

HUMAN BONE REPORT FOR THE ANGLO-SAXON CEMETERY AT WASPERTON

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WASPERTON OSTEOLOGICAL AND PALAEOPATHOLOGICAL CATALOGUE

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DESCRIPTION OF THE INVESTIGATION

A total of 215 inhumations and 26 cremation burials were originally excavated. The inhumation burials were recorded in situ, but only a limited number of the skeletons could be recovered due to the poor condition of the bone. The cremations on the other-hand were in a relatively good condition, with the bone chemically stable as a result of burning. In this report the inhumations and cremations have been considered and discussed separately.

THE INHUMATIONS

Jonathan Scheschkewitz saw the material at Warwick Museum in 2001, and produced a catalogue of the inhumations using the excavation records and any identifiable bones, such as skulls and teeth (Scheschkewitz 2006). He also assessed the preservation and completeness of the skeletons. Attempts to clean the recovered bone were abandoned as any attempt to process the material resulted in almost complete disintegration of the bone. The very poor state of preservation has therefore meant that the original assessment provides all the physical anthropology possible for the assemblage. Further analysis was not felt likely to contribute any new information but simply lead to further destruction of the remains. As a consequence the inhumation report is based entirely on Scheschkewitz's data.

Minimum Numbers of Individuals

A total of 215 graves were recognised archaeologically, but only 55(25.6%) contained any surviving bone, of which one (Inh 39) was found to contain only animal bone (Table 1). 156 (72.6%) of the graves contained some evidence for a burial, ranging from the visible remains of the skeleton, albeit it extremely poorly preserved, to a body stain. A significant proportion of these (66%) had grave goods associated with the remains. One grave (Inh 147) contained the remains of two individuals. 31 graves (14%) had no visible remains of a body but grave goods were present indicating that a body had been present. A further 29 features, originally recorded as graves, had no evidence either for a body, in the form of bone or a burial stain or grave goods. This raises the question as whether or not these were indeed graves. The minimum number of individuals therefore buried at Wasperton numbers 188.

Preservation

Skeletal preservation is dependant upon the burial environment, post-depositional disturbance as well as the age and robusticity of the bone. The amount of information which can be extracted from the skeletal assemblage is influenced by not only the degree of preservation but also the completeness of the skeleton. Preservation was graded into the following categories: very poor, poor, moderate, good and excellent. Excellent preservation implied no bone surface erosion and very few post-mortem fractures. Very poor preservation indicated complete or almost complete loss of the bone surface due to erosion and severe fragmentation.

Of the 54 inhumations with bone preserved, the majority (78%) were in a very poor condition (Table 2). In these cases the bone was so severely eroded that little of the surface and cortex survived, making them largely unidentifiable. The bones were additionally fragmented into pieces which were usually no larger than 80mm, but often smaller than 5mm. The teeth were similarly affected, causing total destruction of the tooth roots and dentine and only leaving the very fragile enamel of the tooth crowns intact.

Six of the burials (11%) were in a poor condition with the bone surface being sufficiently intact for some of the remains to be identified but with a high degree of fragmentation. A further five inhumations (9%) were moderately well preserved. These assemblages suffered from less surface erosion, but were fragmented. The bone from these assemblages was largely identifiable.

Only one bone assemblage (2%) was in a good condition (Burial 153). This assemblage consisted entirely of teeth, which were well preserved.

Completeness

None of the skeletons was complete. Only one skeleton (Inh. 1) was represented by more than 25% of the body, with approximately 35% of the skeleton having been recovered. The remaining skeletons were less than 25% complete, in fact the majority were represented by 10% or less of the original skeleton. The implication is that even if the bone surface preservation had been better, the potential of the assemblage would still have been limited because of the incomplete nature of the skeletons.

Estimation of age, pathology and sex

Age

It was attempted to determine age using standard ageing techniques, as specified in Scheuer and Black (2000a; 2000b) and Cox (2000), but because of the preservation of the bone it was almost entirely reliant on tooth development and wear. The results of the study are shown in Table 8 where they have been grouped into wide age ranges: infant (newborn to one year), juvenile (1-12 years), adolescent (13-17 years), young adult (ya 18-25 years), young to old middle adult (m; 26-45 years), mature adult (ma; 46+) to adult (an individual whose age could not be determined more accurately as over the age of seventeen). 42 individuals were possible to age with some degree of accuracy, while a further twelve with bone preserved proved impossible to age. Seven individuals (17%) were young adults, eleven (26%) were aged between 26 and 45, five (12%) were mature adults and eight (19%) were adults whose age could not be estimated with any greater accuracy (Table 8). Eleven subadults were identified; these included nine (21.4%) adolescents, aged between thirteen and seventeen years and two (4.8%) juveniles, aged between one and twelve years.

The age distribution suggests that individuals of all ages were interred at Wasperton. The absence of the very young (infants) is felt to more probably reflect taphonomic factors, rather than burial rite. Infant bones are extremely fragile and contain a much smaller proportion of the hard compact, or cortical, bone and are therefore much more susceptible to physical and chemical weathering. Poor preservation may have also caused an under-representation of juvenile skeletons, explaining the relatively low number of children in the assemblage.

Pathology

The loss of the cortical surface of the bone due to weathering, and the high degree of fragmentation meant that no pathological lesions could be identified. The poor preservation of the jaw bones and tooth roots meant that the majority of the information on dental pathology had been lost.

Sex

Estimation of sex was problematic due to the poor preservation of the skeletons. An attempt had been made to use the better preserved skulls, but given the very poor state of preservation this was considered to be insufficiently accurate. Indeed of the 6 individuals where sexing had been attempted, two cases were at variance with the grave goods. The gender of the individuals is therefore dependent on grave goods alone.

In Anglo-Saxon studies the presence of pairs of brooches, beads and bracelets, or wrist adornment have all been used to identify female burials (Table 6) The individual was usually buried fully clothed. Women wore a pair of brooches on or near the shoulder to fasten the peplos or dress. A string of beads was attached to each of the brooches by the pin. Occasionally another brooch was worn centrally, thought to attach a cloak or maybe an undergarment. The peplos was held in at the waist by a belt of either tablet woven wool, or of leather fastened with a buckle. 51 (23.7%) of the 215 graves identified had one or more of these grave goods. 36 had pairs of brooches, 31 bead necklaces, 7 bracelets & two were buried with wrist guards. Other grave goods associated with female burials include rings, pendants, ear scoops, purses, a brush holder, spindle whorls, keys and a firesteel.

