On Injuries of the Head Hippocrates by Francis Adams———————————————————————————————————-1'S heads are by no means all like to one another, nor are theof the head of all men constructed in the same form. Thus,has a prominence in the anterior part of the head (by prominencemeant the round protuberant part of the bone which projects beyondrest of it), in him the sutures of the head take the form of theletter tau, T; for the head has the shorter line running transversethe prominence, while the other line runs through the middlethe head, all the way to the neck. But whoever has the prominencethe back part of the head, in him the sutures are constructed inthe opposite form to the former; for in this case the shorterruns in front of the prominence, while the longer runs throughmiddle all along to the forehead. But whoever has a prominencethe head both before and behind, in him the sutures resemble theletter eta E; for the long lines of the letter run transverseeach prominence while the short one runs through the middleterminates in the long lines. But whoever has no prominence onpart he has the sutures of the head resembling the Greek letter; for the one line comes transverse to the temple while the otheralong the middle of the head. The bone at the middle of theis double, the hardest and most compact part being the upper, where it is connected with the skin, and the lowest, whereis connected with the meninx (dura mater); and from the uppermostlowermost parts the bone gradually becomes softer and less compact,you come to the diploe. The diploe is the most porous, the softest,most cavernous part. But the whole bone of the head, with theof a small portion of the uppermost and lowermost portionsit, is like a sponge; and the bone has in it many juicy substances,caruncles; and if one will rub them with the fingers, some bloodissue from them. There are also in the bone certain very slenderhollow vessels full of blood. So it is with regard to hardness,, and porosity. ———————————————————————————————————-2respect to thickness and thinness; the thinnest and weakest partthe whole head is the part about the bregma; and the bone therethe smallest and thinnest covering of flesh upon it, and the largestof brain is situated in that region of the head. And hencehappens that from similar or even smaller wounds and instruments,a person is wounded to the same or a less degree, the bone ofhead there is more contused, fractured, and depressed; and thatthere are more deadly and more difficult to cure; and itmore difficult to save one's life in injuries there than in anypart of the head; that from having sustained a similar or evenless wound a man will die, and that, too, in a shorter space ofthan from a wound in any other part of the head. For the brainthe bregma feels more quickly and strongly any mischief thatoccur to the flesh or the bone; for the brain about the bregmain largest quantity, and is covered by the thinnest bone and theflesh. Of the other portions, the weakest is that about the; for it is the conjunction of the lower jaw with the cranium,there is motion there up and down as at a joint; and the organhearing is near it; and further, a hollow and important vein runsthe temple. But the whole bone of the head behind the vertexthe ear is stronger than the whole anterior part, and the bonehas a larger and deeper covering of flesh upon it. And hencefollows, that when exposed to the same or even greater injuriesinstruments of the same or greater size, the bone is less liablebe fractured and depressed than elsewhere; and that in a fatalthe patient will live longer when the wound is in the posteriorof the head than when elsewhere; and that pus takes longer timeform and penetrate through the bone to the brain, owing to theof the bone; and moreover, as there is less brain in thatof the head, more persons who are

wounded in the back part ofhead escape than of those who wounded in the anterior part. Andfatal cases, a man will survive longer in winter than in summer,be the part of the head in which the wound is situated.————————————————————————————————————-3to the haedrae (dints or marks?) of sharp and light weapons, whentake place in the bone without fissure, contusion, or depression(and these take place equally in the anterior and posteriorof the head), death, when it does occur, does not properly resultthem. A suture appearing in a wound, when the bone is laid bare,whatever part of the head the wound may have been inflicted, isweakest point of the head to resist a blow or a weapon, when thehappens to be impinged into the suture itself; but more especiallythis occurs in the bregma at the weakest part of the head, andsutures happen to be situated near the wound, and the weapon hasthe sutures themselves. ——————————————————————————————————-4bone in the head is liable to in the following modes, and theremany varieties in each of these modes of fracture: When a woundedbreaks, in the bone comprehending the fissure, contusion necessarilyplace where the bone is broken; for an instrument that breaksbone occasions a contusion thereof more or less, both at the fracturein the parts of the bone surrounding the fracture. This is themode. But there are all possible varieties of fissures; forof them are fine, and so very fine that they cannot be discovered,immediately after the injury, or during the period in whichwould be of use to the patient if this could be ascertained. Andof these fissures are thicker and wider, certain of them beingwide. And some of them extend to a greater, and some to a smaller,. And some are more straight, nay, completely straight; andare more curved, and that in a remarkable degree. And some are, so as to extend downwards and through the whole bone; and someless so, and do not penetrate through the whole bone.