THE EDWIN SMITH PAPYRUS

Updated Translation of the Trauma Treatise and Modern Medical Commentaries

Gonzalo M. Sanchez & Edmund S. Meltzer

LOCKWOOD PRESS

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Edwin Smith. By Francesco Anelli, 1847.
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Foreword

Since the dawn of history, medical care has been a blend of magic and science. It is the curse of human nature that drives us to act according to our beliefs and disregard facts that fail to fit them. Much has been made of the role of magic in ancient Egyptian medicine, and its role was, indeed, very important. Were it not for the Edwin Smith papyrus, we might well believe that magic was the essence, if not the whole, of the ancient profession, and relied on exploiting the patient's belief in hope of generating a powerful placebo affect. That probably happened, but this amazing document shows that those physicians, called *swnw*, also practiced valid evidence-based medicine four millennia ago!

I look to a book's Foreword to tell me why I should read it. In this instance, it is widely recognized that James Henry Breasted produced a masterpiece in his translation of the Edwin Smith papyrus. But that was in 1930. The practice of medicine and our understanding of many conditions have taken massive leaps forward. Simultaneously, there has been steady progress by philologists in clarifying the ancient language. The production of the monumental *Grundriss der Medizin der alten Ägypter* (9 vols.; Hermann Grapow, Wolfart Westendorf, and Hildegard von Deines; Berlin: Akademie, 1954–1973) has provided an invaluable resource in subsequent studies.

We are fortunate to have the expertise of an outstanding neurosurgeon, Gonzalo Sanchez, combined with that of a dedicated and well-recognized scholar of the ancient text, Dr. Edmund Meltzer, to update our knowledge of this document. Their comprehensive new translation advances our understanding of ancient medical practice and further clarifies it as a thoroughly rational approach to assessing and managing the conditions presented.

The papyrus is primarily an ancient text book regarding trauma. In current parlance, most of these cases are neurosurgical problems, while the bulk of the remainder consists of orthopedic problems or simple trauma. The analysis of many of these complex skull injuries is relatively simple and straightforward for a skilled practicing neurosurgeon such as Gonzalo Sanchez. However, that analysis would require considerable research for me and my colleagues in other specialties, and be a truly imposing, nearly impossible challenge for those without medical training. Dr. Sanchez shows us the subtle distinctions between these injuries and how the ancient *swnw* similarly distinguished them to manage each in a rational manner. This could only have evolved from the *swnw* carefully and systematically observing a number of cases. No doubt trial and error informed them in their judgments of what to treat and how to treat it.

The cases that today would go to the hands of an orthopedic surgeon are more easily understood. The need to realign and stabilize broken bones to reduce pain and promote healing is obvious, as is the desirability of replacing dislocations. It is worthy of note that the *swnw* discerned important elements of these procedures that mirror those in use today. Furthermore, the limited pharmacopeia they utilized also reflects careful consideration of both benefit and avoidance of harm.

The inclusion of a Visual Index for the illustrations is a nice innovation. The illustrations are clear, well-labeled and to the point for each case. Figures also clarify some of the cases. This is especially important for the nonmedical reader.

As the text develops, a clear exposition of the thought processes leading to the identifications is clarified via voluminous footnotes. The footnotes also permit us to follow the authors' joint consideration of the work of other scholars in relation to their own and to present alternative interpretations. For the serious reader this is a refreshing approach lacking in many texts. As such, the work becomes accessible to the general public interested in all aspects of Egyptology rather than exiling it to the arena of arcane work for specialists.

The authors' collaboration has provided us important clarification of several terms that had been interpreted by Breasted in a manner that did not make good sense in the medical scenario. For example, in Case #6

Breasted interpreted the word *ryt* to mean "pus," but the new interpretation to mean "discharge" is more rational. Several other important words, such as *wbnw*, *mtw*, and *dgmy*, are now assessed in relation to their determinatives in the text to correlate with the different wounds, vessels/tendons, and particularly the subtle degrees of alteration of level of consciousness such as torpor, stupor, and coma.

In Case # 41 Breasted identified *bnf* as dung. If that were correct it would be the only instance in the text where a counterproductive and actually harmful medication was prescribed. The authors' new interpretation as "ox bile" brings the ancient pharmacopeia back to the realm of the rational as a strong case can be made for bile having therapeutic value.

Today we take scientific medicine for granted, but it took thousands of years before any significant advances were made from what the *swnw* practiced. We did not understand the human circulatory system any better than they did until the work of William Harvey in the seventeenth century. Yet the *swnw* did recognize a relationship between the heart and the pulse as seen in Case #1. They further recognized that the intact fused human skull of an adult prevents detection of the pulsation of the brain as can be found in the open fontanels of a baby or a disastrous injury exposing the brain as in Case #6.