Male burials in the Anglo-Saxon period are often accompanied by weaponry, but not exclusively. 33 graves were considered to contain male burials. These included inhumations buried with spears by the body and or a shield (Table 7). Heinrich Harke (1990:25) in his study noted that 44% of weapon burials contain just a spear, while 26% had a spear & shield. He also noted that weapon burials are rare in the 5th century, peak in the mid 6th century and were almost out of use by 700AD, giving some indication of date for the burials at Wasperton. .

22 graves had shields and or spearheads (24) while (14) had both. Three were subadults (Inh 10,33,108). Not all male & adolescent males were accompanied by weapons, these probably reflect the status of the individuals with individuals of lower status being buried either with simpler items such as a knife or without any grave goods at all. Indeed a fair proportion of the burials in the unsexed category were probably male.

Other grave goods associated with male burials include, ferrules (9) 6 of which are thought to be from the base of the spear. Two males were buried with a single brooch (161) and beads (63). Knives, tweezers, buckets, purse mounts, and a firesteel were also associated with male burials.

The presence of belt fastenings and knives were found in both male and female burials in almost equal proportions, with 20 females, 21 males and 18 of unknown sex being buried with knives.

THE CREMATION BURIALS

26 cremations were originally excavated from Wasperton. Only 20 of the cremated burials were removed from the site for analysis along with cremated remains from three other contexts (x1- x3)..

Methodology

The total weight of each cremation was recorded and given in grams. The remains were then sieved through a stack of sieves with 10m, 5mm and 2mm mesh sizes. The overall weight may include soil in the bone trabecular and also small soil particles in the smallest sieve size.

Age at death

The methods employed in ageing cremated remains are essentially the same as those for inhumations, but fragmentation imposes its own limitations.

Age was assessed according to

- the stage of epiphyseal union,
- dental development
- levels of dental attrition
- the appearance and stage of fusion of the cranial sutures
- degenerative changes to the articular surfaces and vertebral bodies.

The individuals were placed in broad age categories which are as follows:

Subadult :	Birth – 17 years
Infant:	Birth – 2 years
Juvenile:	2-12 years
Adolescent:	12- 17 years
Adult:	17 years +
Young	18 – 30 years
Middle	30 – 45 years
Mature	over 45 years.

Determination of sex

The degree of fragmentation in cremated human remains makes an assessment of the morphological differences between males and females problematic, as elements of the skeleton such as the skull and pelvis are rarely well preserved.

Appearance of the bone

These include colour, cracking, weathering and warping and were recorded for each cremation according to Buikstra & Ubelaker (1994).

Results

Demographic data

A record of each cremation recording the identifiable and unidentifiable bone can be found in Appendix B

A possible 30 individuals were represented by the cremation burials. None had any duplication of body parts indicating that each cremation represented only one individual. A minimum number of 26 individuals was recorded from the original cremations excavated. Cremation 1 contained two burial urns with a single individual in each, while cremation 2 had no bone present during the excavation although the vessel in the “cremation pit” appeared to be a burial urn. Table 9 records the type of cremations recorded. Cremated bone was also recovered from 3 other contexts (x1-x3), two contained human bone and the third (x2) was entirely composed of unidentifiable fragments measuring less than 5mm in size. The bone could be best described as crumbs and could not even be positively identified as human. The deposit moreover was either poorly cremated or not cremated at all.

Unfortunately an estimation of sex could not be given for any of the cremations as none of the elements of the skeleton which show sexual dimorphism, were sufficiently well preserved. However, cremation burials 8 & 26 contained grave-goods which might indicate that they contained the cremated remains of two women. In cremation 8 this was a burnt saucer brooch while cremation 26 contained two fragments of an equal armed bronze brooch and two unidentified melted bronze objects.

The age of individual cremated burials is summarised in Table 10. Infants were not represented at the site, but otherwise most age groups were present with 40% of individuals dying before they reached adulthood.

Pathology

The recording of pathological changes in cremated and fragmentary bone is always problematic. Fragments were closely examined and any abnormalities recorded using a binocular microscope and or hand-lens. The only pathological changes noted were in cremations 19 & 26. In cremation 26 a single vertebral body exhibited osteophytosis and moderate to severe intervertebral osteochondrosis, while cremation 19 had concentric intervertebral osteochondrosis. These changes are the result of degeneration to the vertebral disc with age. Both individuals were mature adults.

Size of cremation

The size of cremation burials varied greatly in this assemblage. The smallest weighed only 4 grams and the largest 803 grams. Table 11 records the number of cremations in each weight category. McKinley (1994), estimates that the remaining mineral component of a complete body after cremation, weighs between 2.5-3kg. At Wasperton all of the cremations weighed under 1 kg, with 70% under 500g. The conclusion must therefore be that these represent incomplete cremations.

Bone fragmentation

During the cremation process bone not only splits but it also cracks and warps. The greater the heat of the cremation the more fragmented the calcined bone is thought to be. To measure this the weight of bone in each mesh size was recorded, and in the 10mm + mesh the largest fragment was also measured. Table 12 shows the weight of bone in each category. Overall between 25-81% of the total body weight, in separate cremations, had fragments larger than 10mm.

The temperature is not the only factor influencing the degree of fragmentation, the age of the cremated individual will also be significant. This was clearly demonstrated in the juvenile cremations (12 13 & 20) where there was a greater proportion of the body in the under 5mm sieve approximately 46-64% of the body.

Appearance of the bone

The change in colour of cremated bone has been used to infer information about the temperature at which the body was burnt, and the condition of the body at the time of cremation. It may also be an indication of the efficiency of the cremation temperature in various parts of the pyre. All of the cremations had some variation in colour (Appendix) . Most were a relatively uniform cream to beige or even light brown in colour suggesting that the remains had not been burnt at a particularly high temperature between 300-600 C. A small proportion (5) had bone which was cream to white in colour, suggesting a higher temperature around 600 C. See Appendix 4 .

The types of fracture have been used in studies to show the state of the individual on cremation. Baby (1954) suggested that there is a difference between the types of fractures in fleshed and defleshed cremations. At Wasperton the majority of fractures were longitudinal with curved transverse lines (Appendix 4). Some checking particularly to the vertebrae bodies and articular surfaces of joints was also noted. These types of fractures are the expected pattern for bones which have been burnt while still in a fresh fleshed state.

Identification of the remains

A significant proportion of fragments from all of the cremations could not be identified, accounting for between 18 – 69% of the cremated burial see Table 13. The unidentified fragments are mainly smaller in size or have no distinguishing features. It is also possible that this category contains some animal bone, although none was positively identified. Some other elements of the body could be placed in broad categories i.e. the long bones, accounting for between 54-100% of the burial. A much smaller proportion between 6-42 % were identifiable as specific bones. Table 13 gives the weight and % of total weight, for identified bone, broad categories (I.e long bones) and unidentifiable fragments.

