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Osteological Analysis

Norton

North Yorkshire

NGR SE 7940 7060

Report No 1008

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York Osteoarchaeology Ltd was commissioned by MAP Archaeological Consultancy Ltd to carry out the osteological analysis of a single cremated bone assemblage recovered during installation of street lighting in Norton, North Yorkshire (SE 7940 7060). The skeletal remains were recovered from an intact urn, thought to date to the Roman period. The vessel contained almost no soil, suggesting that it was covered with a lid prior to its discovery. A Roman cemetery thought to date to the third century AD was previously discovered in the vicinity of the urn. A total of nine cremation burials, two of which were urned and 26 inhumations were excavated (Monument Records no 59856). Associated finds included brooches, coins, jet beads and bracelets.

Osteological analysis found that the burial contained the remains of an adult female. The skeleton was gracile, even discounting shrinkage from the cremation process. The vessel contained largely lower limb bones, though all parts of the skeleton were represented. The bones were found in no specific order in the urn, though it appears that the larger fragments remained at the top of the vessel, while smaller bone fragments descended to its base. The bone was well-calcined and had been cremated thoroughly. No manifestations of disease were noted.

Acknowledgements

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In May 2008 York Osteoarchaeology Ltd was commissioned by MAP Archaeological Consultancy Ltd to carry out the osteological analysis of an assemblage of cremated human bone. The burial was discovered during installation of street lighting in Norton, North Yorkshire (SE 7940 7060). The skeletal remains were recovered from a complete urn, which is thought to date to the Roman period. It is likely that a lid had been placed on top of the urn, as the vessel contained little soil.

Upon excavation, it was noted that the bones had not been placed in any particular anatomical order in the urn. However, the larger bone fragments had remained in the upper part of the vessel, while the smaller bone fragments had descended to its base.

A Roman cemetery excavated in the vicinity of the urn in the past suggests that this burial may have been part of this burial ground. A total of nine cremation burials, two of which were urned and 26 inhumation burials were discovered. The associated finds included brooches, coins, jet beads and bracelets that are thought to date to the third century AD (Monument Records no 59856).

1.1 AIMS AND OBJECTIVES

Initially, the assessment aimed to identify whether all cremated human bone recovered from the urn was human. The skeletal assessment then aimed to determine age and sex, as well as any manifestations of disease from which the individual may have suffered. Additionally, information was sought regarding the cremation techniques.

1.2 METHODOLOGY

The cremated bone was first analysed to determine whether it was human or non-human. The human bone was subsequently sieved through a stack of sieves, with 10mm, 5mm and 2mm mesh sizes. The bone recovered from each sieve was weighed and sorted into identifiable and non-identifiable bone. The identifiable bone was divided into five categories: skull, axial (excluding the skull), upper limb, lower limb and long bone (unidentifiable as to the limb). All identifiable groups of bone were weighed and described in detail.

2.0 OSTEOLOGICAL ANALYSIS

Osteological analysis is concerned with the determination of the demographic profile of the assemblage based on the assessment of sex, age and non-metric traits. This information is essential in order to determine the prevalence of disease types and age-related changes. It is also crucial for identifying gender dimorphism in occupation, lifestyle and diet, as well as the role of different age groups in society.

2.1 PRESERVATION

Skeletal preservation depends upon a number of factors, including the age and sex of the individual as well as the size, shape and robusticity of the bone. Burial environment, post-depositional disturbance and treatment

assessed subjectively, depending on the severity of bone surface erosion and post-mortem breaks, but disregarding completeness.

Preservation was assessed using a grading system of five categories: very poor, poor, moderate, good and excellent. Excellent preservation implied no bone erosion and very few or no post-depositional breaks, whereas very poor preservation indicated complete or almost complete loss of the bone surface due to erosion and severe fragmentation.

The skeletal remains showed no evidence for erosion and were in an excellent condition (Table 1). It is likely that the urn and possible lid protected the bone from erosion, as it was found during analysis that the skeletal remains were very fragile and prone to fragmenting. Little warping and bone cracking, which occurs commonly during the cremation process, was evident.

Table 1 Summary of the assemblage preservation

Feature Type	Inclusions	Bone State	Preservation	Age	Sex	Weight (g)
Pit	Charcoal	White and light grey	Excellent	Adult	Female	269.7

The fragment size of cremated bone is frequently attributed to post-cremation processes. This is because skeletal elements retrieved from modern crematoria tend to be comparatively large before being ground down for scattering or deposition in the urn. Bone is also prone to fragmentation if it is moved while still hot (McKinley 1994, 340). It is likely that the bone was not moved much following burning, as by far the majority of the bone was derived from the 10mm sieve (Table 2). The largest fragment was a humeral shaft that was 141mm long.

Table 2 Summary of cremated bone fragment size

10mm (g)	10mm (%)	5mm (g)	5mm (%)	2mm (g)	2mm (%)	Residue	Weight (g)
253.6	94	9.2	3.5	6.9	2.5	-	269.7

The quantity of cremated bone recovered was 269.7g (see Table 2). The amount of bone retrieved from the burial weighed considerably less than that produced by modern crematoria, which tends to range from 1000.5g to 2422.5g with an average of 1625.9g (McKinley 1993). Wahl (1982, 25) found that archaeologically recovered remains of cremated adults tend to weigh less (between 250g and 2500g), as a result of the commonly practised custom of selecting only some of the cremated bone from the pyre for inclusion in the burial, thereby representing a symbolic, or token, interment. The burial from Norton produced less than 16.6% of the quantity of bone expected to remain following cremation.

