Osteological Analysis
3 and 6 Driffield Terrace
York
North Yorkshire

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York Archaeological Trust
For Excavation & Research Ltd
Cuthbert Morrell House
47 Aldwark
York
YO1 7BX

Prepared by

Anwen Caffell and Malin Holst
York Osteoarchaeology Ltd
Ivy Cottage
75 Main Street
Bishop Wilton
York YO42 1SR

Reviewed by Niki Gilding

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Summary

York Osteoarchaeology Ltd was commissioned by York Archaeological Trust (YAT) to carry out the osteological analysis of 82 skeletons, cremated bone from 37 features (representing eighteen cremation burials and 19 assemblages of residual cremated bone), and 101 contexts of disarticulated bone. The skeletal remains were recovered from two separate excavations at 1-3 Driffield Terrace (NGR SE 59324510, excavated in 2004-2005), and 6 Driffield Terrace (NGR SE 59285095, excavated in 2005), in York, North Yorkshire. Osteological analysis confirmed initial impressions that the remains from the two sites were likely to derive from the same cemetery, which is situated along a Roman road leading from Roman York in a south-western direction to Tadcaster. The burials dated to the Roman period, to between the late first or early second century AD to the late fourth century AD, and many of the cremation burials dated from the later phases of the site.

The cemetery appeared rather disorganised, as graves were not arranged in rows, there was some intercutting of burials, and burial orientations were somewhat variable. Most inhumed individuals had been interred in an extended supine position, on variations of northeast-southwest/ northwest-southeast (or inverted) alignments. A small percentage of burials were flexed on their left or right sides, and three had been interred in prone positions. The frequency of decapitation was exceptionally high, with 70.8% of the burial population having been decapitated (based on osteological and contextual evidence). Most individuals had been decapitated with a single cut, but multiple cuts to the neck were observed on occasion. Where direction could be established, the majority of cuts were delivered from behind. The severed heads had been placed in a variety of positions, most frequently near the legs or in the correct anatomical position. Seven of the graves contained multiple burials, and notably, the heads of the individuals in one double burial had been interchanged.

The cemetery was almost exclusively devoted to the burial of young to middle aged males. Of the 75 adults only one was female (98.5% of sexed adults were male), and there was a complete lack of adults aged over 45 years. Three of the seven non-adults were adolescents in their late teens (probably socially regarded as adults), but four young children were identified (a foetus, a neonate, and two juveniles). The average stature was slightly above average for the period, but the range was large, and the population appeared to be genetically diverse.

Numerous pathological conditions were observed, particularly trauma. Evidence for peri-mortem blade injuries was extensive, but most of this was associated with decapitation. Peri-mortem blunt force injuries were scarce. One individual had possible animal bite marks in his pelvis. The frequency of healed trauma was high, and included injuries potentially associated with inter-personal violence (e.g. cranial and facial trauma, dental fractures and fractures to the first metacarpals), as well as injuries potentially caused through accidental means, such as twisted ankles and falls. Evidence for infection was also frequent, and included inflammation of the lower limbs (some of which may have been due to trauma), and respiratory infections. Otherwise, frequencies of joint disease and most dental diseases were low, as would be expected given the young age of the population. Despite the slightly above average stature, there was evidence that suggested that these individuals experienced childhood stress in the form of *cribra orbitalia* and enamel hypoplasia. Various developmental anomalies of the skeleton and teeth were also observed.

Acknowledgements

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1.0 INTRODUCTION

In September 2010 York Osteoarchaeology Ltd was commissioned by York Archaeological Trust to carry out the osteological analysis of 82 skeletons, cremated bone from 37 features, and 101 contexts of disarticulated bone from Driffield Terrace, York, North Yorkshire. The human remains came from two separate excavations: 1-3 Driffield Terrace (NGR SE 59324510), excavated between August 2004 and January 2005 (Ottaway 2005); and 6 Driffield Terrace (NGR SE 59285095), excavated between June and August 2005 (Hunter-Mann 2005), with further excavations undertaken during a watching brief in October 2009. The remains from the two sites are thought to derive from the same cemetery. Skeleton numbers from 3 Driffield Terrace were prefaced with '3DT', and those from 6 Driffield Terrace with '6DT'.

Fifty-nine skeletons were recovered from 3 Driffield Terrace, of which 58 were articulated burials identified archaeologically, and one was identified during analysis of the disarticulated remains. The latter (Skeleton 3DT 59) was apparently a disturbed Roman burial that had been redeposited in a post-medieval pit. Twenty-three skeletons were recovered from 6 Driffield Terrace. The bulk of the skeletons (72%) therefore came from 3 Driffield Terrace.

The burials ranged in date from the first century/early second century AD through to the late fourth century AD. Within this time frame the skeletons were placed into four phases, numbered 31-34 for 3 Driffield Terrace and 21-24 for 6 Driffield Terrace, although it should be noted that the phase divisions were tentative in some cases. Table 1 and Figure 1 show the distribution of skeletons in each phase. The majority of skeletons from 3 Driffield Terrace were thought to date to the late second and early third century AD, whereas most of the skeletons from 6 Driffield Terrace dated to the late third to late fourth centuries AD.

Table 1 Number of skeletons in each phase

Phase	Date	3DT		6DT	
		n	%	n	%
31/21	First – early second century	12	20.3%	1	4.3%
32/22	Late second – early third century	23	39.0%	6	26.1%
33/23	Late third – early fourth century	17	28.8%	8	34.8%
34/24	Late fourth century	6	10.2%	8	34.8%
Unphased	-	1	1.7%	0	0.0%
Total		**59**		**23**	

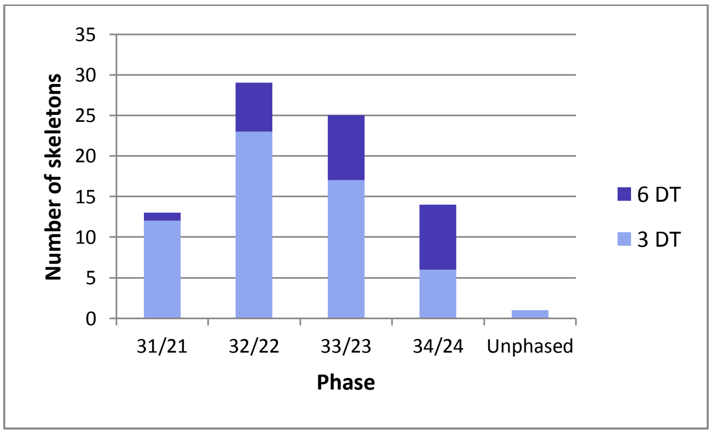


Figure 1 Distribution of skeletons between phases

Forty-one contexts contained cremated bone, 38 contexts from 3 Driffield Terrace and three from 6 Driffield Terrace. At 3 Driffield Terrace one feature contained four contexts, and another contained two contexts, so the overall number of features containing cremated bone was 34 (at 3 Driffield Terrace) and 37 (3 and 6 Driffield Terrace combined). Fourteen of these features had been identified on site as cremation burials (thirteen at 3 Driffield Terrace and one at 6 Driffield Terrace; Table 2). Four contexts from 3 Driffield Terrace were identified post-excavation as possible cremation burials (4037, 4099, 4104, and 4143). Eight cremated bone assemblages came from grave cuts containing articulated skeletons (six at 3 Driffield Terrace, two at 6 Driffield Terrace), and so probably represent residual material. Two contexts from 3 Driffield Terrace (4224 and 4384) came from cuts identified as empty graves (or possibly a gully in the case of 4384). It is less certain whether the cremated bone in these features represents residual material or deliberate deposits within the features. The same is true of cremated bone in five contexts from the fill of a large pit (4488) at 3 Driffield Terrace. Cremated bone from Context 4053 (probable medieval ploughsoil) and 4078 (upper spit of Roman cemetery soil) probably represent disturbed material. Cremated bone from contexts 4000 and 4242 was effectively unstratified.

Table 2 Contexts containing cremated bone

Deposit Type	3 Driffield Terrace	6 Driffield Terrace
Cremation burial	4023, 4050/4071/4073/4079, 4057, 4179, 4180, 4240, 4270, 4299, 4310, 4342/4343, 4376, 4415, 4454	1022
Possible cremation burial	4037, 4099, 4104, 4143	
Grave cuts (with articulated skeletons)	4028, 4047, 4066, 4205, 4275, 4356	1008, 1040
Empty graves/ gully?	4224, 4384	
Large pit (4488)	4411, 4464, 4504, 4506, 4511	
Upper spit of Roman cemetery soil	4078	
Medieval ploughsoil?	4053	
Unstratified	4000, 4242	

Overall, 101 contexts contained 1,238 fragments of disarticulated bone, some of which joined together. Most of these joins occurred within the same context as would be expected, but occasionally fragments of the same bone were found in different contexts. For example, part of a fibula was found in Context 1040, and another part was found in Context 1043; both contexts were grave fills in Grave 1042 (for Skeleton 6DT7). At 3 Driffield Terrace, part of a right os coxa was found in Context 4104 (fill of a shallow pit cutting grave 4195) and another part of the same bone was found in Context 4103 (fill of cut 4117).

Most (76) of the disarticulated bone assemblages were recovered from 3 Driffield Terrace, and these yielded 863 fragments (Table 3, an average of 11.4 fragments per context). Twenty-five contexts from 6 Driffield Terrace contained 375 fragments (an average of 15.0 fragments per context). The largest quantity of disarticulated bone (271 fragments) came from Context 1048 at 6 Driffield Terrace and this comprised 72.3% of the disarticulated bone from 6 Driffield Terrace and contained bones from a minimum of three individuals. This was the fill of a large pit that had cut at least three articulated skeletons (6DT10, 6DT11 and 6DT13), and it seems likely that most of this bone derived from these individuals. At 3 Driffield Terrace the largest quantity of bone (97 fragments) came from Context 4400 (fill of grave cut 4439). Additional disarticulated bone was found with 26 skeletons, 21 from 3 Driffield Terrace (41 fragments) and five from 6 Driffield Terrace (6 fragments).