Pyre Goods

In theory a range of grave-goods accompanied the body to the funeral pyre. These were then collected with the cremated remains and placed in the burial urn. Brooches were found in cremations 8 & 26 and the suggestion here is that these burials were

probably female. Cremation burial 11 was associated with a bronze cauldron, while cremation 15 was associated with a bronze object. Copper alloy fragments were found in cremations 20 & 19, with melted copper adhering to the wrist (radius) of the burial in cremation 19.

There was some evidence for the presence of glass objects in four of the cremations. Cremation 8 had several fragments of melted glass with the bone. Cremations 9, 10 & 22 have small amounts of melted glass to both long bone and skull fragments. In cremations 9 & 10 this has the appearance of a sheen to the cortical surface of some of the long bones the result of a thin layer of molten glass.

Unlike Anglo-Saxon inhumations it has been suggested that the grave goods included with cremations are not necessarily gender specific. Brush (1988) found, at Spong Hill, that the sex of the individual played only a minor role in the selection of grave goods. It is perhaps therefore inadvisable use grave goods in cremations as an indicator of gender.

DISCUSSION

Many of the cremation burials had been truncated either during excavation or ploughing and therefore may not represent the amount of the bone originally interred. A fairly high proportion of each cremation contained unidentifiable bone, between 40 – 50% of the larger cremations. However the absence of duplication of skeletal elements suggested that only one person was represented in each urn. The age at death was estimated in broad terms with most age ranges represented, the exception to this is the presence of infants. Unlike the inhumation cemetery where physical & chemical weathering may have accounted for the absence of immature skeletons it is more likely that in cremations they were either included with an adult burial, as was the case at Spong Hill (McKinley 1994), or that they were buried in a different part of the cemetery.

Where the cremations took place has been the cause of some debate. Calvin Wells (1960) argued that at Illingworth the body seemed to have been placed on the ground with a pyre covering it. McKinley (1994) suggests that this is unlikely as it would have lead to incomplete cremation. A more probable explanation is that the body was laid on top of the pyre, which might well have been built over a pit to provide an underdraught. The absence of remains of cremation pyres at Wasperton suggests that cremation probably took place outside the cemetery, and the partial remains of the body were later collected and placed in the urns for burial. The suggestion that only some of the remains were collected is supported by the total weight of the cremations, the majority being less than 500g well below the expected 2.5 -3 kg for a complete body. The large fragment size in some of the cremations would appear to suggest that collection was relatively selective, favouring the more identifiable and larger fragments of bone.

When burnt, bone follows a progressive colour change with white representing the highest temperature and the most calcined bone and blackening simply suggesting low temperatures or charring. McKinley (1994) has suggested that the range of temperature in Anglo-Saxon cremations appears to have been from about 400 degrees Celsius up to a maximum of about 1200 degrees. At Wasperton most of the bone was

fairly uniform in colour, mainly a cream or beige to light grey suggesting burning at a relatively low temperature. Experimental work by Parker (1985:18) has shown that the relationship between colour and temperature may not be that simple, but may also reflect the amount of oxygen supplied to the fire. Where there is a free circulation of air, it would be expected that the bone would have a more uniform colour. This is the case at Wasperton and supports McKinley's argument for the presence of pits beneath cremation pyres to ensure the circulation of air.

The splitting and cracking of cremated bone not only depends upon the temperature of the pyre but also the type of bone. The larger and more identifiable pieces tend to be from the long bones and skull whereas the smaller unidentifiable fragments most probably contain a higher proportion of the more fragile bones of the thoracic cage and pelvis. It was also demonstrated that the younger the individual the smaller the overall fragment size, simply because the bones are less robust and presumably fracture more easily.

CONCLUSION

Inhumation burials and cremation burials appear to have occurred concurrently at Wasperton. The inhumations have been shown to date from the mid to late Roman period through to the 7th century. The cremation burial rite appears to have had a shorter timespan with a single cremation dated to the late Roman period and continuing through to the 6th century. The majority of both inhumations & cremations occurred within the enclosure area.

The inhumations were extremely poorly preserved in fact only 58 of a possible 215 graves had any bone within them. Much of the demographic data therefore came from secondary sources such as grave goods. By contrast the cremation burials were in a good state of preservation. This is because burning makes the organic component of bone chemically stable. Despite this it was not possible to give an indication of sex for any of the cremations because of the degree of fragmentation.

Although none of the cremation burials could be sexed, all age groups, with the exception of infants, were represented with 40% dying before they reached adulthood. This did not appear to be the case with the inhumations, but the poor preservation of the burials has disguised the true picture, with the skeletons of immature individuals more prone to weathering.

Finally, there is no evidence that bodies were cremated on site. More likely the cremation took place in another location and the remains were later partially collected for burial in an urn. The colour of the bone suggest that the cremation process was not particularly efficient and the large fragment size in many of the samples supports this view. Unlike the inhumations relatively few cremations have the inclusion of grave goods, and where these do occur they are much less gender specific.

INHUMATION TABLES

Body only	Grave goods only	Body & grave goods	No body	TOTAL
53	31	103	29	216

Table 1 Grave information found in recorded graves

	Very poor	Poor	Moderate	Good	Excellent
Number of individuals	46	6	6	1	0
%	78%	10%	10%	1.7%	

Table 2. State of inhumation preservation.

Decapitated	Crouched	Extended /supine	Extended /prone	Left side	Right side	Disarticulated	Unknown
5	6	49	2	2	2	2	132
?2	?2						

Table 3 Position of the body and number of inhumations.

Head at feet	Between femora		Possible decapitation or disturbance.
Inh 26,125,	40.		inh122, 143
194	181		187
3	2		3

Table 4 Position of the skull in decapitation burials.

N-S	NE/SW	SE/NW	E/W	ENE/WSW	WNW/ESE	NNW/SSE	NNE/SSW	UNKNOWN
67	8	5	45	24	4	18	28	15
35(N-S)	3/5		7/38	6/18		9/9	8/20	
32(S-N)								

Table 5 Orientation of burials at Wasperton.

	Brooches	Beads necklace	Brooches & beads	Necklace/pendant	Wrist guards	Bracelets	belts	knives	Belts & knives
Nos	36	31	22	2	2	7	15	20	10
%	70.6	60.8	43.1	3.9	3.9	13.7	29.4	39.2	19.6

Table 6 The number of individuals with female grave goods.

