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Egyptian Predynastic Lice Combs: Analysis of an Ancestral Tool

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Combs are instruments of great antiquity and varied morphology, but there is one format that has remained practically unchanged since its first appearance: the two-sided lice (or nit) comb. Its shape is a response to global health needs across time and cultures. Egyptian lice combs have been in use since the Predynastic Period, and although their utilitarian function encourages uniformity, their shape has varied slightly. This study will focus on lice combs from the Predynastic, reviewing aspects from the purely functional to the typological, their possible applications with gender and age, and their place amongst funerary equipment.

Lendreras del Egipto Predinástico: análisis de una herramienta ancestral
Los peines son instrumentos de gran antigüedad y variada morfología, pero existe un formato que se ha mantenido prácticamente inalterado desde el momento de su aparición: la lendrera o peine de doble hilera de púas. Su formato es una respuesta a una necesidad global en el tiempo y diferentes culturas. Las lendreras egipcias han sido usadas desde el Periodo Predinástico y, aunque su función utilitaria les otorgó uniformidad, su formato presenta ligeras variaciones. El presente estudio se centra en las lendreras predinásticas, revisando aspectos que van de lo puramente funcional a lo tipológico, sus posibles relaciones de género y edad, así como su presencia entre el equipamiento funerario.

Keywords: Ectoparasites, lice, nits, lice comb, nit comb, double-sided comb.
Palabras clave: Ectoparásitos, liendre, piojo, lendrera, peine de doble hilera de púas.

In modern Western society, lice combs tend to be used only during a contagion, but archaeological finds show that they might have been common in many cultures, and for millennia, though their study has been of little interest to historians until recent decades.

The appearance of a lice comb at an archaeological site elicits artefactual analyses that go beyond chronological evaluations, and into those of design and function. It has been proposed that these objects might have had other uses, such as in the preparation of textiles,[1] but the remains of ectoparasites found in their tines seem to make it clear that their main function would have been delousing.[2]

The data studied here suggests that lice contagions were common in the ancient world, and that the most successful solution was the two-sided comb.

Their versatility is still evident in modern treatments, as contemporary healthcare workers affirm that meticulous combing with a fine comb is the safest and most effective means of eradicating ectoparasites.[3] The large number of examples from different regions of the planet show that two-sided combs emerged as an effective response, both globally and

1 Arriaza *et alii* 2014: 693–694, 696, 704; Castro 1988: 253; Mata *et alii* 2017: 121–122.

2 Mumcuoglu 2008a: 218; Arriaza *et alii* 2014: 693; Palma 1991: 194.

3 Jahnke 2009; Gairí *et alii* 2007: 59; Herrán and Abad 2008: 269–270; Rosso 2003: 115.

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autonomously, because cultures that were distant from one other both geographically and chronologically have developed the same solution, as will be shown below.

The aim of this paper is to clarify some relevant points about this particular type of comb during the Egyptian Predynastic Period: their function, chronology, social and gender aspects, and importance as models for later designs. In order to appreciate them, it is essential to understand the affliction they were designed to combat, and a brief historical analysis of ectoparasites will therefore be undertaken, along with a historical and ethnographic review of these familiar yet often disregarded objects.

1 | Lice infestations

There is still one global affliction that, even with today's rapidly developing science and technology, has not been eradicated: infestation by *Pediculus humanus capitis*.

According to a study carried out in 1999, this parasite affects 15% of the world's population, especially children, among whom it reaches 30%. This makes lice infestation the second most widespread affection after the common cold.[4] Curtailing this pandemic, which occurs at certain times of the year, requires significant investment in genetic and biochemical research,[5] but some results extend beyond healthcare and have enabled researchers to understand some medical processes and implements of the ancient world.

DNA studies of louse species have been revelatory, as they have managed to determine their place of origin before their association with archaic hominids. Proto-humans and lice developed an intimate host-parasite relationship that was strengthened by environmental adaptations and mutations that the hosts underwent. Lice originated in Africa, and accompanied human groups as they emigrated to other continents. Several clades have evolved, with slight but distinctive mutations. *Pediculus humanus* evolved into three types: the head louse (*Pediculus humanus capitis*), the crab louse (*Pthirus pubis*), and the body louse (*Pediculus humanus corporis*).[6] Of these, the only the latter can transmit a disease (typhus). The other two are not life-threatening, although they can be associated with infections caused by external bacteria affecting lacerations and scoring.

The head louse has certain characteristics that favour its propagation and development, while also mitigating the possibility of eradication. They do not fly, but they achieve a high level of contagion either through direct contact with another host, or by indirect contact via shared headgear or tools. This, along with socialisation patterns, helps to explain why head lice currently have a greater impact on children and women, but transmission patterns were different in the ancient world due to different social and gender behaviours.

The ectoparasites attach their eggs to hair by means of a cement-like substance that is not water-soluble, making them very difficult to extract. This may be an impediment to their extermination, but it is useful for scientific purposes because the eggs remain as witnesses of infestation in most environments,

4 Gairí *et alii* 2007: 56; Rosso *et alii:* 2003: 111.

5 Prieto 2015: 17–18.

6 Boutellis, Abi-Rached and Raoult 2014: 209–215; Kittler, Kayser and Stoneking 2003: 1414–1415; Light *et alii* 2008: 1275–1280; Drali, Mumcuoglu and Raoult 2016: 1–6.

including marine environments.[7] The life cycle of each louse is about fifty days, with a larval (nit) phase, a nymph, and an adult. A single female is able to lay up to one hundred eggs in a ten days period, and these hatch in about ten days, so that a serious infestation can result if there is no means of elimination. The small size of eggs and nits (ca. 1 mm) means that special attention, and illumination, is necessary to detect them.[8] These particularities make the louse a difficult enemy to combat, and leads to questions of how they were tackled in past times.

Specialized studies of ancient hair and its ectoparasites were virtually unknown until a few decades ago, but they are now providing valuable information on the cultural, environmental, and health conditions of the populations being studied.[9]

A project specializing in ectoparasites of pre-Hispanic Andean mummies, developed by several American universities since 2000, is one of the most active and is generating interesting results, not only biological but also cultural, such as the identification of tools and activities related to hair (hairstyles, rituals).[10] A similar project is now being undertaken for European and Mediterranean environments, and is producing studies related to Israelite, Roman, Iberian, and Viking peoples, among others, across different historical periods.[11]

Infestations in antiquity have been identified in different datasets which, for the purposes of this study, have been organized into three categories.

a) Textual. The word *kalmatu* appearing in Akkadian texts has been identified as a louse or parasite, and the word *kalmati* as the person affected by them.[12] The Egyptian papyrus Ebers (ca. 1500 BCE) contains a recipe for repelling parasites,[13] but one of the best known is the passage in Exodus 8: 16–19, from which biblical scholars identify lice as the third plague sent to afflict the Egyptian people.[14] From a later period, the chronicles of Pedro de Cieza de León (16th century CE) and those of Garcilaso de la Vega (17th century CE) stand out, as they describe taxes paid with lice, and rituals of delousing and consumption of them in Amerindian cultures.[15] Other texts that include references to lice can be found in medical books such as that of Hortus Sanitatis (15th century CE), in which a mixture of oil and arsenic sulphide was prescribed.[16]

b) Anthropological. The earliest indicators of affliction have been found in Brazil (10,000

7 Eggs have been detected in double-sided combs found in the wreck of the Mary Rose. See BBC Today: http://news.bbc.co.uk/today/hi/today/newsid_8302000/8302030.stm [accessed 26/08/2018].

