



Osteological Analysis of the Human Remains from The Butts, Worcester City, Worcestershire.

A Report for Worcester Archive and Archaeology Service

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1. INTRODUCTION	3
2. METHODS AND PROCESS	3
2.1 REASONS FOR THE ANALYSIS	4
3. INVENTORY OF SKELETAL MATERIAL	5
3.1 INTRODUCTION	5
3.2 OBSERVATIONS	5
3.3 RESULTS.....	5
4. CONDITION OF THE BONE PRESENT	6
4.1 INTRODUCTION	6
4.2 OBSERVATIONS	7
4.3 RESULTS.....	7
5. COMPLETENESS OF SKELETONS	7
5.1 INTRODUCTION	7
5.2 OBSERVATIONS	8
5.3 RESULTS.....	8
6. AGE ASSESSMENT	8
6.1 INTRODUCTION	8
6.2 OBSERVATIONS	9
6.3 RESULTS.....	9
7. SEX DETERMINATION	10
7.1 INTRODUCTION	10
7.2 OBSERVATIONS	10
7.3 RESULTS.....	11
8. NON-METRIC TRAITS	11
8.1 INTRODUCTION	11
8.2 OBSERVATIONS	11
8.3 RESULTS.....	11
9. STATURE AND MORPHOMETRIC ANALYSIS.....	11
9.1 INTRODUCTION	11
9.2 OBSERVATIONS	12
9.3 RESULTS.....	12
10. SKELETAL PATHOLOGY.....	12
10.1 INTRODUCTION	12
10.2 OBSERVATIONS	12
10.3 RESULTS.....	12
11. DENTAL PATHOLOGY	13
11.1 INTRODUCTION	13
11.2 OBSERVATIONS	13
11.3 RESULTS.....	13

12. CONCLUSION 14
13. FUTURE RECOMMENDATIONS 16
14. ACKNOWLEDGEMENTS 16

1. Introduction

The aim of this report is to present the data collated from the osteological analysis of human skeletal remains recovered during an excavation at the site of The Butts, Worcester city, Worcestershire (Grid reference: SO8467 5509, site reference WCM101653). The excavation was carried out by Worcestershire Historic Environment and Archaeology Services from 2008 to 2009 on behalf of the Worcester Library and History Centre Joint Project Team in advance of construction in the area.

Three contexts from negative features contained human remains; [8659], [8676] and [8892], associated with cut numbers [8664], [8677] and [8876] respectively. The articulated remains of skeleton [8853] were contained in cut [8677], a pit-like feature identified as a grave. Context [8659] was the middle fill of a pit ([8864]), into which a well had been cut, and contained a single disarticulated element. Disarticulated elements were also found in the primary fill ([8892]) of pit cut [8876]. These contexts are all thought to date to the Roman period according to the stratigraphic evidence. A disarticulated human bone was also recovered from a further fourth context [8802], consisting of tillage soil stripped by machine from the site.

2. Methods and Process

The skeletal material was analysed according to the standards laid out in the guidelines recommended by the British Association of Biological Anthropologists and Osteologists in conjunction with the IFA (Guidelines to the Standards for Recording Human Remains, Brickley and McKinley (eds) 2004) as well as by English Heritage (Human Bones from Archaeological Sites: Guidelines for producing assessment documents and analytical reports, Centre for Archaeology Guidelines, 2002).

Recording of the material was carried out using the recognised descriptions contained in Standards for Data Collection from Human Skeletal Remains by Buikstra and Ubelaker (1994). Full recording forms are supplied separately to be archived with any other archaeological recording forms. All skeletal data has been recorded using an MS-Access database(s) which can be found on the CD-Rom provided.

The material was analysed macroscopically and where necessary with the aid of a magnifying glass for identification purposes. Where relevant, digital photographs have been used for

illustration and a full digital image archive of all pathologies and any other features of interest has been provided on the CD-Rom enclosed with this report.

The material was analysed without prior knowledge of associated artefacts so that the assessment remained as objective as possible.

Comparison of the results was made with published osteological data from contemporary skeletal populations.

2.1 Reasons for the Analysis

Osteological analysis was carried out to ascertain:

- Condition of bone present
- Completeness of the skeleton
- Inventory of the skeletal material
- Sex Determination
- Age Assessment
- Non-metric Traits
- Stature
- Skeletal Pathology
- Dental Pathology

3. Inventory of Skeletal Material

3.1 *Introduction*

An inventory of the skeletal remains present is undertaken to identify the skeletal elements present and to assess the minimum number of individuals represented. Each element is recorded as present or absent. The long bones are recorded according to the presence or absence of the proximal, middle and distal sections and also the proximal and distal joint surfaces. The completeness of the bones of the axial skeleton (with the exception of the spine) is recorded according to the categories of <25%, 25-50%, 50-75% and 75%>.