	Shields	Spears	Shields & spears	Buckle	Knives	Belts & Knives	Ferrules	Wooden buckets
Nos	22	24	16	14	21	11	9	2

Table 7 Numbers of graves with male grave goods

Sex	Inf	Juvenile	Adoles-cent	Young Adult	Middle Adult	Mature Adult	Adult	Age Unknown
Subadult total	-	2	9	-	-	-	-	-
Adults Unknown	-	-	-	3	10	3	6	11

Female	-		2	2	2	1	1	3
Male	-	1	1	2	1	1	1	1
Total	0	2	9	7	13	5	8	15

Table 8 Summary of the age and sex distribution of inhumed skeletons

	Nos of cremation burials excavated	Nos of cremations recorded	Cremations with no bone recovered	Cremations with no bone recovered for analysis	Cremations from other contexts
Nos of individuals	26	21	1	5	3

Table 9 Type of cremations recorded

Infant	Child	Adolescent	Subadult Unknown	Young adult	Middle adult	Mature adult	Adult	Unknown
0	3	4	2	4	0	2	4	3
	13.6%	18.2%	9.1%	18.2%		9.1%	18.2%	13.6%

Table 10 Ages of individuals within the cremation burials

	0-250 grams	250-500 grams	500-750 grams	750-1000 grams
Nos	14	8	4	1
%	51.9	29.6	14.8	3.7

Table 11 Total cremation weight in grams.

cremation nos	total wt	10MM +	%	5-10mm	%	2-5mm	%
1a	592	270	49.6	100	18.4	174	32
1b	752	441	63.6	164	23.6	88	12.7
3	14	14	100				
4	464	127	27.9	206	45.3	122	26.8
5	468	220	47	162	34.6	86	18.4
6	48	12	2500%	24	5000%	12	25%
8(a&b)	620	168	27.1	270	43.5	142	22.9
9	420	220	52.4	50	11.9	150	35.7
10	344	80	23.8	160	47.6	96	26.2
11(a & b)	288	118	41	96	33.3	60	20.8
12	26	12	46.2	2	7.7	12	46.2
13	66	22	33.3	10	15.2	34	51.5
14	608	146	25	260	44.5	178	30.5

15	872	242	28.4	432	50.7	178	20.9
17 (a & b)	304	73	24	157	51.6	74	24.3
18	28	ck					
19	572	456	81.4	68	12.1	30	5.4
20	420	100	23.6	56	13	274	65.2
22	233	53	22.7	94	41.2	84	36.1
24	12	2	33.3	2	33.3	2	33.3
26	150	114	76	32	21.3	4	2.7
X1	8	6	75	2	25		
X2	4					4	100
X3							
[Apple]	76	40	52.6	12	15.8	24	31.6

Table 12 The percentage of bone in each sieve size.

Cremation Numbers	Age	Total weight (g)	Total (identified weight)	% Identified weight	Total weight broad categories	% Weight broad categories	Total unident Weight	% Unidentif Weight
1a	Adult	592	73	12.3	516	87.2	302	51
1b		717	103	14.3	390	54.4	274	38.2
3		14			14	100		
4		455	65	14.3	386	84.8	228	50.1
5		468	67	14.3	401	85.7	162	34.6
6		49	9	18.4	40	81.6	24	50
8 (a&b)	adult	584	64	11	518	88.7	306	52.4
9	16-18	419	93	22.2	326	77.8	200	47.7
10		344	46	13.7	300	87.2	156	45.3
11(a & b)	Adolescent	274	95	34.7	168	61.3	125	45.6
12	Child	26	11	42.3	15	57.7	13	50
13		66	14	21.2	52	78.8	34	51.5
14		608	52	8.6	556	91.4	304	50
15		803	121	15.1	656	81.7	438	50.2
17 (a&b)	Young adult	304	44	14.5	261	85.9	113	37.2
18	adult	28	5	17.9	22	78.6	10	35.7
19		560	218	38.9	346	61.8	98	17.5
20		430	58	13.5	372	86.5	298	69.3
22		233	14	6.0	184	79	84	36.1
24		12	1	8.3	11	91.7	5	41.7
26		150	57	38	93	62	27	18

Table 13 Weights for identified & unidentified cremated remains.

WASPERTON OSTEOLOGICAL AND PALAEOPATHOLOGICAL CATALOGUE
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APPENDIX 1 Summary of assessment data of preserved inhumed remains

Burial	Area	Feature	Context	Condition	Bones Apparently Present	Bones Present	Complete	Age	Sex ¹
1	-	56	-	Poor	Skeletal remains good with right radius and hand missing. Pelvis not fused	Left foot, left femur, parts of right femur, tibiae, pelvis, arms, most of skull	25-50%	Yg	
3	B	61	1008	Very poor	Small fragment (?humerus)	1 long bone fragment	1-25%	-	-
6	-	237	1238	Very poor	Teeth	3 tooth crown fragments	1-25%	Yg	M
8	L	240	1303	Very poor	Teeth	Tooth fragments	1-25%	Adol	F
10	L	246	1328/4	Very poor	Teeth	3 tooth crowns	1-25%	Juv	M
16	-	344	1270	Very poor	None identified, although dark streaks were noticed in backfill. Possibly some fragments were recovered, uncertain if they are belonging to this context	Few eroded long bone fragments	1-25%	-	-
24	L	302	1230/2	Very poor	Preserved bones were recovered. Including 13 teeth, jaw (mandible) and other fragments	20 tooth crowns, 1 skull fragment, few eroded long bone fragments	1-25%	Yg	F
26	L	308	1286	Very poor	Surviving bones recorded as left and	Eroded skull, teeth, femoral,	1-25%	-	U

¹ Actually gender, drawn from grave goods by Scheschkewitz 2006.

