



THE EDWIN SMITH PAPYRUS

Updated Translation of the Trauma Treatise
and Modern Medical Commentaries

Ψ LOCKWOOD PRESS

Gonzalo M. Sanchez & Edmund S. Meltzer


THE EDWIN SMITH PAPYRUS



Edwin Smith. By Francesco Anelli, 1847.
With permission of the New York Historical Society.

THE EDWIN SMITH PAPYRUS
UPDATED TRANSLATION OF THE TRAUMA TREATISE
AND MODERN MEDICAL COMMENTARIES

Gonzalo M. Sanchez
and
Edmund S. Meltzer

 LOCKWOOD PRESS

ATLANTA, GEORGIA

PUBLISHED BY
LOCKWOOD PRESS
PO Box 133289
Atlanta, GA 30333
www.lockwoodpress.com

© 2012 by Lockwood Press
All rights reserved. Published 2012.
Printed in the United States of America

21 20 19 18 17 16 15 14 13 12 1 2 3 4 5

ISBN: 978-1-937040-01-7 (hardcover)

Library of Congress Control Number: 2012947516

This paper meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS	vii
FOREWORD, by W. Benson Harer, Jr., M.D.	xi
ACKNOWLEDGMENTS	xv
NOTE ON TRANSLITERATION	xvi
NOTE ON COLUMN AND LINE NUMBERING	xvii
ABBREVIATIONS	xviii
GENERAL AND MEDICAL INTRODUCTION, by Gonzalo M. Sanchez, M.D.	1
PHILOLOGICAL INTRODUCTION, by Edmund S. Meltzer, Ph.D.	9
VISUAL INDEX	19
CASES ON THE MAIN BODY OF THE PAPYRUS "RECTO"	29
CASE #1: Scalp Contusion Laceration Penetrating to the Bone (Plate I:2–12)	31
CASE #2: Scalp-Slicing Wound Penetrating to the Bone (Plate I:12–17)	41
CASE #3: Head Injury with Skull Perforation (Plate I:18–II:2)	45
CASE #4: Head Injury with Open, Displaced, Elevated Skull Fracture (Plate II:2–11)	52
CASE #5: Head Injury with Open, Comminuted, Depressed Skull Fracture (Plate II:11–17)	60
CASE #6: Head Injury with Open, Comminuted, Depressed Skull Fracture, and Dura Laceration (Plate II:17–III:1)	65
CASE #7: Frontal Cutting Wound with Compound Skull Fracture Penetrating the Frontal Air Sinus, Uncomplicated and Infected: Tetanus (Plate III:2–IV:4)	71
CASE #8: Closed Head Injuries with Comminuted Skull Fracture (Plate IV:5–18)	86
CASE #9: Wound in the Forehead, Fracturing the Outer Table of the Frontal Bone (Plate IV:19–V:5)	95
CASE #10: Eyebrow Laceration Penetrating to the Bone (Plate V:5–9)	104
CASE #11: Fracture of the Nasal Septum (Plate V:10–15)	107
CASE #12: Nasal Comminuted Depressed Fracture (Plate V:16–VI:3)	114
CASE #13: Closed Comminuted Nasal Fracture with Basilar Skull Fracture and Cerebral Contusion (Plate VI:3–7)	120
CASE #14: Perforating Wound to the Interior of the Nasal Walls (Plate VI:7–14)	124
CASE #15: Necrotic Maxillary Stab Wound (Plate VI:14–17)	128
CASE #16: Closed, Displaced Maxillary-Zygomatic Fracture (Plate VI:17–21)	132
CASE #17: Cranio-Facial Injury with Comminuted Maxillary-Zygomatic Fractures and Basilar Skull Fractures of the Anterior and Middle Fossae (Plate VII:1–7)	135
CASE #18: Temporo-Zygomatic Laceration (Plate VII:7–14)	139
CASE #19: Temporo-Zygomatic Intracranial Stab Wound (Plate VII:14–22)	143
CASE #20: Temporo-Zygomatic Stab Wound with Skull Perforation and Basilar Skull Fracture (Plate VII:22–VIII:5)	148
CASE #21: Closed Head Injury with Temporo-Zygomatic Displaced Fracture and Basilar Skull Fractures into the Mastoid Area with Hyperacusis (Plate VIII:6–9)	153

CASE #22: Closed Head Injury to the Temporo-Zygomatic Area with Comminuted Fracture and Basilar Skull Fractures (Plate VIII:9–17)	156
CASE #23: Slashing Wound of the Ear (Plate VIII:18–24)	163
CASE #24: Mandibular Fracture(s) (Plate VIII:24–IX:2)	166
CASE #25: Mandibular Dislocation (Plate IX:2–6)	172
CASE #26: Upper Lip Full-Thickness Slash Wound (Plate IX:6–13)	176
CASE #27: Chin Full-Thickness Slash Wound (Plate IX:13–18)	180
CASE #28: Anterior Neck Wound with Esophageal-Tracheal Fistula (Plate IX:18–X:3)	183
CASE #29: Cervical Stab Wound, Perforating a Vertebra (Plate X:3–8)	189
CASE #30: Cervical Wrenching/Sprain with Disc Injury (Plate X:8–12)	194
CASE #31: Cervical Vertebral Dislocation with Spinal Cord and Head Injuries (Plate X:12–22)	200
CASE #32: Cervical Vertebral Compression Fracture (Plate XI:1–9)	207
CASE #33: Cervical Burst Fracture with Spinal Cord Injury and Brain Contusion (Plate XI:9–17)	213
CASE #34: Sterno-Clavicular Dislocation (Bilateral?) (Plate XI:17–XII:2)	219
CASE #35: Clavicular Fractures (Plate XII:2–8)	226
CASE #36: Linear Fracture of the Humerus (Plate XII:8–14)	230
CASE #37: Compound Fracture(s) of the Humerus (Plate XII:14–21)	234
CASE #38: Closed Displaced Fracture of the Humerus (Plate XII:21–XIII:2)	239
CASE #39: Infected Chest Wound with Abscesses (Plate XIII:3–12)	242
CASE #40: Chest Wound Perforating the Manubrium of the Sternum (Plate XIII:12–17)	246
CASE #41: Infection of a Wound of the Chest (Plate XIII:18–XIV:16)	250
CASE #42: Traumatic Costochondritis (Plate XIV:16–22)	258
CASE #43: Sternocostal-Costochondral Dislocation (Plate XIV:22–XV:6)	261
CASE #44: Open Comminuted Rib Fractures (Plate XV:6–9)	266
CASE #45: Round “Masses” on the Chest (Plate XV:9–19)	269
CASE #46: Possible Keratinous/Epidermoid Cyst of the Chest (Plate XV:20–XVI:16)	275
CASE #47: A Slash Wound in the Armpit (Plate XVI 26–XVII 15)	284
CASE #48: Wrenching/Sprain in the Vertebral Column in the (Lower) Back/Disc Injury (Plate XVII:15–19)	293
APPENDIX 1: TYPES OF INJURIES IN THE EDWIN SMITH PAPYRUS	299
APPENDIX 2: NEUROLOGICAL SYMPTOMS AND SIGNS IN THE EDWIN SMITH PAPYRUS	301
APPENDIX 3: CASE TYPE AND THE VERDICT III: “A MEDICAL CONDITION THAT CANNOT BE HANDLED/DEALT WITH”	303
APPENDIX 4: MEDICAL CONSIDERATIONS REGARDING NASAL ANATOMICAL TERMINOLOGY	305
APPENDIX 5: EDWIN SMITH’S HANDWRITTEN MANUSCRIPT	311
WORKS CITED	339
GENERAL AND MEDICAL INDEX	349
PHILOLOGICAL INDEX	357
PLATES: THE EDWIN SMITH PAPYRUS	361

LIST OF ILLUSTRATIONS

VISUAL INDEX

- I Craniofacial Injuries in the Edwin Smith Papyrus. Image courtesy of PHOTO RESEARCHERS, 307 Fifth Avenue, New York, NY 10016.
- II Extracranial Injuries in the Edwin Smith Papyrus. Image courtesy of PHOTO RESEARCHERS, 307 Fifth Avenue, New York, NY 10016.
- III Sir Charles Bell's trooper, First Royal Dragoons, courtesy of the Army Medical Services Museum, Scotland. Ancient Egyptian battle axes courtesy of the Royal Ontario Museum. Kopesh sword GMS collection.
- IV Cranial Fractures in the Edwin Smith Papyrus.
- V Cranial Injuries in the Edwin Smith Papyrus. a) Periorbital ecchymosis from fractured orbital roof(s); b) Penetrating skull fracture by cutting weapon; c) Botryoidal malachite $\text{Cu}_2(\text{CO}_3)(\text{OH})_2$. Naturally occurring copper compound in igneous rocks that have similar appearance to slag produced during copper smelting. Case #6, explanation B compares the brain appearance to that of copper slag; d) Syro-Palestinian axe and broad-blade axe injuries to the right frontal skull as in that of King Seqenenre Tao II; e) *gm3* Case #18, explanation B; f) Speech areas, dominant hemisphere. Red = Broca frontal lobe. Green = Wernicke temporal and parietal lobes.
- VI Case #7, First Alternative Course: Infection (Tetanus). Tetanus following gunshot wounds by Charles Bell, courtesy of the Royal College of Surgeons, Edinburgh. Facial sketches by Allison Stout.
- VII Cerebral Motor Pathways and Hemiparesis. Top: Explanation of contralateral weakness in brain injury. Bottom: Explanation of ipsilateral weakness in brain injury.
- VIII Temporo-Zygomatic Stab Wound. a) Skull x-ray simulated stab head injury. Anterior–posterior view with brain overlay; b) Skull cross section with with brain overlay and simulated stab injury to the left side of the head. Spear reproduction with permission of the Royal Ontario Museum; c) Lateral skull with brain overlay and simulated stabbing weapon at the anterior temporo-frontal areas. Major cerebral cortical speech areas of Broca (orange) and Wernicke (blue) shaded.

