205
800-888-6814
emerita.com

SPECIALTY FOODS

Hemp Seeds, Hemp Protein, Hemp Oil

Living Harvest
P.O. Box 4407
Portland, OR 97208
503-274-0755
livingharvest.com

Organic Dairy Foods and Meats

Organic Valley
One Organic Way
La Rarge, WI 54639
608-625-2666
organicvalley.coop

Whole-Grain Breads

French Meadow Bakery
2610 Lyndale Avenue South
Minneapolis, MN 55408
612-870-4740

CLINICS, NATUROPATHIC COLLEGES, AND ORGANIZATIONS

A Woman's Time, P.C.
Tori Hudson, N.D.
2067 NW Lovejoy
Portland, OR 97209
503-222-2322
awomanstime.com
E-mail: womanstime@aol.com
Blog: torihudson.com

Institute of Women's Health and Integrative Medicine (postgraduate training in women's health and natural therapies)
Dr. Tori Hudson
2067 NW Lovejoy
Portland, OR 97209
503-222-2322
instituteofwomenshealth.com

National College of Naturopathic Medicine
049 SW Porter
Portland, OR 97201
503-499-4343

Bastyr University
14500 Juanita Drive NE
Bothell, WA 98011
425-602-3100

Southwest College of Naturopathic Medicine and Health Sciences
2140 East Broadway
Tempe, AZ 85282
602-990-7424

Bridgeport University
126 Park Avenue
Bridgeport, CT 06601
203-576-4552

Canadian College of Naturopathic Medicine
2300 Yonge Street
P.O. Box 2431
Toronto, ON M4P1E4
416-486-8584

American Association of Naturopathic Physicians
4435 Wisconsin Avenue NW, Suite 403
Washington, DC 20016
202-895-1392

American Holistic Medical Association
6728 Old McLean Village Road
McLean, VA 22101
703-556-9728

American College of Obstetricians and Gynecologists
Resource Center
409 12th Street SW
Washington, DC 20024
202-863-2518

The American Herbalists Guild
P.O. Box 746555
Arvada, CO 80006
303-423-8800

American Botanical Council
P.O. Box 12006
Austin, TX 78711
512-331-8868

American Herb Association
P.O. Box 1673
Nevada City, CA 95959
530-265-9552

Herb Research Foundation
1007 Pearl Street
Boulder, CO 80302
303-449-2265

ADDITIONAL PUBLICATIONS, ARTICLES, AND TAPES BY DR. TORI HUDSON

Dr. Tori Hudson's blog
torihudson.com

Women's Health Update, The Complete Collection of Townsend Letter Columns 1992–2005, Volumes I, II, and III
Tori Hudson, N.D.
TK Publications
2067 NW Lovejoy
Portland, OR 97209
503-222-2322

Institute of Women's Health and Integrative Medicine (audiotapes and lecture series of post-graduate seminars for licensed health-care practitioners)
2067 NW Lovejoy
Portland, OR 97209
instituteofwomenshealth.com
503-222-2322

Emerson Ecologics
800-654-4432
emersonecologics.com

Holistic Primary Care
P.O. Box 953
Peck Slip Station
New York, NY
212-406-8957

Townsend Letter for Doctors and Patients
360-385-6021

Herbal Educational Services (tapes)
P.O. Box 3427
Ashland, OR 97520
800-252-0688

Tree Farm Communications (tapes)
800-468-0464

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CHAPTER 1: ABNORMAL UTERINE BLEEDING

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CHAPTER 17: PREMENSTRUAL SYNDROME

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