					right femur, and tibiae, humeri, left radius and ulna, traces of pelvis, lower vertebrae, skull	tibial and pelvis fragments			
27	-	309	1259	Very poor	Surviving bones recorded as stains, skull, fragments of left and right femora, fragments of left tibia	Left mastoid, right petrous temporal, 1 premolar, few eroded long bone fragments. 1 tooth crown	1-25%	Yg	F
28	L	325	1294	Very poor	Bones surviving as a stain: skull, right humerus and tibia	Left temporal, small fibula and femur fragments, 1 molar crown	1-25%		U
33	L	340	1251	Very poor	Teeth not recovered	Several tooth crown fragments	1-25%	Adol	S
34	L	346	1265	Poor	Surviving bones include parts of skull, left humerus and radius, both femora and tibiae	Femoral tibial and humeral shaft fragments	1-25%	Yg	U
35	L	347	1266	Very poor	Skull and two teeth were recovered	Few eroded skull fragments, several tooth crowns	1-25%	Mid	U
37	-	362	1269	Very poor	Very fragmented parts of right humerus, right femur and both tibiae	1 fragment of humeral shaft	1-25%	-	-
38	L	363	1271	Very poor	Skull, humeri, part of the pelvic area, femora and tibiae	Eroded fragments of skull and long bones	1-25%	A	U
39	-	365	1267/2	-	Skull and teeth fragments. Recovered	ANIMAL	-1-25%	-	-

					bones probably out of fill of pot				
40	L	366	1305	Very poor	Skull and bone fragments	Eroded long bone shafts and tooth fragments	1-25%	Mid	U
41	L	368	1307	Very poor, mouldy	Skull, some vertebrae and ribs, part of sacrum, left and right clavicles, fragmented left scapula, left and right humeri, left radius and ulna, right radius, right and left femora, right and left tibiae	Eroded parts of the majority of skeleton, mostly unidentifiabl e	1-25%	-	-
42	-	373	1319	Very poor	Skull, right humerus and radius, part of the pelvic girdle, left and right femora and tibiae, some foot bones	Skull, teeth, eroded long bone fragments	1-25%	Mid	U
43	L	377	1324	Very poor	Skull and teeth, part of pelvis, both femora and tibiae, fragments of right fibula. Only skull recovered	Eroded skull and tooth fragments	1-25%	-	F
44	L	378	1325	Very poor	Teeth, part of pelvis, both femora and tibiae	Eroded long bone shafts and fragments of femur	1-25%	A	M
46	L	382	1335	Poor	Teeth, mandible, cervical vertebrae, clavicles, left scapula, right and left humeri, fragments of right and left radii plus ulnae, some ribs, part of pelvis, right	Mandible and teeth, long bone fragments, pelvis, ribs	1-25%	Adol	S

					and left femora, fragments of right and left tibiae and fragment of right fibula				
48	L	385	1344	Very poor	Skull	Eroded skull and teeth	1-25%	Mat	U
54	L	413	1414/5	Very poor	Skull	Eroded skull, few long bone fragments, tibia shaft	1-25%	A	M
55	L	419	1421	Very poor	Described bones were recovered	Skull, tooth crowns, eroded long bone fragments	1-25%	Mat	U
71	-	1036	2331	Very poor	Skull	Eroded skull	1-25%	A	F
85	Q	1524	3100	Very poor	One tooth	1 tiny tooth fragment	1-25%	-	F
87	Q	1529	3122	Very poor	Teeth	Tooth fragments	1-25%	Adol	S
104	-	1558	3214	Very poor	One tooth	1 tooth	1-25%	-	M
108	Q	1570	3228	Poor	Teeth	Tooth crowns	1-25%	Adol	M
115	Q	1582	3266	Very poor	Teeth.	2 tooth crowns	1-25%	Mid	M
119	Q	1598	3297	Very poor	Teeth	14 tooth crowns	1-25%	Adol	F
138	Q	3043	-	Moderate	Skeleton almost complete with good bone preservation . Teeth, arm and leg bones	Foot and wrist bones, arms and legs, parts of skull and teeth	1-25%	A	U
140	Q	3046	3371	Very poor	Teeth	1 tooth fragment	1-25%	-	F
143	Q	3054	3399/13	Very poor	Teeth	13 tooth crowns	1-25%	Adol	S
153	Q	3080	3472	Good	Teeth	20 teeth	1-25%	Adol	S
155	Q	3085	-	Very poor	Teeth	9 tooth crowns	1-25%	Mid	F
161	Q	3098	3542/3	Very poor	Teeth	10 tooth crowns	1-25%	Yg	M
166	-	3106	3615	Moderate	Skull	Skull	1-25%	Mat	U
167	Q	3107	-	Very poor	Teeth	11 teeth	1-25%	Mid	F
169	Q	3110	-	Moderate	Skeletal condition good	Both femora, whole left hand, ribs,	1-25%	A	U

					including crushed and decayed bones	left clavicle			
173	Q	3120	-	Moderate	Skull	Skull, teeth	1-25%	Mid	F
174	-	3122	3683	Moderate	Skull and teeth	Skull and teeth	1-25%	Mat	M
180	Q	3142	3795	Very poor	Skull. Full set of milk teeth, second teeth forming within jaw	Mandible, teeth	1-25%	Juv	S
190	-	3159	-	Very poor	Skull and teeth	Eroded skull and tooth fragments	1-25%	Mat	F
191	Q	3161	3965	Poor	Teeth	Teeth	1-25%	Mid	U
193	Q	3163	3970/1	Very poor	Skull	Eroded skull and teeth	1-25%	A	?M
194	Q	3166	3877	Very poor	Teeth	21 teeth	1-25%	Mid	U
195	Q	3171	8148	Very poor	Teeth	2 tooth crowns	1-25%	Yg	U
199	AE	4204	-	Very poor	Teeth	Tiny tooth fragments	1-25%	Adol	S
200	-	4205	-	Very poor	Teeth	Several Tooth fragments	1-25%	Mid	U
215	J3	606	1610	Poor	-	Eroded parts of femur, pelvis and skull, humerus, left femur	1-25%	A	U
216	U	1351	5297	Very poor	-	Tiny tooth fragments	1-25%	-	-
-	J3	549	1649	Very poor	-	Eroded long bone fragments	1-25%	-	-

Key:

Age: A – adult; Yg – young adult; Mid – middle adult; Mat – mature adult; Adol – adolescent; Juv – Juvenile