FIGURES

- Fig. 1. Layers of the cranium. The cerebrospinal fluid circulates in the subarachnoid space. 36
- Fig. 2. Soldier #14, from Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*, plate VIII A. 43
- Fig. 3. Left: Soldier #25, left frontal 1-cm-diameter open skull fracture. Right: Soldier #54, left parietal 1-cm-diameter open skull fracture. From Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*, plate IX B and D. Bottom: ancient Egyptian arrow, courtesy of the Royal Ontario Museum. 49
- Fig. 4. Skull base. Fractures to the anterior and middle fossae. 57
- Fig. 5. a) Depressed skull fracture, 3-D computer tomographic reconstruction; b) Soldier #62, from Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*, plate X D; c) Middle Kingdom mace, courtesy of the Royal Ontario Museum. 63
- Fig. 6. Left: Soldier #62, plate X D. Center: Soldier #14, plate VIII B. From Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*. Right: King Seqenenre Tao II's head injuries. 70
- Fig. 7. Left: Soldier #14, plate VIII B. Right: Soldier #23, plate IX A, showing penetrating wounds to the frontal air sinus areas. From Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*. 80

- Fig. 8. a) Closed head injury force transmitted to the brain; b) Closed depressed skull fracture, 3-D CT scan; c) Hemiparetic posture and gait; d) Soldier #14, from Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*, plate VIII A and C. 94
- Fig. 9. a) Soldier #25, from Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*, plate IX B; b) Cadaver femoral head with diploe bone defect (left), filled with a paste of ostrich egg shell and vegetable oil by G. M. Sanchez; sealed appearance after six months (right). 101
- Fig. 10. Anatomy of the nose. a) external bone and cartilages of the nose; b) external nasal bone structures; c) schematic off-the-midline sagittal section; d) nasal cavity boundaries. 110
- Fig. 11. Author's rendition of Egyptian nasal perspective. Left: Nasal lateral midline view. Right: Nasal anatomy in the brow-up position. 112
- Fig. 12. "Pillar of the Nose" failure. Nasal cartilaginous fracture. Right: Nasal anatomy in the brow-up position. 112
- Fig. 13. a) Skeletal nasal vault failure; b) Lateral displacement. 118
- Fig. 14. Nasal fractures in human remains. Left: Soldier #58, from Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*, plate X C. Right: King Seqenenre mummy. 118
- Fig. 15. LeFort Fracture II. 122
- Fig. 16. Right maxillary fracture and left frontal penetrating fracture. Soldier #25, from Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*, plate IX B. 131
- Fig. 17. Displaced maxillary-zygomatic fracture. Soldier #29, from Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*, plate X B. 134
- Fig. 18. a) Le Fort Fracture III; b) Soldier #23, from Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*, plate IX A, with Le Fort III fracture. 138
- Fig. 19. Soldier #29, from Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*, plate X A, displaying injury to the temporo-zygomatic area. 141
- Fig. 20. Soldier #23, from Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*, plate IX A, with perforating temporal stab wound. 147
- Fig. 21. Temporal fracture with hyperacusis. 155
- Fig. 22. a) Soldier #14, from Winlock, *Slain Soldiers of Neb-hep-et-Re Mentu-hotpe*, plate VIII C; b) Simulated injury with brain visualized. Drawing by the author (GSM); c) Mace, courtesy of the Royal Ontario Museum. 160
- Fig. 23. Crab plover's foot inverted, projecting over mandibular ramus. Left: Banding crab plover (*Dromas ardeola*) feet detail (courtesy of "A Rocha Kenya"). Right: Mandible showing the inverted plover's foot. 160
- Fig. 24. Human remains, mandibular fractures. Left: *hsb* fracture. Right: *sd* fracture. (Specimens HRx-194-196-198.) Courtesy of The University of Arizona Egyptian Expedition, Tausret Temple Excavation 2009–2010. 169
- Fig. 25. Reduction technique for mandibular dislocation. 174
- Fig. 26. Penetrating cervical injuries. a) Anatomic triangles and zones of the neck; c) Direction of injury, Cases #28 and #29; c) Neck cross-section lower cervical spine, direction of injury, Cases #28 and #29. 186
- Fig. 27. Battle relief examples of injuries in Cases #28 and #29: a) courtesy of the author; b) and c) courtesy of The Oriental Institute of the University of Chicago; d) from W. Wreszinski, *Atlas zur altägyptischen Kulturgeschichte* (Leipzig: Hinrichs, 1923). 192
- Fig. 28. Cervical spine anatomy and current functional concepts. 197
- Fig. 29. Cervical sprain/injured disc, mechanism of injury. 198
- Fig. 30. Cervical vertebral dislocation, mechanism of injury. 205

Fig. 31. Cervical compression fracture, mechanism of injury.	211
Fig. 32. Cervical burst fracture, mechanism of injury.	215
Fig. 33. Sternoclavicular joints, trachea and adjacent vessels.	222
Fig. 34. Fractured clavicle.	229
Fig. 35. Fractured humerus with coaptation splint.	232
Fig. 36. Compound, comminuted humeral fracture. White arrows indicate fragmented humerus.	237
Fig. 37. Humeral <i>pšn</i> type of fracture.	241
Fig. 38. Left: Arrow injury chest wall and sternum, soldier #10, from Winlock, <i>Slain Soldiers of Neb-hep-et-Re Mentu-hotpe</i> , plate VII B. Right: Human remains, University of Arizona Tausret Temple Excavation, Luxor 2010.	248
Fig. 39. Chest wall cartilagenous and bone injuries. Center image courtesy of PHOTO RESEARCHERS, 307 Fifth Ave., New York, NY 10016.	265
Fig. 40. Left: From Robert William Smith, <i>A Treatise on the Pathology, Diagnosis and Treatment of Neuroma</i> (Dublin: Hodges & Smith, 1848), plate 1. Right: Skin neurofibromas and “caffé-au-lait spots” in neurofibromatosis 1.	274
Fig. 41. Posterior lateral torso musculature slash wound.	290
Fig. 42. Lumbar anatomy and herniated disc.	297

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 fontanelles 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

ACKNOWLEDGMENTS

Dr. Edward Bleiberg, Curator of Egyptian, Classical and Ancient Middle Eastern Art, Brooklyn Museum, for facilitating the search for Edwin Smith's handwritten manuscript and giving us permission to publish it.

Ms. Kathy Zurek-Doule, Curatorial Assistant, ECAMEA, Brooklyn Museum, for sending us the Photostats and reversed images of the manuscript.

Ms. Sandy Wallace, Librarian, and Ms. Jessica Popkin, Graduate Intern, Brooklyn Museum, for searching and finding the Smith ms. in files which had belonged to the New York Historical Society.

Dr. Angela McDonald of Glasgow University, for generously discussing issues of hieratic and sending copies of several of her papers.

Dr. John Booss, Professor Emeritus of Neurology, Yale school of Medicine for his critical review of the manuscript and insightful observations.

Dr. James T. Goodrich, Professor of Clinical Neurological Surgery, Pediatrics, Plastic and Reconstructive Surgery at the Albert Einstein College of Medicine, for his enthusiastic support and constructive review of the manuscript.

Dr. Christian Tutundjian de Vartavan, Director of the Armenian Egyptology Centre, for generous correspondence about substances mentioned in the papyrus.

Mrs. Arlene Shaner, reference librarian of historical collections, The New York Academy of Medicine, for facilitating the use of the Edwin Smith Papyrus Recto photographic material.

The New York Historical Society for the use of Mr. Edwin Smith's portrait.

The Oriental Institute of the University of Chicago for the use of Prof. Breasted's photograph at his Haskell Hall office, with the Edwin Smith Surgical Papyrus plates, circa 1929.

The University of Michigan Museum of Art for the use of the painting "Medicine in Ancient Egypt" by Robert Thom, for the front cover.

The Royal Ontario Museum for their generosity in allowing us to use ancient Egyptian weapons photographs from their collection.

The Australian Centre for Egyptology, for permission to use extensive quotations from Dr. James E. Walker's *Studies in Ancient Egyptian Anatomical Terminology* (1996).

The Royal College of Surgeons, Edinburgh for the use of Sir Charles Bell's painting, "Tetanus following Gunshot Wounds."

The Army Medical Services Museum, Scotland, for their permission to use the painting, "Trooper 1st Royal Dragoons" by Sir Charles Bell.

Ms. Cinthya J. Coan, "Indexing by the Book," for her extremely efficient work in compiling the General and Medical Index.

Ian Stevens and Krista Zimmer of ISD for their encouragement and enthusiastic help and expertise in the distribution and marketing of the book.

And last but by no means least, Dr. Billie Jean Collins of Lockwood Press, for her confidence in us and in our project, her patience and expertise in working with an extremely complex manuscript and two demanding authors, and her indefatigable efforts in helping our work to become the book that she knew it could be.

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.ḥr.f*) or mutatis mutandis the heavier endings of the Stative (*rḥ.kwi*, *ḥnh.ti*), *sḏmty.fy* forms, etc. It is not used to separate feminine and plural endings (e.g., *drt*, *db^cw*) or the initial augment or prefix added to a verbal stem (*išwy*, *shpr*).

A hyphen is used to separate elements of a compound word or name, for example, *ḥr-ib.f*, *mn-ḥpr-r^c*.

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 [w³d]*.

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

GENERAL AND MEDICAL INDEX

Page numbers followed by f indicate figures; t indicates tables.