The cremated bone was very well burnt, causing the complete loss of the organic portion of the bone and producing a white to light grey colour. According to McKinley (1989), the body requires a minimum temperature of 500° Celsius over seven to eight hours to achieve complete calcination of the bone.

It was possible to identify 89.5% of the bone from the burial (Table 3). The majority of fragments were lower limb bones, particularly femoral fragments. However, tibia, fibula and foot bone fragments were also identified. Elements of other parts of the skeleton, especially of the upper limb and axial skeleton were also recovered.

Table 3 Summary of identifiable elements in the cremation burial

Skull (g)	Skull (%)	Axial (g)	Axial (%)	UL (g)	UL (%)	LL (g)	LL (%)	UIL (g)	UIL (%)	Total ID (g)	Total ID (%)	Total UID (g)	Total UID (%)
25.2	10.5	42.2	17.5	51.1	21	104.2	43	18.8	8	241.5	100	28.2	10.5

The burial contained one tiny fleck of charcoal, which was probably an accidental inclusion, rather than being deliberately added to the burial.

2.2 MINIMUM NUMBER OF INDIVIDUALS

A count of the 'minimum number of individuals' (MNI) recovered from a cemetery is carried out as standard procedure during osteological assessments of inhumations in order to establish how many individuals were represented by the articulated and disarticulated human bones (without taking the archaeologically defined graves into account). The MNI is calculated by counting all long bone ends, as well as other larger skeletal elements, such as the hip joints and cranial elements. It is not possible to calculate the MNI for cremation burials, because only a token selection of bone from the pyre tends to be buried. Double burials can be identified only if skeletal elements are duplicated, or if skeletons of different ages are represented in one burial. In this instance, a double burial was not identified.

2.3 ASSESSMENT OF AGE

Age was determined using standard ageing techniques, as specified in Scheuer and Black (2000a; 2000b) and Cox (2000). Age estimation relies on the presence of the pelvis and uses different stages of bone development and degeneration in order to calculate the age of an individual. Age is split into a number of categories, from foetus (up to 40 weeks in *utero*), neonate (around the time of birth), infant (newborn to one year), juvenile (1-12 years), adolescent (13-17 years), young adult (ya; 18-25 years), young middle adult (yma; 26-35 years), old middle adult (oma; 36-45 years), mature adult (ma; 46+) to adult (an individual whose age could not be determined more accurately as over the age of seventeen).

Because none of the criteria normally used for age determination were represented in the burial, age determination was based on less reliable criteria. As all the long bones recovered were fully fused, the individual was at least eighteen years old, but may have been considerably older than that.

2.4 SEX DETERMINATION

Sex determination is usually carried out using standard osteological techniques, such as those described by Mays and Cox (2000). Assessment of sex in both males and females relies on the preservation of the skull and the pelvis and can only be carried out once sexual characteristics have developed, during late puberty and early

The cremated bone assemblage contained no skeletal elements which were sexually dimorphic; however, the measurement of the femoral head was only 38.2mm in size, suggesting that the skeleton was female. Even considering 15% shrinkage, this would suggest that the individual was a gracile female.

2.5 METRIC ANALYSIS

Cremated bone shrinks at an inconsistent rate (up to 15%) during the cremation process and it was therefore not possible to measure any of the bones from this burial.

2.6 NON-METRIC TRAITS

Non-metric traits are additional sutures, facets, bony processes, canals and foramina, which occur in a minority of skeletons and are believed to suggest hereditary affiliation between skeletons (Saunders 1989). The origins of non-metric traits have been extensively discussed in the osteological literature and it is now thought that while most non-metric traits have genetic origins, some can be produced by factors such as mechanical stress (Kennedy 1989) or environment (Trinkhaus 1978). Non-metric traits were not observed in any of the individuals.

Non-metric traits were not identified in the cremated individual.

3.0 PATHOLOGICAL AND DENTAL ANALYSIS

The analysis of skeletal and dental manifestations of disease can provide a vital insight into the health and diet of past populations, as well as their living conditions and occupations. In this case, manifestations of disease were not observed.

Analysis of the teeth from archaeological populations can provide vital clues about health, diet and oral hygiene, as well as information about environmental and congenital conditions. No teeth were recovered from the Norton cremation burial.

4.0 DISCUSSION AND SUMMARY

A single cremated bone assemblage was discovered by chance during street lighting installation at Norton. No artefacts or animal bones were found with the burial. It is likely that the burial was part of a larger cemetery, 35 burials of which were previously excavated in the vicinity of the recently discovered urn. The cemetery contained inhumations and cremation burials, including two cremated bone assemblages in urns. Artefacts recovered from the cemetery suggest that it dates to the third century AD.

The burial contained only 269.7g of cremated bone, which is 16.6% of the expected mean quantity of bone produced by modern cremations. The fact that the urn was probably covered with a lid suggests that the

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majority of bone from the burial was not lost, but instead had deliberately not been included in the urn. The burial thus represented a token interment of the complete cremated skeleton. It is unlikely that the cremation pyre was raked while still hot, as this would have caused fragmentation and erosion to the fragile bones. Instead, it is likely that bones were selected from the pyre for burial once they had cooled down. The bone recovered from the burial was well calcined, suggesting that the cremation temperature and length had been adequate to thoroughly cremate the body.

Age could be determined approximately – the individual was aged eighteen years or over. The gracile nature of the bones suggested that this was a female skeleton. No evidence for disease was noted.