Sex :M - male; F - female; U –undetermined sex; S - subadult

I – Isotope analysis

C14 and Isotope analysis: X – analysis should be possible

APPENDIX 2 Summary of assessment data on preserved cremated remains

Burial No.	Area	Feature	Context	Condition	Weight	Largest Fragment Size
1 (A)	L	51	1000/2	Good	378.8g	42mm
1B	L	51	1000/3	Excellent	640g	72mm
2	-	-	-	No bone recovered	-	-
3	-	76	3209	Excellent	12.2g	35mm
4	-	80	-	Good	?	?
5	L	267	1308	Good	468.3g	49mm
6	L	371	1311	Good	63.2g	21mm
7	-	-	-	No bone recovered	-	-
8A	Q	1500	3000	Excellent	134.4g	29mm
8B	Q	1500	3000	Good	501.8	43mm
9	-	1501	3005	Excellent	252.3g	45mm
10	Q	1502	3004	Moderate	332.2	54mm
11A	Q	1503	3006	Moderate	4.4g	27mm
11B	Q	1503	3007	Excellent	266.5g	63mm
12	-	1504	3008	Moderate	27.7	25mm
13	Q	1505	3011	Moderate	63.7g	28mm
14	Q	1506	3013	Excellent	592.8	42mm
15	Q	1565	3223	Excellent	879.7	37mm
16	-	-	-	No bone recovered	-	-
17A	Q	1567	3225	Excellent	292.5g	47mm
17B	Q	1567	3254	Moderate	2g	22mm
18	-	1594	3290	Good	36.4g	27mm
19	Q	1599	3298	Excellent	566.5g	63mm
20	-	3006	3308	Moderate	228.2	24mm
21	-	-	-	No bone recovered	-	-
22	Q	3021	3336	Good	228.9g	37mm
23	-	-	-	No bone recovered	-	-
24	AA	3180	8190	Good	14.3g	24mm
25	-	-	-	No bone recovered	-	-
26	Q	1589	3279	Excellent	104.3g	54mm
X1	Q	1552	3198	Excellent	8.6g	35mm
X2	L	-	1307	Poor	4.8g	<2mm
X3	-	-	-	Good	69.1g	35mm

-	-	342	1260	Good	11.4g	48mm
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Key:

Condition Excellent, good, moderate, poor.

Weight in grams

Largest frag size in mm

Appendix 3: Identifiable remains in Wasperton cremations

CREMATION 1A Adult, sex unknown.

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		Frag of cranium	6	1.0	
Vertebrae			16	2.7	
Atlas	L	Condylar portion			
Cervical		1x C vert			
		2-3 vert bodies			
		2x transverse processes			
Ribs		Frag of shaft	6	1.0	
M.Tarsal		Head of 1 st & 2 x other midshaft. 2x other heads	6	1.0	Adult
Phalanx		Proximal (hand) and shaft of 1x other.	2	0.3	Adult
Flat bone		Frag of innominate & acetabulum	50	8.4	
Femur		2x femoral head & shaft frags	30	5.1	
Clavicle	?	Medial aspect	1	0.2	
Humerus		Prox end of shaft & frag of head	6	1.0	
Long bone		Include frags of lower arm, humerus, & fibula shaft	164	27.7	
Unidentif			302	51.0	
Total Wt			592		

CREMATION 1B Young adult , sex unknown

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		1x wormian bone/ frags of cranium	48	6.7	Sutures open = young
Mandible	R	R side , ramus & tempomandib joint	18	2.5	Adult
Vertebrae			18	2.5	
Atlas	R	R side – small			? Subadult
Thoracic		1 st or 2 nd T vert body			Adult
Lumbar		L side body			? adult
		Tip neural spine x 1			? epiph unfused.
Innominate	?R	Frag of ilium, & frag of ? pubic symphysis	14	2.0	P.Symphysis – ridged = young alternatively part of unfused iliac crest.. P/symph ?? male.
Scapula		Frag acromion process	2	0.3	
M. carpal		Prox artice surface ? 2 nd /3 rd .	1	0.1	
Long bones total			320	44.6	
Tibia/fibula		Frag of shaft	(88)	(12.3)	?? subadult
Femur/humerus		Frag of femoral & humeral shaft	(92)	(12.8)	
Thin long bones		? fibula	(20)	(2.8)	
ribs		2 x frag of shaft	2	0.3	
Other long bones		unidentif	(96)	(13.4)	
Artic surfaces		Frag	20	2.8	
Unidentif			274	38.2	
Total wt			717		

CREMATION 3 ? Adult

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Long bone		Frag shaft femur or humerus	14		Thickness of cortical bone suggest adult
? fibula		Frag of shaft			
Total wt			14		

CREMATION 4 Adolescent (under 16 years)

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
skull		Frag of frontal, parietal & occipital bone	46	10.1	Cranial frags thin = Sutures unfused.
Long bones		Frag of shaft – tibia, humerus, lower arm & femur	158	34.7	
Artic surfaces		frags	12	2.6	
femur		Frag of femoral head, & condyles	(2)		Small = young
Tibia		Condyles & distal artic surf	(2)		
Radius		Prox artic surf	(1)		
Humerus		Frag prox & distal artic surfaces	(1)		
Diaphysis		? Distal end of ulna diaphysis	(1)		Unfused => 16 yrs
Innominate		Frag of ilium, pubic symphysis acetabulum	10	2.2	Iliac crest unfused > 18 yrs. P Symphysis – ridged = young
Vertebra		Frag apoph joint. 2 x frag of body	2	0.4	
Unidentif		frags	228	50.1	
Total Wt			455		

CREMATION 5 Young adult, sex unknown

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		Cranial frags	48	10.3	Sutures open (thin vault 4-5mm = young
Vertebrae		Frag of vertebrae	3	0.6	
Artic surfaces		Small frags	8	1.7	
M Tarsal		Frag of prox end & frag of shaft	2	0.4	
Innominate		Frag of innominate & acetabulum	10	2.1	
Talus		Frag of tibia & calcaneum artic surf	4	0.9	
Long bone		Frag of shaft. Frags femur/tibia/humerus & lower arm	231	49.4	Cortical bone = ? adult
Unident		Frag	162	34.6	
Total wt			468		

CREMATION 6 Subadult

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull	?		8	16.7%	Subadult
Vertebrae	?	N.spine & artic surf- neural arch	1	2%	
Unidentif			24	50%	
Artic surface		Unknown position	10	20.9%	1x unfused frag = subadult
Long bones			6	12.5%	
Total wt			48		

CREMATION 8 (a & b) Young adult sex unknown

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull	?R	Orbital margin	54	9.3	
	L	Frag frontal bone			
		Frag cranium			
Teeth		3 rd maxillary molar/ 2 x other molar root (1x max)			No wear 15-25
Vertebrae		1x Cervical vert 3x vert body/ 2 x apoph joint/ 2x N.spine	8	1.4	Vertebral body fused
Artic Surfaces			20	3.4	
Femur		Lower condyles			
Humerus		Distal artic surf			
1 st Prox phalanx & 1 x distal phalanx		Proximal artic surfs	1	0.2	Adult
M.carpal/ M.tarsal		Shafts only. Distal end M.tarsal	1	0.2	
Flat bones		Parts of the innominate	14	2.4	
Long bones			178	30.4	
Unidentif			306	52.4	
Total wt			584		

CREMATION 9 – glass fused to long bone. Adolescent (16-18 yeas)