——————————————————————————————-5a bone may be contused, and yet remain in its natural conditionany fracture in it; this is the second mode. And there arevarieties of contusion; for they occur to a greater or less degree,to a greater depth, so as sometimes to extend through the whole; or to a less depth, so as not to extend through the whole bone;to a greater and smaller length and breadth. But it is not possiblerecognize any of these varieties by the sight, so as to determineform and extent; neither, indeed, is it visible to the eyesany mischief of this kind takes place, and immediately afterinjury, whether or not the bone has been actually bruised, aslikewise the case with certain fractures at a distance from theof injury. ——————————————————————————————————-6the bone being fractured, is sometimes depressed inwards fromnatural level along with the fractures, otherwise there wouldno depression; for the depressed portion being fractured and broken, is pushed inwards, while the rest of the bone remains in itsposition; and in this manner a fracture is combined with the. This is the third mode. There are many varieties of depression,it may comprehend a greater and a small extent of bone, and maybe to a greater depth, or less so, and more superficial.————————————————————————————-7a hedra, or dint of a weapon, takes place in a bone, there maya fracture combined with it; and provided there be a fracture,must necessarily be joined, to a greater or less extent,the seat of the dint and fracture, and in the bone which comprehends. This is the fourth mode. And there may be a hedra, or indentationthe bone, along with contusion of the surrounding bone, but withoutfracture either in the hedra or in the contusion inflicted byweapon. But the indentation of a weapon

takes place in a bone,is called hedra, when the bone remaining in its natural state,weapon which struck against the bone leaves its impression onpart which it struck. In each of these modes there are many varieties,regard to the contusion and fracture, if both these be combinedthe hedra, or if contusion alone, as it has been already statedthere are many varieties of contusion and fracture. And the hedra,dint, of itself may be longer and shorter, crooked, straight, and; and there are many varieties of this mode, according toshape of the weapon; and they may be more or less deep, and narrowerbroader, and extremely broad. When a part is cleft, the cleft orwhich occurs in the bone, to whatever length or breadth, ishedra, if the other bones comprehending the cleft remain in theirposition, and be not driven inwards; for in this case it woulda depression, and no longer a hedra. ————————————————————————————————————————-8bone may be injured in a different part of the head from that onthe person has received the wound, and the bone has been laid. This is the fifth mode. And for this misfortune, when it occurs,is no remedy; for when this mischief takes place, there is noof ascertaining by any examination whether or not it has occurred,on what part of the head. ————————————————————————————————————————-9these modes of fracture, the following require trepanning: the, whether the bone be laid bare or not; and the fissure,apparent or not. And if, when an indentation (hedra) by atakes place in a bone it be attended with fracture and contusion,even if contusion alone, without fracture, be combined with the, it requires trepanning. A bone depressed from positionrequires trepanning; and those which are most pressed and brokentrepanning the least; neither does an indentation (hedra)fracture and contusion require trepanning; nor does a notch,it is large and wide; for a notch and a hedra are the same.————————————————————————————————————————-10the first place, one must examine the wounded person, in what partthe head the wound is situated, whether in the stronger or weaker; and ascertain respecting the hairs about the wound, whetherhave been cut off by the instrument, and have gone into the wound;if so, one should declare that the bone runs the risk of beingof flesh, and of having sustained some injury from the weapon.things one should say from a distant inspection, and beforea hand on the man; but on a close examination one should endeavorascertain clearly whether the bone be denuded of flesh or not;if the denuded bone be visible to the eyes, this will be enough;otherwise an otherwise an examination must be made with the sound.if you find the bone denuded of the flesh, and not safe from the, you must first ascertain the state of the bone, and the extentthe mischief, and of what assistance it stands in need. One shouldinquire of the wounded person how and in what way he sustainedinjury; and if it be not apparent whether the bone has sustainedinjury or not, it will be still more necessary, provided the bonedenuded, to make inquiry how the wound occurred, and in what manner;when contusions and fractures exist in the bone, but are not apparent,must ascertain, in the first place from the patient's answers,or not the bone has sustained any such injuries, and thenout the nature of the case by word and deed, with the exceptionsounding. For sounding does not discover to us whether the bonesustained any of these injuries or not; but sounding discoversus an indentation inflicted by a weapon, and whether a bone befrom its natural position, and whether the bone be strongly; all which may also be ascertained visibly with the eyes.————————————————————————————————————————-11a bone sustains fractures, either so fine as to escape the sight,such as are apparent, and contusions

