SUMMARY OF OSTEOLOGICAL METHODS FOR ADS DATABASE

All the human remains recorded in this database are derived from sixteen different sites in Northumberland and Durham and are all stored at the Great North Museum in Newcastle upon Tyne, Sunderland Museum and Wintergardens in Sunderland, or Arbeia Museum and Roman Fort in South Shields. Other than the remains from Hasting Hill, which were examined at Sunderland Museum as they are on display at the museum, the rest of the skeletal material was removed from its museum storage and taken to the Wolfson Laboratory at Newcastle University for examination. The skeletal material from Early Bronze Age burials is both cremated and unburned, with varying degrees of burning observed on the skeletons from some sites. While there are a great number of Early Bronze Age burials recorded for these regions, the remains described and recorded here (and in Fowler and Gamble, in prep.) were all those that could be located within the Museum stores at this time. This section will briefly describe the steps of examination and the methods used for this particular study.

The methods of observation and analysis of the human remains in this report are in agreement with the recommendations from Buikstra and Ubelaker (1994). Observations were recorded in a detailed inventory in the following order: site name, skeleton identifier (where required), accession number, bone element, side, the segment of the skeletal element present, the number of fragments, the completeness score, the surface preservation level of the skeletal element and notes on the skeletal element including pathologies. Preservation levels are roughly based on McKinley (2004). The colour and the nature of the surface texture as affected by the burning process is recorded when dealing with cremated bone. The length of the bone is recorded where possible and any evidence of pathologies on the bones or teeth are described. Photo reference identifiers are provided referring to images on the ADS (in bold

text) and those which are held by the respective museum. These photos are mostly reference shots and are not meant for publication.

CODES AND ABBREVIATIONS USED IN THE OSTEOLOGICAL DATABASE

Side

L = left

R = right

A = axial

U = un-sided

Segment of the long bone, metatarsal or metacarpal present

PE = proximal epiphysis

P1/3 = proximal third of the diaphysis

M1/3 = middle third of the diaphysis

D1/3 = distal third of the diaphysis

DE = distal epiphysis

Pend = un-fused proximal end

Dend= un-fused distal end

Completeness score (Buikstra and Ubelaker 1994)

1 = <25%

2 = 25-75%

3 = >75%

4 = 100%

Surface preservation

0 = Excellent

1 = Very Good

2 = Good

3 = Fair

4 = Poor

5 = Extremely poor

6 = Burned bone

Where cremated remains were examined they were described by their appearance

L= Longitudinally Split

T= Longitudinal and Transverse Checking

C= Cracking

W= Warping

Additional information about the bone element, such as colour and any evidence of pathological, taphonomic or curatorial, changes are found in the 'Notes' section of the inventory table.

Age, sex and stature assessment

Standard age estimation methods were used, as recommended by Buikstra and Ubelaker (1994) and Schaefer, Black and Sheuer (2009). The accepted methods of ageing adult skeletons based on degenerative changes to the os coxa (i.e. Lovejoy *et al.* 1985; Brooks and Suchey 1990; Todd 1920) and/or the sternal ends of the ribs (Iscan and Loth 1986) were employed where possible and in correlation with dental wear. Miles (1963) and Lovejoy (1985) were used to estimate age at death based on dental wear. As a last resort age estimation based on cranial suture closure was used. However, due to issues with accuracy and reliability these are taken as tentative (Meindl and Lovejoy 1985; Key, Aiello and Molleson 1994). Dental development (Ubelaker 1989) and epiphyseal fusion (Schaefer,

Black and Sheuer 2009) were used, where applicable, to estimate age-at-death for subadult skeletal material.

The recommended methods to determine sex of adult human skeletal remains once again use the os coxae for the greatest accuracy and precision (Phrenice 1969; Schwartz 1995). This was used in conjunction with sexually dimorphic features of the skull to determine sex (Buikstra and Ubelaker 1994; White and Folkens 2005). Where this was not possible, postcranial measurements were used (as within Bass 1995). Living stature was estimated, where possible, for adult individuals using the length of the long bones and Trotter's (1970) equations and where this was not possible, metatarsal length was used if they were present (Byers *et al*. 1989).

It must be kept in mind that these charts, for age, sex and stature, are not based on prehistoric British populations and diet and natural variation across populations can affect the precision of estimation. However, as there is currently no chart for prehistoric British populations these standards were systematically and consistently used to present the best possible result.

Preservation

The assessment of surface preservation is subjective, but an evaluation of the surface condition of the remains puts the assessment of age, sex and pathologies into context. Skeletal preservation is partly a factor of the age and sex of the individual and of the size, shape and robusticity of the bone, while taphonomic processes such as the burial environment, excavation and the curation of the skeletal material may significantly impact on the condition of the bones and the amount of the skeleton recovered. Excellent preservation implies that there is no bone surface erosion and clear surface morphology, while extremely

poor preservation reflects severe erosion of the bone surface and complete loss of bone surface morphology making it impossible to assess for pathology or other features of the bones. The amount of a single bone present or its completeness, will also affect the ability to obtain information from the bone element and overall skeleton and has been recorded using Buikstra and Ubelaker (1994).

Burned skeletal material

Burning of skeletal material can cause a number of observable changes to the morphology and structure of the bones and teeth. The colour of burnt bone varies according to burning time and temperature, with black or brown indicating a lower temperature or less burning time, up to white or blue which can indicate a calcined fragment (Ubelaker 2009). Bones which do not bear flesh when burnt tend to display less variation in fracture pattern and more transverse cracking, whilst fleshed bones tend to display more warping, more variation in longitudinal splitting and transverse fractures, frequently in a curvilinear pattern (Ubelaker 2009, 3). During burning, long bones tend to split apart in a longitudinal manner (as if twisted apart into fragments) and the enamel on teeth shatters. This severely limits the amount and nature of information which can be derived from the teeth of cremated skeletons (i.e. with no crowns it is impossible to identify the tooth, discuss pathology or age assessments). The degree of fragmentation has been recorded but it is difficult to interpret whether this is caused by the action of collecting the cremated bone or fragmentation (deliberate or otherwise) following collection.

Palaeopathology

Pathological lesions represent evidence of a physiological stress during life which has affected the skeleton. Trauma, osteoarthritic changes, dental pathology and lesions representing a disease or disorder are all commonly included within a skeletal analysis.

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