A

- Abscesses
 Cellulitis compared to, 255
 chest wounds, infected with, 242–45
 cysts compared to, 280
 definition and overview of, 245
 types and characteristics of, 272–73
- Acacia leaves
 as astringent and demulcent, 282
 cyst treatment with, 278, 282
- Actinomycotic abscesses, 272
- Acute head injury, 6
- Acute respiratory distress, 225
- Adhesive strips, stitches compared to, 44
- Airplane propellers, brain injuries caused by, 68
- Air sinus penetration, 21f, 26f
- Alexander the Great, chest-penetrating injury suffered by, 249, 290, 290n297
- Alum
 anti-inflammatory role of, 131, 199
 as astringent and antiseptic, 283
 clavicular fracture, binding with, 227, 229
 compression fracture treatment with, 209, 212
 humerus fracture, binding with, 231, 233, 236, 240, 241
 jaw binding with, 173, 175
 rib injury treatment with, 259, 262, 265
 soft tissue contraction role of, 131
 sprain treatment with, 195, 198
 wound bandaging with, 129, 130, 131
- Aluminum, 257
- Ama bird's foot, 159, 161
- Amputation, 237
- Anatomical pathology, 6
- Anatomical terminology, 39
- Anatomy, 6
- Anesthesia of the body in spinal cord injury, 204, 205, 216
- Animal butchery, 39
- Antibacterial agents
 aluminum, 257
 frit, crushed, 283
 malachite powder, 257, 282, 283
 ointment, 105
 potassium sulfate, 257
- Anti-inflammatory agents
 alum, 131
 carob beans, 257
 natron, 281
 poppy powder, 282, 283
 willow leaves, 256
- Antimicrobial agents
 calcium hydroxide, 281
 ox bile, 256–57, 282
- Antiseptics
 alum, 283
 aluminum, 257
 malachite powder, 257
 potassium sulfate, 257
 willow leaves, 256
- Aphasia
 case breakdown for, 302t
 signs and symptoms of, 152
 in temporozygomatic area injuries, 151, 157, 158, 159, 161
- Arm injuries and lesions, 4
 See also Humerus fracture
- Arm motion, pain produced by, 287, 291
- Armpit slash wound, 284–92
 bandages and binding for, 287
 bandaging, injunctions against, 288, 291–92
 case breakdown for, 22f
 posterior lateral torso musculature slash wound, 290f
- Arms and legs, non-awareness of, 201, 202, 206, 214, 216
- Arrows
 ancient Egyptian, 49f
 chest wounds caused by, 248f
 facial injuries caused by, 130
 neck injuries caused by, 187, 191
 scalp injuries with, 44
 skull fractures caused by, 50
- Assaults, chest wounds caused by, 249
- Astringents
 acacia leaves, 282
 alum, 283
 carob seeds, 282, 283
- Auditory canal
 bone, shattered in, 159
 wound penetrating, 164

Auricle

- anatomy and histology of, 164–65
- laceration repair of, 164, 165

Axe

- axillary wound from, 289, 291
- frontal skull injury from, 25f
- skull fractures caused by, 56
- Syro-Palestinian, 25f
- types of, 23f

Axillary muscles, 289

Axillary slash wound, 284–92

- case breakdown for, 22f
- posterior lateral torso musculature slash wound, 290f

Axillary vessels, 289

Ayat, Mustafa Aga, 16

B

Bacteria, ancient concept of, 103

Bacterial abscesses, 272, 280

Bandage, flesh rejection of, 253, 256

Basilar skull fracture

- of anterior and middle cranial base, 63
- of anterior and middle fossae, 135–38, 308
- closed head injury to temporozygomatic area with comminuted fracture and, 156–62
- elevated skull fracture and, 306
- mandibular fracture accompanied by, 169
- into mastoid area with hyperacusis, 153–55, 308
- nasal fracture and cerebral contusion with, 120–23, 305, 308
- severe head injury, indication of, 56
- signs and symptoms of, 137
- temporozygomatic stab wound and skull perforation with, 148–52, 307

Battleaxe, 23f, 56

Bell, Sir Charles, drawings of, 23f, 59, 165, 182

Bile

- as antimicrobial agent, 256–57, 282
- chest wound infection treatment with, 253, 256–57
- cyst treatment with, 278, 282
- therapeutic uses of, xii

Biogenic material, 100

Biomimetic materials, 100

Blood volume, 58, 58n48

Boat propellers, brain injuries caused by, 68

Body, ancient Egyptian concept of, 296

Bone fracture *versus* smash fracture, 48, 48n

Bone hemorrhaging control, 98, 100

Bone reconstitution, 98–99, 100

Bone reconstitution and healing agents, 98–99, 100

Bone trauma, scalp injury compared to, 35, 44

Bone wax, 99–100

Botryoidal malachite, 25f

Bowel distension in spinal cord injury, 206

Brachial plexus, 289

Brain

- contusion of, 120–23, 213–18, 305, 308
- copper slag, comparison to, 25f, 66, 67, 69, 94
- head injury accompanied by damage to, 49
- pulsation, detection, difficulties of, xii

Braincase. *See* Cranium

Brain damage

- causes of, 49
- cranio-facial injury with, 300
- lower brain stem affected by, 78
- secondary, avoiding, 57

Brain edema, 68, 91

Brain hemorrhage

- brain damage and death due to, 49
- in depressed skull fracture, 63

Brain injury

- ancient and modern treatment outcomes compared, 68, 70
- biochemical and molecular biology of, 70
- cerebral contusion, 120–23, 213–18, 305, 308
- in depressed skull fractures, 63
- infection following, 68
- ipsilateral weakness in, 27f, 91
- in maxillary-zygomatic injuries, 137
- nasal fracture accompanied by, 123
- in temporozygomatic area injuries, 159, 160f

Brain pulsations

- detection of, 6
- palpation of, 66, 69, 88, 92–93, 94

Brain stem, lower, damage to, 78

Brain stem, upper, temporozygomatic area injury impact on, 151, 152

Brain surgery, 37

Brain swelling in depressed skull fracture, 63

Breasted, James Henry

- papyrus dating by, 12, 14
- papyrus historical account by, 16
- papyrus source, views on, 1
- translation by, xi, xii, 2, 3, 4, 11

Breathing, pain upon

- costochondritis, 260
- rib fractures, 267
- sternoclavicular dislocations, 224
- sternocostal-costochondral dislocations, 265

Breathing difficulty in sternocostal-costochondral dislocation, 264, 264n270

Breathing process, 267

Broad-bladed axe, 25f, 291

Broca's area, 25f, 159

Broken bones, realigning and stabilizing, xi

- Broths, 75, 85
 Builder's mortar, cyst treatment with, 281
- C**
- “Caffe-au-lait spots,” 273, 274f
 Calcite powder
 cyst treatment with, 278, 281
 as sclerotic agent, 281
 Calcium, 100
 Calcium carbonate, 100
 Calcium hydroxide, 281
 Calcium phosphate, 100
 Carob, 283
 Carob bean broth, 75, 85
 Carob beans
 as anti-inflammatory agent, 257
 chest wound infection treatment with, 253, 257
 as demulcent, 257
 Carob seeds
 as astringent, 282, 283
 cyst treatment with, 278, 282
 Carotid artery, internal
 post-traumatic occlusion of, 169
 Case records, headings/rubrications in, 13t
 Cauterization
 abscesses, treating with, 7, 243, 245
 bleeding, treating with, 225
 Cellulitis
 definition and overview of, 255
 symptoms of, 256
 treatment for, 257
 Cephalic tetanus, 83
 Cerebral blood flow, autoregulation of, 70
 Cerebral contusion
 cervical burst fracture and spinal cord injury with, 213–18
 nasal fracture with basilar skull fracture and, 120–23, 305, 308
 Cerebral herniation, preventing, 57
 Cerebral motor pathways, hemiparesis and, 27f
 Cerebrospinal fluid
 leak of, 122, 301t, 303t
 reference to, 67, 69
 Cervical burst fracture, 25f, 213–18, 300, 302t, 304f
 Cervical collar, bandaging, ancient compared to, 199, 212
 Cervical emphysema, subcutaneous, 169
 Cervical injury
 anterior with esophageal-tracheal fistula, 183–88
 battle reliefs depicting, 192f
 dislocation, 300
 fractures, 217 (stability of), 300
 head injury accompanied by, 50
 open, case breakdown for, 22f
 overview of, 4
 penetrating, 186f
 stab wound perforating vertebra, 189–93
 vertebral dislocation with spinal cord and head injuries, 200–206
 wrenching/sprain with disc injury, 194–99, 198f, 300
 Cervical spine
 anatomy and functional concepts, 197f
 Egyptian concept of, 204–5, 205n216
 lower, cross-section view of, 186f
 Cervical spine examination and assessment, 50, 137–38
 Cervical spine injury
 anatomical level of, 205
 case breakdown for, 22f
 compression flexion injury to, 217
 mid-level *versus* lower, differentiating between, 206
 Cervical vertebra, stab wound perforating, 189–93
 Cervical vertebral compression fracture, 207–12, 302t
 burst fracture differentiated from, 217
 classification of, 216–17
 injury mechanisms in, 211–12, 211f
 Cervical vertebral dislocation, 205f, 304t
 Cervico-thoracic injury, 204–5
 Cheek
 crushed fracture in, 135–38
 perforation in, 128–31
 Chest binding
 contraindications for, 268
 for rib dislocations, 262, 264, 265
 for rib sprains, 259, 260
 Chest cavity, penetrating injuries to, 289–90
 Chest injuries and lesions
 abscesses, 242–45
 armpit slash wound, 22f, 284–92, 287, 288, 290f
 arrow injuries, 248f
 costochondritis, traumatic, 22f, 258–60, 300
 cysts, possible keratinous/epidermoid, 275–83
 infection of, 242–45, 250–57
 manubrium of sternum perforated by, 246–49
 neoplasms, soft tissue, case breakdown for, 22f
 overview of, 4
 prevalence, modern of, 289–90
 round masses, 269–74
 sternocostal-costochondral dislocation, 261–65
 See also terms beginning with rib
 Chest wall
 cartilagenous and bony injuries, 265f
 deformities, 264, 267
 infections, case breakdown for, 22f
 slashing injury, 302t
 superficial injuries to, 290
 Chin, layers of, 182