which are not apparent, andfrom its natural position, especially when one person iswounded by another, or when, whether intentionally or, a blow or stroke is received from an elevated place, and if thein the hand, whether used in throwing or striking, be ofpowerful nature, and if a stronger person wound a weaker. Of thoseare wounded in the parts about the bone, or in the bone itself,a fall, he who falls from a very high place upon a very hard andobject is in most danger of sustaining a fracture and contusionthe bone, and of having it depressed from its natural position;he that falls upon more level ground, and upon a softer object,likely to suffer less injury in the bone, or it may not be injuredall. Of those instruments which, falling upon the head, wound theabout the bone, or the bone itself, that which falls from ahigh place, and the least on a level with the person struck,which is at the same time very hard, very blunt, and very heavy,which is the least light, sharp, and soft, such an instrumentoccasion a fracture and contusion of the bone. And there isdanger that the bone may sustain these injuries, under such circumstances,the wound is direct and perpendicular to the bone, whether struckthe hand or from a throw, or when any object falls upon the person,when he is wounded by falling, or in whatever way the bone sustainsdirect wound from this instrument. Those weapons which graze theobliquely are less apt to fracture, contuse, or depress the bone,when the bone is denuded of flesh; for in some of those woundsinflicted the bone is not laid bare of the flesh. Those instrumentsespecially produce fractures in the bone, whether apparent or, and contusions, and inward depression of the bone, which are, globular, smooth on all sides, blunt, heavy, and hard; andweapons bruise, compress, and pound the flesh; and the woundsby such instruments, whether obliquely or circularly, are, and are more disposed to suppurate, and to have a discharge,take longer time to become clean; for the flesh which has beenand pounded must necessarily suppurate and slough away. Butof an oblong form, being, for the most part, slender, sharp,light, penetrate the flesh rather than bruise it, and the bonelike manner; and such an instrument may occasion a hedra and a(for a hedra and a cut are same thing); but weapons of this descriptionnot produce contusions, nor fractures, nor depressions inwardly.in addition the appearances in the bone, which you call detectthe sight, you should make inquiry as to all these particulars(for they are symptoms of a greater or less injury), whether the woundedwas stunned, and whether darkness was diffused over his eyes,whether he had vertigo, and fell to the ground. ———————————————————————————————————-12the bone happens to be denuded of flesh by the weapon, and whenwound occurs upon the sutures, it is difficult to distinguishindentation (hedra) of a weapon which is clearly recognized inparts of the bone, whether it exist or not, and especially ifhedra be seated in the sutures themselves. For the suture beingthan the rest of the bone occasions confusion, and it is notwhich is the suture, and which the mark inflicted by the instrument,the latter (hedra) be large. Fracture also for the most partcombined with the indentation when it occurs in the sutures; andfracture is more difficult to discern when the bone is broken,this account, that if there be a fracture, it is situated for thepart in the suture. For the bone is liable to be broken and slackened, owing to the natural weakness of the bone there, and to its, and from the suture being readily ruptured and slackened:the other bones which surround the suture remain unbroken, becauseare stronger than the suture. For the fracture which occurs atsuture is also a slackening of the suture, and it is not easydetect whether the bone be broken and slackened by the indentationa weapon occurring in the suture, or from a contusion of the

bonethe sutures; but it is still more difficult to detect a fracturewith contusion. For the sutures, having the appearance of, elude the discernment and sight of the physician, as beingthan the rest of the bone, unless the bone be strongly cutslackened (for a cut and a hedra are the same thing). But it is, if the wound has occurred at the sutures, and the weaponimpinged on the bone or the parts about it, to pay attention andout what injury the bone has sustained. For a person woundedthe same, or a much smaller, extent, and by weapons of the sameand quality, and even much less, will sustain a much greater, provided he has received the blow at the sutures, than ifwas elsewhere. And many of these require trepanning, but you mustapply the trepan to the sutures themselves, but on the adjoining.

