The Lady under the hill: an osteobiography of a Middle Bronze Age cremated female from Ermelose Heide (Ermelo, prov. Gelderland, the Netherlands)

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The Lady under the hill: an osteobiography of a Middle Bronze Age cremated female from Ermelose Heide (Ermelo, prov. Gelderland, the Netherlands)

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Abstract

Cremated human remains are an important source of information on the life and well-being of past individuals, but due to their nature (i.e. burnt, fragmented) often form a challenge to analyse. Generally, cremation cemeteries are considered on a population level, but by creating life narratives, the sociocultural roles that certain individuals had in past societies can be reconstructed. The burial ground of Ermelose Heide currently consists of 46 prehistoric mounds. Several mounds were excavated in the 1950's, whereby mound 14 was comprised of two "submounds", a small and a large one, after which both mounds were covered to look like one. Mound 14 contained 7 cremation graves, 4 in 14Large and 3 in 14Small. One of the cremation deposits, V41, was located separately from the rest in 14Small and was composed of the burnt remains of an older female and a foetus (~28 weeks *in utero*). The remains of the female were nearly complete, as opposed to the other cremation deposits in mound 14. Although it is not possible to prove that the female was the mother of the foetus, if indeed she was, she would have been visibly pregnant. In addition, her lumbar vertebrae showed lesions that could be the result of trauma, which most likely was exacerbated by the presence of an incomplete fusion of her 4th lumbar vertebra. Considering that she may have been visibly pregnant and potentially had trouble or pain while walking as a result from the spinal trauma, it is possible that she was viewed upon differently than the rest. By creating an osteobiography for the female with the foetus in mound 14, her life narrative highlights the divergent nature of her funerary practices, aiding in the reconstruction of her sociocultural role withing the MBA-society of Ermelose Heide.

1. Introduction

The burial mounds of Ermelose Heide, located in the middle of the Netherlands (fig. 1), were excavated in the 1950's and date to the Middle Bronze Age (Bourgeois 2013, 78-88). In those days, cremated remains often were too complicated to study and either would have been stored or discarded entirely. Fortunately, the cremated remains from Ermelose Heide were preserved, enabling the osteological assessment years later.

Mound 14 actually incorporated two "submounds", each containing cremation deposits, as demonstrated in figure 2. While 14Large shows the cremation deposits to be buried close to each other, 14Small shows two distinct locations of cremation deposits, displaying V41 separately.

Usually, cremation cemeteries are considered at a population level (Mäntylä-Asplund & Storå 2010; Caswell & Roberts 2018; Veselka *et al*. 2021), whereby the interred individuals are discussed together. An osteobiography, however, highlights the individual life history instead of the population as a whole (Hosek & Robb 2019; Robb *et al*. 2019). The construction of osteobiographies is increasingly being performed on skeletal remains (e.g. Mays *et al*. 2018; McIntyre *et al*. 2022; Baldoni *et al*. 2020), but cremated human remains are not considered due to their challenging nature. To our knowledge only the study by Bartsiokas (2000) constructed an osteobiography of cremated human remains.

The aim of this paper is to create an osteobiography of female V41 by combining osteoarchaeological analyses of V41, comparing the results to the other individuals, and considering the differences in burial practices. This way, one of the few osteobiographies on cremated human remains from prehistoric times is created with which divergent funerary practices can be better identified, thereby improving our understanding of the sociocultural roles of individuals within past societies.

2. Materials and Methods

V41 is part of the Ermelose Heide collection, consisting of 35 cremation deposits from 8 burial mounds (Bourgeois 2013). All the cremated remains were deposited seemingly without a container directly in a grave pit. Table 1 presents the demographic overview with total weights of the cremation deposits from mounds 2, 3, 4, 8, 14Small, 14Large, 15, and 18 Ermelose Heide, the Netherlands.

The entire dataset will also be part of a large forthcoming overview study of the prehistoric burial mounds in the Gelderland province (Bourgeois *et al*. in prep.). In this paper, the focus is on V41.

The remains were analysed using standard osteoarchaeological methods. Appendix 1 provides a detailed description of all the methods used to estimate age and biological sex. Standard works on palaeopathology (Ortner 2003; Aufderheide & Rodríguez-Martín 1998; Roberts & Manchester 2005) were used to identify pathological anomalies and the work of Barnes (2012) to identify developmental anomalies.

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Fig. 1. The location of the Ermelo burial cemetery marked on a map of the Netherlands with an impression of the currently preserved burial mounds (Photograph: Stichting NMP Ermelo).