- Chin injury
 case breakdown for, 21f
 full-thickness slash wound, 180–82
- Circulatory system, understanding, xii
- Clavicular dislocation, 300
- Clavicular fracture, 226–29, 229f
 binding for, 221, 224, 227, 228–29
 case breakdown for, 300
 humerus fracture treatment compared to, 233
- Clavicular heads, anatomical structures adjacent to, 225
- Clavicular injury
 case breakdown for, 22f
 dislocation, posterior, 221
- Clinical data overview, 7
- Closed head injury
 case breakdown for, 21f, 300
 comminuted skull fracture in, 86–94, 156–62, 307
 depressed skull fracture, 94f
 force transmitted to brain, 94f
 management of, 91
 neurological symptoms and findings in, 5–6
 skull bone disruption in, 93
 survivability in, 6
 to temporo-zygomatic area with comminuted fracture and basilar skull fractures, 156–62, 307
 with temporo-zygomatic displaced fracture and basilar skull fractures, 153–55, 308
 treatment of, 154–55
- Closed injuries, case breakdown for, 300
- Closed reduction
 in mandibular fracture, 169
 in nasal fracture, 112, 113, 119
 in sternoclavicular dislocation, 223, 224
- Clostridial gas gangrene, 170
- Clostridium tetani, 82
- Coaptation splint, 232, 232f, 240–41
- Collarbone
 blows to, 228
 dislocation of, 220–21, 223
 fracture of, 227
- Compound (open) head injury
 case breakdown for, 21f
 case examples, 45–51
 closed head injury compared to, 92, 93, 94
 frontal skull fracture, 49
 neurological symptoms and findings not included for, 5
 parietal skull fracture, 49
- Compression-flexion injuries
 to cervical spine, 217
 injury mechanisms in, 215f
 progressive severity, stages of, 210
- Compressive extension injury mechanism, 204
- Congestive heart failure, 225
- Consciousness, preservation of (head injuries)
 compound skull fracture, 78
 open, comminuted, depressed skull fracture, 64
 open, displaced, elevated skull fracture, 58
 overview of, 50
 skull perforation, 51
 temporozygomatic area injuries, 146, 151–52, 154
- Consciousness, reduced (head injuries)
 case breakdown of, 301t, 302t, 303t
 in cerebral contusion, 214, 217, 218
 in compound skull fracture, 78
 in cranio-facial injury, 136, 137, 138
 in nasal fracture, 123
 overview of, 7
 prevalence of, 50
 in temporozygomatic area injury, 146, 151, 157, 158, 161
- Cooling medicines, 278, 279, 280, 281
- Copper oxide, 282, 282n294
- Copper sulfate, 282, 282n294
- Costochondral joints, anatomical characteristics of, 260, 264
- Costochondritis, traumatic, 258–60, 300
- Crab plover's foot, 160f, 161
- Cranial convexity injuries, 21f, 306
- Cranial fossa, anterior
 fracture, symptoms of, 57f
 fracture spread into, 154
- Cranial fossa, middle
 condyle jaw fracture displacement into, 159
 fracture, symptoms of, 57f
 fracture spread into, 154
- Cranial fracture
 case breakdown for, 24f
 smashing of cranium, 61–64, 66, 67, 96
 splitting of cranium, 53–59
 stroke compared to, 161
- Cranial nerve deficit, 87, 89, 90
- Cranio-facial injury
 bleeding from nose, mouth and ear in, 309
 with brain damage, 300
 case breakdown for, 21f, 301t
 findings in, 204
 with maxillary-zygomatic and basilar skull fractures, 135–38, 308
- Cranioplasty, 99
- Craniotomy, 146, 159
- Cranium
 absence of injury to, 42
 head injury penetrating to bone of, 32–33, 35
 injuries, types of, 25f, 299–300
 layers of, 36f
- Cutaneous Actinomycosis, 272

- Cutaneous tuberculosis, 273
Cutting wounds, case breakdown for, 299
Cysts
 drawing heat from, 279, 282
 parasitic, 273
 possible keratinous/epidermoid, 275–83
- D**
- Dehydrating agents, 281
Demulcents
 acacia leaves, 282
 carob beans, 257
 flax, 257
Desiccants, 283
Diencephalon injuries, 151, 152
Disc injury
 cervical sprain with, 194–99, 198f, 300
 herniation, 295–97
 in lower back, 295–98, 300
 lumbar sprain, 300
Disease
 foreigners, connection with, 129
 primitive conceptualization of, 85
Dislocations, xi
 See also type of dislocation, e.g.: Collarbone: dislocation of
Distractive extension injury mechanism, 204, 205f
Djehutynakht, mummified head of, 170, 171
“Dual” (term usage for paired anatomical structures), 223, 228
Dura laceration, 65–70, 306
Dura mater
 identification of, 69
 rupture of, 67
- E**
- Ear, pain in front of, 174
Ear injury
 amputation, incomplete, 164
 case breakdown for, 21f
 slashing wound, 163–65
Ears, bleeding from
 basilar skull fractures, 122, 137, 309
 closed head injury, 88, 91, 159
 depressed skull fracture, 61, 63, 64
 elevated skull fracture, 53, 56, 57, 57f, 58
 maxillary-zygomatic injuries, 136, 137
 nasal fracture, 121
 open skull fracture, 74
 temporozygomatic area injuries, 154, 157
Ears, bone splinters inside, 157–58
Ears, cream, pouring into, 150, 152
Earth almond broth, 75, 85
- Ecchymosis
 of cheek and eyelids, 134
 infraorbital, 111
 in mandibular fractures, 169
 periorbital, 25f
Edema
 of brain, 68, 91
 in maxillary-zygomatic fractures, 134
Edwin Smith (person), 1–2, 16–18, 311–30
Electrocoagulation, 37
Encephalopathy, 216
Endotracheal intubation, 187
Epidermoid cysts, 280–81
Epsilon Egyptian battleaxe, 23f
Esophageal injuries, 186–87
Esophageal-tracheal fistula, 185 (2XP: tracheo–esophageal pen. wound), 187–88
Esophagus, neck pierced and collapsed through to, 184, 185
Evidence-based medicine, xiii
Examination
 analysis of, 38–39
 discussion of, 9
 overview of, 6
Exertion, pain upon, 260
Explicatory Sentence (term), 10
Expressed fracture (term defined), 55–56
Extensive open wounds, case breakdown for, 299
Extracranial injuries, case breakdown for, 22f
Eyebrow laceration, 104–6
Eyes
 bloodshot
 in cervical vertebral dislocation, 201, 204
 in temporozygomatic area injuries, 144–45, 146–47, 149, 151, 152
 tearing of (in temporozygomatic area injuries), 149
- F**
- Face, flushing of, 74, 75, 79
Facial bone defects in mummified heads, 170
Facial bone reconstruction, 123, 159
Facial distortion, 169
Facial fractures, 111, 169
Facial nerve, stapedius branch of, 154, 155f
Facial reconstructive surgery, 170
Facial skeleton, functional anatomy of, 171
Falls
 cervical vertebral compression fractures in, 210, 218
 rib fractures in, 268
Femoral head, 101f
Fever, head injury accompanied by, 81
Fibrous joint (ribs), 264
Fig compresses, 97, 99

- Fingernails bending into middle of hand, head injury impact on, 88, 89, 90
- Fir (resin), 278
- Fist, mandibular fractures from, 168
- Flail chest (term), 264, 267
- Flax
chest wound infection treatment in, 257
as demulcent, 257
- Flax seeds, cyst treatment with, 278
- Fontanelle, 66, 69, 88, 94
- Forehead
clamminess of, 74, 79
wound in, 95–103
- Fractures, case breakdown for, 299
- Frazier, Charles H., 37
- Frit, crushed
as antibacterial agent, 283
chest wound infection treatment with, 253, 257
- Frontal air sinus
anatomy of, 77
frontal cutting wound penetrating, 74, 75, 79, 80, 80f, 84, 301t, 306–7
- Frontal bone fracture, 95–103
- Frontal skull, axe injury to right, 25f
- Frontal skull fracture, 49f
case breakdown for, 21f
compound, tetanus following, 26f
- Full-thickness slash wounds
chin, 180–82
upper lip, 176–79, 306
- Fungal abscesses, 272
- G**
- Gait, head injury effect on, 87, 88, 90, 94f
- Gangrene
in mandibular fractures, 170
in maxillary-zygomatic injuries, 130
- Global aphasia, 151, 159
- Gorgias's, chest-penetrating injury suffered by, 290, 290n297
- Grease, 278, 282
- Greek medicine
Egyptian influence on, 3, 7
pulse measurement in, 40
- Greeks, ancient, tetanus cases recorded by, 83, 83n96
- Gunshot wounds
cervical injuries, penetrating, 186
to head, mortality rate for, 68
tetanus following, 26f
- H**
- Harer, Benson, Sr., 37
- Harvey, William, xii
- Head injury
acute, 6
ancient and modern treatment outcomes compared, 68, 69–70
bandages and binding for
eyebrow laceration, 105
forehead wounds, 99
slash wound, 42
bandaging, injunctions against, 53, 58, 61, 64, 67, 70
binding, injunctions against, 47, 51
cervical burst fracture accompanied by, 217
cervical vertebral dislocation with spinal cord injury and, 200–206
complications
infection, 5, 51, 57, 68
evaluation of, 58
examples of, 70f
ipsilateral deficits following, 88, 90–91
management of, 4–5
mortality from, 70, 152, 159
neurological recovery prognosis in, 159
neurological signs and symptoms in, 301–2t, 303–4t
overview of, 4
scalp injury, 31–40, 41–44, 99
skull injury treatment, xii
with skull perforation, 45–51
spinal cord injury accompanied by, 204
stab head injury, 28f
subacute, 85
sutures, 105
See also Closed head injury; Compound (open) head injury; Skull fracture
- Heart
air entering, 225
arrhythmias and failure, 78
dual concept of, 39–40
injury to, 249
pulse relationship to, xii, 40
- Hematomas
intracranial injury followed by, 68
in mandibular fractures, 169
- Hemiparesis
cerebral motor pathways and, 27f
gait affected by, 87, 88, 90, 94f
head injury followed by, 87, 88, 90–91
in temporozygomatic area injuries, 151
- Hemorrhaging, 224
See also type of hemorrhaging, e.g.: Bone hemorrhaging
- Herniated disc
cervical sprains and, 197
lower spine, 22f
lumbar, 295–97, 297f