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13with regard to the cure of wounds in the head, and the mode ofinjuries in the bone which are not apparent, the followingmy opinion:- In a wound of the head, you must not apply anything, not even wine, but as little as possible, nor a cataplasm,conduct the treatment with tents, nor apply a bandage to an ulcerthe head, unless it be situated on the forehead, in the part whichbare of hairs, or about the eyebrow and eye, for wounds occurringrequire cataplasms and bandages more than upon any other partthe head. For the rest of the head surrounds the whole forehead,the wounds wherever situated become inflamed and swelled, owingan influx of blood from surrounding parts. And neither must youcataplasms and bandages to the forehead at all times; but wheninflammation is stopped and the swelling has subsided, you mustup the cataplasms and bandages. A wound in any other part ofhead must not be treated with tents, bandages, or cataplasms,it also requires incision. You must perform incision on woundson the head and forehead, whenever the bone is denuded of, and appears to have sustained some injury from the blow, butwound has not sufficient length and breadth for the inspectionthe bone, so that it may be seen whether it has received any mischiefthe blow, and of what nature the injury is, and to what extentflesh has been contused, and whether the bone has sustained any, or whether it be uninjured by the blow, and has suffered no; and with regard to the treatment, what the wound, and the, and the injury of the bone stand in need of. Ulcers of thisstand in need of incision; and, if the bone be denudedthe flesh, and if it be hollow, and extend far obliquely, we cutthe cavity wherever the medicine cannot penetrate readily, whateverit may be; and wounds which are more inclined to be circularhollow, and for the most part others of the like shape, are cutby making double incision in the circle lengthways,, accordingthe figure of the man, so as to make the wound of a long form.may be practiced with impunity on other parts of the head,the exception of the temple and the parts above it, where therea vein that runs across the temple, in which region an incisionnot to be made. For convulsions seize on a person who has beentreated; and if the incision be on the left temple, the convulsionson the right side; and if the incision be on the right side,convulsions take place on the left side. ——————————————————————————————————-14, then, you lay open a wound in the head on account of the bonesbeen denuded of the flesh, as wishing to ascertain whethernot the bone has received an injury from the blow, you must makeincision proportionate to the size of the wound, and as much asbe judged necessary. And in making the incision you must separateflesh from the bone where it is united to the membrane (pericranium?)to the bone, and then fill the whole wound with a tent, whichexpand the wound very wide next day with as little pain as possible;along with the tents apply a cataplasm, consisting of a

mass (maza)fine flour pounded in vinegar, or boiled so as to render it asas possible. On the next day, when you remove the tent,examined the bone to see what injury it has sustained, if thein the bone be not right seen by you, nor can you discover whatthe bone itself has sustained, but the instrument seems topenetrated to the bone so as to have injured it, you must scrapebone with a raspatory to a depth and length proportionate to theof the patient, and again in a transverse direction, for theof the fractures which are not seen, and of the contusions whichnot discovered, as not being accompanied with depression of thefrom its natural position. For the scraping discovers the mischief,the injuries in the bone be not otherwise manifest. And if youan indentation (hedra) left in the bone by the blow, youscrape the dint itself and the surrounding bones, lest, as often, there should be a fracture and contusion, or a contusion, combined with the dint, and escape observation. And when youthe bone with the raspatory, and it appears that the woundthe bone requires the operation, you must not postpone it for three, but do it during this period, more especially if the weatherhot, and you have had the management of the treatment from commencement.you suspect that the bone is broken or contused, or has sustainedthese injuries, having formed your judgement from the severitythe wound, and from the information of the patient, as that thewho inflicted the wound, provided it was done by another person,remarkably strong, and that the weapon by which he was woundedof a dangerous description, and then that the man had been seizedvertigo, dimness of vision, and stupor, and fell to the ground,-these circumstances, if you cannot discover whether the bonebroken, contused, or both the one and the other, nor can see theof the matter, you must dissolve the jet-black ointment, andthe wound with it when this dissolved, and apply a linen ragwith oil, and then a cataplasm of the maza with a bandage;on the next day, having cleaned out the wound, scrape