8 Gairí *et alii* 2002: 55–57; Herranz and Abad 2008: 268–269; Prieto 2015: 21–27.

9 Harter 2003; Raoult *et alii* 2008; Mumcuoglu 2008a; 2008b; Tassie 2008.

10 Araújo et alii 2000; Arriaza *et alii* 2013; Arriaza *et alii* 2014; Drali *et alii* 2014; Reinhard and Buikstra 2003; Reinhard and Araújo 2016; Rivera *et alii* 2008.

11 Mumcuoglu and Zias 1988; 1989; Derks and Wouter 2010; Castro 1988; Capasso and Tota 1998; Sadler 1990; Kenward 1999; Fragile 1987.

12 Oppenheim 1971: 86–87.

13 Bryan 1930: 163–165.

14 Smith 2018: 95–96; Hamilton 2011: 135.

15 Cieza de León 2005: 96, 337, 448; Vega 1609: 219, 232, 407, 413.

16 von Kaub 1484: Chapter CXIX.

BP) and Nahal Hemar (Dead Sea, 9000 BP).[17] Other human remains with traces of lice or nits include the mummies of Loulan (China, 3800 BP), Camarones 15-D (Chile, 2000 BCE), the Chiribaya culture (Chile, 670–990 CE) and the Aleutian Islands (18th century).[18] Further examples include Roman skulls from Herculaneum and, more recently, the body of Ferdinand II of Aragón (1467–1496 CE) as well as mummies from Iceland (10th to 17th centuries CE).[19]

c) Archaeological. Two-sided combs with fragments of *Pediculus humanus capitis* in their tines have been found in Andean archaeological contexts, as well as in various settlements in Israel, Roman army camps in Holland and Great Britain, and in the remains of the wreck of the Mary Rose, which sank in the 16th century CE (fig. 1).[20]

These examples demonstrate the longevity and global impact of head lice, but not necessarily the degree to which ancient populations were affected; there have been no specific studies of lice in mummies worldwide. Nits and eggs cannot survive on a dead body, so those found on ancient cadavers must remain attached to the individuals they infected during life, whether in the hair and the headgear.

Nits usually appear fragmented due to natural degradation, but eggs act as a valuable control element because they are permanently attached to hair and are more resistant to the passage of time. There are high levels of infestation in Andean bodies, up to 70% in the earliest cultural stages and 90% in the more recent. Upwards of fifty eggs have been counted in samples of 2 cm2, more than 700 in the mummy of Camarones 15-D.[21] The mummy of the so-called 'Bella de Loulan' showed a high incidence of affliction, with lice in her head, pubis, and body, and even her eyelashes showed evidence of these ectoparasites. Compared with current rates, this evidence might suggest that the degree of infestation ought to be high in ancient populations without regard to sex or social status.

Yet the Andean studies indicate that children, unlike today, were the least affected. This seems to be related to the significance of hairstyles among adults, especially among men. Bernardo Arriaza's team suggest that short hair would have been a marker of punishment or misfortune, as well as a means of effectively securing textile headdresses, such as turbans, in the Chinchorro culture.[22] Complex hairstyles and turbans would have been kept for long periods of time, during which lice and nits could not be removed, increasing the level of infestation.

To this indirect evidence should be added a large number of combs with specific characteristics that have been found in funerary and domestic contexts on different continents. Since lice and nits have particular characteristics, both in terms of size and adherence to the hair, a traditional comb has little chance of successfully removing them. A specific method was developed to address this specific problem: the two-sided comb.

17 Araujo *et alii* 2000; Zias and Mumcuoglu 1991.

18 Aufderheide 2003: 268; Rivera *et alii* 2008: 32; Reinhard and Buikstra 2003; Raoult *et alii* 2008; Drali *et alii* 2016: 4.

19 Capasso and Tota 1998; Fornaciari *et alii* 2009.

20 Arriaza *et alii* 2014; Mumcuoglu 2008b; Mumcuoglu and Hadas 2011; Mumcuoglu and Zias 1989; Derks and Wouter 2010; The Mary Rose Museum.

21 Rivera *et alii* 2008: 33–35; Dutra *et allí* 2014: 117–118.

22 Adult Andean mummies have hairstyles of varying complexity. Short hair seems to be associated with childhood or punishments. Arriaza *et alii* 1986; Arriaza *et alii* 2014: 705–706.

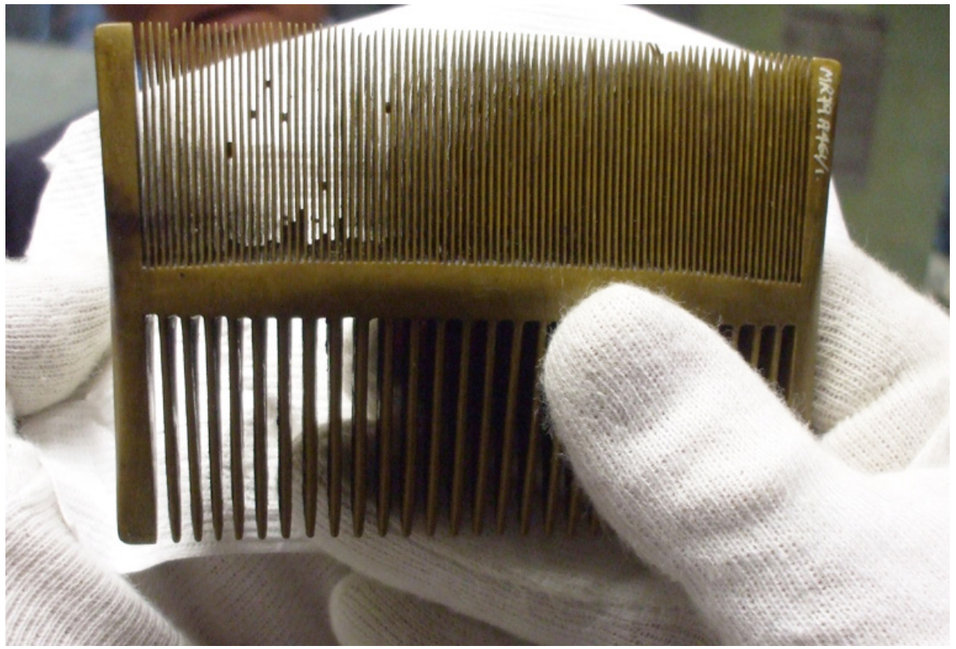

Figure 1. Two-sided comb from the wreck of the Mary Rose. It shows nits, eggs, and lice (BBC Today. October 12, 2009).

2 | Two-sided combs

The difference between traditional and two-sided combs lies in the location of their teeth and the interdental space between them.

Lice combs tend to be rectangular and to have rows of teeth on each side, with a medial area that is often decorated (fig. 2). The presence of elements that allow them to be suspended enables researchers to discuss the orientation of a piece: the side closest to the suspension element is called the proximal section, and the other side is the distal section, with a body or medial section from which the tines protrude and where holes and notches are carved.[23] The dimensions of such combs vary between 3 and 9 cm, although there are exceptional cases, such as a votive or liturgical Christian comb that exceeds 25 cm.[24] A second fundamental characteristic that makes lice combs different from traditional ones is the space between the teeth on each side. The proximal side shows a greater number of tines, so that the interdental space is smaller and appears denser. The distal side has greater space between tines, and thus fewer of them.