- Hieratic script, 1, 11–12, 14, 17–18
- Hieroglyphs, 11
- “His eye is askew” (term), 87, 89, 90
- “His face being something like he weeps” (term), 74, 76, 79, 81
- Honey
- application to dressing for mouth, 74, 78–79
 - application to wound
 - eyebrow laceration, 105, 106
 - in forehead, 101
 - maxillary stab wound, 129
 - temporozygomatic area injuries, 140
 - bactericidal and fungal effects of, 38
 - cervical vertebral compression fracture treatment with, 209, 212
 - clavicular fracture treatment, role in, 227, 229
 - compresses of, 97, 99
 - humerus fracture treatment, role in, 231, 233, 236, 240
 - infection prevention role of, 101
 - jaw binding with, 173, 175
 - nasal fracture treatment with, 108, 116, 119
 - rib injury treatment with
 - costochondritis, 259
 - sternocostal-costochondral dislocation, 262, 265
 - sprain treatment with, 195, 199
 - sternoclavicular dislocation treatment with, 221, 225
- Honey, wound dressing applications with
- axillary wounds, 287, 288, 292
 - chest wounds, 247, 249
 - chin wounds, 181, 182
 - ear wounds, 164, 165
 - humerus fractures, 235
 - lip wounds, 177, 179
 - maxillary-zygomatic area injuries, 133, 134, 136
 - nasal fractures, 108, 113, 119
 - nasal wall injuries, 125, 126
 - neck wounds, 185
 - scalp wounds, 33, 37, 38, 42, 44
 - skull perforations, 47, 51
 - temporozygomatic area injuries, 144, 147
- Horus (son of Osiris), curing, reference to, 96, 102
- “How you find him, etc.” (term), 9
- “How you find his cranium” (term), 9
- Humerus fracture
- binding and splints for, 231, 232, 232f, 233, 236, 237, 240–41
 - case breakdown for, 22f, 300
 - cast for, 232, 240–41
 - closed displaced, 239–41, 241f
 - comminuted, 235, 236–38, 237f
 - compound, 234–38, 237f
 - linear, 230–33
 - signs and symptoms of, 304t
 - wound over, 235
- Hydroxyapatite cement, 99
- Hyperacusis
- ancient Egyptian awareness of, 155
 - basilar skull fractures into mastoid area with, 154
 - defined, 154
 - temporal fracture with, 155f
- ## I
- Ibex fat
- chest wound infection treatment with, 253, 257
 - cyst treatment with, 278, 282
 - as desiccant, 283
 - as vehicle, 283
- “If you examine a man” (term), 9
- “Illness of the teeth” (term), 80–81
- Infection
- ancient Egyptian concepts related to, 245, 256
 - of axillary wound, 287–88, 290, 291–92
 - of cervical injury, 185, 187–88
 - of chest wound, 242–45, 250–57, 281
 - of cyst, 278, 280, 281
 - defined, 290–91
 - head injury followed by, 5, 51, 57, 68, 79, 80, 84, 122
 - in humerus fractures, 237, 240
 - mandibular fracture followed by, 169–70
 - masses associated with, 274
 - prevention of, 101, 282, 282n294
 - secondary opening due to, 299
 - treatment for, xii
- Inflammation
- of axillary wound, 287, 288, 290
 - of chest wound, 253, 254, 255, 256
 - of cyst, 280–81
 - head injury followed by, 79, 80
- Infraorbital ecchymosis, 111
- Infraspinatus, injury to, 289
- Injury assessment (scalp injury), 33, 39
- Interchondral joints, 264
- Intercostal anatomical complex, 265f
- Internal medical problems, supernatural causes of, 102–3
- Intestinal ileus, 204, 205, 206
- Intracranial injury
- closed head injury, causation in, 91–92
 - complications arising from, 68
 - vessel injury, prognosis for, 146
- Intracranial pressure
- monitoring and management of, 70, 155
 - rising, treatment of, 57, 58, 63, 91
 - subsiding, time frame following injury, 70
- Ipsilateral hemiparesis, 91

J

- Jaw(s)
 dislocated, reduction of, xii
 fracture, 3, 159, 169, 304t
 functional anatomy of, 171
 pathological contraction of, 81
See also terms beginning with mandible, mandibular, or maxillary
- Joint, ancient *versus* modern concepts of, 196

K

- Keratinous cysts, 280–81
 Khopesh sword, 291
 Khopesh sword replica, 23f
 Knife wounds, 186, 187, 191

L

- Lacerations
 case breakdown for, 299
 suturing, xii
See also type of laceration, e.g.: Dura laceration
- Laryngeal injuries, 186–87
 Lasègue's test, 295–96, 298, 302t
 Latissimus dorsi, injury to, 289, 302t
 Le Fort fracture II, 122, 122f, 137
 Le Fort fracture III, 138f
 Le Fort fracture III cranial fracture, 137
 Le Fort fractures, 122, 122n152
 Left cerebral hemisphere injuries, 151
 Legs, pain upon extending, 294, 295–96, 298
 Legs and arms
 non-awareness of, 201, 202, 206, 214, 216
 Limb paralysis in spinal cord injuries, 201, 202, 206, 212
 Lip injury
 case breakdown for, 21f
 upper, full-thickness slash wound, 176–79, 306
 Lipomas, 273
 Living tissues, materials mimicking, 100
 Lockjaw (term), 85
 Long-bone fracture treatment, 236
 Lower spine herniated disc, case breakdown for, 22f
 Lower spine injury, 4
 Lumbar anatomy, 297f
 Lumbar herniated disc, 295–97, 297f
 Lumbar spine, 296–97
 Lumbar sprain, 300, 302t
 Lungs, hemorrhaging into, 225

M

- Magic (term), 97, 101–2
 Malachite powder
 antibacterial effects of, 257, 282, 283

- as antiseptic, 257
 chest wound infection treatment with, 253, 257
 cyst treatment with, 278, 282
 as desiccant, 283
- Malignancy (term), 97–98
 Malocclusion of the teeth, 169, 170
 Mandible
 bone, intact in chin wound, 182
 ligaments, contraction of, 74
 Mandible injury
 case breakdown for, 21f
 dislocation, 172–75, 300
 fractures, 166–71, 169f
 Mandibular ramus (rami)
 anatomy of, 159–61, 160f
 Crab plover's foot projecting over, 160f
 examination of, 157
 Manner nominalization (defined), 10
 Manubrium penetrating wound, 22f, 246–49
 Mastoid area, basilar skull fractures into, 153–55
 Maxillary fracture, 131f
 Maxillary sinus, osteotomies of, 171
 Maxillary zygomatic injuries
 case breakdown for, 21f, 300
 closed, displaced fracture, 132–34
 comminuted fractures, 135–38, 308
 displaced fracture, 134f, 308
 maxillary stab wound, necrotic, 128–31
 Maxillo/facial reconstructive surgery, advent of, 170
 Meat, fresh, application to injured area
 cervical fracture, 208, 212
 cervical sprain, 195, 198, 199
 Meat, fresh, application to wound
 axillary wounds, 287, 291
 cervical injuries, 184, 190, 193
 chest wounds, 247, 249
 chin wounds, 181, 182
 cranio-facial injuries, 136
 eyebrow laceration, 105, 106
 lip wounds, 177, 179
 maxillary-zygomatic fractures, 133, 134
 nasal-wall injuries, 125, 127
 scalp contusion laceration, 33, 37
 scalp-slicing wound, 42, 44
 skull perforation, 46
 temporozygomatic laceration, 140
 Mediastinal thrombosis, 224
 Mediastinum, anterior, injuries to anatomical structures, 224
 Mediastinum, anterior, vessel injury, 249
 Medical commentaries
 axillary wounds, 289–92
 cervical injuries, 185–88, 191–93, 196–99, 210–12,

- 216–18
- chest lesions, 272–74, 280–83
- chest wounds, 245, 248–49, 255–57
- clavicular fractures, 228–29
- cysts, 280–83
- disc injury, 196–99
- head injuries
- chin wounds, 182
 - closed with comminuted skull fracture, 90–94, 158–59, 161–62
 - closed with displaced skull fracture, 154–55
 - cranio-facial injuries, 137–38
 - dura laceration, 68–70
 - ear wounds, 164–65
 - eyebrow laceration, 105–6
 - forehead wound with frontal bone fracture, 98–103
 - lip wounds, 178–79
 - mandibular dislocation, 174–75
 - mandibular fractures, 168–71
 - maxillary zygomatic injuries, 130–31, 134, 137–38
 - nasal comminuted depressed fracture, 117, 119
 - nasal fracture (closed, comminuted fracture), 121–23
 - nasal septum fracture, 109–13
 - nasal wall perforation, 126–27
 - open, comminuted, depressed skull fracture, 62–64, 68–70
 - open, displaced, elevated skull fracture, 55–59
 - open skull fracture with frontal cutting wound, 77–85
 - scalp, 35–40, 43–44
 - skull perforations, 48–51
 - temporozygomatic area injuries, 142, 146–47, 151–52, 158–59, 161–62
- humerus fractures, 232–33, 236–38, 240–41
- masses, round, 272–74
- overview of, 15
- rib injuries, 260, 264–65, 267–68
- spinal cord injuries, 204–6, 216–18
- sterno-clavicular dislocations, 223–25
- vertebral column sprain (lower back), 295–98
- “A medical condition I will fight with” (term), 3, 58, 155
- “A medical condition that cannot be handled/dealt with” (term), 3, 303–4t
- “A medical condition which I will handle/deal with” (term), 3
- “A medical condition which I will handle with the firedrill” (term), 243
- Medical instruction, injury description (scalp laceration), 36–37
- Medical methodology and knowledge
- axillary wounds, 291–92
 - cervical injuries, 187, 188, 192–93, 198–99, 211–12, 218
 - chest lesions, 274, 281–83
 - chest wounds, 245, 249, 255–57
 - clavicular fractures, 228–29
 - cysts, 281–83
 - disc injury, 198–99
 - head injuries
 - chin wounds, 182
 - closed, 91–92, 155, 159, 161–62
 - compound (open) skull fracture, 50–51
 - ear wounds, 165
 - eyebrow laceration, 106
 - forehead wound and frontal bone fracture, 99
 - lip wounds, 179
 - mandibular dislocation, 175
 - mandibular fractures, 170–71
 - maxillary zygomatic injuries, 130–31, 134
 - nasal comminuted depressed fracture, 119
 - nasal septum fracture, 113
 - nasal wall perforation, 126–27
 - open, comminuted, depressed skull fracture, 64, 69–70
 - open, displaced, elevated skull fracture, 57–59
 - open skull fracture with frontal cutting wound, 78–79, 85
 - scalp laceration, 36–37, 44
 - temporozygomatic area injuries, 142, 146–47, 152, 159, 161–62
- humerus fractures, 233, 236, 237–38, 241
- masses, round, 274
- rib injuries, 260, 264–65, 268
- spinal cord injuries, 206, 218
- sterno-clavicular dislocations, 224–25
- vertebral column sprain (lower back), 297–98
- Meningismus in head injury
- case breakdown for, 301t, 302t, 303t
 - closed head injury, 93, 159
 - open, comminuted, depressed skull fracture, 63, 68, 69
 - open, displaced, elevated skull fracture, 56
 - open skull fracture, frontal cutting wound with, 78
 - skull perforation, 49, 50, 51
 - temporozygomatic area injuries, 146, 151
- Meningitis, symptoms mimicking, 82
- Mid-cervical injury, 204–5
- Mimicry
- defined, 99
 - as research area, 100
- “More difficult reading, the” (principle), 11
- Motor vehicle accidents
- cervical sprains and herniated discs in, 197
 - cervical vertebral compression fractures in, 210
 - mandibular fractures in, 169
 - rib fractures in, 267
 - temporozygomatic area injuries in, 159
- Mouth
- bandaging and dressings in skull fractures, 74, 78–79