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		Occipital bone, parietal bone	39	9.3	Sutures open
Mandible	R	Sockets for 2-5	(1)		
Ribs		Shaft frags	8	1.9	
Vertebrae		Atlas – condyle/	8	1.9	
	L	Axis- peg			
		1x C vert body			Body epiph unfused
		Thoracic Neural arch			
Epiphyseal plates			36	8.6	
Femur		Condyles			Unfused >18
Tibia		Proximal epiph plate			>18
Fibula		? distal epiph plate			>18
Humerus		Prox end			
M.Tarsal/M.carpal		Head MT & M.carpal head & shaft	2	0.5	Epiph fused 16 +
Talus		Frag artic surface			
Innominate		Frag of ischium			
Flat bone		Frag	28	6.7	
Long bones		Shaft	98	23.4	
Unident		frags	200	47.7	
Total weight			419		

CREMATION 10 Adult

BONE	SIDE	SEGMENT	Wt	% TOTAL WT	SEX/AGE
Skull		Sphenoid, and cranial frags.include zygomatic process Maxilla	46	13.4	Thin – sutures unfused. Incisors root present.
Long bones			40	11.6	
Tibia		1x frag with proximal artic surf fused by glass			
Fibula		Frag of glass – sheen result of glass			
Femur		Shaft – glass sheen to linea aspera. Frag of distal artic surf			
Artic		Frag	24	7.0	Frag with line through

surface					trtabecullae, (Harris line or recently fused epiphysis.
Scapula		Frag of acromion spine			
Long bones (unid)		Frag	80	23.3	
Unidentif			156	45.3	
Total Wt			344		

CREMATION 11 (a&b) Adolescent under 17 years

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		Parietal & frontal frags	36	13.1	
IDENTIF BONE			22	8.0	
Humerus	L&R	Humeral head epiphysis, and capitulum.			>17
Tibia		Proximal plate			>17 older adolescent
radius		Distal epiph plate & diaphysis			>17
Talus	?	Artic for tibia			Adult size
Femur		Frag of conylar epiphyseal plate			> 17
Scapula		Acromion spine			
Innominate		Frag of ilium, rami of pubis	24	8.8	
Vertebrae		frag of vert body, axis, frag of Thoracic vert	3	1.1	
ribs		Frag of shaft	10	3.6	
Trabecular			5	1.8	
Long bone		Frag of shaft	36	13.8	
Unidentif			123	45.6	
Total Wt			274		

CREMATION 12- Juvenile (2- 5 years)

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		Cranium	6	23.1	
		Basilar portion of occiput			
	?	Zygomatic bone			
Tooth		1 st max molar & mandible. Crown only	2	7.7	3-4 years
Vertebrae		4x neural arches 1x vert body	2	7.7	N.arch/body unfused. 2 sides of N.arch – fused.
Rib		Shaft	1	3.4	
Femur	?	Distal end of diaphysis			Epiphysis unfused.
Long bone		?? arm	2	7.7	
Unidentif			13	50	
Total wt			26		

CREMATION 13 Juvenile 6 years +

BONE	SIDE	SEGMENT	W T	% TOTAL WT	SEX/AGE
Skull		Frag of cranium	8		
Teeth		Premolar			Unrupted crown only
Axis	L&R	Peg and L&R artic surf	2	3.0	Tip of peg unfused
Long bone		frags	10		
Epiphyseal plates		Unidentif	4		
Unidentif			34	51.5	
C14			8		
Total Wt			52		

CREMATION 14 Young adult

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		1x frag of sphenoid/ Cranial frags/ frag zygomatic process? Temporal section	10	1.6	Suture unfused/ vault thickness 2-3mm
Vertebrae		1x Cervical apophyseal joint/ 2 x neural arch/ 2 x artic surfaces	2	0.3	
Pelvis		Large frag of acetabulum- ilium	8	1.3	
Tibia		Shaft	20	3.3	
Fibula		Distal artic surf & shaft	8	1.3	adult
Artic surfaces			20	3.3	
Femur/humerus		Artic surfaces			
Talus		Tibial artic surf			

Phalanx (hand)		1x proximal	4	0.7	adult
M.carpal/M.tarsal		Distal artic surf & shafts of bone			
Long bones		Fragments of shaft	202	33.2	
Unident			304	50	
C14 sample		Unidentified bone fragments	30	4.9	
Total wt			608		

CREMATION 15 Adult

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		R.Zygomatic	90	10.3	
Mandible	?	Ramus & incisor area			
Maxilla	?	Fragments			
Teeth		Fragments of roots including incisor & molar.			
Ribs		Fragments of head & shaft	6	0.7	
Vertebrae	L	atlas	22	2.5	
		Cervical vert x 2			
		Fragments of lumbar			
		1x late thoracic			
		Frag of sacrum/ala			
Artic surfaces			26	3.0	
Humerus		Frag of head			
Tibia		Fragments prox artic surface			
Tarsals		Frag of talus, Navic and 3 rd cuneiform.			
Manubrium		Frag by costal cartilage	3	0.3	
Long bones		Fragments of shaft	218	25	
Unidentif			438	50.2	
Total Wt			803		

CREMATION 17a&b Adult sex unknown

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		Ossicle -wormian bone/ zygomatic bone/ cranial frags/ temporomandibular fossa/	28	9.2	Sutures open= young
Vertebrae	R	1 x cervical vert	8	2.6	
Atlas		Frag of odontoid facet			
		1 x T vert joint			
		Frag of sacrum or lumbar/ & lumbar vert body			
Ribs		Frag of shaft & 1 st rib shaft	3	1.0	
Hand		1 x distal phalanx (prox end)	4	1.3	
		Min 3 x proximal phalanges (hand)			Adult
		1 st M carpal – distal surface			
		4 x M.T /MC dist artic surf			
Ulna		Frag of proximal articular surface	1	0.3	
Articular surf/trabecular		Fragmentary	19	6.3	
Flat bones		? innominate	16	5.3	
Long bones			101	33.2	
Unident		frags	113	37.2	
C 14		Frag unidentif	12	3.9	
Total wt			304		

CREMATION 18 Adult

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		Cranial frags	4	14.2	
M.carpal/M.tarsal		Distal surface	1	3.6	adult
Long bone		shaft	12	42.8	
Unidentif			10	35.7	
Total wt			28		