23 For these names see: Mata *et alii* 2017: 121

24 Lorenzo 2017; Sierra 2016; Museo Arqueológico Nacional (Madrid), inv. 52258 and 52199.

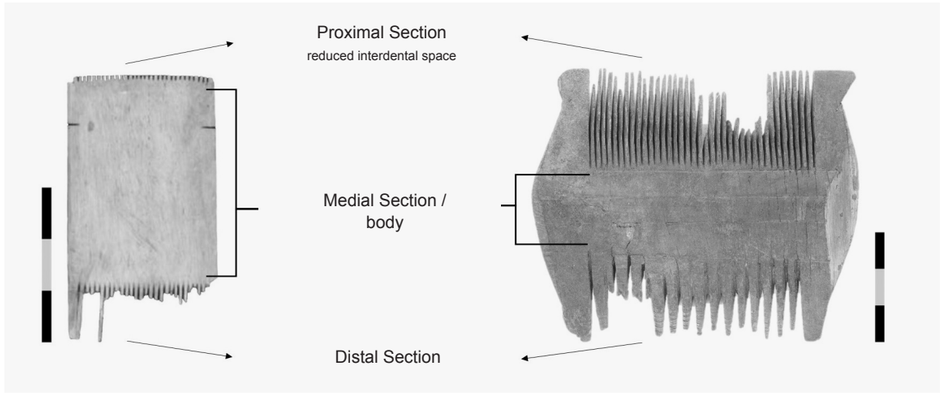

Figure 2. Visual representation of the morphology of lice combs, contrasting a predynastic comb (UC 10159; left) and a Graeco-Roman comb (Te Papa Tongarewa Museum of New Zealand, FE001717; right).

The reason for this variation is that there are two phases of treatment. The hair is separated into strands using the side that has the least number of teeth, which removes dirt and untangles knots. This leaves the hair ready for the second phase, in which it is combed with the other side to extract adult parasites, nits, and eggs.

Current studies indicate that the space between the teeth on the side dedicated to delousing should be 0.2 to 0.3 mm, and thus the average number of tines should be between three and five per centimetre on the combing side and between five and ten on the extraction side. While traces of lice have been found on several one-sided combs,[25] these specimens have a large number of teeth that are very close to one another (0.2–0.3 mm).[26] Another example of such a comb was discovered in the Wadi Farah (Jordan Valley), which was found to contain four lice and eighty-eight eggs within its forty-four teeth (fig. 3).[27] However, the two-sided format

Figure 3. One-sided comb from Wadi Farah (Israel), in which lice and eggs were found (Mumcuoglu 2008a: 219, fig. 13.4).

25 Mumcuoglu and Zías 1988: 546–547; Mumcuoglu and Hadas 2011: 225–227.

26 Herranz and Abad 2008: 269; Arriaza *et alii* 2014: 704.

27 Mumcuoglu 2008a: 218–219; Mumcuoglu and Zías 1989: 67.

Figure 4. Selection of two-sided combs from different cultures. Provenance site is unknown unless otherwise stated: a) probably Roman Gaule, third century. b) Viking culture, ninth-tenth centuries; c) Alcázar, Jerez de la Frontera, Al-Andalus, tenth-eleventh centuries; d) England, sixteenth century; e) Chiribaya culture, tenth-fourteenth centuries; f) probably Swahili culture, nineteenth-twentieth centuries; g) Sinhalese culture, Sri Lanka, seventeenth-eighteenth centuries. Wikimedia Commons.

has been the most successful delousing strategy, and for this reason it has been in use for a very extended period. Examples from different cultures are very similar to one another, despite their temporal and geographical range (fig. 4).

3 | Ancient Egyptian lice combs

Lice infestation among ancient Egyptians is reflected in several written sources. Papyrus Ebers contains a recipe for avoiding these nasty parasites, where under the heading "Beginning of the remedies to drive away fleas and mice" it recommends cooking date flour with water and distributing it over the body and clothes. The text also suggests a mixture of water and natron to disinfect houses.[28] Another method, related by Herodotus, is shaving the head: "The priests shave themselves all over their body every other day, so that no lice or any other foul thing may come to be upon them when they minister to the gods."[29] This passage refers to priests of his era, but it is difficult to generalize and include other groups or periods. Geoffrey J. Tassie indicates that, until the 18th Dynasty, it was not possible to associate the shaven-headed figures represented in ritual scenes with the priesthood.[30] Joann Fletcher has proposed a number of advantages in the use of wigs, such as protection from the sun or the possibility of reducing lice infestation but,[31] as seen in Andean mummies, wigs do not prevent lice affliction, and there-

28 Bryan 1930: 163–165.

29 *Hdt* II, 37 (translator G. C. Macaulay, 1890); Montserrat, 2011: 533.

30 Tassie 2009: 455–456; Tassie 2011: 622–637.

31 Fletcher 1994: 32; 2002: 2.

fore for wigs to be beneficial the wearer would also need to shave the head or to have experienced an episode of alopecia. The mummies of royalty or members of the court appear to have maintained their natural hair, and in some cases bore the eggs of *Pediculus humanus capitis*.[32] This seems to indicate that the function of wigs and hair extensions would primarily have been as an accessory, to reinforce the importance that hair has to personal identity. Hairstyles and wigs marked fashions that were reflected in the iconography of the Nile Valley, as indicated by Tassie and Gay Robins in their research.[33] These designs were made possible due to substances that were used as fixing gels, which allowed the well-off to maintain their elaborate hairstyles.[34]

The remains of ectoparasites have been identified from Nubia to the Delta, and from the Predynastic to the Graeco-Roman period. Lice remains on mummies from the Kerma culture (2400–2050 BCE) to the post-Meroitic Period (350–550 CE) have been found at sites in Upper Nubia.[35] Several cases have been reported from mummies that are considered the oldest in the tombs of Cemetery HK43 at Hierakonpolis.[36] From later periods, Marc Armand Ruffer and Fletcher have detected eggs in some mummies they have examined, although they have not specified the identity of the bodies.[37] The remains of eggs and lice have also been recovered in combs, such as the one deposited in Te Papa Tongarewa, the national museum of New Zealand (FE001717; see fig. 2).[38]

Egyptian two-sided combs have the typical characteristics described above, but there are differences between predynastic and the dynastic examples. Tines were modified and the overall shape tended to standardise, to the point where combs that are similar to those in use today can be recognised. Decoration also differed, appearing during the New Kingdom and presenting its greatest development in the Graeco-Roman period, perhaps reflecting a fashion that Romans brought with them as they expanded across the Mediterranean (fig. 5). This paper focusses on the older, two-sided format that corresponds to the Predynastic Period in Upper Egypt.

3.1 | Lice combs from the Predynastic Period

This study on lice combs is part of a global investigation dedicated to combs and hairpins from the Egyptian Predynastic Period. It examines morphological particularities, raw materials, and possible associations with social and symbolic elements, as well as identifying workshops and territorial delimitations. Some reflections on typology, decoration, and chronology have already been published.[39]

The analyses presented here have been made on twenty combs, the total number that have been collected. They were located by