3.2 *Observations*

An inventory of the human skeletal remains present in SK[8853] recorded in tabular form on Sheet P (see Appendix) and on the articulated skeletal remains accession database. The elements present from contexts [8659], [8802] and [8892] were recorded separately on the disarticulated skeletal remains accession database.

3.3 *Results*

SK[8853] contained associated skeletal elements representing the remains of one individual deposited in an articulated state. Elements present included a small fragment of skull (temporal bone), the proximal (upper) portions of left and right humerii, the left scapula, eight vertebral bodies (one cervical, three thoracic, three lumbar and one sacral), 23 vertebral arches (some fragmented), six ribs (three left and three right) and one right femur (See Plate 1). No dentition was present.

Only one skeletal element was contained in each of contexts [8659] and [8802]. Context [8802] contained one left femur while one right tibia was present in context [8659]. These remains represent elements deposited in a disarticulated state, likely to have been re-deposited from other disturbed features, such as pits or graves.

Context [8892] contained two seemingly associated elements, one left femur and tibia. Given the lack of further associated human skeletal elements, it is probable that these were also deposited in a disarticulated state, re-deposited from a disturbed feature.



Plate 1: *Articulated Remains of SK[8853]*

4. Condition of the Bone Present

4.1 Introduction

The condition of the bone was assessed macroscopically according to the categories and descriptions provided by the Guidelines to the Standards for Recording Human Remains (Brickley

and McKinley, eds, 2004). Since most skeletons exhibit more than one grade of state of preservation, these categories are simplified into 4 main groups of preservation: Good (grades 0-2), Fair (grades 2-4), Poor (grades 4-5+) and Varied (more than 4 grades of condition). The preservation of human bone from archaeological assemblages can vary according to soil and environmental conditions, to the age of the individual (where adult bones are more robust and resilient to taphonomic changes) and to the morphology of the individual bone (long bones, for example, are more robust than rib bones) (Henderson 1987).

4.2 *Observations*

The bone present was generally well preserved in all contexts. Some erosion to the distal ends of the long bones was noted in SK[8853] and some post-deposition damage had occurred to the more fragile elements, such as the ribs and scapula, leading to their fragmentation. The ends of the long bones from context [8892] had undergone some post-deposition damage, causing them to be incomplete.

4.3 *Results*

All the skeletal remains were categorised as being in a state of 'good' condition.

5. Completeness of Skeletons

5.1 *Introduction*

This is a guide to the overall completeness of the individual's skeletal remains and is calculated according to the percentage of the bones present in relation the total number of bones in a complete human skeleton. Completeness of remains is gauged through an assessment of the amount of material representing different areas of the body. A complete skeleton comprises of:

Skull = 20%

Torso = 40%

Arms = 20%

Legs = 20%

Each area of the skeleton was assessed and then placed into the following four categories of completeness: <25%, 25-50%, 50-75% and 75%> (Buikstra and Ubelaker 1994).

Recording the completeness of the individual can allow an insight to be gained into how much post-depositional activity has occurred as well as to assess how much information can potentially be gained from the remains.

5.2 *Observations*

Completeness was assessed via the tabular recording carried as part of the inventory compilation on Sheet P for context [8853] (See Appendix). Completeness of skeleton was not recorded for contexts [8659], [8802] or [8892] due to these elements being interred in a disarticulated state.

Little of the skull had survived from SK[8853] and also absent from the skeleton were the lower arm bones (radius and ulna), left leg (femur, tibia and fibula) as well as the lower right leg (tibia and fibula). Approximately a third of the torso was also absent and few elements containing a high proportion of the more fragile cancellous (spongy) bone had survived.

5.3 *Results*

Approximately 40% of SK[8853] was present and was categorised as 25-50% complete.

6. Age Assessment

6.1 *Introduction*

Establishing the age and sex of individuals from an archaeological assemblage not only provides an insight into the demographic profile of the population but can also be used to inform us of patterns in pathological distributions in a skeletal assemblage.

