

REVIEW

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**Otology in Medical Papyri in Ancient Egypt**

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Ancient Egyptian medicine evolved in a unique environment. Three main historical sources are available for the study of ancient Egyptian medicine: papyri, human remains, and visual art. The goal of this work was to compile a repertoire of ancient Egyptian medical treatises on the ear and its diseases and to comment on them. Ear diseases and treatments are mentioned in 4 major papyri (the Ebers papyrus, the Edwin Smith papyrus, the Berlin papyrus, and the Kahun papyrus), in 2 minor papyri (the Leiden papyrus and the Vienna papyrus), and on 1 ostrakon (potsherd), which is displayed in the Louvre. Those texts, which are the first written sources of otology in the history of medicine, are of great interest and include clearly defined descriptions of the principal symptoms of ear diseases (hearing loss, ear discharge, tinnitus, and ear pain). These ancient treatises show that the ear symptomatology of antiquity was not really different from that of the present day.

Egyptian medicine evolved in a unique environment. The geography of Egypt is like that of no other country in the world, and it formed the basis for the historical and cultural events that allowed a sophisticated system of medicine to develop and to be recorded from the third millennium BC. Egypt is a child of the Nile. The term "ancient Egypt" refers to the period between 3050 BC and 642 AD. The beginning of recorded history is marked by the unification of Upper and Lower Egypt under the first king of the First Dynasty. During the period predating 323 BC, the year of the invasion of Egypt by Alexander the Great, 30 dynasties succeeded with varying levels of importance. That era is referred to as "Pharaonic Egypt." The period from 323 BC until 642 AD is classified as the Greco-Roman period<sup>(1)</sup>.

The ancient Egyptians have been justly credited for their medical knowledge. In the study of ancient medicine, information from a variety of sources contributes to a more complete picture of the diseases that afflicted specific populations. Egypt offers a range of biological, written, and artistic ancient sources. By far the most important collection of knowledge of the ancient world is contained in medical papyri. Other sources are also important because they attest to the variety and epidemiology of ancient diseases. The goal of this study was to compile a repertoire of ancient written sources that describe the ear and its diseases and to comment on those texts.

The medical papyri of ancient Egypt are the oldest known written sources of medicine. The texts were written in a hieratic language rather than in hieroglyphics; this render their content more accessible. Eight major and 5 minor medical papyri have been catalogued date<sup>(2)</sup>. Each is named for the site of its current display or for the first owner or the editor of first publication. The oldest of those treatises is the Kahun Papyrus, a gynecologic text. Establishing the exact date of that work is difficult and remains a topic of debate among experts (cut away). Establishing the exact date of that work and each of those papyri is difficult, and remains a topic of debate. In addition, no author of any of the papyri is mentioned, and those texts are not

originals but are copies of copies that contain all the mistakes and changes, additions, and omissions that a tradition of revision over many centuries necessarily involves. Nevertheless, they provide descriptions of a wide range of symptoms and illnesses that can be studied.

Ear diseases are described in 4 major papyri (Ebers, Edwin Smith, Berlin, and Kahun), in 2 minor papyri (Leiden, Vienna), and on 1 ostrakon (potsherd) that is now housed in the Louvre. A description and commentary on each of those works is provided in this report. Whether these texts were considered important at the time of their creation, whether they were characteristic of standard medical practices of their day, or whether they represented alternative medicine or the peculiarities of a certain school of treatment remains unknown<sup>(3)</sup>.

### **Ebers Papyrus**

The Ebers papyrus (550 BC) is said to have been found in a tomb with the Edwin Smith papyrus in 1862 by Edwin Smith. In 1873, Professor Georg Ebers brought that eponymous papyrus to the University Library of Leipzig, Germany<sup>(4)</sup>. The Ebers papyrus is a complete compendium of medicine with a well-defined and dignified introduction of 20.23 meters and 108 columns of 20 to 22 lines each. In 1875, Ebers published a facsimile edition of this papyrus. Later, individual parts of the papyrus were subjected to examination by a variety of investigators, including Wreszinski, in 1913. The papyrus was translated by Ebbell in 1937<sup>(5)</sup> and was partially reprinted after examination by Wreszinski. Ebbells' translation is probably not perfect, but it is the version most used in English. In several places, the Ebers papyrus describes its content as a "compilation" of recipes and remedies against various symptoms, and there is much evidence to show that it is a copy of various ancient works. However, this compilation was not undertaken casually but was written according to a definitive and carefully considered plan, and care was taken to include the greatest variety of diseases that a physician would treat. The content of the Ebers papyrus is used as the foundation for the knowledge of ancient

Egyptian medicine<sup>6</sup>). The ear is mentioned in many sections of that work, some of which are presented in literal translations below.