32 Ruffer 1921: 173.

33 Tassie, 2008: 36–37, 49–59; Robins 1999.

34 McCreesh, Gizeb and David 2011.

35 Armelagos 1969: 256; Harter 2014: 112, 197.

36 Fletcher 1998: 7–9. The final results of this study have not been published.

37 Ruffer 1921: 173; Fletcher 1994: 5; 1997: 4; 1998: 8–9.

38 Palma 1991: 194.

39 Martín del Río 2006; 2016; 2017; 2018; Martín del Río and Almenara 2004.

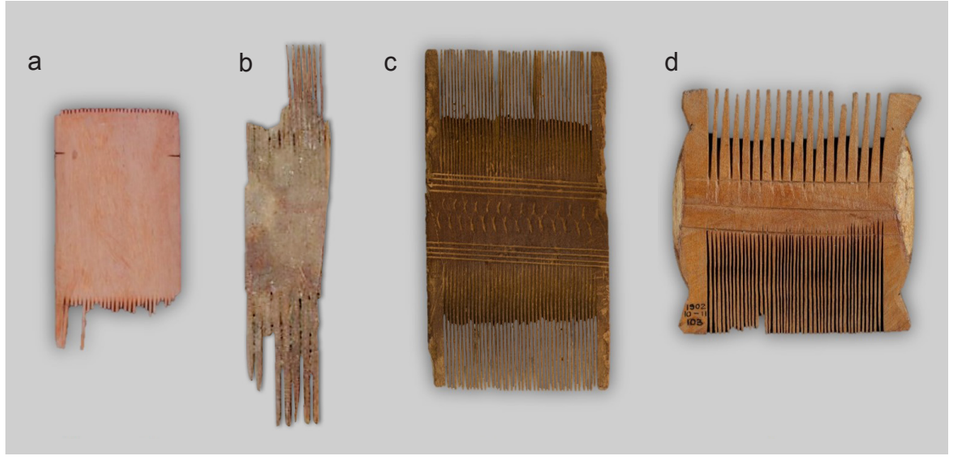

Figure 5. Selection of two-sided combs from different Egyptian periods (montage by the author): a) Hammamiya, NII-IIIC, London, The Petrie Museum (UC 10159); b) Rifeh, Twelfth Dynasty, London, The Petrie Museum (UC 10159); c) Saqqara, Eighteenth Dynasty, New York, Metropolitan Museum of Art (26.2.22); d) Fayum, IV B.C.E., London, British Museum (EA 37414).

searching in memoirs and reports of excavations and prospections carried out between the end of the 19th century and 2016, as well as in the databases and catalogues of museums that hold Egyptological material (table 1).

Most of the objects come from funerary contexts; only UC 10159 is derived from a living environment, while EMC 14486 and ROM 909.80.75 have no recorded origin. These three objects will therefore be excluded from those analyses that relate directly to funerary furnishings: i.e. geographical distribution of cemeteries, age and sex, place of deposition, and association with other objects in the tomb.

3.1.1 | Morphology

The bodies of these pieces are almost always rectangular, with two quadrangular exceptions. Some appear to be irregular due to the nature of the raw material and the shape of the available fragment. Typologies are based upon suspension features, notably notches in the sides of the body, a hole in the central area, or a combination of both (fig. 6).

The rows of tines show differences that are mainly related to their number and dimensions. Those on the proximal side are generally shorter and have a greater number of teeth than those on distal. The tines of the upper section are usually blunt, but in some cases this could not be evaluated due to a poor state of preservation.

3.1.2 | Measurements

This type of comb comes in a manageable format, at an average size between 5 and 6 cm, though there are larger specimens of up to 7 cm, and some that are smaller at around 3 cm.

Where they could be evaluated, there were between fourteen and twenty-eight teeth in the proximal section, though there are some examples with thirty-two and even forty-five.

The number of tines in the distal section varies between twelve and twenty-three.

The length of the tines on the proximal side ranges from 0.5 mm to 4 mm. On the distal side they are between 1 mm and 22 mm. The interdental space averages between 0.5 mm and 1 mm in the proximal section, and 1 mm in the distal.

	Object number	Site	Proposed date
1	PM E1169	Deir el Ballas (Q23)	NIC-IID2
2	UC4377	Naqada (177)	NIIC
3	Unlocated	el-Amra (b62)	NIID1
4	PM E1167	Deir el Ballas (Q116)	NIIIA1-IIIB
5	UC15464	Abydos (--)	*NIIC-IIID*
6	UC 5613	Naqada (1507)	NIC
7	EMC 52067	el Mustagedda (1632)	NIIC
8	AM E.933	el-Amra (b62)	NIID1
9	EMC 14486	Unknow	No date
10	UC 5624	Naqada (1787)	NIIA
11	UC 10159	Hammamiya (Northern settlement A5)	*NIIA-IIIC1 (?)*
12	AM 1895.946	Naqada (177)	NIIC
13	AM 1895.947 (image not found)	Naqada (147)	NIID1
14	MRAH E.1301	Naqada (428)	NIID2-IIIC1
15	UC 5248	Naqada (1230)	NIIA-IIIC1
16	ROM 909.80.75	Unknow	No date
17	UC 5612	Naqada (1507)	NIC
18	AM 1895.932	Naqada (1467)	NIID2
19	BM EA.63060	el Mustagedda (11735)	NIIB-IIC
20	PMAE 14-63-50/B555	Mesaid (555)	NIC-NIID2 (?)

Museum identification	Institution
AM	Ashmolean Museum. Oxford – United Kingdom
BM	British Museum. London – England
EMC	Egyptian Museum. Cairo – Egypt
MRAH	Musées Royaux d'Art et d'Historie. Brussels - Belgium
PMAE	Peabody Museum of Archaeology and Ethnology. Harvard University. Cambridge – USA
PM	Pennsylvania Museum of Archaeology and Anthropology Museum. University of Pennsylvania. Philadelphia – USA
ROM	Royal Ontario Museum. Ontario - Canada

Table 1. List of predynastic two-sided combs analyzed in this study.

3.1.3 | Decorations

Although examples from later periods with geometric or figurative adornments are known, no predynastic lice combs bear any decoration. This contrasts somewhat with other comb typologies of this period, which frequently contain ornamental elements. This absence is probably due to their utilitarian nature.

3.1.4 | Chronology

Chronological estimates are based on information provided by excavation reports for the tombs in which they were found. Where this data was not available, dates have been attributed by evaluating other items of funeral equipment, similarity with other well-dated lice combs, or through the general chronology of the site.[40]

Two-sided combs are present in the three recognised phases of the Naqada Period. While the standard typology of lice combs persisted over time, changes in design occurred during the final phase of Predynastic Period, following a pattern in which other objects were also modified or simply disappeared during the reorganization of a unified Egypt (palettes, tags, tusk, hairpins, combs, pottery, etc.).

Since this work is focused on the Predynastic Period, Naqada IIID will be adopted as the chronological limit, following the standard practice of the academic community.[41]

The catalogue accompanying this paper shows a chronological estimate for the various typologies of lice comb. The earliest specimen would be Naqada IC, and the latest Naqada IIIC1. The largest number of objects are ascribed to Naqada II, especially Naqada IIC. According to the proposed typology, specimens with holes would be the oldest (Naqada IC–IID1), those with notches can be dated to between Naqada IIA and Naqada III, while those found without suspension elements are later, between Naqada IIC and Naqada IIIB (table 2).

3.1.5 | Raw materials

Identification of the raw materials used for lice combs has been difficult to establish as it has not been possible to carry out a visual inspection of every example, since they are held in museums the world over. Accordingly, information provided by museum catalogues or offered by the archaeologists who discovered them has been used in most cases.

Lice combs were mainly made from ivory and bone, with six and seven examples respectively in the catalogue. Four pieces were carved from horn and one from stone, in this case serpentine. In later stages of Egyptian civilization, the prevailing raw material was wood, but in predynastic times there appears to be no reliable evidence for its use.

Ivory examples are present in all predynastic phases. Bone was most commonly used in Naqada II, while horn appears in Naqada I and Naqada II. The stone example is exceptional and its chronology is difficult to specify because the piece (UC 15464) cannot be assigned to a specific cemetery in Abydos. This comb appears on the plates of Flinders Petrie's book *Prehistoric Egypt*,[42] but its prove-

40 Hendrickx and van den Brink 2002.

41 Hornung, Krauss and Warburton 2006: 55–115; Hendrickx 2011: 913–914; Campagno 2013: 2; Köhler, Smythe and Hood 2011: 102.