The age of sub-adults is assessed using both dental development (Smith 1991) and eruption (Ubelaker 1989) as well as long bone lengths (Schaefer *et al.* 2009) and epiphyseal fusion (Scheuer & Black 2004). These methods can usually provide a reasonably accurate age estimation due to a relatively narrow range of variation in normal sub-adult development. Thus, sub-adults can be placed into the following age categories: Foetal (<36 weeks), Neonate (0-1

month), Young Infant (1-6 months), Older Infant (6-12 months), Child (1-5 years), Juvenile (6-12 years) and Adolescent (13-19 years).

Assessment of adult age at death, unfortunately, results in much less specific age estimates due to a much greater individual variation in the features exhibited by the examined elements at particular ages (Cox 2000). Age estimation of adults was assessed from analysis of the auricular surface (Lovejoy *et al.* 1985) and the pubic symphysis (Brookes and Suchey, 1990). Each of these methods examines the deterioration of these surfaces and categorises them accordingly. This deterioration is due in part to due to the health status of the individual but can also be influenced by life-style and so the variation produced by these factors results in much wider age categories: Young Adult (20-34), Middle Adult (35-49) and Old Adult (50+) (Buikstra and Ubelaker, 1984). Grading of dental attrition was also used as a supplementary age assessment technique using the Miles method (1963) where dentition sets were complete enough to allow fair observation.

6.2 *Observations*

Age assessment for SK[8853] was carried out using metric analysis of the left scapula and right femur, both elements being sufficiently preserved to allow measurements to be taken. Assessment of age from dental eruption and development was not possible due to the lack of dentition present.

Metric analysis was also undertaken on the elements present in contexts [8659], [8802] and [8892] where preservation of the elements was suitable.

6.3 *Results*

Data obtained from the metric analysis is presented in Table 1 below.

The metric analysis of both the femur and scapula from SK[8853] indicated an age of death at around 40 weeks old. This individual was therefore categorised as a neonate (0-1 month).

Metric analysis of the femur from context [8802] indicated an age at death of 36-38 weeks whereas that of the tibia from [8659] suggested an age at death of 38-40 weeks. Both elements were also classified as belonging to neonates.

	<i>SK[8853]</i>	<i>[8659]</i>	<i>[8802]</i>	<i>[8892]</i>
<i>Scapula Length (mm)</i>	38.6	-	-	-
<i>Scapula Width (mm)</i>	28.7	-	-	-
<i>Femur Length (mm)</i>	76.6	-	65.3	c.196
<i>Femur Distal Width (mm)</i>	21.4	-	17.9	-
<i>Tibia Length (mm)</i>	-	64.1	-	-
Age Assessment	40+ weeks	38-40 weeks	36-38 weeks	3-4+ years

Table 1: *Metric Analysis*

The metric analysis of the femur present in context [8892], however, was clearly indicative of an older child. The distal end, or metaphyseal area, of the femur had sustained some damage but the measurement taken of the bone present suggested an age of approximately 3-4 years old to be taken as a minimum estimate. This individual was, therefore, categorised as a child (1-5 years).

7. Sex Determination

7.1 Introduction

Sex is assessed using the criteria laid out by Buikstra and Ubelaker (1984) in the analysis of morphological features of the skull and pelvis. In addition, metric data is also used where possible, taking measurements of sexually dimorphic elements such as the femoral and humeral head (Bass 1995). Categories ascribed to individuals on the basis of this data were ‘Male’, ‘Possible Male’, ‘Indeterminate’, ‘Possible Female’, ‘Female’ and ‘Unobservable’. Sex may be ascribed on the basis of metrics alone where no sexually dimorphic traits are observable. Where sex was not observable by either metric or morphological observations, it was recorded as ‘Unobservable’. No sexing of sub-adult material is attempted due to the lack of reliable criteria available.

7.2 Observations

The sex of the individuals present could not be assessed due to all the skeletal elements present being noted as sub-adult.

7.3 *Results*

The sex of the individuals present was unobservable.

8. Non-Metric Traits

8.1 *Introduction*

Non-metric traits are morphological features that occur both in bone and dentition. These features have no specific functional purpose and occur in some individuals and not in others. The origins of non-metric traits have now been shown to be highly complex, each having its own aetiology and each being influenced to differing extents by genetics, the environment and by physical activity. A review of the current literature suggests that the undetermined specific origins of these traits and the fact that there is more genetic variation within populations than between them can prevent useful conclusions regarding their presence or absence in skeletal remains from being drawn (Tyrell 2000).

8.2 *Observations*

Observable skeletal non-metric traits do not occur in infant and neonate individuals due to their lack of development at this age. Therefore, no non-metric traits were observed.