Table 3 Quantity of disarticulated bone per context

3 Driffield Terrace						6 Driffield Terrace	
Context	**Fragments (n)**	**Context**	**Fragments (n)**	**Context**	**Fragments (n)**	**Context**	**Fragments (n)**
4000	13	4162	13	4368	21	1000	18
4017	2	4171	19	4400	97	1006	1
4019	30	4174	1	4411	5	1008	3
4021	29	4186	6	4420	1	1017	1
4037	5	4193	6	4421	16	1018	1
4040	3	4196	12	4428	5	1026	2
4047	14	4197	1	4431	45	1031	9
4048	7	4205	35	4460	2	1032	10
4051	3	4229	1	4464	7	1037	1
4059	15	4232	2	4466	4	1040	1
4066	5	4251	3	4467	4	1043	7
4078	29	4252	1	4477	17	1048	271
4085	53	4255	2	4493	5	1054	6
4091	4	4274	2	4504	2	1073	7
4099	24	4275	5	4505	5	1078	1
4103	2	4277	1	4506	31	1080	1
4104	10	4278	4	4507	3	1087	4
4111	3	4325	6	4508	54	1093	1
4114	5	4334	3	4510	43	1095	1
4118	11	4336	9	4511	32	1107	6
4126	3	4339	2	4514	2	1108	11
4129	11	4349	3	10000	22	1114	9
4132	1	4351	1	10011	1	1158	1
4139	1	4356	5	10021	1	1200	1
4148	4	4358	3	**Total**	**863**	1201	1
4153	4	4361	1			**Total**	**375**

The data presented in this report is based on the full analysis of the human remains carried out by York Osteoarchaeology Ltd (main analysis by AC, in consultation with MH). The human remains had previously been recorded by Tucker (2006), and by Saržinski (2009) for her Master's dissertation. During the analysis of each skeleton, Tucker's recording forms and Saržinski's data spreadsheets were consulted and their data were re-evaluated. Although this data was informative, discrepancies in opinion occurred and all interpretations presented in this report were made based on data collected by York Osteoarchaeology Ltd.

Comparison of the skeletal remains from Driffield Terrace was made with other Roman cemeteries in the vicinity, including Mill Mount (skeletal remains recovered during two separate excavations in 2004 and 2005; Holst 2005, 2006), 89 The Mount (data supplied by M. Holst), and Trentholme Drive (Wenham 1968, Warwick 1968). Comparisons were also made with two rural cemeteries from Lincolnshire, Horncastle (Caffell and Holst 2008) and Ancaster (Cox 1989), and also with the proposed 'gladiator cemetery' at Ephesus, Turkey (Kanz and Grossschmidt 2006). The data from Trentholme Drive should be viewed with caution since the skeletal analysis was carried out in the 1950s or 1960s prior to the development of many of the modern methods of recording and data presentation. Caution should also be employed with Ephesus, since much of the skeletal data is based on disarticulated remains rather than analysis of articulated burials. This may well have affected how comparable the Ephesus data is with that of the other skeletal populations.

1.1 AIMS AND OBJECTIVES

The aim of the skeletal analysis was to determine the age, sex and stature of the skeletons, as well as to record and diagnose any skeletal manifestations of disease and trauma.

1.2 METHODOLOGY

The skeletons were analysed in detail, assessing the preservation and completeness, calculating the minimum number of individuals present as well as determining the age, sex and stature of the individuals. All pathological lesions were recorded and described.

The disarticulated bone was recorded following accepted guidelines (McKinley 2004a). All bones were identified, and the part of the bone element that was present was recorded. As with the articulated skeletons, preservation and completeness, and any information on the age and sex of the individuals were recorded, along with pathological lesions observed. Attempts were made within contexts (and occasionally between contexts, where relevant) to join fragments of the same bone.

The cremated bone was analysed according to the guidelines specified by McKinley (2004b). The bone was passed through a nest of sieves with mesh sizes of 10mm, 5mm and 2mm. The maximum fragment size was measured, bone colour was noted, and any identifiable fragments were recorded. An attempt was made to determine age and sex, and any pathological lesions present were described.

The data recorded for each skeleton by York Osteoarchaeology Ltd was compared with that from the recording forms compiled by Tucker (2006) and Saržinski's (2009) data spreadsheets and the data for the cremated bone assemblages was compared with Tucker's (2006) recording sheets. During the analysis for this report, it was recorded when discrepancies between the different analyses occurred and it was justified why a different result had been concluded upon. Data on discrepancies is only recorded on the York Osteoarchaeology Ltd recording sheets and has not been incorporated into this report, which relies solely on the data gathered by York Osteoarchaeology Ltd.

2.0 OSTEOLOGICAL ANALYSIS

Osteological analysis is concerned with the determination of the identity of a skeleton, by estimating its age, sex and stature. Robusticity and non-metric traits can provide further information on the appearance and familial affinities of the individual studied. This information is essential in order to determine the prevalence of disease types and age-related changes. It is crucial for identifying sex dimorphism in occupation, lifestyle and diet, as well as the role of different age groups in society. A summary of the osteological and palaeopathological data is given in Table 4, with a detailed catalogue of skeletons provided in Appendix A. A summary of the cremated bone is provided in Table 5 and a catalogue of the disarticulated bone can be found in Appendix B.

Table 4 Summary of osteological and palaeopathological data of the inhumed skeletons

Sk No	C (%)	SP	F	Age	Age Group	Sex	Stature (cm)	Dental Pathology	Pathology
3 Driffield Terrace									
3DT1	40-50	1	sev	26-35	yma	M?	-	Calculus; DEH; slight crowding; RM_3 NP/U; cyst?	Schmorl's node; DJD spine (1 lumbar facet); cribra orbitalia; developmental anomaly T11; hallux valgus L MT1; decapitation C4(?)
3DT2	60-70	2	mod	36-45	oma	M	161.9cm ±4.30cm	Calculus; caries; AMTL; slight crowding; rotation; DEH; abscesses; AM fracture; enamel chips	Schmorl's nodes; DJD costal facets & medial clavicles; developmental anomaly sphenoid; cranial border shift at TL border; maxillary sinusitis; healing fracture of right scapula; fracture of right ulna olecranon; clay shoveler's fracture T1; soft tissue trauma to right humerus & right pubis; ossified cartilage; pilasterism left femur; partial decapitation C6
3DT3	50-60	2	mod	36-45	oma	M	178.5cm ±2.99cm (white) 172.9cm ±3.53cm (black)	Calculus; caries; AMTL; DEH (pits); periodontal disease; enamel chips; uneven wear	Schmorl's node; OA lateral right clavicle; DJD both hips; maxillary sinusitis; small depression in occipital; cyst in left MT1; damage to right shoulder joint capsule; ossified haematoma left tibia; possible soft tissue injury to right fibula
3DT4	80-90	3	mod	18-25	ya	M	-	Calculus; LM^3 super-erupted; LM_3 NP/U; slight crowding; rotation; small enamel chips	Bilateral os acromiale; healed fracture RMC1; spondylolysis L4; cortical defect distal left tibia; lamellar bone deposits internal tibiae; decapitation C2, cut also penetrating mandible
3DT5	50-60	2	mod	26-35	yma	M	169.9cm ±4.05cm	Calculus; crowding	DJD apophyseal facets T4-5, costal facets T12; ossified ligamentum flavum; cribra orbitalia; decapitation C5
3DT6	80-90	1	sli	26-35	yma	M	167.6cm ±2.99cm	Calculus; caries; AMTL; partial impaction RM_3; fractures RI^1, LI^1, LI^2, RP_1, LP^2; enamel chips	Schmorl's nodes; DJD costal facets T1, 5 & 9; cribra orbitalia; cleft neural arch S1; possible additional lumbar vertebra sacralised + border shift between sacrum & coccyx; bipartite sesamoid bone; healed fracture R rib 5(?); healed fracture to nasal bones; avulsion fracture R MT5; soft tissue trauma L calcaneus; possible Osgood-Schlatter's disease; cortical defects R calcaneus, RMT1 & L humerus; hallux valgus LMT1; woven bone R MT5, L tibia & fibula; lamellar bone both tibiae; woven-lamellar bone both zygomas; decapitation C3-4
3DT7	50-60	1	sli	26-35	yma	M	169.2cm ±3.27cm (white), 165.9cm ±3.94cm (black)	-	Schmorl's nodes; cleft neural arches S1-5; cranial border shift at TL border; spondylolysis L5; ossified haematoma/ periosteal reaction left tibia; 2 cuts to the right pectoral girdle; inferred decapitation due to location of cut on medial right clavicle
3DT8	80-90	2	mod	26-35	yma	M	176.2cm ±2.99cm (white), 170.9cm ±3.53cm (black)	Calculus; enamel chips; retained dc^1 + displacement RC^1; unusual wear; several displaced teeth	Schmorl's nodes; DJD costal facets T12; sacralisation L6; coxa valga both femora; torsion both femora & tibiae; avulsion fracture/ developmental anomaly right navicular; non-osseous tarsal coalition right lateral cuneiform & MT3; cyst right proximal 1st foot phalanx; possible decapitation C5

3DT9	10-20	2	sev	18+	a	U	-	-	Trauma to left foot (collapsed arches & subluxation); flattened right fibula shaft
3DT10	50-60	4	sli	36-45	oma	M	161.8cm ±4.30cm	Calculus; caries; abscess; AMTL; DEH; teeth NP/U; LM^3 super-erupted; impacted canine; diastema; enamel chips	DJD SI body, left hip; excavated muscle attachment right humerus
3DT11	20-30	1	min	18+	a	U	-	-	Healed fracture RMC1; cyst RMC2; lamellar bone both tibiae & fibulae; possible trauma to both feet
3DT12	90+	3	sli	26-35	yma	M	177.6cm ±2.99cm	Calculus; DEH; caries; AMTL; abscesses; crowding; RI^2 NP/U; LM^3 crown enlarged & partially impacted; fractures to 3 teeth; enamel chips	Schmorl's nodes; cortical defects proximal humeri; crush fracture T11; trauma to L4; healed fracture to left rib; dislocation/ subluxation left hip?; avulsion fracture L tibia medial malleolus & associated trauma to L talus; maxillary sinusitis; lamellar bone both tibiae & fibulae; enthesophytes both feet; ivory osteoma; multiple cuts to the mandible, atlas, axis & C3, decapitation C2
3DT13	90+	4	sli	16-19	ad	(M?)	173.6cm ±3.37cm	Calculus; DEH; crowding; narrow palate	Schmorl's nodes; developmental anomalies C5-6, T1-2, T5, third metacarpals & capitate bones; cleft neural arches S1, 4-5; cortical defect R proximal foot phalanx; cribra orbitalia; healed fracture RMC1; woven bone on mandible, ribs; lamellar bone on femora, feet, ribs
3DT14	30-40	1	sli	30-32 wiu	f	-	-	-	-
3DT15	90+	1	min	18-25	ya	M	169.5cm ±3.27cm	Calculus; DEH; parastyles; absence LI^2 – possible cyst?	Schmorl's nodes; grooves in surfaces T5-6; developmental anomaly T10-11; cranial border shift TL border; lamellar bone on 2 right ribs; dorsal bars on both naviculars; decapitation C3-4
3DT16	90+	1	sli	36-45	oma	M	171.8cm ±2.99cm (white), 167.1cm ±3.53cm (black)	Calculus; DEH; periodontal disease; small upper third molars; rotation; fracture LC_1; enamel chips	Schmorl's nodes; DJD spine & clavicles, left wrist; OA spine & left wrist; sacralised sixth lumbar vertebra; caudal border shift at TL border; osteochondritis dissecans of left tibia; maxillary sinusitis; developmental anomalies/ trauma to right MT5 & proximal 5^{th} foot phalanx; healed fracture to spinous process T4; healed fracture to left wrist; decapitation C6
3DT17	80-90	1	sli	18-25	ya	M	177.8cm ±3.27cm	Calculus; caries; lower third molars super-erupted; RM^3 tilted; enamel chips	Schmorl's nodes; depression in left parietal; lamellar bone on external occipital, right tibia, right fibula; woven-lamellar bone on both fibulae; maxillary sinusitis in right sinus; os acromiale right scapula; cortical defects; cyst in left fibula; decapitation C2-4 (single cut)
3DT18	50-60	1	sli	15-19	ad	(I)	-	Calculus; caries; DEH; periodontal disease; cyst; enamel chips	Soft tissue trauma to both proximal fibulae; developmental anomaly both feet; cribra orbitalia
3DT19	90+	1	sli	16½-20	ad	(M?)	165.0cm ±2.99cm	Calculus; DEH; retained Rdc^1 & impaction RC^1; enamel chips	Reduction in vertebral segments & multiple border shifts; elongated manubrium; shallow depression external left parietal; nodule of bone on internal frontal; hypervascularity of tibiae; hallux valgus
3DT20	5-10	4	ext	1-2	j	-	-	Calculus	-
3DT21	90+	1	sli	36-45?	oma?	M?	174.3cm ±2.99cm	Calculus (asymmetric & heavy); caries; AMTL; DEH; periodontal disease; asymmetric dental	Schmorl's nodes; DJD spine; asymmetry (cranium & pos-cranium); developmental anomalies of spine; border shift at TL border; maxillary sinusitis; lamellar bone both tibiae; trauma to anterior L4; healed fracture right rib 10; tarsal bar; decapitation C5-