42 Petrie 1974: XXX-5.

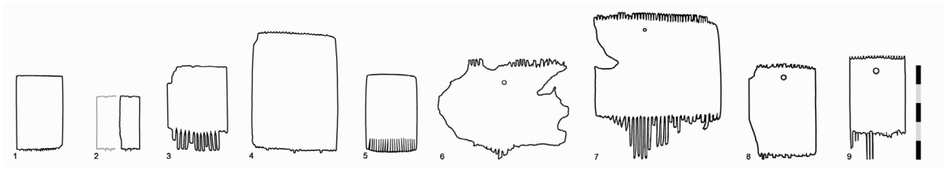

Figure 6a. Typology catalogue of predynastic two-sided combs according to suspension elements: without suspension elements (1–5), with a hole (6–9). Drawings: E. Almenara.

nance was not mentioned. Documents deposited at University College London were traced by the author of this paper, and the comb was found to have been included in the distribution list from Abydos in 1900.[43]

Petrie's manuscripts about his excavations at Abydos during this year show that it could have come from either Cemetery G, M, X, B or Q. Accordingly, its proposed chronology is based on the dating of the Cemeteries G (Naqada IIC–Naqada III?) and Q (Naqada IIIC1–Naqada IIID), which correspond to the earliest and latest dating for the Abydos sites.[44]

Table 3 shows the correspondence between the different formats and the raw materials used. Bone is represented in all of them, ivory does not appear in the combined typology, and horn is only present in those with a suspension hole and a combination of holes and notches.

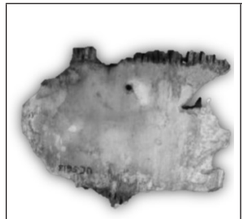	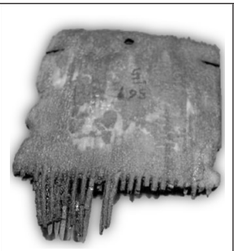		
Hole (4 items)	**Combined elements** notches +hole **(4 items)**	**Notches (7 items)**	**Without suspension element (5 items)**
NIC - NIID1	**NIC - NIID2**	**NIIA - NIIIC1**	**NIIC - IIIB**

Table 2. Chronological table according to suspension elements.

43 University College London 1999. Distribution List and excavations diaries.

44 Hendrickx and van den Brink 2002: 358

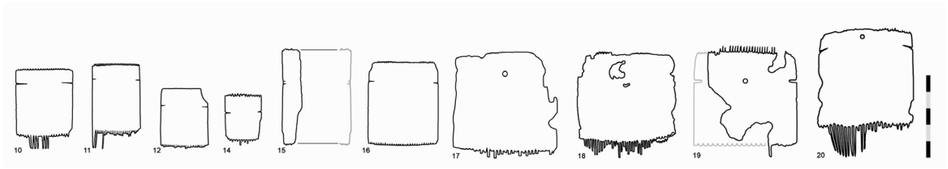

Figure 6b. Typology catalogue of predynastic two-sided combs according to suspension elements: with notches (10–12, 13-16), and with a combination of elements (17–20). Drawings: E. Almenara.

3.1.6 | Function

As indicated throughout this article, this type of comb was specifically developed for the effective elimination of headlice and their eggs and larvae. There are, however, some features that distinguish predynastic examples from those used in Egypt during later periods, or those from other cultural groups.

One of the most significant is the proximal side, for in the majority of specimens the tines are very short, and in some cases are mere sawn edges and almost imperceptible. This does not seem to be due to breakages or weathering. The ends of these small tines are blunt, and this lends itself to the proposal that they might have been useful not only for delousing, but also as scrapers to alleviate itching without causing injury. In representations of humans in this period, men tended to have short hair and grew their beards.[45]

Another distinguishing element is the presence of fastening- or suspension elements. They are absent in later periods, when the format of lice combs began to standardize. The presence of so many predynastic examples with these features suggests that users would carry them about their person and, therefore, that they would have been in ongoing use. The main areas of affliction are usually above the forehead, behind the ears, and above the neck, which would have been readily accessible with a comb hanging from a cord.

	Without elements	Hole	Notches		Combined elements	Total
			One notche	Double notches		
Horn		2			2	4
Ivory	3	1	3			7
Bone	1	1	3	1	2	8
Stone	1					1

Table 3. Frequency of suspension elements and raw materials.

45 Tassie 2008: 123–125.

3.1.7 | Geographical distribution

Lice combs have been found in the cemeteries of Badari, Naqada, and Abydos. No examples have been found at Hierakonpolis, although traces of eggs have been detected in several bodies from Cemetery HK49.[46]

The largest number of these combs—eleven—are associated with the area of Naqada: nine from its main cemetery and two from Ballas. Four two-sided combs are from Abydos, with three discovered in its necropoleis of el-Amrah (two examples) and Mesaid (one). The fourth cannot be ascribed to a specific cemetery, as indicated above. Two were found at Badari, both in the necropolis of Mustagedda.

3.1.8 | Relationship to age and sex

The age and sex of bodies recovered from tombs is not always mentioned in excavation reports or subsequent publications. For this reason, the following is largely for informative purposes.

Age and sex could only be established for twelve graves containing two-sided combs, all of them occupied by adults. Of these, three were male and two were female. No information is available for the others. The absence of lice combs in children's burials might indicate that delousing was within the purview of adults, or that the hair of children was kept very short, or even shaved, as suggested by Tassie.[47]

3.1.9 | Location inside the tomb

Information on this aspect was not recorded in all cases, and investigations have revealed that of the seventeen pieces known from specific tombs, only five had their exact positions recorded on the corpse: two over the head, and one each in the areas of the knee, elbow, and torso.

This information should also be treated with caution, since taphonomic movements and later alterations of burial contexts were rarely recorded in detail by the earliest excavators.

3.1.10 | Other types of comb and hairpins found with two-sided combs

Only five tombs had lice combs associated with other combs or hairpins. Given the small number of pieces available, it is not possible to establish a pattern, but two aspects can be highlighted. The first is that two-sided combs do not appear next to combs of other typologies, but were sometimes associated with hairpins and hairpin-combs. The second is that three of the five tombs mentioned above showed lice combs that came in pairs (table 4).

Conclusions

Throughout this study it has been observed that the two-sided comb was present in all Egyptian periods, and that its form evolved throughout history. However, as noted, the Predynastic Period presents differences compared to later ones.

Dimensions should be highlighted. In general, predynastic lice combs were smaller than in subsequent periods, and their distal and proximal tine lengths were often different. Dynastic examples were of greater dimensions, and their teeth tended to be of similar lengths on both sides. It was during the Roman period that the form became standardized to the one known today, with a narrow central area and a length greater than the height.

The raw material is another distinguishing element, since in most historical times wood was preferred, whereas in the Predynastic Period they were typically executed in ivory, horn, or bone, and one unique example of stone. Adornment is absent in predynastic examples, appearing in the Middle Kingdom and reaching maximum diffusion in the Roman and Byzantine periods.

Another aspect that should be emphasised is the low number of two-sided combs in predynastic contexts compared to other typologies. Of the 308 pieces analysed in the context of this project,[48] only twenty are lice combs. This requires explanation. If it is assumed that the level of infestation was as high in the Predynastic Period as it was in all other documented periods, then a higher number of two-sided combs should be expected, or at least a number proportionate to other analysed cultures. One possible answer might be found in the functionality of other predynastic combs, some of which had a single row of teeth with an average of five or six teeth per centimetre. This density would allow the extraction of parasites (Fig. 7). A comparative study of the average number of tines in one-sided combs has been initiated, and although no definitive conclusions have yet been reached, it appears that the majority of early Egyptian combs have between two and three tines per centimetre, and therefore cannot have served as lice combs.