- Mouth (cont'd)
- closing, inability of, 173, 175
 - opening, difficulty in, 74, 78, 79, 80, 82, 84, 85, 121, 136, 138
 - wedge placed in, 75, 85
- Mouth, bleeding from
- basilar skull fractures, 137, 309
 - maxillary-zygomatic injuries, 136, 137
 - nasal fractures, 121
- Muscle, wound application of, 37
- N
- Nail scratching, infection dissemination from, 244, 245
- Nasal airway obstruction, 111
- Nasal fractures
- bone fractures, causes of, 111, 117
 - cartilagenous fracture, 112f
 - closed, comminuted fracture with basilar skull fracture and cerebral contusion, 120–23, 305, 308, 309
 - comminuted depressed fracture, 114–19, 305, 307
 - in human remains, 118f
 - septum fracture, 107–13, 305, 307
- Nasal injuries
- case breakdown for, 21f, 300
 - nasal vault failure, 118f
 - septal hematomas, 126
 - treatment for, 111–13
 - types of, 109–13
- Nasal walls
- perforating wound to interior of, 124–27, 306, 308, 309
 - term usage, 308, 309
- Naso-Frontal Facial Smash Syndrome, 122
- Natron
- cyst treatment with, 278, 281
 - as dehydrating and anti-inflammatory agent, 251
 - northern natron salt, 253, 257, 278, 282
 - as osmotic, 283
- Neck, anatomy of, 185–86, 186f
- Neck immobilization, 210, 217
- Neck injury. *See* Cervical injury
- Neck ligaments, taut condition of, 74, 75, 79, 81
- Neck motion tests, contraindications for, 210, 212
- Neck pain
- in cervical injuries, 195, 198
 - in sternoclavicular dislocations, 224
- Neck rigidity, skull fracture accompanied by
- closed head injury, 88, 91, 159
 - muscle rigidity in tetanus, 81, 82, 84, 85
 - open, comminuted, depressed skull fracture, 61, 64, 65, 68
 - open, displaced, elevated skull fracture, 53, 56, 57, 58
 - open, frontal cutting wound with, 74, 78
 - skull perforation, 46, 47, 50–51
 - temporozygomatic area injuries, 144, 146, 150, 151
- Neck rigidity in cervical injuries, 191, 192, 208, 212
- Necrosis (perforating facial injuries), 128–31
- Neferirkare, Pharaoh, 4
- Neurofibromas, 273, 274f
- Neurofibromatosis, xii
- Neurofibromatosis NF1, 273, 274f
- Neurological injury, cervical injury accompanied by, 191
- Neuroma, 274f
- Neurosurgical Classics*, 5
- Neurosurgical injuries, xii
- Nocardiosis, 273
- Northern natron salt
- chest wound infection treatment with, 253, 257
 - cyst treatment with, 278, 282
- Northern salt, 283
- Nose
- anatomy and terminology of, 109–11, 110f, 112f, 126, 305–9
 - palpation of, 121
- Nose, bleeding from
- basilar skull fractures, 137, 307, 309
 - closed head injury, 88, 91, 159, 307
 - depressed skull fracture, 61, 63, 64, 65, 68, 306
 - elevated skull fracture, 53, 56, 57, 57f, 58, 306
 - maxillary-zygomatic injuries, 136, 137
 - nasal fractures, 108, 121, 307
 - nasal injuries, 111
 - open skull fracture, 74, 306
 - temporozygomatic area injuries, 149, 150, 151, 154, 157, 307
- O
- Oil
- application to wound, 67, 99, 101f, 105, 106, 129
 - nasal fracture treatment with, 108, 113, 115, 116, 119
- Oil, wound dressing applications with
- chest wounds, 249
 - ear wounds, 165
 - lip wounds, 179
 - maxillary-zygomatic area injuries, 134, 136
 - nasal fractures, 108, 113, 119
 - nasal wall injuries, 125, 126
 - scalp wounds, 33, 37, 38, 44
 - skull perforations, 47, 51
- Ointment
- antibacterial, 105
 - compresses of, 97
- Ointment, wound dressing applications with
- axillary wounds, 287, 288
 - chest wounds, 247
 - chin wounds, 181, 182

- ear wounds, 164
 humerus fractures, 235
 lip wounds, 177
 maxillary-zygomatic area injuries, 133
 neck wounds, 185
 scalp wounds, 42
 temporozygomatic area injuries, 144, 147
- Ointment, wound treatment with
 temporozygomatic area injuries, 140
- Ointment applications
 to dressing for mouth, 74, 78–79
 to head, 53, 59, 150
 sterno-clavicular dislocation treatment with, 221
 vertical compression fracture treatment with, 209, 212
- Open injuries, case breakdown for, 299
- Open reduction, 112, 169
- Oral sepsis, 170
- Orbital floor disruption, 134
- Orbital injury, 146, 151, 152
- Orbital rim wound, 21f, 104–6
- Orbital roof fracture, 25f
- Organs, gaseous, 201, 206
- Osteomyelitis, 169
- Osteosynthesis, wire, mandibular fracture treatment with, 169
- Ostrich eggshell
 bone fracture and wound treatment with, 96, 99, 101f
 bone wax, comparison to, 100
- Ox bile
 as antimicrobial agent, 256–57, 282
 chest wound infection treatment with, 253, 256–57
 cyst treatment with, 278, 282
- Oxygen peroxide, 38
- P**
- Pain control (rib fractures), 268
 “Pain material” (term), 103
- Paleographical dating, 12, 14
- Papyrus dating, 12, 14
- Parasitic cysts, 273
- Parietal skull fracture, 49f
- Pathogenesis
 early concept of, 102–3
 overview of, 6
- Penis
 ejaculation/discharge, involuntary of, 201, 205, 206
 stiffness of, 201, 202, 206
 texts referring to, 203
- Perforating wounds, case breakdown for, 299
- Periorbital ecchymosis, 25f
- Physiology, 6
- Pipe, mandibular fractures from, 168–69
- Pneumonia, 83, 268
- Pneumothorax, 169, 224, 249
- Poppy, 283
- Poppy extract
 as analgesic, 257
 chest wound infection treatment with, 253, 257
- Poppy powder
 as analgesic, 283
 as anti-inflammatory agent, 282, 283
 cyst treatment with, 278, 282
- Posterior lateral torso musculature slash wound, 290f
- Postpartum tetanus, 84
- Potassium sulfate, 257
- Priapism, 201, 202, 204, 205, 206
- Prognosis
 overview of, 2–3, 4
 text describing, 10, 11
- Prospective Relative Form (term), 10
- Protasis, conditional found in, 9, 10
- Ptahhotep, Vizier, 4
- Pulse, heart relationship to, xii, 40
- “Pyramidal Fracture” (term), 122
- Q**
- Quadriplegia, 204, 205, 216, 218, 302t
- R**
- Ramesses II, battle reliefs of, 188, 192f, 193
- Red poppy extract
 as analgesic, 257
 chest wound infection treatment with, 253, 257
- Reduction
 in humerus fracture, 232, 233, 236
 in mandibular dislocation, 174–75, 174f
 in mandibular fracture, 169
 in nasal fracture, 112–13, 117, 119
 in sternoclavicular dislocation, 223, 224, 228
- Rehabilitation
 spinal cord injury treatment follow-up with, 206, 217
 temporozygomatic area injury treatment follow-up with,
 146
- Religious practices
 magic compared to, 101
 medical application of, 96, 97, 102
 religion, magic, and medicine, boundaries between, 101–2
- Resin, 283
- Respiratory complications, 224
- Respiratory distress, 224, 225
- Respiratory tract, blood entering, 221, 225
- Responsiveness, loss, in temporozygomatic area injuries, 161
- Rhomboid major, injury to, 289
- Rib dislocation, 261–65, 296, 302t

- Rib fracture
 case breakdown for, 22f
 linear, 267
 open comminuted, 266–68
 signs and symptoms of, 304t
 treatment for, 3
- Rib “heads” (term defined), 265, 265n271
- Rib sprains, 258–60
- Ritual power, medical application of, 96, 99, 101–3
- Round small-eyed battleaxe, 23f
- Royal Dragoons, 1st, 23f, 59, 165
- Rubrics, use of, 13t, 14–15
- Rushes, ground, 253, 257, 282
- Rushes, land, 278, 282
- S**
- Sanchez, Gonzalo, 15
- Scalp
 anatomy of, 35
 repair of, 99
- Scalp injury
 bleeding, controlling, 99
 contusion laceration penetrating to bone, 31–40
 slicing wound penetrating to bone, 41–44
- Sciatica, 298
- Sciatic nerve roots
 irritation of, 297
 pain in, 302t
 stretching of, 295, 298
- Science, magic compared to, 101
- Sclerotic agents, 281
- Secondary intention, healing by, 290, 291
- Seqenenre Tao II, King, head injuries suffered by, 68, 70f, 131
- Sety I, battle reliefs of, 192f, 193
- Shoulder blade, shooting pains in, 287
- Shoulder joint immobility, 88, 89, 90
- Shoulder motion impairment, 289
- Sitting position
 in cervical vertebral compression fracture treatment, 209, 212
 in maxillary-zygomatic fracture treatment, 133, 134, 136, 137, 138
 in skull fracture treatment, 53, 58–59, 75, 85, 88, 92
 in temporozygomatic injury treatment, 150, 151, 152
- Skull, anatomy of, 55, 77
- Skull fracture
 comminuted in closed head injury, 86–94, 307
 depressed, 60–70, 63f, 306
 drawings of, 23f, 59
 frontal bone fracture, 95–103
 open, comminuted, 60–70, 79
 open, displaced, elevated, 52–59, 306
 open, frontal cutting wound with, 71–85, 306–7
 prognosis, 58, 59, 61–62, 69–70
 scalp laceration without, 35, 36
 skull perforation, head injury with, 45–51, 143–52, 147f, 307
 traumatic brain injury (TBI) without, 36
 weapons causing, 56, 56n40
 penetrating from cutting weapon, 25f
- Skull injury treatment, xii
- Skull x-ray, stab head injury simulated in, 28f
- Slash wound
 in armpit, 22f, 284–92
 bandages and binding for, 287
 in head injuries
 absence of, 35
 bandages and binding for, 42
 chin injury, 180–82
 compound skull fracture, 73, 74
 depressed skull fracture, 61, 65
 ear injury, 163–65
 elevated skull fracture, 53
 eyebrow laceration, 105
 lip, upper, 176–79, 306
 skull perforation accompanying, 46
- Smash fracture
 bone fracture *versus*, 48, 48n
 cranial fractures, 61–64
- Smith, Edwin
 background, 1
 characterization of, 14
 contribution of, 16–18
 as witness, 11
- “Son of Osiris is saved, the” (term), 96, 102
- Speaking, difficulty (mandibular dislocation), 174
- Speech areas, anatomy of, 25f
- Speech therapy, 146
- Spinal column, functional anatomical features of, 196
- Spinal cord functions, awareness of, 204–5
- Spinal cord injury
 case breakdown for, 22f
 cervical burst fracture with, 213–18
 cervical vertebral dislocation with, 200–206
 evaluation and treatment, modern of, 205–6
 neurological function impact of, 6, 204, 206
- Sporotrichosis, 273
- Sports
 cervical sprains and herniated discs in, 197
 cervical vertebral compression fractures in, 210
 costochondritis, traumatic in, 260
 maxillary wounds in, 130
 nasal fractures in, 111, 117
- “Sprain” (term), 196