CREMATION 19 Mature adult sex unknown

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		Occipital & temporal frags	42	7.5	
		Temporomandibular joint			
Vertebrae		1 st sacral vertebrae & 5 th Lumbar	40	7.1	Adult. Concentric Intervertebral osteochondrosis.
		2 x other Lumbar vertebrae			
		1x Thoracic vertebra			
Ribs		Frag of shaft	10	1.8	
Flat bones			90	16.1	
Scapula		Frag of glenoid cavity, coracoid process.			
Innominate		Ilium, acetabulum, pubic bone, Frag of sacroiliac joint.			
		Frag innominate/scapula/sternum			
Upper limb			88	15.7	
	L&R	Frag proximal artic surface shaft & distal end.	(8)	(1.4)	
	R	Ulna, proximal	(8)	(1.4)	
	L	Proximal end of shaft			
	L	Radius distal artic surf	(6)	(1.1)	Cu stain distal end/wrist.
Lower Limb			90	(16.1)	
Femur	L & R	Femoral head & condyles	(36)	(6.4)	Adult
Tibia		Frag of shaft	(44)	(7.9)	
Fibula		Frag of shaft	(14)	(2.5)	
M Carpals	L&R	2 nd M.carpal prox end & shaft	10	1.8	L 2 nd – green stain(ring)
	L	3 rd M.C			
		2 x prox artic 1 x shaft			
Trabecula		Unknown position ? lower limb	6	1.1	
Artic surfaces		Frag	2 2	3.9	
Long bone frags			64	11.4	(C 14 sample)
Unidentif frags			98	17.5	
Total wt			560		

CREMATION 20 Juvenile 9 – 10 years

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		Frontal & sagittal frags	46	10.7	Unfused sutures – thin (2-4mm) young/subadult
Ribs		Frag shaft	6	1.4	
Epiphyses			6	1.4	
Humerus	L&R	Distal epiphysis			. 9-10 Trochlea & capitulum unfused.
		Hd of humerus or femur			
		Frag of diaphysis			
Femur		Frag of condyle.			V small
Flat bone		? innominate	8	1.9	
Long bones		Frag femoral shaft/ tibia & ? humerus.	50	11.6	(C 14 sample)
		Lower arm & small lg bones	12	2.8	
Trabeculla bone		Frag	4	0.9	
Unidentif		Frag	298	69.3	
Total wt			430		

CREMATION 22 Adult sex unknown

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		Frontal or parietal frags	8	3.4	One has shiny/glass like covering
Vertebra		3 x Frag of vert body	2	0.9	Body epiphysis fused = adult
		1x Neural spine			
Hand			4	1.7	
M.tarsal		Head of 1 st			
Phalanx		Prox artic surf distal phalanx			adult
		Unidenti artic surface			
		Shaft of M.Carpal ofr M.Tarsal			
Lg bones			98	42.1	
? femur		Thick cortical bone shaft			
		? tibia shaft			
Flat bones		Prob innominate	2	0.9	
		? axillary border			
Unidentif		Frag	84	36.1	

TOTAL			233		

CREMATION 24 Probable subadult

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Skull		Cranium	1	8.3	v.slight = immature?
Unidentif			5	41.7	
C 14		Sample	6	50	
Total wt			12		

CREMATION 26 Mature adult sex unknown

BONE	SIDE	SEGMENT	wt	% TOTAL WT	SEX/AGE
Skull		?mastoid area & base of skull, parietal frags & other crani8al frags	44	29.3	
Vertebrae		Frag of vertebral body	2	1.3	Pathology – Intervertebral osteochondrosis to body & o/phytes = mature
	R	Inf apophyseal joint lumbar			
Scapula		Axillary border	2	1.3	
Long bones			60	40	Includes C 14 sample
Ulna		Distal end of shaft			
Fibula		Shaft			
? Humerus		Frag of shaft & distal artic surface	2	1.3	
Tibia			2	1.3	
Artic surf		Porous with osteophytes _ ? head of femur	2	1.3	Early osteoarthritis
Calcaneum		Frag of heel & ? R talar artic surf	2	1.3	
Artic surf		Site unknown	2	1.3	
M carpal		Head of ? 1 st	1	0.7	
Unidentif			27	18	
Total wt			150		

CREMATION x 1

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Long bones		? frag lower arm	6		?adult
Unidentif			2		
Total Wt			8		

CREMATION x 2

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Unidentif			4g		??Human
					C 14

CREMATION x 3 (APPLE)

BONE	SIDE	SEGMENT	WT	% TOTAL WT	SEX/AGE
Pelvis		Frag ilium & iliac crest	10	13.2	Hardly calcined
Long bone		Lower arm	30	39.4	Sent C 14
Vertebra		Apophyseal joint	1	1.3	
Artic surface		Unknown position	3	3.9	
Unidentif			32	42.1	
Total wt			76		

APPENDIX 4 The Colour and pattern of fracture of the cremated bone.

Cremation	Colour	Cracking	Age
3	cream	Longitudinal/ curvilinear	? adult
4	cream - lt grey int/ lt brown	linear/ transverse	Adol(> 16)
5	White - cream / lt grey	linear/ transverse / curvilinear	yg
6	Cream	Linear transverse	s.adult
9	white-cream-lt brown	Linear & transverse - checked	Adol (16-18)
10	cream- beige	Linear & transverse	Adult
12	cream - white	Linear transverse	Juv (3-4)
13	White - cream / brown	Linear transverse	Juv (6+)
14	cream / beige - lt brown	Longitudinal. Linear transverse some curved.	yg
15	Lt brown/ cream - lt grey	linear/transverse & curvilinear	Adult
18	cream		?
19	cream-beige / lt brown	Checking/ transverse. Linear	mat
20	cream - beige	Linear transverse some curved	Juv (9-10)
22	cream - lt brown	Linear & transverse some curved	Adult
24	cream - white	linear/transverse	? S.adult
26	cream - beige / lt brown	Linear & transverse - some checking.	mat
11 (a&b)	cream - lt brown	Transverse & Longit/ curved	Adol (>17)
17 (a&b)	Beige - lt brown & lt grey	Linear curved / transverse & longit	Adult
1A	cream/ beige - white	curvilinear linear	Adult
1B	cream - lt grey int	curvilinear/ linear/ checking Transverse	yg
8 (a&b)	white/ cream lt grey int	checked/ linear, curvilinear & transverse	Yg
x1	white - cream	linear & curved	? Adult
x2	Beige - lt brown	crumbs	?
x3 apple	cream - beige	Linear & curved	?

Key

Colour - white, cream, light grey ,beige, light brown.

Cracking – Longitudinal, linear transverse, curvilinear, checked

Age: A – adult; Yg – young adult; Mid – middle adult; Mat – mature adult; Subadult- under 17 years

Adol – adolescent; Juv – Juvenile

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