Pieces analogous to predynastic lice combs from 4th millennium BCE Mediterranean and Near Eastern contexts have been examined in order to establish possible parallels, but no similar characteristics could be identified. This absence could be due to the fact that other populations also used combs with a single, dense row of teeth to remove lice.[49] If so, then it is possible that predynastic two-sided combs are the first examples of this form in the Mediterranean area.

What seems certain is that Egyptian predynastic lice combs had a defined format since the Naqada I phase, and that their function was

Burial	Hairpins type	Comb-hairpin	Comb type ii.1	Chronology
el Amra (b62)	II.2.C.2a (x2)		(x2)	NIID1
Naqada 147		III	(x1)	NIID1
Naqada 177			(x2)	NIIC
Naqada 1230	II.1		(x1)	NIIA-IIIC1
Naqada 1507			(x2)	NIC

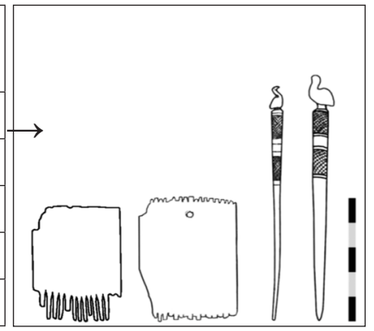

Table 4. Relationship between the types of combs and hair pins that appeared in tombs together with two-sided combs.

46 Fletcher 1998: 8–9.

47 Tassie 2008: 98, 127, 189, 207.

48 Martín del Río 2016.

49 Mumcuoglu and Zías 1989: 67.

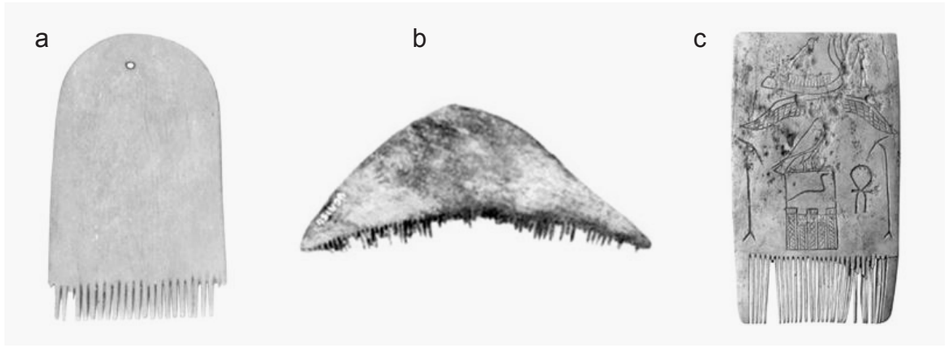

Figure 7. Predynastic Egyptian one-sided comb, whose interdental spaces could be used for delousing: a) Abydos, NIIIC1, London, The Petrie Museum (UC16195); b) el-Badari, Badarian, London, The Petrie Museum (UC 9156); c) Abydos, NIIIC2, Cairo, Egyptian Museum (CG 47176).

adapted to meet the needs of their users: their size was manageable, they were easy to carry, and they could be used as scrapers. The latter function is extrapolated from the observation that short hair seems to have been predominant among men of all social ranks and among non-elite women. Such tools could also have been used to alleviate itching when wearing elaborate hairstyles, such as the tripartite and braided styles identified in predynastic times.[50]

Establishing correspondence between these pieces and gender or age is difficult. Information that would lead to reliable proposals is simply lacking. Yet the absence of lice combs in children's graves might be significant, as it suggests relationships with the hairstyle canons for each gender, age, and social status. Following Tassie, children would either be shaved or have very short hair, as hair extensions and complex hairstyles seem to have been intended for adults.[51]

Funerary equipment in graves where lice combs were found has been evaluated in order to determine whether the latter were related to a particular status. Sixteen pieces, belonging to thirteen graves, have been documented in funerary deposits that are complete enough for such a study to be carried out. Two cases mention only a single object in addition to the lice comb. As the degree to which tombs had been robbed was not usually indicated in the associated reports, other pieces may once have been present in both of these. For the remainder, the results are as follows:

1. Ceramics: Eleven tombs contained ceramics in varying quantities, between one and eighteen pieces. Two of the tombs that had pairs of two-sided combs also had the highest number of pieces: eighteen and sixteen. In the case of el-Amra b62, five different types of ceramics were collected, including Black-topped and Decorated wares.
2. Stone vessels: They were located in five of the tombs analysed, with one specimen in each, except for el-Amra b62 which had five. One of these had a lapis lazuli base.

50 Tassie 2008: 86.

51 Tassie 2008: 98, 127, 189, 207.

TOMB	Deir el Ballas Q23	Deir el Ballas Q116	el Mustagedda 1632	el Mustagedda 11735	el Amra B62	Mesaid 555	Naqada 147	Naqada 177	Naqada 428	Naqada 1230	Naqada 1467	Naqada 1507	Naqada 1787
OBJECT NUMBER	*PM E1169*	*PM E1167*	*EMC 52067*	*BMEA.63060*	*AM E.933 / Not localized*	*PMAE 14-63-50*	*AM 1895.947*	*AM 1895.946 UC4377*	*MRAH E.1301*	*UC5248*	*AM 1895.932*	*UC5612/ UC5613*	*UC5624*
Pottery	6	1	6	1	16		11	18	1		5	2	5
Stone vessels	1				5		1	1				1	
Palette	1	1			6		1	4			1		1
Tag/Tusk	1		1										
Bead	1				14								
Bead Lapislazuli					1								
Bead - gold					7								
Braceelet copper					3								
Shell				1	1		1						
Hairpin					2					1			
Spoon - Ivory					1								
Rod / Spindle whorl								1					
Flint							1	1					
Lapislazuli	1												
Galena / malachite / resin		1			1		1	1					
Textile			1										
Mat			1	1									

Table 5. Funerary equipment in the tombs within which lice-combs were found. See also table 4 for tombs with other combs.

3. Palettes: Seven funerary assemblages contained different types of palettes, including the theriomorphic type. Again, el-Amra b62 stands out with six, one of them being the well-known palette of Min.
4. Elements of personal adornment: These seem to have a limited presence in tombs, since they were only found in two of them. A common element is the presence of beads. El-Amra b62 contained beads that were gold-plated, or made of lapis lazuli, garnet and shells, and some that were glazed in green. Three copper bracelets were also found there. A gold bead was also found in Ballas Q23.
5. Amulets: Two tombs contained one bone amulet each (types B.7.b and B.3.b).[52]
6. Other objects: Items such as an ivory spoon, hair pins, a rod and spindle whorl set, flint, textile fragments, and a mat appear in various tombs, along with products such as galena, resin, or malachite.

The appearance of remarkable elements such as gold and lapis lazuli, together with prestigious objects such as stone vessels, decorated palettes, or pieces of ivory, seems to indicate a certain level of wealth for most burials with lice combs. Among the eleven graves with funerary equipment consisting of more than two objects, seven had sufficient elements for them to be considered high status. The most meaningful ones are el-Amra b62, Ballas Q23, Naqada 147, and Naqada 177 (table 5). The sex of an occupant could only be established for el-Amra b62; a female. In consequence, two-sided combs seem to have been possessions of sufficient worth to accompany the high-ranking deceased into the afterlife.

52 Hendrickx and Eyckerman 2011: 540, 549.

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Bibliography

Araújo, A.; Ferreira, L.; Guidon, N.; Maues Da Serra Freire, N.; Reinhard, K.; Dittmar, K.
2000 "Ten Thousand Years of Head Lice Infection", *Parasitology Today* 16: 269.

Armelagos, G.J.
1969 "Disease in Ancient Nubia", *Science* 163: 255–259.

Arriaza, B.; Allison, M.J.; Standen, V.; Focacci, G.; Chacama, J.
1986 "Peinados precolombinos en momias de Arica", *Chungara Revista de Antropologia Chilena* 16–17: 353–375.