- Sprains
 cervical, 194–99, 198f
 in lower back, 293–98
 of ribs, 258–60
- Stabbings, chest wounds caused by, 249
- Stab head injury, skull x-ray simulating, 28f
- Standard Theory, 9
- Stapedius muscle, 154
- Staphylococcus aureus, 169
- Sternal manubrium penetrating wound, 246–49
 case breakdown for, 22f
- Sternoclavicular dislocation, 219–25
 anterior, 224
 anterior, bilateral, 223
 posterior, 225
 posterior, bilateral, 224
- Sternoclavicular joints, 222f, 223
- Sternocostal-costochondral dislocation, 261–65
- Sternocostal dislocation, case breakdown for, 22f
- Sternocostal joints, 264
- Sternum wounds, arrows as cause of, 248f
- Stitches and stitching
 adhesive strips compared to, 44
 for axillary wounds, 287, 291
 for ear wounds, 164, 165
 for lip wounds, 179
 for nasal wounds, 125, 126
 taping compared to, 182
- Straight-leg raising test, 294, 295–96, 297
- Stroke
 closed head trauma compared to, 92
 cranial trauma compared to, 161
 death from, 4
- Stupor
 case breakdown for, 302t
 in cerebral contusions, 214, 217, 218
 overview of, xii
 in temporozygomatic area injuries, 150, 151, 157, 158, 159, 161
- Subarachnoid hemorrhage
 complications caused by, 56
 meningismus linked to, 78
 symptoms of, 49–50
 in temporozygomatic area injuries, 146, 151
- Supernatural, illness causation role of, 102, 103
- Suturing
 axillary wound, 291
 eyebrow laceration, 105–6
 lacerations (general), xii
 lip wounds, 177, 179
 nasal wall wounds, 126
 neck wounds, 184
- Sweating, profuse, 225
- Sword
 axillary wound from, 289, 291
 replica, 23f
- Sycamore, 283
- Sycamore leaves
 as analgesic/anesthetic, 282, 283
 cyst treatment with, 278, 282
- Sycamore leaves, pulverized
 as anesthetic agent, 257, 282
 chest wound infection treatment with, 253, 257
- Symphysis fracture, 169
- Symptoms *versus* diseases, confusion between, 85
- Syro-Palestinian axe and broad blade, 25f
- T**
- Taping, 182, 291
- Tausret, Queen, memorial site of, 170, 249
- Temporal area fracture
 case breakdown for, 24f
 with hyperacusis, 155f
 stab wound accompanied by, 147f
- Temporal bone, zygomatic process of, 171
- Temporal injury, case breakdown for, 21f
- Temporozygomatic area, closed head injury to, 156–62, 160f, 307
- Temporozygomatic fracture, displaced, 153–55
- Temporozygomatic laceration, 139–42
- Temporozygomatic region, 142
- Temporozygomatic stab wound, 28f
 intracranial, 143–47
 with skull perforation and basilar skull fracture, 148–52, 307
- Teres major, injury to, 289
- Tetanus
 current understanding of, 84
 head injury followed by, 26f, 79–85, 79n75, 301t, 303t
 immunization, 142, 290
 overview of, 82–83
 recognition in antiquity, 83
 signs and symptoms of, 26f
- Therapy, 7
- Thoracic disc herniation, 296
- Thoracic spine, 296–97
- Thoracic wall axillary slash wound, case breakdown for, 22f
- Thoracic wall slash wound, flank pain, shooting in, 296
- Thumbnail/fingernail bending into middle of hand, head injury impact on, 88, 90
- “To examine a patient” (term), 6
- Torpor
 in closed head injuries, 161, 301t, 303t
 in cranio-facial injuries, 136, 137, 138, 301t, 303t

- Torpor (cont'd)
 in nasal fractures, 121, 123
 overview of, xii
- Toxic syndrome, 130
- Trachea, hemorrhaging into, 225
- Tracheal injuries, 186–87
- Tracheo-esophageal penetrating wound, 185, 187–88
- Traumatic brain injury (TBI), 36
- Traumatic costochondritis, 258–60
 case breakdown for, 22f, 300
- Treatment potential/treatability assessment
 categories of, 2–3, 4
 favorable prognosis, 10
- Trismus
 defined, 81, 82
 in mandibular dislocation, 174
 in maxillary-zygomatic fractures, 134
- Trunk motion, pain exacerbated by, 260
- Tubercular abscesses, 272
- Tuberous sclerosis, 273
- U**
- “Unawareness” of limbs (term), 201, 202, 206, 212, 214, 216
- Upper extremities, awareness in spinal cord injuries, 205
- Urinary incontinence, 201, 202, 204, 205, 206
- V**
- Vascular complications in sternoclavicular dislocations, 224
- Vertebra, cervical
 stab wound perforating, 189–93
- Vertebral body, cervical
 compression fracture injury site in, 211
 neck injury impact on, 187
 structures surrounding, 186
 vertical compression fracture of, 217
- Vertebral column, wrenching/sprain in, 293–98
- Vessel injury in sternal manubrium penetration, 249
- Von Recklinghausen’s disease, 273
- W**
- Wernicke’s area, 25f, 159
- “Whiplash injury” (term), 196
- Willow leaves
 as anti-inflammatory, antiseptic agent, 256
 chest wound infection treatment with, 253, 256
 wound treatment with, 282
- Wound care
 cyst treatment compared to, 282–83
 drawing heat from wound, 253, 257, 278, 279, 282
 forehead wound with frontal bone fracture, 99–101
- Wound dehiscence, 287, 290, 291
- Wound description
 chest wounds, infected, 253–54
 infected wounds, smell of, 74, 75, 79
 scalp injury, 32, 34–35
- Wound dressings
 axillary wounds, 287, 288, 292
 chest wounds, 247
 chin wounds, 181, 182
 ear wounds, 164, 165
 frontal cutting wounds/compound skull fractures, 74, 78–79
 humerus fractures, 235
 lip wounds, 178, 179
 maxillary-zygomatic area injuries, 133, 134, 136
 nasal fractures, 108, 113, 119
 nasal wall injuries, 125, 126
 neck wounds, 185
 scalp wounds, 33, 37–38, 42, 44
 skull perforations, 47, 51
 temporozygomatic area injuries, 144, 147
- Wound palpation (head injuries)
 closed head injuries with comminuted skull fracture, 87
 compound skull fracture, frontal cutting wound with, 73, 78
 eyebrow laceration, 104
 open, comminuted, depressed skull fracture, 61, 66
 open, displaced, elevated skull fracture, 53, 57
 scalp contusion laceration, 32, 36
 temporozygomatic laceration, 140
- Wounds, open, drainage of, xii, 292
- Wound suturing. *See* Suturing
- X**
- Xylocaine, 257
- Z**
- Zizyphus leaves, 253, 256, 282
- Zygoma, mobilization of, 171
- Zygomatic arch
 anatomical boundaries of, 142
 mobilization of, 171
- Zygomatic-maxillary buttress, osteotomies of, 171
- Zygomatic-maxillary complex (ZMC), 137
- Zygomaticosphenoid suture, inferior orbital rim to, 171

PHILOLOGICAL INDEX

GRAMMATICAL TERMS AND FORMS, PALAEOGRAPHY, AND ORTHOGRAPHY, ETC.

These follow English/Roman alphabetization even when Egyptian words are involved.