								arcades; crowding; rotation; enamel chips	6
3DT22	90+	2	mod	36-45	oma	M	174.8cm ±2.99cm (white), 169.7cm ±3.53cm (black)	Calculus; caries; abscesses; fractures LC^1, LP^1, RM_2, LM_2	Schmorl's nodes; DJD + OA spine; DJD clavicles & TMJ; possible healed fracture/ soft tissue injury to right clavicle; border shift at TL border; weavers' bottom; lamellar & woven bone on right tibia; lamellar bone on left fibula; maxillary sinusitis; cribra orbitalia; cortical defect
3DT23	90+	3	sli	26-35	yma	M	178.2cm ±3.37cm	Calculus; DEH; crowding; unusual wear; enamel chip	Schmorl's nodes; DJD + OA spine; oval depression in right parietal; cortical defect right mandible; excavated muscle attachments, right humerus; soft tissue injury to LMC3 & capitate; lamellar bone both tibiae & left fibula; soft tissue trauma to feet; 4-5 peri-mortem cuts to C3-5, (decapitation C5), cut to mandible
3DT24	5-10	4	min	0-1m	n	-	-	-	-
3DT25	90+	1	sli	6-7	j	-	-	Calculus; enamel chip	Cleft neural arches sacrum; woven & lamellar bone on mandible, both femora & tibiae
3DT26	90+	1	sli	36-45	oma	M	179.3cm ±2.99cm	AMTL; calculus; DEH; periodontal disease; LM^1 super-erupted; notch worn into incisive surface LI^1; enamel chips	Schmorl's node; DJD + OA spine; DJD clavicles, right TMJ, right wrist, both hips, proximal tibio-fibular joints; OA left clavicle, left wrist; cleft neural arches S1-5 & probably L5; developmental anomalies of spine; trauma to left shoulder joint; unhealed scaphoid fracture; infection left ulna; disuse atrophy left arm; fractured right rib 10, transverse processes L2 & L3; woven bone on rib 11; spondylolysis & spondylolisthesis L5; cribra orbitalia; ossified cartilage; pilasterism; lamellar bone on both tibiae; dorsal bar left navicular; lamellar bone both 4^{th} MTs; decapitation C6-7
3DT27	20-30	3	sev	25+	a	M	-	Calculus; caries; periodontal disease; abscesses; crowding; worn groove LI^1; fractures RM_1, LC^1; enamel chips	Cribra orbitalia; maxillary sinusitis; rib fracture; decapitation C4
3DT28	95+	3	sli	26-35	yma	M	179.3cm ±2.99cm	Calculus; rotation LI^2 & LP^2; enamel chips	Schmorl's nodes; shallow depressions x2 in frontal & left parietal; border shift at TL border; asymmetric sacrum; lamellar bone both tibiae; neoplasm/infection left ulna; hallux valgus; decapitation C4-5
3DT29	70-80	3	mod	36-45	oma	M	179.9cm ±3.27cm (white), 173.5cm ±3.78cm (black)	-	DJD both hips; border shift at TL border; cleft neural arch S1, 4-5; cortical defect; pilasterism; lamellar bone right tibia & fibula
3DT30	60-70	2	sli	26-35	yma	M	171.1cm ±2.99cm (white), 166.4cm ±3.53cm	Calculus; caries; DEH; LM_3 NP/U; fractures LP_1, LP_2, RP_1, RP_2; enamel chips	Schmorl's nodes; DJD spine, clavicle; ossified cartilage; excavated muscle attachment; healed fracture R MC1; damage to joint capsules L MC1 & 4; border shift at SCx border; trauma to gluteus medius; lamellar bone on both tibiae; soft tissue injury to left talus; peri-mortem cuts – stab C3-4, small cut C4, partial decapitation C7-T1, right Rib 1

							(black)		
3DT31	80-90	1	min	26-35	yma	M	170.8cm ±3.94cm	AMTL; calculus; DEH; crowding; rotation LC$_1$; worn groove LI^1; enamel chips	Schmorl's nodes; asymmetric cranium; shallow depression in frontal; decapitation C6
3DT32	95+	1	sli	17-23	ya	M	154.7cm ±3.53cm	Calculus; caries; DEH; abscess; periodontal disease; woven bone; super-eruption RM$_3$; enamel chips	Schmorl's nodes; lytic lesions thoracic vertebrae; cribra orbitalia; additional vertebral segment, 13 left ribs; broad sternum; developmental anomaly of sphenoid; excavated muscle attachment; inflammation around nose and jaws; possible trauma/ inflammation tibiae; calcaneus secundarius/ fracture right calcaneus; cyst/ developmental anomaly LMT3
3DT33	90+	2	sli	26-35	yma	M	167.5cm ±3.53cm	AMTL; calculus; caries; DEH; abscesses; periodontal disease; fusion RM^2 & RM^3; rotation RP^2; fractures RI^1, LI^1, LI^2; enamel chips	Schmorl's nodes; DJD spine, right clavicle; OA spine; healed fracture right clavicle; subluxation right acromion-clavicular joint; healed fracture left rib 12; healed blade injury left femur; lamellar bone both tibiae & right fibula, palate; cribra orbitalia; maxillary sinusitis; hallux valgus; soft tissue trauma right foot, left shoulder; multiple peri-mortem cuts to neck & mandible, decapitation C2, vertical cuts to posterior neck
3DT34	95+	1	mod	17-23	ya	M	156.2cm ±3.37cm	Calculus; caries; DEH; abscess; periodontal disease; crowding; fractures LM$_2$, RM$_2$; enamel chip	Schmorl's node; reduction in vertebral segments with border shifts; excavated muscle attachments; congenital fusion foot phalanges; lamellar bone & hypervascularity both tibiae
3DT35	80-90	3	sli	36-45	oma	M	170.7cm ±2.99cm (white),, 166.1cm ±3.53cm (black)	Calculus; periodontal disease; fracture RM$_1$ & LM^1; enamel chips	Schmorl's nodes; reduction in vertebral segments with border shifts; congenital fusion of sternum & manubrium; congenital fusion of foot phalanges; pilasterism; dorsal tarsal bar
3DT36	50-60	2	sli	18-25	ya	M	171.8cm ±4.32cm (white), 165.5cm ±4.30cm (black)	-	Schmorl's node; excavated muscle attachment; cortical defect left radius; developmental anomaly L1; cyst right ilium
3DT37	90+	2	sli	26-35	yma	M	166.3cm ±2.99cm (white), 162.1cm ±3.53cm (black)	LM^3 & RM^3 NP/U; LM^2 & RM^2 small crowns; calculus; caries; abscess; crowding; fractures LM^2 & RI^1; enamel chips	Schmorl's nodes; DJD spine, lateral clavicles, hips; caudal border shift at TL border; additional lumbar vertebra, sacralised; shallow depression in frontal bone; dysplasia of right scapula; soft tissue trauma to right clavicle, finger, left tibia; healed fracture left fibula; excavated muscle attachments; rib lesions; woven bone on both femora; woven + lamellar bone on both tibiae; lamellar bone on sacrum; pilasterism; possible decapitation C2
3DT38	95+	1	sli	36-45	oma	M	173.6cm ±3.27cm	Calculus; enamel chips	Ossified ligamentum flavum; DJD medial clavicles; maxillary sinusitis; ossified costal cartilage; possible cervical rib; healed fracture left rib; possible fracture/trauma to right rib 9; pilasterism; lamellar bone on left tibia; soft tissue trauma to proximal & distal tibio-fibular joints, left foot; tarsal bars; congenital fusion foot phalanges; decapitation C6-7
3DT39	10-	2	mod	18+	a	U	-	-	Excavated muscle attachment; cortical defect