The attention to detail of examination for each case permitted them to discern subtle differences to classify them. These distinctions then permitted them to make astute predictions for the outcome of each case. In fact it was not until well into the twentieth century that we have been able to improve on the treatments they recommended for the neurosurgical injuries cited and thus provide somewhat better prognoses.

We can only guess at the processes by which the ancient physicians reached their conclusions about the appropriate therapies for the forty-eight conditions discussed in this text. Some treatments, such as suturing a laceration, appear so obvious that anyone would accept them. Others, such as the skull injuries, would have required very careful observation to discern subtle differences. Perhaps most important is their avoidance of treatments that might aggravate the problem more than they would assist it. The latter are often found in magic-based therapies as in the Ebers Papyrus and others.

The medical profession did not understand the nature of the infection process until the mid-nineteenth century and even then could do nothing but provide little more than cleanliness and drainage until the dawn of the antibiotic era in the mid-twentieth century. Clearly the *swnw* knew as much and understood the need for cleanliness and the desirability to leave some wounds open or to provide a wick for drainage as in Cases #28 and #39. Furthermore, their limited pharmacopeia did serve to reduce risk or ameliorate infection. Even when the *swnw* following these instructions had little or nothing to offer, they still avoided doing harm. A nice example of this restraint is the demonstration of masterful non-intervention as seen in the patient with neurofibromatosis (Case #45).

The *swnw* who followed this text were often using what are best practices today. A good example is the reduction of a dislocated jaw. The concept is deceptively simple: just push the jaw down and back. But, the unaware therapist who puts his thumb on the back lower molars may be rewarded by a serious bite of the thumb as the jaw snaps shut in place! The directions for this case clearly indicate the operator must place his thumbs past the molars, thus avoiding this hazard.

The initial translation of this work by Henry Breasted from 1920–1930 was an enormous undertaking that transformed our thinking about the ancient practice of medicine. His work in converting the hieratic script to hieroglyphs and then laboriously translating the text is a monument to his scholarship and tenacity. In the intervening years great changes have occurred in the practice of medicine as well as in interpretation and understanding of the ancient Egyptian language.

Every subsequent consideration of this document has been based on Breasted's hieroglyphic translation. However, the authors of this new assessment have accepted the formidable challenge of returning to the original hieratic script. In the process they show us indications of subtle alterations in the scribe's work, suggesting fatigue, or the need for breaks to acquire a new pen, or haste, prompting the use of abbreviations or the intro-

duction of an error that required subsequent revision. This new translation and commentary move our understanding forward to a significant degree.

Evidence-based medicine has become the mantra for medical care at the dawn of the twenty-first century. As the term implies, good medical care should be based on solid evidence. It is a sad fact that many of the practices of modern medicine are more hallowed by time and tradition than by factual data. For an example in my own specialty of gynecology, countless women suffered through uncomfortable Pap smear examinations because every text book stated that lubrication should not be used. When actually studied, it was found that the use of a lubricant had no adverse effect at all on the accuracy of the test. Following unverified advice has been part of medicine throughout history.

Were it not for the Edwin Smith papyrus, we would have a totally distorted view of ancient Egyptian medicine. We might consider them superstitious and naively incompetent, but the Edwin Smith papyrus shows us that the patients treated by the standards of this document received care that was as good or better than any place in the world prior to the last 150 years. The volume in hand enhances our appreciation of the sophistication of these ancient physicians in their evaluation and management of this remarkable variety of cases. We can be grateful that Edmund Meltzer and Gonzalo Sanchez were willing to tackle the extraordinary challenge of going back to the original hieratic text and doggedly following through to produce this splendid new addition to our corpus of texts on ancient Egyptian medicine.

W. Benson Harer, Jr., MD, FACOG

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We tender our most grateful thanks to all of the above colleagues and institutions. All opinions that we express in this work, and any remaining errors, are our own.

Note on Transliteration

The authors have adopted the following conventions for transliteration:

The single reedleaf is represented by *i*, the double reedleaf by *y*. The ending *y* is used on nisbe adjectives and the relative word *nty*.

The preposition "to, for," the genitival adjective in its simple form, and the negative arms as a particle are all transliterated *n*. Where written out, the feminine genitive word is transliterated *nt* and the masculine plural *nw*. It was decided that it would be too cumbersome to transliterate repeatedly *n*(*y*), *n*(*y*)*t*, *n*(*y*)*w* for the inflected forms of the genitive word. As far as the negative arms are concerned, we decided that they should be rendered by a simple *n*, not *nj* or *ni*, especially in view of the use of the negative arms as a variant of the waterline *n* in hieratic of this period, including this document.