the bonethe raspatory. And if the bone is not sound, but fractured and, the rest of it which is scraped will be white; but the fracturecontusion, having imbibed the preparation, will appear black,the rest of the bone is white. And you must again scrape morethe fracture where it appears black; and, if you thus removefissure, and cause it to disappear, you may conclude that therebeen a contusion of the bone to a greater or less extent, whichoccasioned the fracture that has disappeared under the raspatory;it is less dangerous, and a matter of less consequence, when thehas been effaced. But if the fracture extend deep, and doseem likely to disappear when scraped, such an accident requires. But having performed this operation, you must apply thetreatment to the wound. ———————————————————————————————————————-15must be upon your guard lest the bone sustain any injury fromfleshy parts if not properly treated. When the bone has been sawedotherwise denuded, whether it be actually sound, or only appearsbe so, but has sustained some injury from the blow, there may beof its suppurating (although it would not otherwise have done), if the flesh which surrounds the bone be ill cured, and becomeand strangled; for it gets into a febrile state, and becomesinflamed. For the bone acquires heat and inflammation from theflesh, along with irritation and throbbing, and the otherwhich are in the flesh itself, and from these it gets intostate of suppuration. It is a bad thing for the flesh (granulations?)an ulcer to be moist and mouldy, and to require a long time toclean. But the wound should be made to suppurate as quicklypossible; for, thus the parts surrounding the wound would be thedisposed to inflammation, and would become the soonest clean;the flesh which has been chopped and bruised by the blow, mustsuppurate and slough away. But when

cleaned the woundbe dried, for thus the wound will most speedily become whole,flesh devoid of humors grows up, and thus there will be no fungousin the sore. The same thing applies to the membrane which surroundsbrain: for when, by sawing the bone, and removing it from the, you lay the latter bare, you must make it clean and dry asas possible, lest being in a moist state for a considerable, it become soaked therewith and swelled; for when these things, there is danger of its mortifying. ————————————————————————————————————-16piece of bone that must separate from the rest of the bone, in consequencea wound in the head, either from the indentation (hedra) of a blowthe bone, or from the bone being otherwise denuded for a long time,mostly by becoming exsanguous. For the bone becomes driedand loses its blood by time and a multiplicity of medicines whichused; and the separation will take place most quickly, if onecleaned the wound as quickly as possible will next dry it,the piece of bone, whether larger or smaller. For a piece of boneis quickly dried and converted, as it were, into a shell, isreadily separated from the rest of the bone which retains itsand vitality; for, the part having become exsanguous and dry,readily drops off from that which retains its blood and is alive.————————————————————————————————————————-17pieces of bone as are depressed from their natural position,being broken off or chopped off to a considerable extent, arewith less danger, provided the membrane he safe; and bonesare broken by numerous and broader fractures are still lessand more easily extracted. And you must not trepan any of, nor run any risks in attempting to extract the pieces of bone,they rise up of their own accord, upon the subsidence of the. They rise up when the flesh (granulations) grows below,it grows from the diploe of the bone, and from the sound portion,the upper table alone be in a state of necrosis. And thewill shoot up and grow below the more quickly, and the piecesbone ascend, if one will get the wound to suppurate and make itas quickly as possible. And when both the tables of the bonedriven in upon the membrane, I mean the upper and lower, the wound,treated in the same way, will very soon get well, and the depressedwill quickly rise up. ————————————————————————————————————————-18bones of children are thinner and softer, for this reason, thatcontain more blood [than those of adults]; and they are porousspongy, and neither dense nor hard. And when wounded to a similarinferior degree by weapons of the same or even of an inferior power,bone of a young person more readily and quickly suppurates, andin less time than the bone of an older person; and in accidents,are to prove fatal, the younger person will die sooner thanelder. But if the bone is laid bare of flesh, one must attendtry to find out, what even is not obvious to the sight, and discoverthe bone be broken and contused, or only contused; and if,there is an indentation in the bone, whether contusion, or fracture,both be joined to it; and if the bone has sustained any of these, we must give issue to the blood by perforating the bonea small trepan, observing the greatest precautions, for the boneyoung persons is thinner and more superficial than that of elder. ————————————————————————————————————-19a person has sustained a mortal wound on the head, which cannotcured, nor his life preserved, you may form an opinion of his approaching, and foretell what is to happen from the following symptomssuch a person experiences. When a bone is broken, or cleft,contused, or otherwise injured, and when by mistake it has notdiscovered, and neither the raspatory nor trepan has been appliedrequired, but the case has been neglected as if the bone were sound,will generally