3. Results

V41 weighed 1483.9 g and contained a female aged 30-49 years and a foetus of ~28 weeks *in utero*. The other cremation deposits within 14Small consisted of a grave with 1469.7 g of burnt bone, containing a male individual and a nonadult, and a cremation deposit with just adult remains weighing 193.5 g. The four cremation deposits in 14Large contained two indeterminate individuals weighing 2.7 g and 17.6 g. The other two contained the remains of a 13-18 years-old and a female aged 19-30 years and total weights were 447.5 g and 91.2 g respectively.

Further analysis of female V41 revealed spinal trauma in the lumbar vertebrae. Figure 3 presents the lumbar vertebrae. On the left, the top vertebra is the first and the last one is the fifth lumbar vertebra (L5). The top right image is the superior view of L1 showing a "step-off" fracture characteristic for avulsion injuries of the vertebral endplate (Maat & Mastwijk 2004). The bottom right image is the anterior view of L5, showing compression of the superior anterior rim. L4 lacks the transverse process on the right side and is half the size of the other vertebrae, but otherwise looks smooth.

4. Discussion and Conclusion

McKinley (1993) and Gonçalves *et al*. (2013) report the total weight of an adult cremated skeletons to be about 1675 g (McKinley 1993) ranging from 1219.6 to 1944.7 g (Gonçalves *et al*. 2013). Since the weight of the foetal remains was very low, the relatively high weight of the female remains and the fact that all skeletal categories were present, suggests that the female remains were nearly complete, as opposed to the other cremation deposits in mound 14 (both submounds), whereby total weight varied from 2.7 g to 1469.7 g, the latter containing at least two individuals (see Table 1). Clearly, none of the total weights of the other cremation deposits in either of the submounds suggested the skeletal remains to have been (nearly) complete.

Double cremation combining female and nonadult is commonly observed throughout time and in different parts of the world (Mizoguchi 1993; Liston & Papadopoulos 2004; Reinhard & Shipman 1978). It is, however, difficult to determine relationship between the female and the foetus. Liston and Papadopoulos (2004) argue that the preservation of the foetal bones after the cremation process would only be possible due to the relative protection of the mother's womb, whereby the presence of foetal remains would prove the female to be the mother. However, Jaeger and Johansen (2013) undertook experimental work burning the remains of small pigs as a proxy for young nonadult skeletal remains. Their results show that young pig bones survive the cremation process very well, and as such, nonadult skeletal remains are likely to survive the cremation process without their mother's protection. The possibility exists that female V41 was the mother of the foetus she was buried with. If