A dot is used to separate the formative (if any) and suffix-pronoun subject of a verbal complex (e.g., *sḏm.ḫr.f*) or mutatis mutandis the heavier endings of the Stative (*rḫ.kwi*, *ꜥnḫ.ti*), *sḏmty.fy* forms, etc. It is not used to separate feminine and plural endings (e.g., *ḏrt*, *ḏbꜥw*) or the initial augment or prefix added to a verbal stem (*išwy*, *sḫpr*).

A hyphen is used to separate elements of a compound word or name, for example, *ḥr-ib.f*, *mn-ḫpr-rꜥ*.

Angular brackets are used only to contain elements that are omitted in error by the scribe, not optional ones; thus *sḏm.<i>n.f, <m> bit*.

Curly brackets are used to contain elements that are added or included in error by the scribe, such as *gm.n.{n.} f.*

Square brackets are used only for restorations; e.g., *iwf* [*wꜣḏ*].

Parentheses are used sparingly to enclose optional elements that are not written in the Egyptian text. On the whole they have been avoided in the running transliteration, so as more closely to reflect the text, but used more freely in the notes.

Note on Column and Line Numbering

The present work employs the same numbering of the columns of the papyrus as Breasted and Allen. These scholars follow the same numbers as regards the Recto, but Breasted numbers the Verso consecutively with the Recto while Allen begins again with "Verso, Column 1" etc. We do not translate the Verso but in one regard we follow Breasted's practice more closely, as he used Roman numerals for the columns while Allen uses Arabic numerals. Breasted and Allen refer to the column that originally preceded what we now designate as Column I; this "lost column" (Breasted, *Edwin Smith*, 2:xi–xii) contained the title of the work and the very beginning of Case 1 (ibid.; cf. Allen *AM*, 70). Like Breasted, we use Arabic numerals for the lines.

When we received Smith's original handwritten manuscript, we found that he uses both Roman and Arabic numerals in the margin. His Roman numerals do not correspond to the columns but are his own numbering of the 48 cases and show how accurately he understood these subdivisions. His Arabic numerals are of the format "1.18" etc. It appears that the first number labels the column, and the number after the point designates the line. The lines are not numbered individually. Smith begins with "0.18" followed fairly closely by "1.1"; it is clear that "0" corresponds to the "lost column" mentioned above. There is, however, a discrepancy, because Smith concludes in his column "21" while there are twenty-two columns and Smith himself states that the Verso comprises five columns ("pages").

Abbreviations

Allen, *AM*	Allen, James P., *The Art of Medicine in Ancient Egypt*. New York: The Metropolitan Museum of Art; New Haven: Yale University Press, 2005
Allen, *ME*	Allen, James P., *Middle Egyptian: An Introduction to the Language and Culture of Hieroglyphs*. 2nd rev. edition. Cambridge: Cambridge University Press, 2010
Breasted, *Edwin Smith*	Breasted, James Henry, *The Edwin Smith Surgical Papyrus*. 2 vols. The University of Chicago. Oriental Institute Publications. Chicago: University of Chicago, 1930
Edel, *AG*	Edel, Elmar, *Altägyptische Grammatik*. 2 vols. Analecta Orientalia 34/39. Rome: Pontifico Istituto Biblico, 1955/1964
ESM	Edmund S. Meltzer
Faulkner, *CDME*	Faulkner, R. O., *A Concise Dictionary of Middle Egyptian*. Oxford: Griffith Institute Asmolean Museum, 1962. Repr. Frome and London: Butler & Tanner, 1996.
Gardiner, *EG*^{3}	Gardiner, Alan H., *Egyptian Grammar*. 3rd ed. Oxford: Oxford University Press/ Griffith Institute, 1957
GEC	Lefebvre, Gustave, *Grammaire de l'égyptien classique*. 2nd ed. Le Caire: Institut français d'archéologie orientale, 1955
GMS	Gonzalo M. Sanchez
Grundriss	Grapow, Hermann, Wolfart Westendorf, and Hildegard von Deines, *Grundriss der Medizin der alten Ägypter.* 9 vols. Berlin: Akademie, 1954–1973
Grundriss 4/1	von Deines, Hildegard, Hermann Grapow, and Wolfhart Westendorf, *Übersetzung der medizinischen Texte*. Vol. 4/1 of *Grundriss der Medizin der alten Ägypter*. Berlin: Akademie, 1958
Grundriss 5	Grapow, Hermann, *Die Medizinischen Texte in hieroglyphischer Umschreibung Autographiert*. Vol. 5 of *Grundriss der Medizin der Alten Ägypter*. Berlin: Akademie, 1958
Grundriss 6	von Deines, Hildegard, and Hermann Grapow, *Wörterbuch der ägyptischen Drogennamen*. Berlin: Akademie, 1959
Grundriss 7	von Deines, Hildegard, and Wolfhart Westendorf, *Wörterbuch der Medizinischen Texte*. Vol. 7 of *Grundriss der Medizin der alten Ägypter*. 2 vols. Berlin: Akademie, 1961–62
Grundriss 8	Westendorf, Wolfhart, *Grammatik der medizinischen Texte*. Vol. 8 of *Grundriss der Medizin der alten Ägypter*. Berlin: Akademie, 1962
Hoch, *MEG*	Hoch, J. E., *Middle Egyptian Grammar*. SSEA Publications 15. Mississauga, Ontario: Benben, 1996
Urk.	Steindorff, Georg, ed., with Kurt Sethe and Heinrich Schäfer, *Urkunden des ägyptischen Altertums*. 8 vols. Leipzig: Hinrichs, 1904–
Wb.	Erman, Adolf, and Hermann Grapow, *Wörterbuch der ägyptischen Sprache*. 5 vols. Leipzig: Hinrichs, 1926–1931