8.3 *Results*

No non-metric traits were recorded due to the very young age of the individuals present.

9. Stature and Morphometric Analysis

9.1 *Introduction*

Stature of adult individuals can be reconstructed from measurements of long bones of the skeleton. Since the long bones of sub-adults have not yet fully developed it is not possible to provide an estimate of stature for immature remains. Stature is the result of many factors including genetics and environmental influences (Floud *et al.* 1990), such as malnutrition and poor health. Height can be used as an indicator of health status and there is a wide range of literature on the relationships between height, health and social status. Estimated stature was

calculated by taking the measurements of the individual long bones and using the formula provided by Trotter (1970). Variation in estimated stature can be up to 3cm.

Metric analysis of the long bones, cranium and mandible may also be undertaken on adult remains to provide comparative information on morphological variability.

9.2 Observations

The sub-adult age of the human remains present precluded any estimation of stature or morphometric analysis.

9.3 Results

Stature was not estimated due to all individuals being of sub-adult age and no morphometric analysis was undertaken.

10. Skeletal Pathology

10.1 Introduction

Palaeopathology is the study of diseases of past peoples and can be used to infer the health status of groups of individuals within a population as well as indicate the overall success of the adaptation of a population to its surrounding environment (Roberts and Manchester 1997; Roberts and Cox 2003). Pathologies are categorised according to their aetiologies; e.g. congenital, metabolic, infectious, traumatic, neoplastic etc. (Ortner 2003; Salter 1999). Artificial modifications to skeletal elements, such as surgical cutmarks, may also be recorded. Any pathological modifications to the bone are described. The size and location of any lesion is also noted. Distribution of lesions about the skeleton should be noted to allow diagnosis. A differential diagnosis for any pathological lesions should also be provided.

10.2 Observations

No skeletal pathology was observed.

10.3 Results

No skeletal pathology was present.

11. Dental Pathology

11.1 Introduction

Dental diseases include conditions that not only directly affect the teeth but also the soft tissue surrounding them, sometimes observable in changes to the underlying alveolar bone (Hillson 1986). Each condition can give an indication of different aspects of lifestyle and health of the individual. For example, caries is associated with diets high in sucrose content. The presence of calculus can inform us about dental hygiene whilst enamel hypoplastic defects testify to developmental stresses that an individual has undergone in childhood (Dobney and Goodman 1991; Goodman and Armelagos 1985). The analysis of dental disease, therefore, not only informs us of specific oral conditions but provides complimentary data regarding overall health status and cultural practices.

11.2 Observations

Neither dentition nor alveolar bone was present and therefore no observations of dental pathology could be made.

11.3 Results

No dental pathology was observed due to the lack of observable elements.

12. Conclusion

A summary of the findings from the osteological analysis are presented in Table 2 below:

<i>Context</i>	<i>SK[8853]</i>	<i>[8659]</i>	<i>[8802]</i>	<i>[8892]</i>
<i>Condition</i>	Good	Good	Good	Good
<i>Completeness</i>	25-50%	-	-	-
<i>Elements</i>	Temporal bone, 6 Ribs, 8 Vertebral Bodies (1 cervical, 3 thoracic, 3 lumbar and 1 sacral), 23 Vertebral Arches (cervical, thoracic and lumbar), Left Scapula, Proximal Humerii, Right Femur.	Right Tibia	Left Femur	Left Femur, Left Tibia
<i>Age</i>	40+ weeks	38-40 weeks	36-38 weeks	3-4+ years
<i>Sex</i>	-	-	-	-
<i>Stature</i>	-	-	-	-
<i>Skeletal Pathology</i>	-	-	-	-
<i>Dental Pathology</i>	-	-	-	-

Table 2: Summary of the Human Remains

The remains of four individuals were excavated from the site of The Butts, Worcester city centre. The bone present was well preserved though some fragmentation had occurred as a result of post-mortem damage. SK[8853] was assessed as being approximately 40% complete and deposited in an articulated state where as the skeletal elements recovered from contexts [8659], [8802] and [8892] were disarticulated elements, likely to be re-deposited from other, disturbed features. Articulated skeleton SK[8853] was recovered from a pit-like feature identified as a burial, whereas the disarticulated elements [8659] and [8892] were retrieved from rubbish pit fills. One element was recovered from the tillage soil [8802]. All the remains were thought to date to the Roman period, possibly the 3-4rd centuries.