	20								
3DT40	60-70	2	sli	16-22	ya	M	166.9cm ±2.99cm (white), 162.7cm ±3.53cm (black)	-	Border shifts at TL & LS borders; possible greensick fracture of right ulna; fracture of right foot phalanx; lamellar bone lumps on both tibiae
3DT41	80-90	3	mod	18-25	ya	M	171.0cm ±4.32cm (white), 164.7cm ±4.42cm (black)	Calculus; caries; abscess; infection; enamel chip	Border shifts at TL & LS borders; slight scoliosis; developmental anomaly T4 & sternum; lamellar bone on both tibia shafts; soft tissue trauma to left pubis; decapitation(?) C7; vertical cut to C2-3
3DT42	90+	2	sli	26-35	yma	F	160.9cm ±3.66cm	Calculus; caries; narrow triangular palate; short roots LP^1 & LP^2; fracture RM^2; enamel chips	Schmorl's nodes; shallow lytic lesion in T11; cortical defects; maxillary sinusitis; possible greenstick fracture of left femur; calcaneus secundarius/ avulsion fracture right calcaneus
3DT43	40-50	2	sli	18-25	ya	M	175.5cm ±2.99cm	Calculus; caries; DEH; periodontal disease; crowding; rotation RC_1, LC_1, LM_3; enamel chips	Possible healed fracture of right maxilla; deviated nasal spine; hookless hamate; cysts (hamate & MT5)
3DT44	90+	3	sli	26-35	yma	M	170.3cm ±2.99cm (white), 165.7cm ±3.53cm (black)	Calculus; crowding; rotation RP_1; hypoplastic supernumerary ectopic tooth; fractures LM_1, LP_2, LM_2; enamel chips	Cribra orbitalia; excavated muscle attachment; lamellar bone right fibula; trauma/infection left foot phalanx; cyst in left foot phalanx; soft tissue trauma to left clavicle; partial decapitation C6
3DT45	95+	1	sli	26-35	yma	M	168.7cm ±2.99cm	Calculus; DEH; super-eruption RM_3 & LM_3; RM^3 & LM^3 tilted distally	Schmorl's node; cranial border shifts at CT & TL borders; healed fractures of T4-6, L3 transverse processes; depression in frontal; soft tissue trauma to right shoulder, left hand, right ankle & right foot; woven bone on left os coxa; flattened femora; lamellar bone left fibula; decapitation C5-6; peri-mortem cut to right femur
3DT46	95+	1	sli	26-35	yma	M	173.9cm ±2.99cm (white), 168.8cm ±3.53cm (black)	LM^3 NP/U; calculus; DEH; rotation LP^1 & LP^2; unusual wear	Schmorl's nodes; DJD medial clavicles; deviated nasal septum; soft tissue trauma to feet; cribra orbitalia; woven bone right maxilla; ossified cartilage; developmental anomaly C3; decapitation C1-2, cut penetrated mandible & right temporal; additional cuts to C2
3DT47	95+	3	sli	26-35	yma	M	171.4cm ±3.37cm	Calculus; LM_3 & RM_3 NP/U; worn grooves LI^1 & LI_1; enamel chips	Schmorl's nodes; cranial border shift at TL border; unidentified ossified object; os acromiale; lamellar bone both femora, tibiae & fibulae; possible haematoma left femur; nodule on right tibia; congenital fusion foot phalanges; 17-18 peri-mortem cuts to the neck and mandible; peri-mortem cuts to left hand
3DT48	90+	3	mod	36-45	oma	M	160.7cm ±3.27cm (white), 158.3cm	AMTL; calculus; caries; DEH; periodontal disease; parastyle; rotation; fracture; enamel chips	Schmorl's nodes; degeneration vertebral bodies; DJD & OA spine; cyst T4; os acromiale; retroversion femora; anomalies of both feet; decapitation C5

							±3.94cm (black)		
3DT49	5-10	3	mod	18+	a	U	-	-	Osteitis/ haematoma right tibia; lamellar bone right tibia & fibula, left tibia
3DT50	10-20	2	sli	18+	a	U	-	-	Healed fracture of foot phalanx
3DT51	90+	1	mod	18-25	ya	M	165.5cm ±2.99cm (white), 161.4cm ±3.53cm (black)	Calculus; caries; DEH; periodontal disease; crowding; rotation; retained Rdc^1 & impaction RC^1; enamel chips	Schmorl's nodes; cribra orbitalia; additional lumbar vertebra; border shift at TL border; os acromiale; osteoma/ infection frontal sinus; lamellar bone both tibiae & femora; cortical defect
3DT52	20-30	1	sli	18-25	ya	M	180.9cm ±4.05cm	-	-
3DT53	60-70	1	sli	26-35	yma	M	162.9cm ±4.05cm	Calculus; caries; DEH; enamel chips	Schmorl's nodes; developmental anomalies of spine, manubrium & clavicle?; additional vertebra, possibly L6 sacralised; excavated muscle attachments; cortical defect; ridges of bone on internal ribs; decapitation C4 & C6-6
3DT54	90+	2	mod	26-35	yma	M	162.9cm ±4.05cm	AMTL; teeth NP/U; calculus; caries; DEH; periodontal disease; crowding; rotation; enamel chips	Schmorl's nodes; developmental fusion manubrium & sternum; border shift at LS border; cleft neural arch; excavated muscle attachment; woven-lamellar bone on radius; rib lesions; lamellar bone both femora & tibiae; lumps on left tibia; cyst right femur; possible fracture L3
3DT55	60-70	1	sli	26-35	yma	M	171.5cm ±4.05cm	AMTL; calculus; crowding; rotation; grooves worn in LI^1	Schmorl's nodes; osteochondritis dissecans; maxillary sinusitis; developmental asymmetry C2-3; healed fractures 3 ribs & T4; decapitation C6
3DT56	20-30	2	sli	18+	a	U	-	-	Lesion in right femur head; infection right femur; soft tissue trauma to right ankle; lamellar bone on both tibiae & right fibula; calcaneus secundarius/ avulsion fracture; trauma to right foot
3DT57	30-40	3	sev	18+	a	M?	-	Calculus; all second premolars & LM_3 NP/U; retained deciduous second molars; rotation; super-eruption LM^3; enamel chips	Possible healed fracture of left clavicle; healed fracture RMC1; soft tissue trauma to left femur; coxa vara
3DT58	30-40	2	sev	36-45	oma	M?	-	Calculus; DEH; enamel chips	Schmorl's nodes; border shift at TL border
3DT59	40-50	3	sev	26-35	yma	M	-	Calculus	Schmorl's node
6 Driffield Terrace									
6DT2	70-80	1	mod	36-45	oma	M	167.3cm ±3.27cm	AMTL; calculus; caries; DEH; abscesses; periodontal disease; crowding; rotation; fractures LM_2, RM_1, LM^2; enamel chips	Schmorl's nodes; porosity in left mandible; OA spine; ivory osteoma; cortical defects; neoplasm/ trauma right humerus; rib fractures x3; pilasterism; border shift at S-Cx border; lamellar bone both tibiae; calcaneus secundarius; non-osseous tarsal coalition; trauma to left ankle
6DT3	90+	2	mod	18-25	ya	M	182.7cm ±3.37cm	Calculus; DEH; crowding; supernumerary tooth	Schmorl's nodes; cribra orbitalia; trauma/ developmental anomaly sacrum; border shift at TL border; excavated muscle attachments; avulsion fracture RMC3; possible avulsion fracture navicular; possible decapitation C4-5; peri-mortem fracture R ulna

6DT4	60-70	2	sli	36-45	oma	M	178.7cm ±3.37cm	Calculus; DEH; periodontal disease; rotation; enamel chips	OA left hand (possible dislocation); osteophytes + lytic lesions around head RMC1; cribra orbitalia; lamellar bone tibiae & fibulae; weaver's bottom; depression in right parietal; decapitation C4-5
6DT5	40-50	2	mod	26-35	yma	M	167.2cm ±4.05cm (white), 164.5cm ±4.43cm (black)	-	Schmorl's nodes; os acromiale; excavated muscle attachments; possible rib lesions; lamellar bone right femur; decapitation C6-7 + peri-mortem cut to left clavicle
6DT6	90+	2	mod	26-35	yma	M	171.2cm ±4.32cm (white), 164.9cm ±4.30cm (black)	AMTL; calculus; periodontal disease; diastema; enamel chips	Schmorl's nodes; sagittal keel; border shift at TL border; excavated muscle attachments; lamellar bone both femora & tibiae; tibiae slightly bowed; cortical defects; bar of bone on right navicular
6DT7	60-70	2	mod	36-45	oma	M	-	AMTL; calculus; caries; periodontal disease; partial impaction LM^3; fracture LM^1; enamel chips	DJD both TMJs, both hips & left wrist; maxillary sinusitis; lamellar bone on zygomatic bones, & tibiae; soft tissue trauma to left radius & right ankle; fracture distal right fibula; developmental anomaly both medial cuneiforms; possible peri-mortem cut to C3
6DT8	90+	2	mod	36-45	oma	M	177.3cm ±4.32cm	AMTL; calculus; caries; DEH; abscesses; periodontal disease; enamel chips	Schmorl's nodes; DJD spine, hips, left knee; trauma to L2; soft tissue trauma to proximal(?) hand phalanx; fractures to distal hand & foot phalanges; rib lesions; cortical defects; lamellar bone on both tibiae & fibulae; decapitation C3-4
6DT9	30-40	2	mod	18+	a	M?	-	Calculus; DEH; diastema; super-eruption LM^3; RM_3 & LM_3 NP/U; fractures RC^1, RP^1, LP^1; enamel chips	DJD both TMJs; asymmetry of mandible; lamellar bone both tibiae, fibulae & femora; decapitation C3-4
6DT10	10-20	2	mod	18-25	ya	U	-	-	Os acromiale; excavated muscle attachment; lamellar bone left humerus; possible cut to C5
6DT11	5-10	3	mod	18+	a	U	-	-	Lamellar bone on right fibula, 2 metatarsals
6DT12	40-50	3	mod	18+	a	M?	-	AMTL; calculus; caries; DEH; periodontal disease; crowding; rotation; enamel chips	Schmorl's nodes; DJD spine, medial clavicle; excavated muscle attachment; decapitation C3-4
6DT13	20-30	2	mod	36-45	oma	M?	-	-	Schmorl's nodes; DJD spine; soft tissue trauma hand phalanx; cyst LMC3; decapitation C6
6DT14	60-70	2	mod	26-35	yma	M	-	AMTL; calculus; crowding; enamel chips	Schmorl's nodes; DJD spine, shoulder, hips, knee; OA spine; trauma to L2 & L4; border shift at TL border; cribra orbitalia; ivory osteoma; soft tissue trauma right shoulder; calcaneus secundarius; lamellar bone tibiae, right fibula, ribs; peri-mortem cuts to C6 & mandible (stabbing injuries?)
6DT15	90+	3	mod	18-25	ya	M	168.6cm ±4.32cm	AMTL; calculus; caries; DEH; abscess; periodontal disease; LM_2 tilted; possible fractures LM^3 & LM_3; enamel chips	Schmorl's node; asymmetric cranium; depression in left parietal; lamellar bone on humeri, ribs, femora, tibiae & talus; fracture spinous process T8; peri-mortem cuts to left hand