**Treatments for Diseases of the Ear (Cut away)  
Ebers Papyrus**

**Eb. 764** (Ebers papyrus, section 764). The beginning of remedies for an ear whose hearing is poor: red ochre, juice of tamarix, are ground fine with fresh balanite oil and applied to the ear.

**Eb. 765.** For an ear that emits a fetid humor: frankincense with goose fat, cream of cow, issued (?) bdt, are ground fine, mixed together and applied to the ear.

**Eb. 766.** To treat the ear; thou shalt treat it with cold remedies, let it not be hot. If the (ear-) canal is painful (?); thou shalt prepare for it: chip of malachite, which is ground and applied thereto for 4 days; afterwards thou shalt prepare for it: seed-wool oil 2/3, honey 1/3 is applied to it many times. If its opening discharges, then thou shalt prepare for it powder to dry a wound: juice of acarria, juice of Ziziphus, fruit of willow, cumin, are ground and given for it; if meanwhile it grows fatty (xerotic), then thou shalt prepare for it remedies against dryness of wounds: head of shrewmouse, mndr (stomach) of a goat, shell of a tortoise, thyme (?), are dusted on it very often.

Thou shalt do similarly as for a finger that is broken and whose bone marrow flows to the ground; this is the treatment of an ear that is split on stt sw (the vault?), (but) that does not fall to the ground: thou shalt prepare for it a knotted net of flax and tie (it) up there with and sap of sycamore, so that it (the ear) fastens to his (the patient's) blood; oil and honey not being applied to it. Thou shalt cut one side of it (the ear) so that its blood may come down one side. Let it not suppurate at all. Now when thou hast perceived that it has grown together, then thou shalt prepare for it: oil and wax that are melted, and (the ear) is bandaged therewith, not applying (too) much. Thou shalt apply to it the same as (to) every effluence from its splitting. If it passes on to decay (necrosis), then thou shalt prepare for it a string of linen, tied on the back of his head.

**Eb. 767.** What is done to treat effluence that is sent out from an ear: if it (the ear) exudes from its interior an effluence like ks (dirt ?), (and) if it flows over with humor like paster water, then thou shalt go round it with a hpt-knife to the limits of all that decays in it; thou shalt prepare for it: oil, honey, seed-wool, (which are) placed within it and applied to a fillet of linen and (the ear) is bandaged therewith, until it is healed (Figure 1).



**Figure 1.** Ebers Papyrus, sections 764-767 (from Ebers G. Papyrus Ebers)

**Eb. 768.** Remedy for a bewitched ear w'f nf rjt: balanite oil /, frankincense /, shpt /, is infused into the ear.

**Eb. 769.** Another (remedy): shpt /, frankincense /, northern salt, likewise.

**Eb. 770.** Another (remedy) to dry an ear that emits humor: red ochre /, cumin /, ear of an ass /, finest oil /, balanite oil /, likewise.

**Eb. 854 e.** As to ® that through which the ears become deaf /: there are 2 vessels that affect it, (namely)

the ones leading to the root of the eye; another lection: to the whole eye. When he is deaf, his mouth cannot be opened (ie, he cannot speak). Another lection: as to Ⓜ that through which the ears become deaf ∴ it is these (vessels) that are on the temples of a man hr nssw; it is these (vessels) that give a cutter in a man, so that he (the cutter) takes for him his air?

**Eb. 854 f.** There are 4 vessels to his 2 ears together with the (ear) canal; (namely), 2 on his right side and 2 to his left side. The breath of life enters into the right ear, and the breath of death enters into the left ear; another lection: it (the breath of life) enters into the right side, and the breath of death enters into the left side.