All the remains represented sub-adults; three individuals were identified as neonates and one as a child. As indicated by the metric analysis undertaken, the disparity present between the size of the disarticulated neonate elements present in contexts [8659] and [8802] and those present in articulated skeleton SK[8853] suggests that they do not originate from this latter individual. Furthermore, the disparity in size observed between the disarticulated elements themselves suggests that these also belong to separate individuals. The age of the 'neonates' spans from 36 to 40 weeks, suggesting that these individuals were peri-natal; it is not possible from the osteological evidence to infer whether these babies were stillborn or whether they died shortly after birth.

Other infant remains dating to the Roman period have been found in Worcester. An infant aged less than 2 months old contained in an inverted urn, thought to date to the 2nd or 3rd century AD, was discovered in the bottom of a ditch associated with a major Roman rampart (WSM01276). A Roman burial ground excavated at the site of King's school, (St. Albans) (WSM08817) contained four sub-adult individuals, although poor preservation prevented a precise age estimation being made for most of the skeletal remains. However, one individual was noted as being approximately 4 years of age at death and another was thought to represent a 'very young child' (Brown and Wichbold 1991, p.11). A second Roman burial ground at Deansway, Powick Lane, North in the city centre also contained sub-adult remains including one East-West aligned interment of a neonate, radiocarbon dated to AD60-400 (Dalwood and Edwards 2002, p.105). The evidence of burial practice for infants and neonates in Worcester to date indicates that remains could either be treated in a similar fashion to adults, with interment in a formal cemetery, or that they could be deposited in seemingly more secular contexts such as ditches and rubbish pits, though perhaps in special circumstances.

Variation in the post-mortem treatment of neonates and infants in Roman Britain is subject to much debate, particularly in light of the recent analysis of a large number of peri-natal human remains at Yewden villa, Hambleton, Buckinghamshire where the high proportion of deaths of infants at or around the time of birth has been suggested as indicative of the practice of infanticide (Mays and Evers 2011). A comprehensive analysis of Roman burials from the South East of England, however, indicates that 22.3% of all burials containing remains that could be assessed for age at death were identified as neonate (Smith nd), a figure consistent with and in some cases lower than other skeletal and historic populations (Chamberlain 2006). The survey

also found that in comparison to the 22% of burials from nucleated settlements and 21% of burials from farms, 77% of burials from villas contain the remains of neonates and infants (Smith nd). Three major deposits of infant remains in Roman Britain occur within infant ‘cemeteries’ at villa sites (Yewden, Barton Court Farm and Keston); other infant remains at villas are deposited in small numbers and are dispersed in and around the villa and its outbuildings (Smith nd). One infant excavated from Yewden villa exhibited cutmarks on the right femur, suggesting that the practice of embryotomy had been undertaken in the case of an obstructed labour by a dead or dying foetus (Mays *et al.* 2012); in context of the large numbers of perinates found there, this perhaps points to the villa forming a base for the administration of obstetric medical aid.

At other settlement sites across the country, such as Baldock (Hertfordshire), Woodcuts Common (Dorset), Poxwell (Dorset), Radwinter (Essex) and Porchester Castle (Sussex), infant remains have been discovered in ditches, gullies and rubbish pits (Brødholt 2012). It is likely in these cases that the age of the infant was a significant factor in its post-mortem treatment. For example, an analysis of the infant burials from the Roman Lankhills cemetery, Winchester by Brødholt (2012, p.40) illustrates that children over 2 years old were more likely to receive visible grave goods whereas neonate and infants were much more likely to be buried without any visible items.

Neonate and infants clearly received very different burial treatment than adults in many cases during the Roman period and the form of these treatments was numerous. This variation in funerary rites and customs for neonates and infants in Roman Britain is reflected in this newly discovered evidence from The Butts, Worcester.

13. Future Recommendations

No further analysis of the human remains is required at this time.

14. Acknowledgements

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THE ARCHIVE

Type	No	Type	No
Skeleton Recording Form A	1	Skeleton Recording Form L	0
Skeleton Recording Form B	0	Skeleton Recording Form P	1
Skeleton Recording Form D	0	Skeleton Recording Form Q	1
Skeleton Recording Form E	0	Skeleton Recording Form R	1
Skeleton Recording Form F	0	Skeleton Recording Form S	0
Skeleton Recording Form G	0	Skeleton Recording Form V	0
Skeleton Recording Form H	0	Articulated Skeletal Remains Inhumated Db	1
Skeleton Recording Form I	0	Disarticulated Skeletal Remains Db	1
Skeleton Recording Form J	0		
Skeleton Recording Form K	0		

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