Appendix 1
Open and Closed Injuries in the Edwin Smith Papyrus

Open injuries:		
Lacerations	Case #1	Scalp
	Case #18	Temporal Area
	Case #24	Mandible
	Case #37a	Humeral Fracture
	Case #44	Rib Fractures
Perforating wounds	Case #3	Skull
	Case #15	Maxilla-Zygoma
	Case #19	Temporal Area
	Case #36	Lip
	Case #28	Anterior Neck
	Case #29	Posterior Neck
	Case #40	Chest, Sternum
Cutting wounds with clear margins ("lips")	Case #2	Scalp
	Case #10	Frontal Area
	Case #14	Nose
	Case #23	Ear
	Case #27	Chin
	Case #41	Chest
	Case #47b	Chest Wall
Cutting wounds with "a mouth" (variant of above)	Case #9	Frontal Area
	Case #20	Temporal Area
Extensive open wounds	Case #4	Braincase
	Case #5	Braincase
	Case #6	Braincase
	Case #7	Frontal Bone and Sinus
	Case #37b	Humeral Piercing
Fracture	Case #47	Chest Wall
Secondary opening due to infection	Case #39	Chest Wall
	Case #41	Chest Wall
	Case #46	Chest Wall

Closed injuries:		
Braincase without and with bone fragmentation	Cases #8a&b	
Braincase	Case #21	Temporal Area
Braincase	Case #22	Temporal Area
Craniofacial injuries with brain damage	Case #13	Nasal Area
	Case #17	Temporal Area
Maxilla-Zygoma	Case #16	
Nasal injuries	Cases #11, #12	
Mandibular dislocation	Case #25	
Cervical sprain/Disc injury	Case #30	
Cervical dislocation	Case #31	
Cervical compression fracture	Case #32	
Cervical burst fracture	Case #33	
Clavicular dislocation	Case #34	
Clavicular fracture	Case #35	
Humeral fracture	Case #38	
Traumatic Costochondritis	Case #39	
Lumbar sprain/Disc injury	Case #48	

Appendix 2
Neurological Symptoms and Signs in the Edwin Smith Papyrus

Case	Type of Injury	Symptoms and Signs	Comments on Neurologically Related Findings
3	*thm* Open	Meningismus	Neck stiffness from subarachnoid hemorrhage in Explanations B and C. Sign of severe head injury.
4	*pšn* Open fracture Elevated	Meningismus Skull base fracture	Bleeding from the nose and the ears are symptoms of base of skull fractures. Signs of severe head injury.
5	*sd* Open fracture Depressed	Meningismus Skull base fracture	Signs of severe head injury. Description of depressed skull fragments on exam.
6	*sd* Open fracture Depressed, dura laceration	Exposed brain Cerebrospinal fluid leaking	Description of torn meningeal covering (Dura). Description of appearance of the brain surface and its pulsating motion. Description of cerebrospinal fluid leaking
7	*thm* Frontal cutting wound with compound skull fracture penetrating the Frontal air sinus	Depressed level of consciousness Meningismus Skull base fracture	Signs of severe head injury with penetration of the frontal air sinus.
7	*thm* First Alternative Course: Infection–*ṯi3* Tetanus	Facial paralysis and symptoms of tetanus	Same patient has developed full-blown tetanus, and symptoms of cephalic tetanus. Complicating infection is directly attributed to the head wound.
8a	*sd* Closed cranial vault fracture	Oculomotor nerve paralysis Spastic hemiparesis Meningismus Skull base fracture	Probable VI nerve abducens oculomotor nerve paralysis. This case has passed the acute stage, as development of spasticity takes several weeks.
13	*sd* Closed, cranio-facial injury	Torpor	Significant brain contusion accompanies this type of injury.
17	*s̲d* Closed, cranio-facial injury	Torpor	Significant brain contusion accompanies this type of injury.
19	*thm* Open	Orbital injury Meningismus	Penetrating injury has caused orbital damage and meningismus.