Arriaza, B.; Standen, V.G.; Núñez, H.; Reinhard, K.
2013 "Study of Archaeological Nits/Eggs of P*ediculus humanus capitis* by Scanning Electron Microscopy", *Micron* 45: 145–149.

Arriaza, B.; Standen, V.G.; Heukelbach, J.; Cassman, V.; Olivares, F.
2014 "Head Combs for Delousing in Ancient Arican Populations: Scratching for the Evidence", *Chungara Revista de Antropología Chilena* 46: 693–706.

Aufderheide, A.C.
2003 *The Scientific Study of Mummies*. Cambridge.

Boutellis, A.; Abi-Rached, L.; Raoult, D.
2014 "The Origin and Distribution of Human Lice in the World", *Journal of Molecular Epidemiology and Evolutionary Genetics of Infectious Diseases* 23: 209–217.

Bryan, C.
1930 *The Papyrus Ebers*. Letchworth.

Campagno, M.
2013 "Late Fourth Millennium BCE", in: W. Grajetzki and W. Wendrich (eds.): *UCLA Encyclopedia of Egyptology*, Los Angeles.

Capasso, L.; Tota, G. di
1998 "Lice Buried Under the Ashes of *Herculaneum*", *The Lancet* 351: 992.

Castro, Z.
1988 "Peines prehistóricos peninsulares", *Trabajos de Prehistoria* 45: 243–258.

Cieza del León, P.
2005 *Crónica del Perú: el señorío de los Incas*. Caracas.

Derks, A.M.; Vos, W.K.
2010 "Wooden Combs from the Roman Fort at Vechten: The Bodily Appearance of Soldiers", *Journal of Archeology in the Low Countries* 2 / 2: 53–77.

Drali, R.; Mumcuoglu, K.Y.; Raoult, D.
2016 "Human Lice in Paleoentomology and Paleomicrobiology", *Microbiology Spectrum* 4: 1–8.

Dutra, J.; Alves, A.; Pessanha, T.; Rachid, R.; Souza, W.; Linardi, P.; Ferreira, L.; Mendoça, S.; Araújo, A.
2014 "Prehistorical *Pediculus humanus capitis* Infestation: Quantitative Data and Low Vacuum Scanning Microscopy", *Revista do Instituto de Medicina Tropical de Sao Paulo* 56: 115–119.

Fletcher, J.
1994 "A Tale of Hair, Wigs and Lice", *Egyptian Archaeology* 5: 31–33.

1997 "Hair: Unraveling the Secrets of the Locks", *Nekhen News* 9: 4.
1998 "The Secrets of the Locks Unraveled!", *Nekhen News* 10: 99.
2002 "Ancient Egyptian Hair and Wigs", *The Ostracon – The Journal of the Egyptian Study Society* 13 / 2: 2–8

Fraile, J.M.
1987 "Notas tradicionales sobre el pelo y su cuidado en Madrid y en la Zona Centro", *Revista de Folklore* 73: 3–15.

Fornaciari, G.; Giuffra, V.; Marinozzi, S.; Picchi, M.S.; Masetti, M.
2009 "'Royal' Pediculosis in Renaissance Italy: Lice in the Mummy of the King of Naples Ferdinand II of Aragon (1467–1496)", *Memórias do Instituto Oswaldo Cruz* 104: 671–672.

Gairi, J.M.; Molina, V.; Moraga, F.A.; Viñallonga, X.; Baselga, E.
2007 "Pediculosis de la cabeza", in: F.A. Moraga Llop (coord.): *Asociación Española de Pediatría. Protocolos de Dermatología*: 55–64.

Hamilton, V.
2011 *Exodus. An Exegetical Commentary*. Grand Rapids.

Harter, S.
2003 *Implication de la Paléoparasitologie dans l'étude des Populations Anciennes de la Vallée du Nile et de Proche- Orient: Étude de cas* (Doctoral thesis). Université de Reims, Reims.

Hendrickx, S.
2011 "The Chronology Workshop", in: R. Friedman and P. Fiske (eds.): *Proceedings of the Third International Conference "Origin of the State. Predynastic and Early Dynastic Egypt*", London, 27th July – 1st August 2008 (*Orientalia Lovaniensia Analecta* 205). Leuven: 911–915.

Hendrickx, S.; van den Brink, E.C.M.
2002 "Inventory of Predynastic and Early, Dynastic Cemetery and Settlement Sites in the Egyptian Nile Valley", in: E. van den Brink and E.L. Levy (eds.): *Egypt and the Levant. Interrelations from the 4th through the Early 3rd Millennium BCE*, London: 346–399.

Hendrickx, S.; Eyckerman, M.
2011 "Tusks and Tags. Between the Hippopotamus and the Naqada Plant", in: R. Friedman and P. Fiske (eds.): *Proceedings of the Third International Conference "Origin of the State. Predynastic and Early Dynastic Egypt*", London, 27th July – 1st August 2008 (*Orientalia Lovaniensia Analecta* 205), Leuven: 497–570.

Herranz, B.; Abad, E.
2008 "Pediculosis de la cabeza", *Revista de Pediatría y Atención Primaria* 10: 267–286.

Hornung, E.; Krauss, R.; Warburton, D.
2006 *Ancient Egyptian Chronology*. Leiden, Boston.

Jahnke, C.; Bauer, E.; Hengge, U.R.; Feldmeier, H.
2009 "Accuracy of Diagnosis of *Pediculosis capitis*. Visual Inspection vs. Wet Combing", *Archives of Dermatology* 145: 309–313.

Kaub, C. von
1484 *Hortus sanitatis, vel tractatus de herbis et plantis, de animalibus omnibus et de lapidibus*. Maguncia.

Kenward, H.
1999 "Pubic Lice (*Pthirus pubis L.*) were Present in Roman and Medieval Britain", *Antiquity* 73: 911–915.

Kittler, R.; Kayser, M.; Stoneking, M.
2003 "Molecular Evolution of *Pediculus Humanus* and the Origin of Clothing", *Current Biology* 13: 1414–1417.

Köhler, E; Smythe, J.; Hood, A.
2011 "Naqada IIIC-D – The End of the Naqada Culture?", *Archéo-Nil* 21: 101–110.

Martín del Río, C.
2006 "Predynastic Hairpins and Combs from the Necropolis of Naqada: Preliminary Conclusions", in: K. Kroeper, M. Chlodnicki and M. Kobusiewicz (eds): *Archaeology of Early Northeastern Africa*, Poznan: 781–787.
2016 *Los peines y las agujas de pelo durante los periodos Predinástico y Dinástico Temprano del Alto Egipto: organización tipológica y función cultural* (Doctoral Thesis). Universidad de La Laguna, San Cristóbal de La Laguna.
2017 "The Geometric Decoration in the Rods of Predynastic Hairpins from Upper Egypt. A Proposal of Typology and its Dates", in: B. Midant-Reynes, Y. Tristant and E. Ryan, (eds.): *Origin of the State. Predynastic and Early Dynastic Egypt, Cairo, 13th – 18th April 2014* (*Orientalia Lovaniensia Analecta* 260), Leuven, Paris, Dudley: 695–702.
2018 "Flat-Section Hairpins during the Egyptian Predynastic Period? A Proposal of Identification and Typology", *Trabajos de Egiptología. Papers on Ancient Egypt* 8: 195–210.