The Ebers papyrus has various interpretations. Stevenson noticed that the eustachian tube was recognized in the statement that the breath of life passes by the right ear<sup>(7)</sup>. This concept is probably a spiritual concept and not an anatomic one, as it is in another text, Eb. 855a, which states Ⓜ As to the breath which enters into the nose: it enters into the heart and the lung; these give to the whole belly ∴ Pahor discusses the association of the eustachian tube with 1 of the 4 vessels of the ear<sup>(8)</sup>. Kamal associates the 2 vessels of the ear with the external and internal auditory canals<sup>(9)</sup>. Politzer's comment about these various interpretations of the Ebers papyrus is interesting: "Since the language of these papyri is several thousand years old, identification of anatomical detail is almost impossible"<sup>(10)</sup>. The use of a knife to treat ear discharge is also confusing. Pahor associated that treatment with a diagnosis of necrotizing otitis externa<sup>(8)</sup> as the result of a translation by Ghalioungui of decay by necrosis<sup>(11)</sup>. This correlation is may be incorrect, however, because the French translation by Bardin<sup>(12)</sup> and the German translation by Grapow<sup>(13)</sup> mention that according to the Ebers papyrus, the interior of the ear is tumefied. This could lead us to suspect that the disorder requiring treatment with a knife is probably a furuncle of the hearing canal. Unfortunately, in that example the exact site of incision is not mentioned. It is almost impossible to try to correlate the descriptions given in the Ebers Papyrus with current diagnoses of ear diseases. Diagnosis, however, is not a part of the medical concepts of the

ancient Egyptians. Some authors consider Ebers paragraph 768 to be the first mention of tinnitus, but a recent publication called into doubt the validity of that interpretation<sup>(14)</sup>. In the remainder of this report, translations of remedies for ear diseases from the papyri and the ostrakon previously cited are presented with comment (cut away).

### **Edwin Smith Papyrus**

The Edwin Smith papyrus (1600 BC) was discovered with the Ebers papyrus and other documents by Edwin Smith in a tomb in 1862 and remained in his possession until his death. His daughter presented it to the New York Historical Society in New York, New York (cut away), in 1906. This papyrus is a large fragment (4.68 meters). It consists of 21.5 columns; 17 (377 lines) columns are on the recto, and 4.5 (92 lines) are on the verso. In 1930, Breasted published a translation of the Edwin Smith papyrus, which is partially reprinted below<sup>(15)</sup>. The Smith papyrus pertains primarily to the treatment of wounds and fractures but also contains medicomagical incantations and prescriptions. The Edwin Smith papyrus is considered to be the world's first surgical treatise<sup>(16)</sup>. Remedies for diseases of the ear that are listed in the Edwin Smith Papyrus are featured below.

**Sm 8, 18-22 (Edwin Smith papyrus, instructions 18-22) (case 23).** Instructions concerning a wound in his ear. If thou examinest a man having a wound in his ear, cutting through its flesh, the injury being in the lower part of his ear, (and) confined to the flesh, thou shouldst draw (it) together for him with stitching behind the hollow of his ear. Thou shouldst say concerning him: Ⓜ One having a wound in his ear, cutting through its flesh. An ailment that I will treat ∴. If thou findest the stitching of that wound loose (and) sticking in the 2 lips of his wound, thou shouldst make for him stiff rolls of linen (and) pad the back of his ear therewith. Thou shouldst treat it afterwards (with) grease, honey, (and) lint every day until he recovers (Figure 2).

This is the only case in the Smith papyrus that pertains exclusively to the ear, although a number of injuries to the head (qv, cases 4, 5, 7, 8, 13, 17, 21, and



Figure 2. Edwin Smith Papyrus, cases 21-28 (New York Historical Society, New York, NY, USA)

22) have ear involvement. The use of stitches to treat a open wound is clearly explained in the description of placing the 2 lips of the wound together to ensure healing.

#### **Berlin Papyrus 3038 ( or Brugsch papyrus)**

The Berlin Papyrus (1200 BBC) is a well preserved manuscript found at (cut away) in a jar 10 ten feet under the ground at Saqqara, Egypt. This papyrus was brought with the Passalacqua Collection to Europe in the early 19th century and was deposited in Berlin. It has 25 pages (3 of which are on the verso and were written by a second hand) with a total of 279 lines and 204 recipes. A lithographic facsimile of the Berlin Papyrus was published in 1863 by Brugsch, who also gave his name to that treatise<sup>(17)</sup>. Wreszinski published the first correct translation in (cut away) of this papyrus in German in 1909<sup>(18)</sup>. The content of the Berlin Papyrus is very similar to that of the Ebers and Hearst papyri, and it includes several passages duplicated from those works.

The text is extremely faulty, sometimes to the level of unintelligibility. Some sections of the Berlin papyrus pertain to the ear.

**Bln 70 (Berlin Papyrus, section 70).** Fumigation (to chase) the deafness provoked by that which comes from outside: cat dung, crocodile dung, swallow droppings, doe's horn. Fumigate the person with all of this.

**Bln 71.** Other (fumigation), to chase away a dead that find itself in an ear: khet-des tree, scorpion dart, dorsal fin (literally ® which is on the back /) of a cynodont. Use as before.