Case	Type of Injury	Symptoms and Signs	Comments on Neurologically Related Findings
20	*thm* Open left frontotemporal fracture	Orbital injury Skull base fracture Meningismus Motor Aphasia Stupor	Penetrating injury has caused orbital and nasal roof damage. Aphasia indicates damage to the left cerebral hemisphere.
21	*pšn* Closed temporal fracture	Skull base fracture Hyperacusia	Fracture to the petrous–mastoid areas of the temporal bone has damaged the facial nerve, with signs of stapedius nerve branch paralysis.
22	*sd* Closed temporal fracture	Meningismus Skull base fracture Aphasia Stupor	Penetrating injury has caused orbital and nasal roof damage. Injury to the left temporal area has aphasia.
31	*wnḫ* Closed cervical vertebral dislocation	Quadriplegia, incontinence and ileus from the cervical spinal cord injury	Signs of complete spinal cord injury with detailed explanation of the mechanism of vertebral injury.
33	*sḥm* Closed cervical burst fracture Head injury	Quadriplegia, spinal cord injury Aphasia Stupor	Signs of complete spinal cord injury with detailed explanation of the mechanism of vertebral injury.
43	*wnḫ* Closed rib dislocation	Intercostal nerve pain	Neurogenic pain from dislocated ribs described as shooting pains in his sides.
47	*kft* Open chest wall slashing injury	Pain from latissimus dorsi muscle injury	Pain when raising the arm due to major slash wound to the muscles of the chest wall
48	*nrwt* Closed lumbar sprain	Low back/sciatic pain on Laségue maneuver testing	Classic symptom of sciatic nerve being compressed as the leg is raised in the stretched position.

Appendix 3
Case Type and the Verdict III: "A Medical Condition that Cannot Be Handled/Dealt With"

Case	Type of Injury	Symptoms /Signs	Why verdict III? No effective treatment available at that time.
5	*sd* Open fracture Depressed	Meningismus Skull base fracture	With signs of severe head injury and *depressed skull fragments* into the skull, the Egyptian physicians could not directly treat.
6	*sd* Open fracture Depressed Dura laceration	Exposed brain Cerebrospinal fluid leaking	A severe head injury with *dura laceration, exposing the brain surface and leaking spinal fluid*, was trauma the Egyptian physicians could not directly and effectively treat.
7	*thm* First Alternative Course: Infection, *ti3*	Facial paralysis and Symptoms of Tetanus	This is the same patient with a Frontal Cutting wound with compound skull fracture penetrating the Frontal air sinus, who now has developed Tetanus. This complicating infection is directly attributed to the head wound.
8a	*sd* Closed cranial vault fracture	Oculomotor nerve paralysis Spastic hemiparesis Meningismus Skull base fracture	This is a *closed head injury at the sub-acute state*. The patient has residual oculomotor nerve paralysis and spastic hemiparesis. A neurological state for which the Egyptian physicians could not directly and effectively treat.
8b	*sd* Closed cranial vault fracture		This is a *severe closed head injury with extensive bone comminution*, transmitting pulsations through the skin. A condition for which no direct treatment was possible.
13	*sd* Closed, cranio-facial injury	Torpor	The major *craniofacial disruption* has impacted the brain from below producing alteration of the level of consciousness. The Egyptian physicians could do nothing to treat it directly.
17	*sd* Closed, cranio-facial injury	Torpor	Significant *brain contusion accompanies this type of craniofacial traumatic separation*. The Egyptian physicians could do nothing to directly treat it, but used the sitting position and local wound care.
20	*thm* Open left frontotemporal fracture	Orbital injury Skull base fracture Meningismus Motor Aphasia, Stupor	*Penetrating injury* has caused orbital and nasal roof damage. *Aphasia* indicates damage to the left cerebral hemisphere. The Egyptian physicians could do nothing to treat it directly.