come on if in winter, and in summer the feverseizes after seven days. And when this happens, the woundits color, and the inflammation dies in it; and it becomes glutinous,appears like a pickle, being of a tawny and somewhat livid color;the bone then begins to sphacelate, and turns black where it wasbefore, and at last becomes pale and blanched. But when suppurationfairly established in it, small blisters form on the tongue anddies delirious. And, for the most part, convulsions seize the otherof the body; for, if the wound be situated on the left side,convulsions will seize the right side of the body; or if the woundon the right side of the head, the convulsion attacks the leftof the body. And some become apoplectic. And thus they die beforeend of seven days, if in summer; and before fourteen, if in winter.these symptoms indicate, in the same manner, whether the woundolder or more recent. But if you perceive that fever is coming, and that any of these symptoms accompany it, you must not put, but having sawed the bone to the membrane (meninx), or scrapedwith a raspatory (and it is then easily sawed or scraped), youapply the other treatment as may seem proper, attention beingto circumstances. ————————————————————————————————————-20in any wound of the head, whether the man has been trepannednot, but the bone has been laid bare, a red and erysipelatous swellingin the face, and in both eyes, or in either of them, andthe swelling be painful to the touch, and if fever and rigor come, and if the wound look well, whether as regards the flesh or the, and if the parts surrounding the wound be well, except the swellingthe face, and if the swelling be not connected with any error inregimen, you must purge the bowels in such a case with a medicinewill evacuate bile; and when thus purged the fever goes off,swelling subsides, and the patient gets well. In giving the medicinemust pay attention to the strength of the patient. ————————————————————————————————————-21regard to trepanning, when there is a necessity for it, the followingshould be known. If you have had the management of thefrom the first, you must not at once saw the bone down to the; for it is not proper that the membrane should be laid bareexposed to injuries for a length of time,as in the end it mayit may become fungous. And and there is another danger if youthe bone down to the meninx and remove it at once, lest in theof sawing you should wound the meninx. But in trepanning, whena very little of the bone remains to be sawed through, and thecan be moved, you must desist from sawing, and leave the bonefall out of itself. For to a bone not sawed through, and whereportion is left of the sawing, no mischief can happen; for the portionleft is sufficiently thin. In other respects you must conducttreatment as may appear suitable to the wound. And in trepanningmust frequently remove the trepan, on account of the heat in the, and plunge it in cold water. For the trepan being heated byround, and heating and drying the bone, burns it and makeslarger piece of bone around the sawing to drop off, than would otherwise. And if you wish to saw at once down to the membrane, and thenthe bone, you must also, in like manner, frequently take outtrepan and dip it in cold water. But if you have not charge oftreatment from the first, but undertake it from another aftertime, you must saw the bone at once down to the meninx with a serrated, and in doing so must frequently take out the trepan and examinea sound (specillum), and otherwise along the tract of the instrument.the bone is much sooner sawn through, provided there be matterit and in it, and it often happens that the bone is more superficial,if the wound is situated in that part of the head wherebone is rather thinner than in other parts. But you must takewhere you apply the trepan, and see that you do so only whereappears to be

particularly thick, and having fixed the instrument, that you frequently make examinations and endeavor by movingbone to bring it up. Having removed it, you must apply the otherremedies to the wound. And if, when you have the managementthe treatment from the first, you wish to saw through the boneonce, and remove it from the membrane, you must, in like manner,the tract of the instrument frequently with the sound, andthat it is fixed on the thickest part of the bone, and endeavorremove the bone by moving it about. But if you use a perforator(trepan?), you must not penetrate to the membrane, if you operatea case which you have had the charge of from the first, but musta thin scale of bone, as described in the process of sawing.END