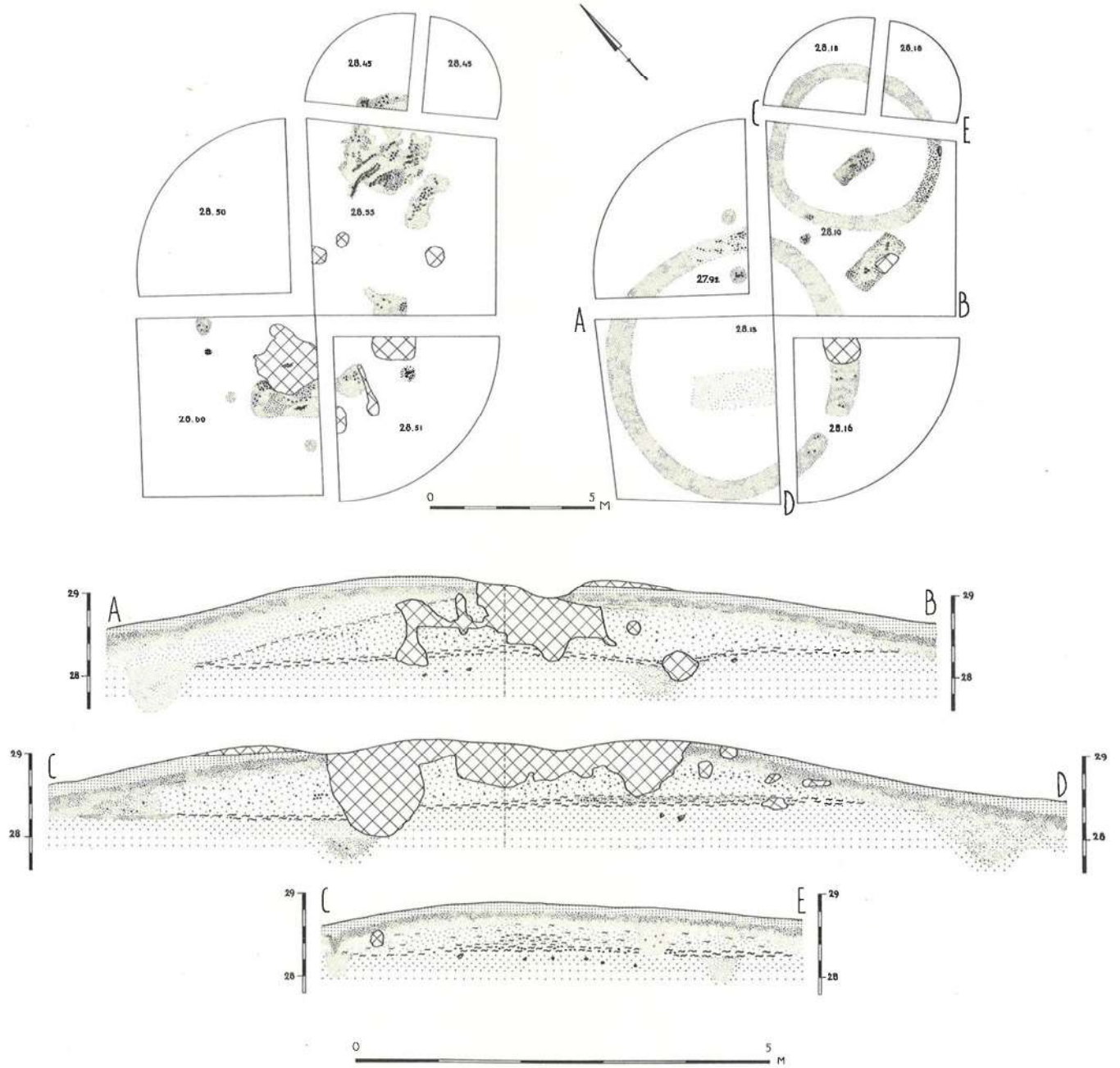

Fig. 2. Original drawing by Modderman (1954) of mound 14. Top two drawings show the contents of the mound (left) and the two structures within mound 14 (right). The bottom drawings are a transversal cut of the mounds.

indeed this was the case, the pregnancy must have been visible when she died.

Analysis of the female remains revealed a divergently shaped L4 and spinal trauma in L1 and L5. L4 was markedly smaller than the other vertebrae with a smooth cortex on the location where the right transverse process should have been. The transverse process may have been congenitally absent or fractured. However, also considering the size and the lack of any signs of healing, L4 could very well be a congenital anomaly, whereby the developing hemimetameres (the parts that make up the vertebra) fail to fuse and develop into single or double wedge-shaped hemivertebra (Barnes 2012). Since none of the other vertebrae show bending that would suggest compensation for the spinal anomaly (Barnes 2012), it is possible that this female had a double hemivertebra, which unfortunately was not retrieved. Figure 4 provides a schematic overview of a spine with a double hemiverteba.

The step-off fracture of L1 and the compression on the anterior side of L5 may have been caused by trauma resulting from events that suddenly increase pressure on the vertebrae, such as falling, which may have happened in childhood or in adulthood (Maat & Mastwijk 2004). Although a spine with a double hemivertebra will not have to cause any symptoms, it is postulated that the spine is less stable at the location of the hemivertebra (L4). This seems to have been either the cause or certainly exacerbated the compression of L5, whereby the superior anterior rim of the vertebral body was pushed posteriorly (see fig. 3). The damage to the superior anterior rim

Mound	Cremation deposit	Age-at-death	Sex	Total weight (g)
2	GAS233 1-3	18+ years	M	701.9
	GAS233 2-3	≤ 18 years	NA	22.8
3	GAS235 V1	19 – 30 years	I	15.9
4	GAS237 V11	> 30 years	M	582.3
	GAS237 V12	19 – 30 years	M	314.6
	GAS240 V10	18+ years	I	542.3
	GAS240 V13	≤ 18 years	NA	229.0
	GAS240 V14	18+ years	I	92.1
	GAS240 V15	> 30 years	F	1081.2
	GAS240 V16	18+ years	I	373.0
	GAS240 V17	19 – 30 years	F	745.6
	GAS241 V07	19 – 30 years	M	2571.6
		≤ 18 years	NA	
	GAS241 V09	18+ years	F	1771.5
		18+ years	I	
	GAS241 V45	18+ years	I	20.3
	GAS241 V48	18+ years	I	141.1
	GAS241 V49	I	I	7.0
	GAS241 V51	I	I	8.0
8	GAS245 V22	I	I	0.4
	GAS248 V43	19 – 30 years	M	1283.2
	GAS249 V44	18+ years	I	437.3
14Small	GAS255 V31	> 30 years	M	1469.7
		≤ 18 years	NA	
	GAS255 V35	18+ years	I	193.5
	GAS255 V41	> 30 years	F	1483.9
		28 weeks in utero	NA	
14Large	GAS255 V33	I	I	2.7*
	GAS255 V34	I	I	17.6
	GAS255 V36	13 – 18 years	NA	447.5
	GAS255 V40	19 – 30 years	F	91.2
15	GAS259 V25	I	I	5.1*
	GAS259 V27	19 – 30 years	I	189.3
	GAS259 V28	≤ 18 years	NA	660.7
	GAS259 V29	I	I	24.1
	GAS267 V61	> 30 years	M	186.3
	GAS267 V63	> 30 years	M	1463.1
18	GAS269 V55	> 30 years	M	1196.4
		≤18 years	NA	
	GAS269 V56	> 30 years	I	839.4