Case	Type of Injury	Symptoms /Signs	Why verdict III? No effective treatment available at that time.
22	*sd* Closed temporal fracture	Meningismus Skull base fracture Aphasia, Stupor	Penetrating injury has caused orbital and nasal roof damage. *Injury to the left temporal area has aphasia*. The Egyptian physicians could do nothing to treat it directly.
24	*ḥsb* Open jaw fracture	Jaw comminuted fracture. The patient has fever from it	The verdict here does not necessarily imply a lethal situation, but rather *complex with bone fragmentation* inside an open wound, now probably infected. The Egyptian physicians could not treat it directly.
31	*wnḏ* Closed cervical vertebral dislocation	Quadriplegia, Incontinence and Ileus from the cervical spinal-cord injury.	Neurological signs of *spinal cord transection*. No effective treatment is available even today.
33	*sḥm* Closed cervical burst fracture Head injury	Quadriplegia, spinalcord injury. Aphasia Stupor	Neurological signs of *spinal cord transection*. No effective treatment is available even today. Aphasia from accompanying severe head injury. No available treatment existed for either injury.
37b	*ḥsb* Humeral fracture	Piercing through from the inside out.	Serious complication with *major tissue laceration*, but not automatically lethal. The verdict expresses the fact that the Egyptian physician could do nothing to cure this injury effectively.
44	*ḥsb* Rib fractures	Multiple ribs fractured with a wound over. The only finding is bone crepitation over the ribs being examined.	Although an open *chest wound would be potentially lethal if it had penetrated the cavity*, no symptoms or signs of respiratory difficulties are given. The verdict III here simply reflects an injury for which no effective treatment existed.

Appendix 4
Medical Considerations regarding Nasal Anatomical Terminology

Three important terms are used in this papyrus to refer to nasal anatomical terminology. Their analysis in the medical context suggests the interpretations assigned to these words by the current authors:

- *fnḏ* = Nose
- *msdty.fy* = [Nostril], nostrils - nasal cavities
- *šrt* = Nasal walls

fnḏ = Nose

fnḏ is used as the term for nose, referring to its pillar (septum; Cases #11, #26); its chamber (roof of the nose; Case #12); the site of smash in/burst fracture (Case #13); the site of perforation (Case #14); the structure to affix rolled bandages to, from the inside, and from the outside (Cases #11, #12). It appears in:

Case #11, Fracture of the Nasal Septum
Hieratic Plate V
Ln. 10, Necessary knowledge and skills for a fracture in the pillar of his nose…
Ln. 11, If you examine a man for a fracture in the pillar of his nose,…
Ln. 13, "… they having restricted (sic) his nose …"
Ln. 14, "As for 'the pillar of his nose': it is the upper top of his nose / top of his nose which is above down to its side and on the upper part of his nose within his nose in the midst of his two
Ln. 15, … nostrils/nasal cavities."
This is the definition of the nasal septum [*iwn n fnd*].
Ln. 15, As for "his two nostrils/nasal cavities," (these are) the two sides of his nose reaching/penetrating to his cheek…

Case #12, Nasal Comminuted Depressed Fracture
Hieratic Plate V
Ln. 16, Necessary knowledge and skills for a fracture in the chamber / vault of his nose:
Ln. 16, If you examine a man for a fracture in the chamber / vault of his nose…
Ln. 21, …(a fracture) in the chamber / vault of his nose, it is in the middle of his nose…

Case #13, Closed Comminuted Nasal Fracture with Basilar Skull Fracture and Cerebral Contusion
Hieratic Plate VI
Ln. 3, Necessary knowledge and skills for a crushed fracture in his nose:

Ln. 4, If you examine a man for a crushed fracture in his nose, you must place your hand on his nose on …

Case #14, Perforating Wound in[to] the Interior of his Nasal Walls
Hieratic Plate VI
Ln. 14, … (to the inside) of his nose," according …

Case #26, … Upper Lip Full Thickness Slash Wound …
Hieratic Plate IX
Ln. 8, … (as) far as the column of his nose.

msdty.fy = [Nostril], Nostrils - Nasal Cavities (It Is Not *šrty.fy*) (Figs. 10a, 10c, 11, and 12)

It is the site from which blood comes out through the nostrils from the nasal cavities in severe head injuries to the cranial convexity with secondary, but indirect, fractures of the anterior cranial base (Cases #4, #5, #6, #7, #8, #22). Bleeding through the nostrils - nasal cavities is also described in direct stab penetration of the temporal area that reach the nasal chamber Case #20. In Case #11, the term *msdty.fy* is anatomically defined, serving also as reference for the description of the nasal septum. Furthermore, in Case #11 the term for nostrils is used to indicate a site from which active bleeding is seen and the area from which coagulated blood inside the nose must be extracted. It appears in:

Case #4, Head Injury with Open, Displaced, Elevated Skull Fracture
Hieratic Plate II:2–11
Ln. 4, … while he bleeds from both his nostrils/nasal cavities and his ears…
Ln. 6, Diagnosis: … (while he bleeds from) both his nostrils/nasal cavities and ears…
This case is an anterior skull base fracture with convexity injury and no direct nasal injury, but with bleeding from facial orifices.