#### **ashe**

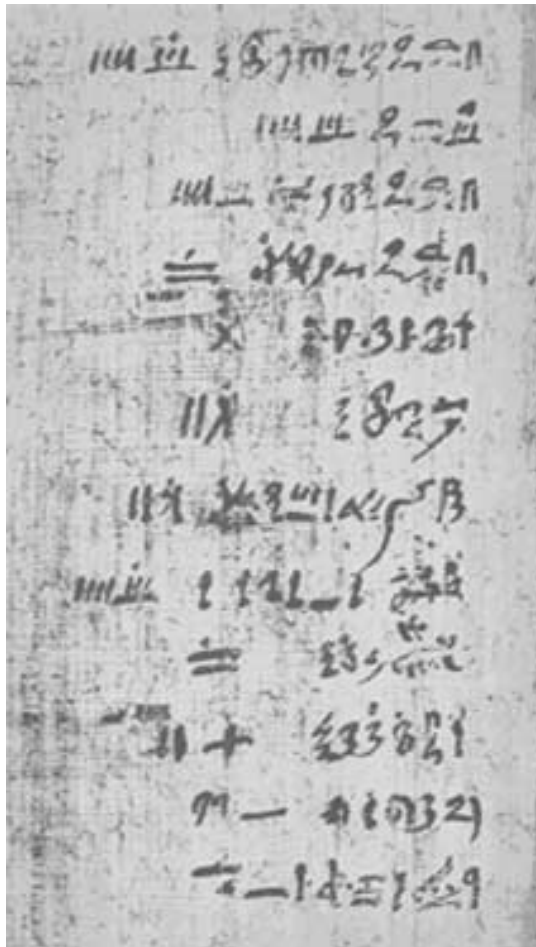
**Bln 163g.** There are 2 mt on the back of his head, there are 2 mt on his front, there are 2 mt in his eyes, there are 2 mt in his eyebrows, there are 2 mt in his nose, there are 2 mt in his left ear, through which the breath of life enters; there are 2 mt in his right ear through which the breath of death enters.

**Bln 200.** Remedy to expel dullness in ear: ink (plant), 1 (part) ; resin of terebinth, 1; celery, 1; bread of offering (?), 1; ox bile, 1; make into a pellet and put into the ear.

**Bln 201.** Another remedy for lancinating pain in the ears: melilotus; make into ointment with laudanum. Put in ear.

**Bln 202.** Another (remedy): fresh ben-oil, 1 (part); Nubian mud, 1; seeds of melon, 1; to be put into the ear.

**Bln 203.** Another remedy for a lancinating pain in the ear: Galena (collyre noire) 1 (part); cream (?) to be put into the ear (Figure 3).



**Figure 3.** Berlin Papyrus, sections 200-203 (from Wreszinski W. Der grosse medizinische Papyrus der Berliner Museum, Berlin, Germany)

**Bln 204.** (...): Seeds of pyrethrum, 1/64; cumin, 1/64; peret-cheny fruit, 1/64; seed from ârou tree, 1/8; ânkh-imy plant, 1/4; melilot, 1/32; acacia leaves, 1/3 ; (...) of djai, 1/64; honey, 1/8; light beer, 15 ro. Reduce to ashes. (This) will be drunk by the person.

Some information in the Berlin Papyrus has been plagiarized from the Ebers Papyrus. According to the Ebers papyrus, the breath of life enters the right ear; in the Berlin Papyrus, it enters the left ear. That difference has not been explained but may be either an error introduced during the transmission of knowledge over centuries (the Berlin Papyrus predates the Ebers Papyrus by almost 350 years) or a deliberate difference of opinion. The interpretation of the Berlin Papyrus also led to speculations by Pahor, who equated the described "dullness" of the ear with Menière's disease<sup>(8)</sup>. Once again, it is impossible to correlate the given descriptions with actual diseases.

### Kahun Papyrus

**The Kahun Papyrus** (1900 BC) was discovered in 1889 at Kahun in the Fayyum district of Lower Egypt. Although fragmentary, it contains portions of 34 sections (all of which are gynecologic disorders that are sometimes associated with symptoms from other organs) and a section on veterinary medicine<sup>(12)</sup>.

**Kah 8 (Kahun papyrus, section 8).** Description (medical) concerning a woman affected in the neck, pelvic region, and the ears (in such a way that) she is unable to hear that which is said. (That) what you should say about this subject: "It is the uterine substances (called) neryou. (That) what you should prepare for this: the same remedy as for chasing away the uterine substances (called) sehaou.