*Table 1. Demographic overview of the cremation deposits from Ermelose Heide, the Netherlands. M = male, NA = nonadult, I = indeterminate, F = female, * = disturbed by later activities*

of the body of L5 seems more severe that the damage to L1, yet both fractures can be the result of a single event. Since L4 most likely is a hemivertebra and the spine is less stable at this point, the same fall causing the avulsion fracture of L1 may have caused L4 to be entirely moved and pushed into the body of L5, thus responsible for more damage to the vertebra. Although it is not possible to determine if this trauma caused any discomfort, the spinal trauma may have hindered this female in her daily activities or during her potential pregnancy, which would have been visible to others.

Considering the location of the cremation deposit V41 within 14Small (fig. 2), being within the mound but separated from the rest of the cremation deposits, and the fact that her skeletal remains were postulated to have been nearly complete, suggests that her sociocultural role within the MBA society of Ermelose Heide differed from the roles of the rest of the population. Commonly, the cremation deposits do not contain enough bone material to indicate a complete skeleton and selective deposition is a commonly encountered practices in many cultures throughout time (Veselka & Lemmers 2014; Stratouli *et al*. 2010; Millaire 2004). Selective deposition could have influenced the total weights of the other cremation deposits in all the mounds of Ermelose Heide, yet, the cremated remains of female from V41 do not seems to have been distributed, but rather buried all together potentially because of her different state.

This paper demonstrates the value of constructing an osteobiography for cremated human individuals, despite the challenging nature of the material and the lack of historical information. Cremation was an important funerary practice in large part of Europe from the Late Neolithic until the Early Medieval period, yet, often only the cremated remains them-

Fig. 3. Left image: lumbar vertebrae 1 to 5 (L1 – L5). Right top image: superior view of first lumbar vertebra with step-off fracture. Bottom right image: compression of superior anterior rim. Damage to inferior anterior rim is postmortem.

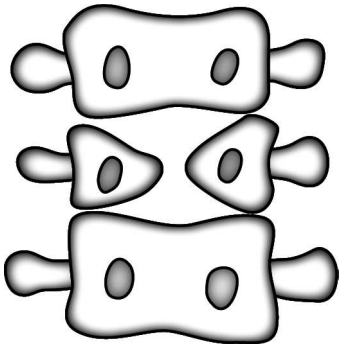

Fig. 4. Schematic overview of the development of double opposing hemivertebrae (after Barnes 2012).

selves can tell the story of an individual's life. Constructing life narratives, especially of individuals such as the female from V41, improves our understanding of the potential factors influencing the sociocultural role of individuals within past societies for which no historical information is available such as Middle Bronze Age Ermelose Heide and stresses the need for more osteobiographies of cremated individuals.

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Appendix 1. Overview of physical anthropological methods used for age- and sex estimation

Sex:

Biological sex was estimated using a combination of several sex estimation methods. Since the estimation of sex in cremated remains heavily depends on the available sexually dimorphic elements, as many methods as possible were used to obtain the most accurate sex estimation possible. Following the method of the Workshop of European Anthropologists (1980), the available sexually dimorphic elements (e.g. size and shape of the mastoid process, the size and shape of greater sciatic notch) were scored together with the Phenice traits (1967; ventral arc, subpubic concavity, and the medial aspect of the ischio-pubic ramus). Measurements were undertaken of the available skeletal elements, as described by Cavazutti *et al*. (2019), Case & Ross (2007), and Bainbridge & Genoves (1956). If at least three sexually dimorphic elements were present, the sex was determined as either female (F) or male (M). If two elements were present, sex was reported as either probable female (PF) or probable male (PM). If only one or no sexually dimorphic elements were present, sex was reported as Indeterminate (I). Only the sex of adults was estimated.

Age:

Age-at-death of nonadults was estimated by assessing the stages of tooth development (Gustafson & Koch 1974) and the stages of epiphyseal fusion (Scheuer *et al*. 2008). Adult age was estimated by evaluating the stages of suture closure (Meindl & Lovejoy 1985), morphological changes of the auricular surface (Buckberry & Chamberlain 2002), the pubic symphysis (Brooks & Suchey 1990), and the sternal clavicle end (Veselka *et al*. 2021).

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