Case #5, Head Injury with Open, Comminuted, Depressed Skull Fracture
Hieratic Plate II
Ln. 13, … while he bleeds from both his nostrils/nasal cavities …
This case is an anterior skull base fracture with convexity injury. No direct nasal injury, bleeding from facial orifices.

Case #6, Head Injury with Open Comminuted, Depressed Skull Fracture and Dura Laceration
Hieratic Plate II
Ln. 22, … while he gives blood from both his nostrils/nasal cavities, …
This case is an anterior skull base fracture with convexity injury. No direct nasal injury, bleeding from facial orifices.

Case #7, Frontal Stab Wound with Open Skull Fracture. Penetrating the Frontal Air Sinus
Hieratic Plate III

Ln. 4, … while he bleeds from his nostrils/nasal cavities…
Ln. 6, … while he bleeds from both his nostrils/nasal cavities…
This case is an anterior skull base fracture with convexity injury. No direct nasal injury, bleeding from facial orifices.

Case #8, Closed Head Injury with Comminuted Skull Fractures
Hieratic Plate IV
Ln. 9, … while he bleeds from his nostrils/nasal cavities and from his ears …
This case is an anterior skull base fracture with convexity injury and no direct nasal injury, but with bleeding from facial orifices.

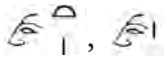
Case #11, Fracture of the Nasal Septum
Hieratic Plate V
Ln. 11, … he has bled from both his nostrils/nasal cavities …
Ln. 12, …Then you must place two swabs of cloth, saturated with oil, within both his nostrils/nasal cavities …
Ln. 14, As for "the pillar of his nose": it is the upper top of his nose / top of his nose which is above down to its side and on the upper part of his nose within his nose in the midst of his two nostrils/nasal cavities …
This is the definition of the nasal septum [*iwn n fnd*].
Ln. 15, As for 'his two nostrils/nasal cavities," (these are) the two sides of his nose reaching/penetrating to his cheek, down to the back of his nose, leaving the upper part of his nose …
This is the definition of nostril - nasal cavities [*msdty.fy*]
This case is a direct nasal injury.

Case #12, Nasal Comminuted Depressed Fracture
Hieratic Plate VI
Ln. 2, As for "every eel of blood which has knotted/coagulated inside both of his nostrils/nasal cavities …
Ln. 3, … it means that the clotted blood inside both of his nostrils/nasal cavities is like the eel that exists in water.
This case is a direct nasal injury.

Case #20, Temporo-Zygomatic Stab Wound with Skull Perforation and Basilar Skull Fracture
Hieratic Plate VII
Ln. 24, … while he bleeds from both of his nostrils/nasal cavities …
Hieratic Plate VIII
Ln. 4, … since he bleeds from both his nostrils/nasal cavities …
This case is an indirect anterior skull base fracture with temporal convexity perforating injury. Direct nasal injury is likely. Bleeding is from facial orifices.

Case #22, Closed Head Injury, Temporo-Zygomatic Area with Comminuted Fracture and Basilar Skull Fractures
Hieratic Plate VIII
Ln. 11 …Then the blood comes down, out of his nostrils/nasal cavities …
Ln. 13 … while he bleeds from both of his nostrils/nasal cavities and both of his ears …

This case is an anterior skull base fracture with closed temporal injury. No direct nasal injury, but bleeding through the facial orifices (nostrils - nasal cavities).

šrt = Nasal Walls 

The ancient Egyptian word *šrt* appears in Case #13 for the first time in this papyrus. On the basis of all its applications in the Edwin Smith Papyrus we conclude its meaning is "nasal walls." This interpretation of the word *šrt* is similar, but not identical to Brawanski's "nose wing/nose shell."[1]

The anatomical integrity of the nasal walls can be directly disrupted in major skull fractures in which actual separation of various forms occur at the skull base and the facial bones (Cases #13, #17, #21). The anatomical integrity of the nasal walls can also be disrupted by direct penetration through its anterior cartilaginous and thin bone structure (Case #14). The nasal walls may produce active bleeding (Cases #13, #17, #21) and blood clot formation (Case #14). It appears in:

Case #13, Closed comminuted Nasal Fracture with Basilar Skull Fracture and Cerebral Contusion
Hieratic Plate VI
Ln. 5, … while he is bleeding from his nasal walls and from his ear on his side…
Ln. 6, … One who has a crushed fracture in his cheek, while he bleeds from his nasal walls, from his ear, …
Craniofacial fractures open but away from the nose, with disruption of skull base.