6DT16	20-30	3	mod	26-35	yma	M	-	-	Schmorl's nodes; lytic lesions T9; excavated muscle attachment; os acromiale
6DT17	50-60	2	mod	36-45?	oma?	M?	165.1cm ±3.37cm (white), 161.1cm ±3.78cm (black)	Calculus; caries; DEH; periodontal disease; RM_3 NP/U; super-eruption RM^3; enamel chips	Schmorl's nodes; DJD right hip; OA hand; osteochondritis dissecans C2; 2 depressions in frontal; woven bone on clavicle; excavated muscle attachment
6DT18	80-90	2	sev	17-21	ya	M	-	Calculus; DEH; enamel chips	Schmorl's nodes; cribra orbitalia; border shift at TL border; clay shoveler's fracture T1; excavated muscle attachment sites
6DT19	70-80	2	mod	26-35	yma	M	171.9cm ±3.37cm	Calculus; caries; DEH; abscesses; periodontal disease; enamel chips	Schmorl's nodes; DJD; lytic lesions in L2 & L4; cortical defect; border shift at LS border; os acromiale; new bone formation – rib, auricular surface, femora, tibiae & fibula; cyst in ischium; developmental anomaly L5; decapitation C2-3, mandible; peri-mortem bite marks both os coxae
6DT20	90+	2	mod	26-35	yma	M?	-	Calculus; caries; DEH; rotation; grooves in incisive surfaces; fractures LM^1, LI^1, LI^2, RC^1; enamel chips	Schmorl's nodes; DJD spine; ossified ligamentum flavum; os acromiale; cysts; lamellar bone on 1 rib; developmental anomaly left calcaneus; potential decapitation T1
6DT21	80-90	2	sev	36-45	oma	M	-	Calculus; caries; DEH; abscess; periodontal disease; rotation; enamel chips	Schmorl's nodes; lytic lesions in L1-2; cribra orbitalia; maxillary sinusitis; os acromiale; fracture right ulna, right hamate, left fibula, right tibia; soft tissue trauma to left tibia; lamellar bone on both tibiae, femora & 2 ribs; cortical defect; decapitation C5-6
6DT22	80-90	3	sev	26-35	yma	M	176.2cm ±4.32cm (white), 169.3cm ±4.30cm (black)	AMTL; calculus; caries; abscess; periodontal disease; lamellar bone; enamel chips	Schmorl's nodes; DJD; cribra orbitalia; maxillary sinusitis; additional vertebra; ivory osteoma; healed penetrating injury to occipital; rib lesions; cyst; stabbing injury to neck (C5?)
6DT23	80-90	2	sev	18-25	ya	M	-	Calculus; periodontal disease	Schmorl's nodes; excavated muscle attachments; four cuts to neck & mandible, decapitation C5
6DT24	90+	2	min	18-25	ya	M	173.8cm ±2.99cm	Calculus; caries; periodontal disease; crowding; rotation; enamel chips	Schmorl's nodes; soft tissue trauma T5; asymmetric cranium; border shift at TL border; cleft neural arch; developmental anomalies; rib lesions; lamellar bone RMC3; inflammation auricular surface; pilasterism; osteochondritis dissecans right femur; hallux valgus; cyst; possible peri-mortem injury to C7

Key: SP = Surface preservation: grades 0 (excellent), 1 (very good), 2 (good), 3 (moderate), 4 (poor), 5 (very poor), 5+ (extremely poor) after McKinley (2004a); C = Completeness; F = Fragmentation: min (minimal), sli (slight), mod (moderate), sev (severe), ext (extreme)

Non-adult age categories: f (foetus, <38weeks *in utero*), p (perinate, c. birth), n (neonate, 0-1m), i (infant, 1-12m), j (juvenile, 1-12y), ad (adolescent 13-17y)

Adult age categories: ya (young adult, 18-25y), yma (young middle adult, 26-35y), oma (old middle adult, 36-45y), ma (mature adult, 46+y), a (adult, 18+y)

Table 5 Summary of cremated assemblages

Context	Feature	Feature Type	Urned?	Bone Colour	Preservation	ID	Age	Sex	Weight >2mm (g)	Weight as % of modern*	Max Frag. (mm)
3 Driffield Terrace:											
4000	-	Unstratified	No	White	Good	?	?	?	1.7	0.1	21.87
4023	4032	Pit – cremation burial	No	Black, dark-mid-pale grey, white	Good	H	A	F?	143.2	8.8	81.26
4028	4027	Grave cut for Sk 3DT3	No	Black, dark-mid-pale grey, white	Good	H	A?	?	10.3	0.6	45.63
4037	-	Unknown; cremation burial?	No	Black, dark-mid-pale grey, white	Good	H	A	M?	66.2	4.1	45.97
4047	4045	Grave cut for Sk 3DT6	No	Black, dark-mid-pale grey, white	Good	H?	A?	?	45.6	2.8	47.17
4050, 4071, 4073, 4079	4084	Pit – cremation burial	No	Brown/black, dark-mid-pale grey, white	Good	H+A	A	?	740.8	45.6	70.58
4053	4058	Medieval ploughsoil?	No	Dark-mid-pale grey, white	Good	A+?	?	?	24.0	1.5	32.04
4057	4067	Pit – cremation burial	No	Black, dark-mid-pale grey, white	Good	H+A	A/Ad	?	308.9	19.0	49.84
4066	4064	Grave cut for Sk 3DT7	No	Black, dark-mid-pale grey, white	Good	?	?	?	4.4	0.3	29.89
4078	-	Spit 2, upper Roman cemetery layer	No	Mid-pale grey, white	Good	?	?	?	0.3	0.0	12.15
4099	4121	Possible charnel pit?	No	Pale grey, white	Good	H?	A?	?	2.7	0.2	26.50
4104	4105	Pit	No	White	Good	?	?	?	1.5	0.1	29.80
4143	4154	Probable pit	No	Dark-mid-pale grey, white	Good	?	?	?	6.6	0.4	39.80
4179	4190	Pit – cremation burial	No	Brown/black, dark-mid-pale grey, white	Good	H+A	A/Ad	?	367.3	22.6	45.41
4180	4181	Pit – cremation burial	No	Brown/black, dark-mid-pale grey, white	Good	H+A?	A	?	539.9	33.2	54.60
4205	4260	Grave cut for Sk 3DT34	No	Pale grey, white	Good	H?	A?	?	12.9	0.8	44.94
4224	4225	Empty grave?	No	Mid-pale grey, white	Good	?	?	?	1.3	0.1	18.95
4240	4241	Pit – cremation burial	No	Black, dark-mid-pale grey, white	Good	H	A/Ad	?	19.9	1.2	32.53
4242	-	Unstratified	No	Black, dark grey, white	Good	?	?	?	0.9	0.1	18.16
4270	4271	Pit – cremation burial	No	Brown/black, dark-mid-pale grey, white	Good	H+A	A	M?	1173.3	72.2	60.43
4275	4288 (4116)	Grave cut for Sk 3DT18	No	Black, mid grey, white	Good	?	?	?	0.4	0.0	12.24

4299	4300	Pit – cremation burial	No	Brown/black, dark-mid-pale grey, white	Good	H	A	?	1289.3	79.3	68.17
4310	4311	Pit – cremation burial	No	Brown/black, dark-mid-pale grey, white	Good	H	A?	?	114.7	7.1	43.77
4342, 4343	4345	Pit – cremation burial	No	Brown/black, dark-mid-pale grey, white	Good	H	A	?	73.8	4.5	42.43
4356	4352	Grave cut for Sk 3DT36/37	No	Mid-pale grey, white	Good	H?	A?	?	4.4	0.3	37.17
4376	4382	Pit – cremation burial	No	Brown/black, dark-mid-pale grey, white	Good	H+A?	A?	?	97.6	6.0	39.76
4384	4398	Empty grave/ gully	No	Dark-mid-pale grey, white	Good	H	A/Ad	?	73.5	4.5	45.00
4411	4488	Large pit	No	Black, dark-mid-pale grey, mid blue, white	Good	A+H?	?	?	21.8	1.3	53.20
4415	4416	Pit – cremation burial	No	Mid-pale grey, white	Good	H?+A	?	?	2.7	0.2	18.54
4454	4457	Pit – cremation burial	No	Black, dark-mid-pale grey, white	Good	H	A	?	218.3	13.4	36.81
4464	4488	Large pit	No	Black, dark-mid-pale grey, white	Good	?	?	?	6.9	0.4	48.81
4504	4488	Large pit	No	Dark-mid-pale grey, white	Good	?	?	?	1.2	0.1	30.11
4506	4488	Large pit	No	Mid-pale grey, white	Good	H	A	?	0.4	0.0	18.75
4511	4488	Large pit	No	Black, dark-mid-pale grey, white	Good	?	?	?	15.5	1.0	31.61
6 Driffield Terrace:											
1008	1028	Grave cut for Sk 6DT4	No	Black, white	Good	?	?	?	1.7	0.1	20.41
1022	1023	Pit – cremation burial	No	Black, dark-mid-pale grey, white	Good	H+A	A	M?	1022.6	54.64	54.64
1040	1042	Grave cut for Sk 6DT7	No	Mid-pale grey, white	Good	?	?	?	1.5	0.1	17.68

Key: ID: H – human, A – animal, ? – unknown; Age: A – adult, Ad – adolescent, ? – unknown; Sex: M – male, F – female, ? – unknown

* Weight of bone >2mm expressed as a percentage of average weight of bone >2mm recovered from modern cremation burials (1625.9g, McKinley 1993)

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 following excavation can also have a considerable impact on bone condition (Henderson 1987, Garland and Janaway 1989, Janaway 1996, Spriggs 1989). Preservation of human skeletal remains is assessed subjectively, depending upon the severity of bone surface erosion and post-mortem breaks, but disregarding completeness. Preservation is important, as it can have a large impact on the quantity and quality of information that it is possible to obtain from the skeletal remains.

2.1.1 Inhumation Preservation

Surface preservation, concerning the condition of the bone cortex, was assessed using the seven-category grading system defined by McKinley (2004a), ranging from 0 (excellent) to 5+ (extremely poor). Excellent preservation implied no bone surface erosion and a clear surface morphology, whereas extremely poor preservation indicated heavy and penetrating erosion of the bone surface resulting in complete loss of surface morphology and modification of the bone profile. Surface preservation could be variable throughout an individual skeleton, so the condition of the majority of bones in the skeleton was taken as the preservation grade for the whole skeleton. One skeleton had such distinctly different preservation of the upper and lower parts of the body that it was divided between two categories. The degree of fragmentation was recorded, using categories ranging from 'minimal' (little or no fragmentation of bones) to 'extreme' (extensive fragmentation with bones in multiple small fragments). Again, one skeleton was divided between two fragmentation categories. Finally, the completeness of the skeletons was assessed and expressed as a percentage: the higher the percentage, the more complete the skeleton.

Most of the skeletons (42.7%) had good surface preservation (Grade 2), with 28.7% having very good (Grade 1) and 23.2% having moderate (Grade 3) surface preservation. Only 5.5% of the skeletons had poor surface preservation (Grade 4), and none were very poorly preserved (Table 6 and Figure 2). The generally good condition of the bone cortex meant that surface detail tended to be preserved. Surface preservation tended to be slightly worse at 6 Driffield Terrace (Table 6 and Figure 3), with fewer skeletons considered to be very well preserved (4.3% compared to 38.1% at 3 Driffield Terrace). However, the majority of skeletons at 6 Driffield Terrace were still well preserved (73.9%) and none were poorly preserved, indicating that the difference in visible surface detail between the two sites was not significant.