In the excerpt above, the writer states that an ear disorder can be a manifestation of another disease. No actual disease can be inferred from that description, but the concept of associating all the symptoms together in the same entity is new.

### Leiden Papyrus 348

The demotic Leiden Papyrus 348 (1291-1185 BC), which dates from the 19th dynasty<sup>(19)</sup> and includes references to both magic and medicine, was discovered at Memphis with other papyri pertaining to different subjects. It was bought by the Dutch government in 1828 and was first studied by Brugsch. The papyrus has 13 columns on what is now its recto and 12 columns on its verso. One column on the verso mentions ear treatment. The following text is excerpted from the translation by Griffith and Thompson<sup>(20)</sup>.

**Verso col IV.** Medicament for an ear that is watery. Salt, heat with good wine; you apply it after cleansing (?) (the ear) first. You scrape salt, heat with wine; you apply it for 4 days (Figure 4).

### Demotic Vienna Papyrus 12287

The Vienna demotic Papyrus was purchased by Theodor Graf in the latter part of the 19th century. Also described as a medical book from the Fayyum (Crocodilopolis), this papyrus is a part of many other papyri displayed in the Austrian National Library in

Vienna. Probably dating from the second part of the second century AD, this papyrus consists of 16 partly preserved columns of text of which there is an almost complete column concerning ear treatments (Book D, Col. x + IX and x + X)<sup>(20)</sup>. Ten prescriptions (9 pertaining to ear symptoms and 1 devoted to swelling of the parotid gland) are recognizable (lines 28-34).

### Dem Wien (Demotic Vienna Papyrus) IX, 17-19

Treatment for humming in the ear. Apply a red stalk to his hearing organ; sap of black reed; take measure of herbs of any kind 1/10: salt, hulwort in chip(s), oles-resin, oily ointment, sap of lotus 1/4; to be triturated finely; to be applied to it. Another (prescription): fresh medicinal oil of rose; to be strained; to be applied to it.

### Dem Wien IX, 19-24.

Treatment of acute pain in the ear. Another (prescription) for recovering from acute (pain in the ear). ( )... ( ); to be triturated finely; to be applied to it. Another (prescription): radish, reed ( ); to put it into one; to place 1 bowl at its mouth, there being 1 (dose of)



Figure 4. Leiden Papyrus, verso column IV (Leiden Museum)

oil ( ) his mouth. How art to place ( ) to fumigate his (ear) 1 bo(wl (...), while it steams away; to heat underneath it till (reed) to his ear. To the pipe to enter the stream into it. Another (prescription): wild water cucumber, thorn acacia, cannabis undivided; to be triturated finely; ( ) (to' one) ear of them. Here are 2 pipes ( ) bowl to his ear, to one of them. Thou art to sprinkle into the other? Another (prescription): hulwort, black reed ( )... , iris, mecon; to be applied to it. Another (prescription): hot wine milk

n ; to make it hot; to be applied to it.

#### Dem Wien IX, 24.

Treatment of disturbance in the ear. Another (prescription): for recovering from a disturbance in the ear ( ). Juice of mulberry; to be applied to it.

#### Dem Wien IX, 24-25.

Treatment of the sny – disease of the ear. Another (prescription) for recovering from the sny – disease (of the ear) the ear: real cereal, shoot of raspberry; to make it hot; to be applied to it.

#### Dem Wien IX, 25-26.

Treatment of putrefaction. Another (prescription) for drying up the putrefaction in the ear: poro-oil, heated cadmia to be triturated finely to be applied to it. Water-parsnip according to the previous (methods). Another (prescription): mouse's dung, hot wine; to be applied to it. Another (prescription): myrrh, ebony, cc-drug. It is beneficial.

#### Dem Wien IX, 26-27.

Treatment of disturbance in the ear. Another (prescription) for recovering from the disturbance in the ear (when) the putrefaction is in it: oleo-resin, cc-drug, crushed golden thistle; to be triturated finely; to be applied to it. A bandage is made in hot water for any kind of ailment in the ear.

#### Dem Wien IX, 35-37.

Treatment of hardening of the ear. The physician's feat (even) his (method of) awakening (the) hearing: the Persea tree, natron ( ), medicinal oil according to the prescribed measure. ⑧ Eating every heart / which is to befall. The physician's feat (even) his (method of) awakening (the hearing), water 1/2 of liquid measure; to be triturated finely; to be strained; to be drunk for 5 days. It is usually made for the man who removes ( ) (

#### Dem Wien IX, 38.

Treatment of the worm in the ear. The physician's feat that makes the pnty (hof worm) to settle down (Figure 5).