Case #14, Perforating wound in[to] nasal walls
Hieratic Plate VI
Ln. 7, … necessary knowledge and skills for a wound into his nasal walls …
Ln. 9, … One who has a wound in his nasal walls …
Ln. 11, … coagulated inside his nasal walls …
Ln. 13, As for 'a wound in his nasal walls, *pierced* …

Case #17, Cranio-Facial injury with open Maxillo–Zygomatic Fractures and Basilar Skull Fractures Anterior and Middle Fossa
Hieratic Plate VII
Ln. 3, … while he is bleeding from his nasal walls and from his ear …
Ln. 4, … while he bleeds from his nasal walls, from his ear …
Craniofacial fractures disrupt the skull base, forming part of the "walls" of the nose, i.e., the roof of the nasal cavity.

Case #21 - Closed Head Injury with Temporo-Zygomatic Displaced Fracture and Basilar Skull Fractures into the Mastoid Area with Hyperacusis
Hieratic Plate VIII
Ln. 7, … time he bleeds from his nasal walls and from his one ear…
Ln. 8, One who has a split in his temple / zygomatic area while he bleeds from his nasal walls and his ear …

1. Brawanski, "Mittelgesichtsverletzungen im Pap. Smith (Fälle 9–14)," 53.

Source of Confusion with the Nasal Terminology

Breasted's opinion was that the Egyptian scribe committed a number of mistakes in Case #13. In our opinion, there were no scribal errors in this section. Breasted, however, presumed an error in the use of the word *fnḏ* "nose," believing that the scribe meant "nostril." He also proposed the use of the word *šrt* to designate the nostril. Considering that it has been clearly established in Case #11 by Breasted himself that the Egyptian term for 'nostril' is *msd.ty* his proposed textual changes to the original script of Case #13 have created some confusion.

We cannot accept Breasted's (*Edwin Smith*, 252) translation of the title reading: "Instructions concerning a smash in his nostril." This would imply an injury only to the tissue forming the nostril's boundaries, a trivial injury, when clearly it is not.

Case #13 is, in actuality, a severe head injury producing a cranio-facial disruption of enough severity to result in a nasal closed comminuted fracture, a base of skull fracture, or a cerebral contusion.

Breasted's substitution of = nose for nostril appears in the first line of Case #13 under the Examination (*Edwin Smith*, 254). This is followed by a description of severe local tissue damage, and hemorrhage "while he discharges blood from his nostril." Breasted elected to use the Egyptian word *šrt* meaning "nostril" for . While nosebleeds are reported in simpler injuries than in Case #13, the use of *šrt* here and in subsequent appearances in the Edwin Smith Papyrus, only occurs in severe trauma cases in which there has been violation of the structural integrity of the nasal walls.

The authors believe that the word *šrt*, also written , refers to the structures forming the nasal walls, of which the external soft tissues of the nose are part (in this we agree with Breasted). Disruption of the nasal wall anatomy would be seen in major skull fractures in which actual separation occurred between the skull base and the facial bones. Examples of such injuries are found in Cases #13, #17 and #21. Direct disruption of the structural integrity of the nasal wall would also occur with direct penetration, as shown in the stab wound of Case #14.

Active bleeding and intra-cavitary clot formation are present in Cases #13, #14, #17, and #21.

There are several examples of the word *šrt* outside this papyrus, cited by Breasted, in which the translation "nasal walls" makes more sense than "nostril," that is, "Give me that sweet breath that is in thy two nostrils" would be better translated as "Give me that sweet breath that is inside the nose" (*Edwin Smith*, 253). The amount of air in the nostril per se would be insignificant!

We also disagree with Breasted's translation wherein he perceived another scribal error (*Edwin Smith*, 254–55) in line 5, plate VI. We translate the original text in Case #13 as follows: "and while assuredly, he bleeds from his nasal walls , from his ear and from his mouth because of that crushed fracture."

Here, Breasted changed the original word *r3* = "mouth," for *gs* = "side," it seems, in order to conform the text to his presumption that bleeding just from one ear had to be paired with bleeding from only one side of the nose. Breasted's textual changes resulted in the following translation with which we must disagree: "while at the same time he discharges blood from his nostril (and) from his ear, on the side of him having that smash."

On clinical grounds this above change to the original scribal text of Case #13 is unwarranted and not supported by medical understanding. The original text in Case #13 as written is medically sound. The cranio-facial skull base disruption occurring in this case would produce bleeding from the mouth and the nose; whether from one nostril, or both, is irrelevant. The source of hemorrhaging is from the roof of the mouth and the nose, and the disrupted nasal structures. Bleeding from the ear is indicative of fracture of the petrous portion of the temporal bone which forms part of the skull base and houses all the ear structures. The temporal bone communicates to the outside through the external auditory canal (fig. 4). Bleeding from only one ear in Case #13 would merely indicate a unilateral petrous bone fracture resulting from an asymmetric disruption of the skull base.