Table 6 Surface Preservation

SP Grade	3DT		6DT		Total	
	n	%	n	%	n	%
0	0	0.0%	0	0.0%	0	0.0%
1	22.5	38.1%	1	4.3%	23.5	28.7%
2	18	30.5%	17	73.9%	35	42.7%
3	14	23.7%	5	21.7%	19	23.2%
4	4.5	7.6%	0	0.0%	4.5	5.5%
5	0	0.0%	0	0.0%	0	0.0%

5+	0	0.0%	0	0.0%	0	0.0%
Total	**59**		**23**		**82**	

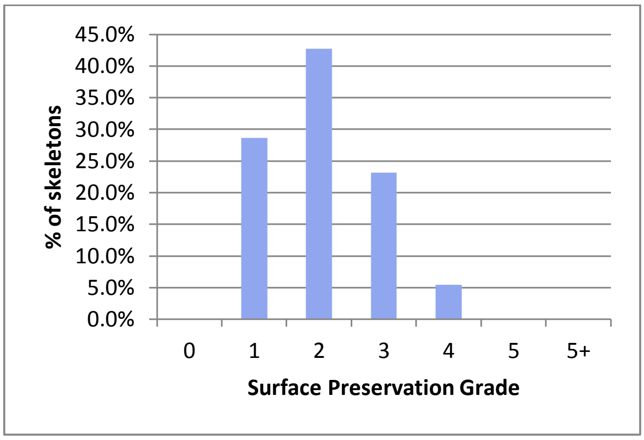


Figure 2 Overall surface preservation

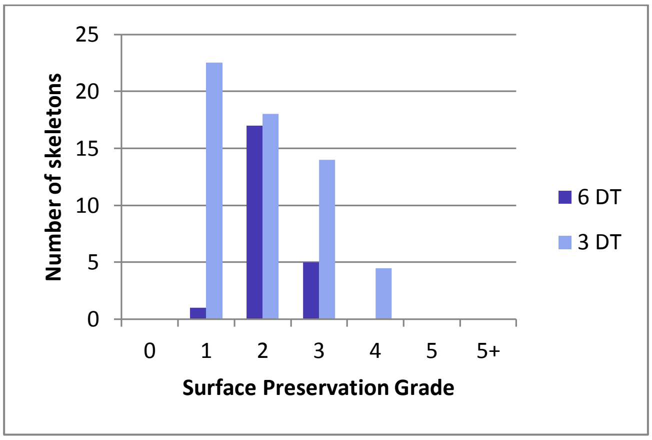


Figure 3 Surface preservation: 3DT and 6DT

The majority of the skeletons were either slightly (42.1%) or moderately fragmented (38.4%), with the remainder distributed between the remaining categories (Table 7 and Figure 4). The more severe levels of fragmentation prevented stature and indices from being calculated. The skeletons from 6 Driffield Terrace tended to be more fragmented, with most (73.9%) being moderately fragmented, compared to 3 Driffield Terrace where most (56.8%) were only slightly fragmented (Table 7 and Figure 5).

Table 7 Fragmentation

Frag	3DT		6DT		Total	
	n	%	n	%	n	%
Min	4	6.8%	1	4.3%	5	6.1%
Slight	33.5	56.8%	1	4.3%	34.5	42.1%
Mod	14.5	24.6%	17	73.9%	31.5	38.4%
Sev	6	10.2%	4	17.4%	10	12.2%
Ext	1	1.7%	0	0.0%	1	1.2%
Total	**59**		**23**		**82**	

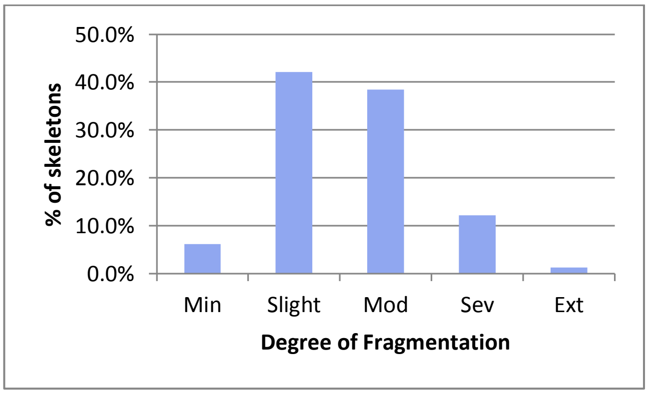


Figure 4 Overall degree of fragmentation

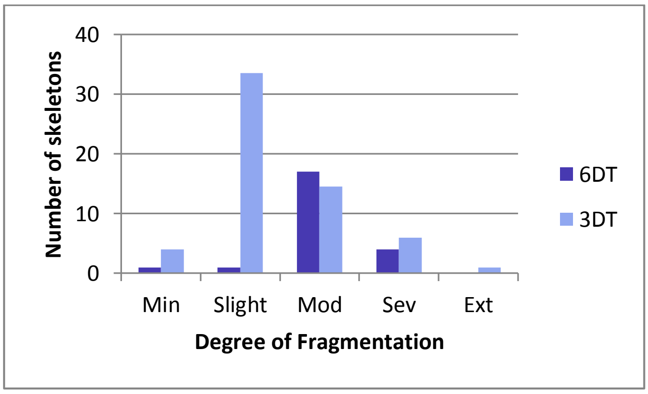


Figure 5 Degree of fragmentation: 3DT and 6DT

Half the skeletons were between 81-100% complete, and the remainder were distributed relatively evenly between the remaining categories (Table 8 and Figure 6). The pattern was similar between 3 and 6 Driffield Terrace (Table 8 and Figure 7), although a slightly higher proportion of skeletons from 3 Driffield Terrace were over 80% complete (52.5% compared to 43.5% from 6 Driffield Terrace).

Table 8 Completeness

%	3DT		6DT		Total	
	n	%	n	%	n	%
81-100	31	52.5%	10	43.5%	41	50.0%
61-80	7	10.2%	5	21.7%	11	13.4%
41-60	8	13.6%	3	13.0%	11	13.4%
21-40	7	11.9%	3	13.0%	10	12.2%
1-20	7	11.9%	2	8.7%	9	11.0%
Total	**59**		**23**		**82**	

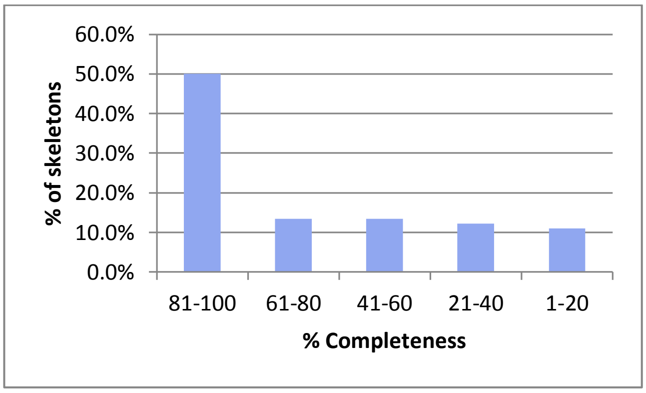


Figure 6 Overall completeness

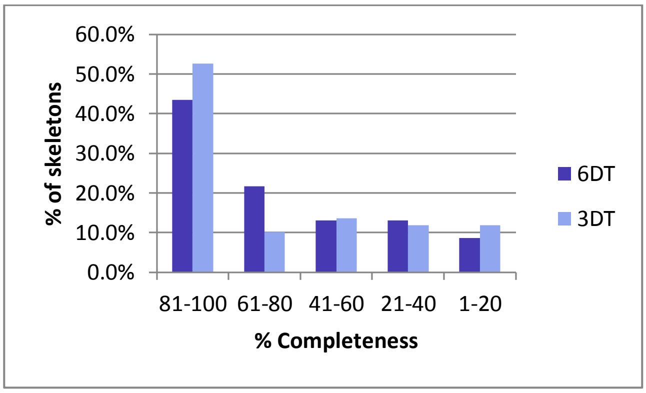


Figure 7 Completeness: 3DT and 6DT

Despite intercutting by later graves and disturbance by later features resulting in the truncation of some graves, the skeletons overall tended to be fairly complete. This, combined with the slight to moderate fragmentation and good surface preservation of the majority of the skeletons, meant that the information that could be gained on the population during analysis was extensive. In general, the skeletons from 6 Driffield Terrace tended to be slightly less well preserved than those from 3 Driffield Terrace, being slightly less complete, more fragmented and with greater surface erosion. Although this was detrimental to the osteological analysis of the skeletons from 6 Driffield Terrace, these differences were not great and are unlikely to have had a pronounced effect on the amount of data obtained.

2.1.2 Cremated Bone Preservation

Preservation of all cremated bone assemblages was good: the bone cortex was solid and there was minimal erosion of the bone edges (see Table 5). The amount of bone fragmentation in each context is shown in Table 9. In most contexts the amount of bone in the 2mm sieve was small or non-existent, and the majority of the bone was in the 10mm fraction. The assemblages that had been identified as cremation burials on site had a much higher proportion of smaller fragments (7-22%), and on average 40.0% of the fragments were in the 10mm sieve and 45.6% were in the 5mm sieve (Table 10). This no doubt reflects differences in the excavation of deposits identified as cremation burials which probably ensured more small fragments would be recovered.