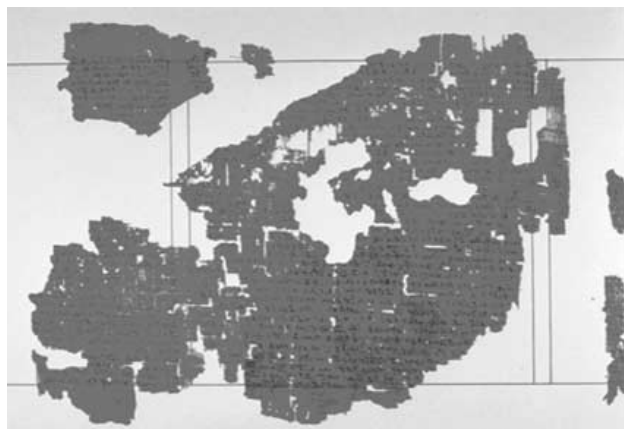


Figure 5. Vienna Demotic Papyrus, column IX (Austrian National Library, Vienna, Austria)

Different points are relevant in this papyrus. As in the Ebers Papyrus, ear pain is expressed by various descriptions of the symptoms, and putrefaction in the ear is attributed to chronic inflammation of the ear, such as that caused by worms. This notion of chronic disease is also found in the Ebers Papyrus (Eb. 765) when treatment for fetid humor is described. The bandage applied to the ear was probably used to retain the formulation in the ear. Almost all the different ancient methods of treating ear diseases are mentioned here: local application of a dry or hot preparation, local fumigation, and a drinkable solution. Also of interest is



the order of description used in this papyrus, which is similar to that used by Galen (book XIV, 330). This fact leads one to suspect that a common source of medical information was used by the Egyptians and was disseminated throughout the ancient world through the channel of Alexandria<sup>(21)</sup>.

**Ostrakon 3255** (Musée du Louvre, Paris, France)

Isolated prescriptions are rare, but a few have been found on ostraca. One such ostrakon (1550-1185 BC), which dates the 18th and 19th dynasties and is now displayed in the Louvre Museum, contains 2 prescriptions for the ear<sup>(22)</sup>.

O Lv (Ostrakon Louvre). A doe's horn, finely ground. Another fumigation similar to this: crocodile droppings, frogs' spawn; fumigate the ears (with this). A tortoise shell; fumigate the ear (with this) (Figure 6).



**Figure 6.** Ostrakon 3255 (Musée du Louvre, Paris, France)

Unfortunately, the beginning of that text is missing; thus, it is not possible to know the indication for the use of those preparations. It is clear, however, is (cut away) that the remedies mentioned are to be used to treat an ear problem. References to some of the ingredients cited have been found in other papyri.

The Book of the Dead states: ®O ye who make perfected souls to enter into the Hall of Osiris, may ye cause the perfected soul of Osiris, the scribe Ani, victorious (in the Hall of Double Truth), to enter with you into the house of Osiris. May he hear as ye hear;

may he see as ye see; may he stand as ye stand; may he sit as ye sit/<sup>(23)</sup>.

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**CONCLUSION**

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The medicine of ancient Egypt undoubtedly occupies an important place in the history of medicine<sup>(24)</sup>. The texts described in this report are the first written sources of otology in the history of medicine. The interpretation of these texts is sometimes difficult because it is necessary to try to interpret each disease in the context of the era in which it is described. Only symptoms were known in ancient Egypt, and the symptom was the disease!

When we try to correlate symptoms with an actual diagnosis in ancient medicine, the risk of error is great. In addition, some of the remedies used then are unknown to the modern world. Treatments changed as more clinical information about ear diseases and disorders became available. Nevertheless, the medical papyri of ancient Egypt are of great interest because the principal symptoms of ear diseases (hearing loss, ear discharge, tinnitus, ear pain) are clearly defined. These treatises show that ear symptomatology in ancient Egypt was not really different from that of the present day. In these papyri, anatomic knowledge is nearly absent. Embalming and mummification usually did not involve the careful preservation of an organ as intricate as the ear<sup>(7)</sup>. The different otologic texts found in these papyri show that otology (and medicine in general) was not a component of a scientific system but rather of an empiric one. In an approach different from that of current medical treatments, ancient remedies were based only on clinical descriptions and were not correlated with known defined diseases.

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