Martín del Río, C.; Almenara, E.
2014 "An Analysis of the Theriomorphic Representations on Combs and Hairpins from the Predynastic Period", in: S. Hendrickx, R. Friedman, K. Cialowicz and M. Chlodnicki (eds.): *Egypt at Its Origins: Studies in Memory of Barbara Adams: Proceedings of the International Conference "Origin of the State, Predynastic and Early Dynastic Egypt," Krakow, 28 August – 1st September 2002* (*Orientalia Lovaniensia Analecta* 138), Leuven: 881–889.

Mata, C.; Soria, L.; Blasco, M.; Fuentes, M.; Collado, E.
2017 "Peines de marfil y madera de la II Edad del Hierro en la Peninsula Ibérica. Talleres, estilos y otros enredos", *Complutum* 28: 119–141.

McCreesh, N.C.; Gizeb, A. P.; David, A. R.
2011 "Ancient Egyptian Hair Gel: New Insight into Ancient Egyptian Mummification Procedures through Chemical Analysis", *Journal of Archaeological Science* 38: 3432–3434.

Montserrat, V.J.
2011 "Sobre los artrópodos en la obra de Heródoto y su tiempo", *Boletín de la Sociedad Entomológica Aragonesa* 48: 525–543.

Mumcuoglu, K.Y.
2008a "Human Lice: *Pediculus and Pthirus*", in: D. Raoult and D. Drancourt (eds): *Paleomicrobiology. Past Human Infections*, Berlin, Heidelberg: 215–222.
2008b "The Louse Comb: Past and Present", *American Entomologist* 54: 164–166.

Mumcuoglu, K.Y.; Hadas, G.
2011 "Head Louse (*Pediculus humanus capitis*) Remains in a Louse Comb from the Roman Period Excavated in the Dead Sea Region", *Israel Exploration Journal* 61: 223–229.

Mumcuoglu K.Y.; Zias, J.
1988 "Head Lice, *Pediculus humanus capitis* (Anoplura: Pediculidae) from Hair Combs Excavated in Israel and Dated from the First Century BC to the Eighth Century AD", *Journal of Medical Entomology* 25: 545–547.
1989 "How the Ancients Deloused Themselves", *Biblical Archaeology Review* 15: 66–69.

Light, J.E.; Allen, J.M.; Long, L.M.; Carter, T.E.; Barrow, L.; Suren, G.; Raoult, D.; Reed, D.L.
2008 "Geographic Distributions and Origins of Human Head Lice (*Pediculus humanus capitis*) Based on Mitochondrial Data", *The Journal of Parasitology* 94: 1275–1281.

Oppenheim, A.L. (ed.)
1971 s.u. "kalmatu", *The Assyrian Dictionary,* Vol .8, Chicago: 86–87.

Palma, R.
1991 "Ancient Head Lice on a Wooden Comb from Antinoë, Egypt", *Journal of Egyptian Archaeology* 77: 194.

Petrie, W.M.F.
1974 *Prehistoric Egypt*. London.

Petrie Museum, The
1999 *The Petrie Museum Archives, University College London*. London.

Prieto, M.
2015 *Plan de prevención y control de la Pediculosis en Navarra* (Master Thesis). Universidad Pública de Navarra. Pamplona.

Raoult, D.; Reed, D.; Dittmar, K.; Kirchman, J.; Rolain, J.; Guillen, S.; Light, J.
2008 "Molecular Identification of Lice from Pre-Columbian Mummies", *The Journal of Infectious Diseases* 197: 535–543.

Reinhard, K.; Buikstra, J.
2003 "Louse Infestation of the Chiribaya Culture, Southern Peru: Variation in Prevalence by Age and Sex", *Memórias do Instituto Oswaldo Cruz* 98: 173–179.

Reinhard, K.; Araújo, A.
2016 "Prehistoric Pathoecology as Represented by Parasites of a Mummy from the Peruaçu Valley, Brazil", *Korean Society for Parasitology and Tropical Medicine* 45: 585–590.

Rivera, M.; Mumcuoglu, K.; Matheny, R.; Matheny, D.
2008 "Head Lice Eggs, *Anthropophthirus capitis*, from Mummies of the Chinchorro Tradition, Camarones 15-D, Northern Chile", *Chungara. Revista de Antropología Chilena* 40: 31–39.

Robins, G.
1999 "Hair and the Construction of Identity in Ancient Egypt, c. 1480–1350", *Journal of the American Research Center in Egypt* 36: 55–69.

Rosso, R.; Ramírez, S.; Torres, M.
2003 "*Pediculus capitis*: Terapias disponibles" *Revista Chilena de Infectología* 20: 111–116.

Ruffer M.A.
1921 *Studies in the Paleopathology of Egypt*. Chicago.

Sadler, J.
1990 "Records of Ectoparasites on Humans and Sheep from Viking-age Deposits in the Former Western Settlement of Greenland", *Journal of Medical Entomology* 27: 628–631.

Smith, J.
2018 *Exodus: A Commentary*. Lulu.com.

Tassie, G.J.
2008 *The Social and Ritual Contextualisation of Ancient Egyptian Hair and Hairstyles from the Protodynastic to the End of the Old Kingdom* (Doctoral thesis). University College London, London.
2009 "Hairstyles Represented on the Salakhana Stelae", in: T. Du Quesne (ed.): *The Salakhana Trove: Votive stelae and other objects from Asyut* (*Oxfordshire Publications in Egyptology* 7), London: 459–536.
2011 "What Your Hair Says About You: Changes in Hairstyles as an Indicator of State Formation Processes", in: R.F. Friedman and P.N. Fiske (eds.): *Egypt at its Origins 3: Proceedings of the Third International Conference "Origin of the State. Predynastic to Early Dynastic Egypt"* (*Orientalia Lovaniensia Analecta* 205), Leuven: 605–645.

Vega, G. de la
1609 *Los comentarios reales de los Incas*. Lisboa.

Zias, J.; Mumcuoglu, K.Y.
1991 "Pre-pottery Neolithic B Head Lice from Nahal Hemar Cave", *Atiqot* 20: 167–168.

Webgraphy

BBC Today (2009). New Mary Rose Artefacts on Show. London. Retrieved from http://news.bbc.co.uk/today/hi/today/newsid_8302000/8302030.stm [accessed 26/08/2018].

British Museum. London. Retrieved from https://research.britishmuseum.org/research/collection_online/collection_object_details.aspx?objectId=118854&page=1&partId=1&searchText=roman%20comb [accessed 12/08/2018]

Lorenzo, J. M. (2017). Peines buenos, peines malos. Madrid. Retrieved from https://cvc.cervantes.es/el_rinconete/anteriores/marzo_17/01032017_01.htm [accessed 20/09/2018].

The Mary Rose Museum. Portsmouth. Retrieved from https://maryrose.org/meet-the-surgeon/#diseases [accessed 10/10/2018].

Metropolitan Museum of Art. New York. Retrieved from https://www.metmuseum.org/art/collection/search/554526?&searchField=All&sortBy=Relevance&ft=comb+egypt&offset=0&rpp=20&pos=1 [accessed 12/08/2018].

Museo Arqueológico Nacional (2018). Peine litúrgico. Madrid. Retrieved from http://www.man.es/man/dms/man/actividades/pieza-del-mes/2014-ciclos/fondos-fundacionales/MAN-pieza-mes-2014-09-peine-liturgico.pdf [accessed 12/08/2018].

Te Papa Tongarewa Museum. New Zealand. Collection online. Wellington. Retrieved from https://collections.tepapa.govt.nz/object/167588 [accessed 01/10/2018].

The Petrie Museum of Egyptian Archaeology. London. Retrieved from http://petriecat.museums.ucl.ac.uk/search.aspx [accessed 05/07/2018].

Sierra, X. (2016). Peines litúrgicos. Retrieved from http://xsierrav.blogspot.com/2016/05/peines-liturgicos.html [accessed 12/08/2018].

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