Table 9 Cremated bone fragment size

Context	Sieve Fractions						Total >2mm	Total as % of modern*	<2mm	Total	Max frag.
	10mm		5mm		2mm						
	g	%	g	%	g	%	g		g	g	mm
Cremation burials											
4023	82.5	57.6	46.2	32.3	14.5	10.1	**143.2**	**8.8**	1.0	144.2	81.26
4050, 4071, 4073, 4079	293.3	39.6	335.5	45.3	112.0	15.1	**740.8**	**45.6**	5.2	746.0	70.58
4057	134.5	43.5	136.7	44.3	37.7	12.2	**308.9**	**19.0**	7.6	316.5	49.84
4179	105.0	28.6	208.1	56.7	54.2	14.8	**367.3**	**22.6**	2.2	369.5	45.41
4180	207.0	38.3	268.3	49.7	64.6	12.0	**539.9**	**33.2**	3.3	543.2	54.60
4240	13.3	66.8	5.1	25.6	1.5	7.5	**19.9**	**1.2**	0.0	19.9	32.53
4270	679.0	57.9	403.0	34.3	91.3	7.8	**1173.3**	**72.2**	10.0	1183.3	60.43
4299	440.3	34.2	620.9	48.2	228.1	17.7	**1289.3**	**79.3**	22.0	1311.3	68.17
4310	42.2	36.8	53.5	46.6	19.0	16.6	**114.7**	**7.1**	0.6	115.3	43.77
4342, 4343	33.2	45.0	30.0	40.7	10.6	14.4	**73.8**	**4.5**	0.7	74.5	42.43
4376	30.5	31.3	53.8	55.1	13.3	13.6	**97.6**	**6.0**	0.8	98.4	39.76
4415	0.0	0.0	2.3	85.2	0.4	14.8	**2.7**	**0.2**	0.0	2.7	18.54
4454	29.3	13.4	140.7	64.5	48.3	22.1	**218.3**	**13.4**	6.2	224.5	36.81
1022	356.1	34.8	483.8	47.3	182.7	17.9	**1022.6**	**62.9**	34.8	1057.4	54.64
Possible cremation burials											
4037	59.0	89.1	7.1	10.7	0.1	0.2	**66.2**	**4.1**	0.0	66.2	45.97
4099	2.7	100.0	0.0	0.0	0.0	0.0	**2.7**	**0.2**	0.0	2.7	26.50
4104	1.5	100.0	0.0	0.0	0.0	0.0	**1.5**	**0.1**	0.0	1.5	29.80
4143	6.6	100.0	0.0	0.0	0.0	0.0	**6.6**	**0.4**	0.0	6.6	39.80
Grave cuts											
4028	10.3	100.0	0.0	0.0	0.0	0.0	**10.3**	**0.6**	0.0	10.3	45.63
4047	44.5	97.6	1.1	2.4	0.0	0.0	**45.6**	**2.8**	0.0	45.6	47.17
4066	3.5	79.5	0.9	20.5	0.0	0.0	**4.4**	**0.3**	0.0	4.4	29.89
4205	12.0	93.0	0.9	7.0	0.0	0.0	**12.9**	**0.8**	0.0	12.9	44.94
4275	0.0	0.0	0.4	100.0	0.0	0.0	**0.4**	**0.0**	0.0	0.4	12.24
4356	3.5	79.5	0.9	20.5	0.0	0.0	**4.4**	**0.3**	0.0	4.4	37.17
1008	1.7	100.0	0.0	0.0	0.0	0.0	**1.7**	**0.1**	0.0	1.7	20.41
1040	1.5	100.0	0.0	0.0	0.0	0.0	**1.5**	**0.1**	0.0	1.5	17.68
Empty graves											
4224	1.3	100.0	0.0	0.0	0.0	0.0	**1.3**	**0.1**	0.0	1.3	18.95
4384	22.3	30.3	46.1	62.7	5.1	6.9	**73.5**	**4.5**	0.7	74.2	45.00
Large pit											
4411	20.4	93.6	1.4	6.4	0.0	0.0	**21.8**	**1.3**	0.0	21.8	53.20
4464	6.9	100.0	0.0	0.0	0.0	0.0	**6.9**	**0.4**	0.0	6.9	48.81
4504	1.2	100.0	0.0	0.0	0.0	0.0	**1.2**	**0.1**	0.0	1.2	30.11
4506	0.0	0.0	0.4	100.0	0.0	0.0	**0.4**	**0.0**	0.0	0.4	18.75
4511	11.6	74.8	3.9	25.2	0.0	0.0	**15.5**	**1.0**	0.0	15.5	31.61
Ploughsoil/ upper cemetery											
4053	13.1	54.6	9.7	40.4	1.2	5.0	**24.0**	**1.5**	0.0	24.0	32.04
4078	0.0	0.0	0.3	100.0	0.0	0.0	**0.3**	**0.0**	0.0	0.3	12.15
Unstratified											
4000	1.7	100.0	0.0	0.0	0.0	0.0	**1.7**	**0.1**	0.0	1.7	21.87
4242	0.0	0.0	0.9	100.0	0.0	0.0	**0.9**	**0.1**	0.0	0.9	18.16

* Weight of bone >2mm expressed as a percentage of average weight of bone >2mm recovered from modern cremation burials (1,625.9g, McKinley 1993)

Table 10 Mean cremated bone fragment size per deposit type

Deposit Type	Sieve Fractions						Total >2mm	Total as % of modern*	<2mm	Total	Max frag.
	10mm		5mm		2mm						
	g	%	g	%	g	%	g		g	g	mm
Cremation burials	174.7	40.0	199.1	45.6	62.7	14.4	**436.6**	**26.9**	6.7	443.3	49.91
Possible cremation burials	17.5	90.6	1.8	9.2	0.0	0.1	**19.3**	**1.2**	0.0	19.3	35.52
Grave cuts	9.6	94.8	0.5	5.2	0.0	0.0	**10.2**	**0.6**	0.0	10.2	31.89
Empty graves	11.8	31.6	23.1	61.6	2.6	6.8	**37.4**	**2.3**	0.4	37.8	31.98
Large pit	8.0	87.6	1.1	12.4	0.0	0.0	**9.2**	**0.6**	0.0	9.2	36.50
Ploughsoil/ upper cemetery	6.6	53.9	5.0	41.2	0.6	4.9	**12.2**	**0.7**	0.0	12.2	22.10
Unstratified	0.9	65.4	0.5	34.6	0.0	0.0	**1.3**	**0.1**	0.0	1.3	20.02

* Weight of bone >2mm expressed as a percentage of average weight of bone >2mm recovered from modern cremation burials (1,625.9g, McKinley 1993)

The largest fragment in each context ranged in size from 12.15mm (from Context 4078, the upper layer of the Roman cemetery) to 81.26mm (from Context 4023, one of the cremation burials; see Table 9). The cremation burials on average had larger maximum fragments (mean 49.91mm) than other types of deposit (mean ranging between 20.02mm to 36.50mm; see Table 10), although one cremation burial had a maximum fragment size of 18.54mm (Context 4415). The unstratified material had the smallest mean maximum fragment size.

The quantity of cremated bone over 2mm in size recovered from each feature varied considerably (see Table 9), ranging from 0.3g (Context 4078, the upper layer of the Roman cemetery) to 1,289.3g (Context 4299, a cremation burial), with an overall mean of 173.5g. As would be expected, the largest quantities of bone came from the cremation burials: these deposits had a mean weight of 436.6g, whereas the mean weight of all other deposit types was less than 40.0g (Table 10). Only three cremation burials weighed less than 100g, but the smallest was very light, weighing only 2.7g. The non-cremation burial deposits containing the largest amounts of bone were Context 4384 (73.5g, from an empty grave/gully), Context 4037 (66.2g, from a possible cremation burial), and Context 4047 (45.6g, from the grave of Skeleton 3DT6).

As a comparison to the weights of bone recovered, the quantity of bone over 2mm in size recovered from modern adult cremations ranged from 1,001.5g to 2,422.5g with a mean of 1,625.9g (McKinley 1993). Only three of the Driffield Terrace cremation burials (Contexts 4299, 4270 and 1022) fell into that range, each producing 79.3%, 72.2% and 62.9% of the mean expected weight (see Table 9). All the non-cremation burials and three of the cremation burials contained less than 5% of the expected weight of bone.

The colour of cremated bone is connected to the temperature of the pyre, amount of oxygen available during burning, and the duration of the cremation. High temperatures (c. 600ºC and over) and plentiful oxygen will result in fully oxidised white bone given adequate time, whereas temperatures between c.300-600ºC and/or lack of oxygen will result in partially oxidised bone ranging in colour from dark to pale grey (McKinley 2004b). Temperatures below c. 300ºC and absence of oxygen will lead to charring of the bone, expressed as brown and black colours (*ibid*). As can be seen from Table 5, the majority of contexts contained bone displaying a whole range of colours, from browns and blacks indicative of charring, through all shades of grey, to white. A high proportion of the fragments displayed more than one colour. Only four contexts contained white or pale grey/white bone alone. This predominantly grey colour of the cremated bone indicates the bone was only partially oxidised, suggesting burning at moderate temperatures (c.300-600ºC) with inadequate oxygen supplies, and possibly that the duration of the cremation was not long enough to allow full oxidation.

Cremated human bone (or potential human bone) was identified in 23 of the contexts, with animal bone identified in ten (see Table 5). Nine of the contexts containing animal bone also contained human bone. Fourteen contexts contained human bone alone (or at least no animal bone could be positively identified). Human bone/ potential human bone was identified in all fourteen cremation burials, with animal bone identified in eight. Human bone/ potential human bone was also identified in two of the possible cremation burials (Contexts 4037 and 4099), four of the deposits from grave cuts, one empty grave (Context 4384), and two of the deposits from the large pit (Contexts 4411 and 4506).

The amount of identifiable human bone expressed as a proportion of the context weight ranged from 2.3% (Context 4411 from the large pit) to 100.0% (Context 4099 from a possible cremation burial, and Context 4506 from the large pit; Table 11). Bone could be identified in all the cremation burials, ranging from 6.9% to 60.8% of the context weight, although less than 20% of the bone could be identified in half the cremation burials. The amount of identifiable bone is usually larger in undisturbed burials, particularly urned burials (McKinley 2004c, 299).

Table 11 Cremated bone - proportions of identified fragments

Context	Identified Bone								Total ID	Total ID
	Skull		Axial		Upper Limb		Lower Limb			
	g	%	g	%	g	%	g	%	g	%
Cremation burials										
4023	45.5	63.6	1.1	1.5	23.5	32.9	1.4	2.0	71.5	49.9
4050, 4071, 4073, 4079	43.3	59.0	3.6	4.9	2.9	4.0	23.6	32.2	73.4	9.9
4057	16.6	53.9	3.9	12.7	2.0	6.5	8.3	26.9	30.8	10.0
4179	17.5	40.3	1.2	2.8	10.3	23.7	14.4	33.2	43.4	11.8
4180	73.8	63.7	18.4	15.9	8.9	7.7	14.8	12.8	115.9	21.5
4240	6.6	54.5	0.0	0.0	0.8	6.6	4.7	38.8	12.1	60.8
4270	137.7	55.1	19.1	7.6	24.7	9.9	68.5	27.4	250.0	21.3
4299	48.6	37.2	32.3	24.7	26.8	20.5	23.0	17.6	130.7	10.1
4310	32.7	100.0	0.0	0.0	0.0	0.0	0.0	0.0	32.7	28.5
4342, 4343	9.5	75.4	0.1	0.8	0.0	0.0	3.0	23.8	12.6	17.1
4376	17.7	100.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	18.1
4415	1.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	37.0
4454	13.0	86.7	0.8	5.3	1.0	6.7	0.2	1.3	15.0	6.9
1022	128.3	60.1	8.6	4.0	52.6	24.6	23.9	11.2	213.4	20.9
Possible cremation burials										
4037	17.3	76.9	0.0	0.0	0.0	0.0	5.2	23.1	22.5	34.0
4099	2.7	100.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	100.0
4104	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0

4143	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0
Grave cuts										
4028	3.3	100.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	32.0
4047	2.4	100.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	5.3
4066	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0
4205	2.7	40.9	0.0	0.0	0.0	0.0	3.9	59.1	6.6	51.2
4275	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0
4356	0.0	0.0	0.0	0.0	0.0	0.0	3.5	100.0	3.5	79.5
1008	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0
1040	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0
Empty graves										
4224	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0
4384	12.7	87.0	0.0	0.0	1.9	13.0	0.0	0.0	14.6	19.9
Large pit										
4411	0.5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.3
4464	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0
4504	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0
4506	0.4	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	100.0
4511	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0
Ploughsoil/ upper cemetery										
4053	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0
4078	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0
Unstratified										
4000	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0
4242	0.0	-	0.0	-	0.0	-	0.0	-	0.0	0.0

The identified bone was divided into four broad categories, namely the skull, axial skeleton (vertebrae and ribs), upper limb and lower limb (see Table 11). Among the cremation burials, the mean proportion of skull fragments was 58.0%, the proportion of axial fragments averaged 8.7%, the mean proportion of upper limb fragments was 15.0%, and the proportion of lower limb fragments averaged 18.2%. In comparison, among the undisturbed unurned cremation burials at the Roman cemetery at Brougham, Cumbria, the proportion of skull fragments averaged 40% (range 22-47%), axial fragments averaged 9% (range 5-14%), upper limb fragments averaged 13% (range 3-15%) and lower limb fragments averaged 38% (range 21-46%; McKinley 2004c, 300). Thus the proportion of lower limb fragments identified was markedly lower than at Brougham, and the proportion of skull fragments identified was higher.