- Active *sdm(w).f*, **2**, 42–43; **4**, 55; **28**, 185; **29**, 190
Adjective-verb, **1**, 34; **6**, 67; **7**, 76; **19**, 145; **20**, 150; **30**, 195; **41**, 254; **43**, 263
Appositive, **46**, 279
Attributive genitive, **2**, 42; **4**, 54; **29**, 190; **46**, 279; **47**, 288
Causative, **9**, 97; **15**, 129; **26**, 178
Conditional, 9–10; **4**, 54; **29**, 190; 311
Coptic, **7**, 76; **15**, 129–30; **17**, 137; **19**, 145; **26**, 178; **40**, 248
Dual, **7**, 76; **20**, 150; **27**, 181; **32**, 209; **34**, 222; **35**, 227–28; **43**, 263
Edwin Smith (person), 1–2; **14**, 16–18; 311–30
Generic reference, 10–11
Hieratic, 11–15; 311
Imperative, **23**, 171; **48**, 324–25
Infinitive, **7**, 76; **11**, 108; **20**, 150; **22**, 158; **31**, 203; **40**, 247; **43**, 263
iw
+ noun, **8**, 89; **11**, 108; **19**, 145; **20**, 150; **31**, 203; **41**, 254
+ suffix–pronoun, **22**, 158; **45**, 272
+ circumstantial or adverbial, **6**, 67; **12**, 116; **39**, 244
+ impersonal Stative, **6**, 67; **7**, 76; **13**, 121; **21**, 154; **29**, 190; **47**, 289
+ suffix conjugation (statement of fact), **5**, 62; **7**, 76; **17**, 136; **20**, 150
iw.f + *sdm.f* (statement of fact), **19**, 145; **20**, 150
in statements of equivalence, **42**, 260
Lectio difficilior, 11, 14; **11**, 109
Manner nominalization, 9–10; **1**, 34; **3**, 47; **4**, 54–55; **6**, 67; **9**, 97; **11**, 108–9; **12**, 116; **16**, 133; **18**, 141; **19**, 145–46; **22**, 158; **24**, 168; **30**, 196, 198; **31**, 203; **32**, 210; **33**, 215–16; **34**, 221, 223; **37**, 236; **40**, 248; **41**, 255; **42**, 260; **43**, 263; **46**, 279; 311. *See also* geminating/nominal *sdm.f*, nominal *sdm.n.f*.
n-prefix, **46**, 279
n sdm.n.f (negation of ability), 11; **5**, 61–62; **6**, 67; **8**, 90; **16**, 133; **45**, 271–72; **46**, 279
elliptical form, **45**, 272
iwty + *sdm.n.f*, **8**, 90
Negational complement, **8**, 90
n wnt (existential negation), **18**, 141; **45**, 271
Participial statement, **1**, 34–35; **11**, 109; **31**, 203; **33**, 216
Participle. *See also* Participial statement; Relative form
active, *passim*
passive, **5**, 62; **10**, 105; **11**, 108; **22**, 158; **34**, 221; **47**, 289
geminating, **20**, 150; **34**, 221–22
aspect problematic, **4**, 54; **20**, 150; **28**, 185
demonstrative + participle, **3**, 48
Particle (linguistic term), **1**, 35; **5**, 62; **8**, 90; **12**, 116; **13**, 121; **41**, 254; **43**, 263; **48**, 294–95
Passive *sdm(w).f*, **7**, 77; **11**, 109; **12**, 116; **17**, 136; **23**, 164; **24**, 167; **34**, 222; **37**, 236
Permansive (stative), **31**, 202
Pragmatics, **29**, 190
Prothetic *i*/reedleaf, not spelled *iw* in Smith, **16**, 133; **29**, 190
Pseudo-participle (stative), **31**, 202
Register of language, **9**, 98
Relative form, 10–11; **1**, 34; **4**, 54–55; **5**, 61–62; **8**, 89–90; **20**, 150; **34**, 221; **39**, 244; **47**, 289. *See also* Participle requires its own actor expression, **4**, 54; **27**, 181; **39**, 245; **48**, 295
geminating, **34**, 222
prospective, 10–11; **1**, 34; **4**, 54
abstract relative form = nominal *sdm.flsdm.n.f*, **11**, 109
Root (linguistic term), **9**, 97; **14**, 126; **15**, 129; **19**, 145; **26**, 178; **36**, 231; **43**, 263; **44**, 267
Rubrics introduction, 13–15
sdm.f
geminating/nominal, **3**, 47; **4**, 54–55; **8**, 89; **11**, 108–9; **12**, 116; **14**, 126; **19**, 145–46; **21**, 154; **22**, 158; **26**, 178; **30**, 195; **31**, 204; **34**, 221, 223; **39**, 244; **42**, 260; **43**, 263; **45**, 271–72. *See also* Manner nominalization.
prospective, **4**, 55; **13**, 121; **17**, 136; **19**, 145; **20**, 150
circumstantial, *passim*. *See also* Adjective-verb as indefinite relative, **45**, 272
noun + (circumstantial) *sdm.f*, **7**, 76; **13**, 121; **41**, 254; **42**, 260
iw + circumstantial (statement of fact). *See iw n sdm.f* negation, **9**, 98; **31**, 202; **46**, 279

- sdm.hr.f*, 17, 136; 22, 158; 311
sdm.in.f, 40, 248
 defective writing without reedleaf, 11; 12, 116; 14, 126; 30, 195; 34, 221
sdm.n.f. See also *n sdm.n.f*, *n sdm.f*
 of *rh* and analogous verbs, 31, 202–3
 circumstantial, 11, 109; 31, 203; 33, 216; 39, 244; 45, 271; 46, 279
 nominal, 6, 67; 11, 109; 19, 145–46; 24, 168. See also Manner nominalization
 of adjective-verb, 6, 67
 corresponds to passive *sdm(w).f*, 34, 222
sdmt.f, 31, 203
n sdmt.f, 6, 67; 8, 89; 39, 244
r sdmt.f, 12, 116
 not used independently in Middle Egyptian 39, 244
 object of verb in Old Egyptian 4, 55
sdmty.fy, 22, 158; 39, 245
 Stative
 accomplished/achieved state, 2, 43
 agreement and endings, 9, 97; 12, 116; 19, 145–46
 as indefinite relative, 23, 164
 passive meaning from transitive verb, 23, 164; 25, 173; 40, 247
 of result, 4, 55; 9, 97; 12, 116; 20, 150; 25, 173; 26, 178; 34, 221; 35, 227; 40, 248; 43, 263; 47, 288; 48, 295
 impersonal. See *iw* + impersonal stative
 Verb forms, function and syntax of, 9
Wechselsatz, 16, 133; 30, 195, 198

EGYPTIAN WORDS

These follow Egyptian alphabetization, such as for instance Faulkner's dictionary. Glosses are only used for disambiguation.

- 3irwy*, 27, 181
3mʕ, 22, 159–61
3t (back), 48, 296
3t (*3t*), 47, 289
3ʕi (for *ʕr*), 14; 40, 247–48
iw (*n*) *ʕnd*, 11, 110, 113; 305–6
ib, 1, 39–40; 7, 78
ibnw, 15, 129; 25, 173
im3, 41, 257; 46, 278; 282
imrw, 12; 15, 129–30; 25, 173; 30, 195; 32, 209; 35, 228
in particle, 1, 34, 35; 5, 62; 8, 90; 33, 216
irty.fy, 19, 145; 20, 150
isk, 13, 121; 21, 154; 33, 216; 42, 259; 43, 263. See also *ist*
ist, 41, 254
isdb, 14, 126; 26, 178; 28, 185; 29, 190; 34, 222; 224; 37, 236–337
3w3(y), 9, 98
ʕrt{y}.f{y}, 7, 76; 25, 173
ʕhʕt, 32, 211
ʕy, 30, 196; 48, 295
ʕdnt, 6, 67
w3t, 9, 97–98
w3b(?), 24, 167–68
win, 1, 35
wbnw, 12, 35, 168, 181, *et passim*
wbnw n kft, 2, 42; 29, 191; 47, 288
wpt, 7, 77
wnh, 302; 304
whdw, 9, 102–3
wšbt, 41, 253; 46, 283
wdi, 3, 47; 25, 173; 41, 255. See also *dw*
b33, *b3(?)* = *br*, 19, 145
bksw, 31, 205
bw, 7, 77
bd3w, 11, 109; 23, 164
p3ist, 41, 255
phwy, 48, 296
psd/psd (back), 48, 294–97
psn, 4, 55–59; 16, 134; 18, 141; 21, 154; 38, 240–41; 301–2; 306
ʕnd/ʕnd. See also *iw* (*n*) *ʕnd*., 11, 110, 113; 13, 121–22; 14, 126; 305–6
ʕrw = *ʕrw(?)*, 47, 288
ʕh, 11, 109
mnw, 3, 48; 5, 312
mns3, 31, 203
mrht, 1, 37; 2, 43 *et passim*
mhw, 20, 150
mhr, 1, 34 *et passim*
msdty.fy, 13, 121; 306–7
mk3t, 48, 296
mtw, 1, 39; 9, 102–3; 34, 255; 45, 274; 311
nʕb3, 46, 279
npw, 9, 98
nfnfn, 47, 288
nʕryt r, 11, 109
nnw, 31, 203
nrwt, 48, 295, 297; 302
nh3(w), 4, 54
nsw(t) (king), 324

- nswt* (sinking), **32**, 209
ntnt, **7**, 77
r3-ty. See *ty*
ryt, **6**, 67, 69; 313 (rit)
rh, **31**, 202–3
h3w, **17**, 136
h3ty, **1**, 39; **7**, 78
hm, **13**, 121
hnn, **31**, 203
hnt3, **40**, 248
hr, of addition, **2**, 43
hsb, **11**, 113; **12**, 117; **24**, 168; **35**, 233; **36**, 232; **37**, 236; **42**, 259; **44**, 267–68; 304
hsmn, **41**, 255
hk3(w), **9**, 97
h3c, **47**, 289
h3s, **43**, 263
hm, **31**, 202–3
ht, **48**, 296
st-ib, **1**, 39–40
s3 (back), **48**, 296
s3b, **32**, 209
swt, **42**, 260
swnw, xi–xii, 3, 7
sp (coagulated diseased mass?) **24**, 167
sfn3, **22**, 161
sry, **17**, 136–38; **20**, 150; **32**, 210
srf, **7**, 79; **41**, 255; **47**, 289
shm, **33**, 215; 302; 304
shr, **46**, 280
sht, **46**, 278, 281
sšwy, **35**, 227–28
sd/sd, **5**, 64; **6**, 68; **8**, 90, 92; **9**, 98; **13**, 121, 123; **17**, 137; **18**, 141; **22**, 158; **24**, 168; **37**, 236; **44**, 267–68; 301–2; 303–4
šm3y, *šm3w*, **15**, 129; **41**, 254–57
šrt, **13**, 121–23; **14**, 126; 308–9
šs3w, **1**, 33–34, *et passim*
ksnty, **41**, 256–57; 46, 281–82
kdw, **22**, 161
kdt, **22**, 161
kdd, **22**, 161
kf, **2**, 42; **29**, 190
kft, 302
gm3, **18**, 142
gs, **8**, 89; 309
ti3, **6**; **7**, 79–85
tp3w, **7**, 77
tm, **8**, 90; **46**, 279
tmtw, **41**, 255; **46**, 279
thm, **3**, 47–48, 50–51; **7**, 77; **9**, 98; **18**, 141; **20**, 150; **29**, 190–91; **40**, 247–48; 301–2; 303
ḫw, **5**, 62; **19**, 146; **41**, 255
ts, **31**, 202; **33**, 215; **48**, 295
d(w), **25**, 173; **29**, 191; **34**, 221; **41**, 255; **46**, 279; 312. *wdi*
dhr, **7**, 77
dgm3y, **13**, 123; **17**, 137; **20**, 151; **22**, 161
dfyt, **32**, 210