Almost invariably, the majority of the identified bone in all the assemblages comprised skull fragments (including tooth fragments). This is due to the ease with which even small fragments of skull can be identified (McKinley 2004c, 298-299). Other areas of the body were less well represented. The bones of the axial skeleton are often fragile, being largely made up of spongy bone covered with a thin layer of cortical bone. This probably led to them suffering a greater amount of damage post-mortem (*ibid*), and also means that they tend to be lighter than bones from other areas of the skeleton. Even so, fragments of vertebrae (bodies and arches) and ribs were recorded in ten of the cremation burials. The shafts of long bones, whilst generally being more robust, are not easy to identify when very fragmented during the cremation process. Although long bone shaft fragments were present in many of these contexts, indicating the general presence of limb bones, it was not possible to identify which bone they represented. Identifiable parts of the upper and lower limb were present, including small bones from the fingers/toes, hands/feet, as well as major long bones. A detailed catalogue of the identified bone in each context is provided in the recording forms.

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 in osteological reports on inhumations in order to establish how many individuals are 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 recovered. The largest number of these is then taken as the MNI. The MNI is likely to be lower than the actual number of skeletons which would have been interred on the site, but represents the minimum number of individuals which can be scientifically proven to be present.

A minimum of 72 individuals were present at both sites combined: 64 adults (proximal left femur) and eight non-adults. The latter included three adolescents (distal right humerus), two juveniles (left and right temporo-mandibular joints), an infant (left femur), a neonate (left femur) and a foetus (left femur). The MNI at 3 Driffield Terrace was 52 (44 adults and 8 non-adults), and at 6 Driffield Terrace it was twenty (all adults). The MNI was smaller than the number of archaeologically identified individuals, probably due to the amount of intercutting of graves and resulting truncation of skeletons.

2.3 ASSESSMENT OF AGE

Age was determined using standard ageing techniques, as specified in Scheuer and Black (2000a; 2000b) and Cox (2000). For non-adults age was estimated using the stage of dental development (Moorrees *et al.* 1963a; 1963b), dental eruption (Ubelaker 1989), measurements of long bones and other appropriate elements, and the development and fusion of bones (Scheuer and Black 2000b). In adults, age was estimated from stages of bone development and degeneration in the pelvis (Brooks and Suchey 1990, Lovejoy *et al.* 1985) and ribs (modified version of methods developed by İşcan *et al.* 1984; 1985 and İşcan and Loth 1986 provided in Ubelaker 1989), supplemented through examination of patterns of dental wear (Brothwell 1981, Miles 1962).

The individuals were divided into a number of age categories. Non-adults were subdivided into 'foetuses' (f: where the age estimate clearly fell below 38-40 *weeks in utero*), 'perinates' (p: where the age estimates converged around birth), 'neonates' (n: where the age estimate suggested 0-1 month), 'infant' (i; 1-12 months), juvenile (j; 1-12 years), and adolescent (ad; 13-17 years). Adults were divided into 'young adult' (ya; 18-25 years), young middle adult (yma; 26-35 years), old middle adult (oma; 36-45 years), and mature adult (46+ years). A category of 'adult' (a) was used to designate those individuals whose age could not be determined beyond the fact that they were eighteen or older.

For each skeleton as many criteria as possible (preservation allowing) were used to estimate age. However, it is important to note that several studies (for example Molleson and Cox 1993, Molleson 1995, Miles *et al.* 2008) have highlighted the difficulty of accurately determining the age-at-death of adults from their skeletal remains, with age-at-death frequently being underestimated for older individuals. The categories defined here should be taken as a general guide to the relative physiological age of the adult, rather than being an accurate portrayal of the real chronological age.

2.3.1 Age of the Inhumations

Seven (8.5%) of the 82 skeletons were non-adults, all from 3 Driffield Terrace (Table 12). One (Skeleton 3DT14) was a foetus around 30-32 weeks *in utero*, and one (Skeleton 3DT24) was a neonate (around 0-1 month old). Juveniles comprised 28.6% of the non-adults, and included one young juvenile (Skeleton 3DT 20) aged between one to two years, and one older juvenile (Skeleton 3DT25) aged six to seven years. Three (42.9%) of the non-adults were older adolescents, all aged around fifteen/sixteen to nineteen/twenty years (Skeletons 3DT13, 3DT18 and 3DT19).

Table 12 Non-adult age distribution at 3 Driffield Terrace

Age Group	3DT		6DT		Total	
	n	**%**	**n**	**%**	**n**	**%**
f	1	14.3%	0	-	1	14.3%
n	1	14.3%	0	-	1	14.3%
i	0	0.0%	0	-	0	0.0%
j	2	28.6%	0	-	2	28.6%
ad	3	42.9%	0	-	3	42.9%
Total	**7**		**0**		**7**	

Key: Age group: f = foetus; p = perinate; n = neonate; i = infant; j = juvenile; ad = adolescent

By far the majority of individuals from Driffield Terrace were adults (75/82, 92.6%), and most of these (37.3%) were young middle adults (aged 26-35 years; Table 13). A quarter of the adults (25.63%) were aged 36-45 years, and 22.7% were young adults (aged 18-25 years); there were no mature adults (aged 46+ years). The age of eleven (14.7%) of the adults could not be more precisely determined, largely due to truncation resulting in the post-mortem loss of the relevant parts of the skeleton.

Table 13 Adult age distribution

Age Group	3DT		6DT		Total	
	n	**%**	**n**	**%**	**n**	**%**
ya	11	21.2%	6	26.1%	17	22.7%
yma	21	40.4%	7	30.4%	28	37.3%
oma	12	23.1%	7	30.4%	19	25.3%
ma	0	0.0%	0	0.0%	0	0.0%
a	8	15.4%	3	13.0%	11	14.7%
Total	**52**		**23**		**75**	

Key: Age group: ya = young adult (18-25); yma = young middle adult (26-35); oma = old middle adult (36-45); ma = mature adult (46+); a = adult (18+)

The disarticulated remains support the impression of the age distribution provided by analysis of the articulated skeletons. A small number of foetal/ neonate/ infant bones were recovered from Contexts 4193 and 4078: half a fibula, a rib fragment and three cranial vault fragments (including half the frontal bone) from Context 4193, and a tibia and six cranial vault fragments from Context 4078. A single femur was found with Skeleton 3DT25 (6-7 year old juvenile), the length of which suggested an infant of around 1-3 months. This may (or may not) be from the same individual represented by the bones in Context 4193 (which was the grave fill for Skeleton

3DT25). This femur suggests the presence of at least one infant at Driffield Terrace, in addition to the foetus, neonate and one to two year old juvenile identified archaeologically. The only other non-adult remains found amongst the disarticulated bone were from adolescents: a partial right humerus (Context 4000), a small fragment of humerus (Context 4040), a proximal epiphysis from a humerus or femur (Context 4114) and a left ulna (Context 4148). The latter two fragments may well belong to Skeleton 3DT18 (15-19 year old adolescent), as other fragments from Context 4114 were found to belong to this individual. Other remains were identified that were either from adolescents or young adults. All the non-adult disarticulated bone came from 3 Driffield Terrace; none was found amongst the disarticulated bone from 6 Driffield Terrace. This is consistent with the lack of non-adults among the articulated burials at 6 Driffield Terrace.

Almost all the disarticulated remains had derived from adult individuals, but more specific information about age was limited. Nonetheless, this limited data indicated a bias towards younger adults. Thirty-seven bones (61 fragments) were either from adolescents or young adults, and most of these derived from Context 1048, the fill of the large pit that truncated Skeletons 6DT10, 6DT11 and 6DT13. These included a pelvis (sacrum, left and right ox coxae) and three lumbar vertebrae (L3-5) from a single individual, and it is very likely that these bones were part of either 6DT10 or 6DT11 (6DT13 had part of the pelvis present). Two mandibles, a left and right radius, fragment of sternum and many vertebrae and ribs, all from young adults or adolescents, were also recovered from Context 1048. Context 1031 (6 Driffield Terrace) contained young adult or adolescent bones (right clavicle, ribs and cervical vertebra), as did Contexts 4025 (left clavicle), 4421 (rib) and 4506 (rib), all from 3 Driffield Terrace.

A minimum of two young middle adults were present among the disarticulated remains, represented by two right os coxae (auricular surfaces) from Contexts 4104 and 4019; note another fragment of the os coxa from Context 4104 was found in context 4103. A pubic bone from Context 4205 also derived from a young middle adult, as did rib fragments from Contexts 4037 and 1114. A minimum of one young or old middle adult was identified, represented by partial os coxae in Contexts 4504 and 4508. As with the articulated burials, mature adults were notable by their absence.

The age distribution of the skeletal sample was clearly not representative of a normal cross section of the population (Figure 8). Since the area excavated was quite large it seems likely that the area was dedicated to the burial of younger to middle aged adults, with the complete exclusion of older individuals. The three adolescents were close to skeletal maturity, and socially may have been perceived as equivalent to those in the 'young adult' category. The inclusion of four younger non-adults (a foetus, neonate, 1-2 year old child and 6-7 year old child) with this group is odd. Their burial did not occur in a particular phase, but spans phases 32-34.

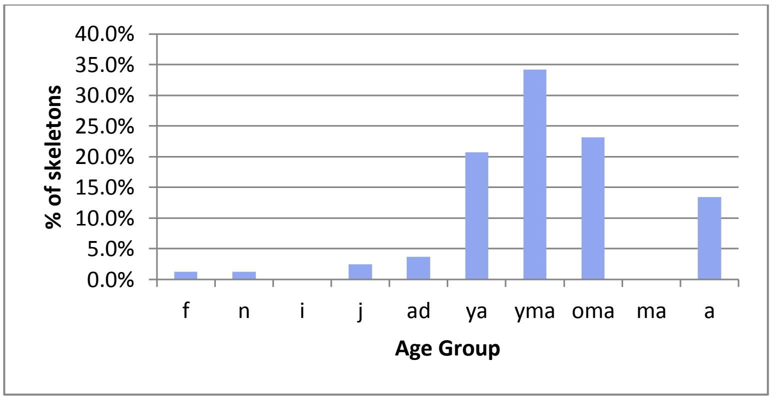


Figure 8 Age distribution

In comparison with other Roman cemeteries, the proportion of adults at Driffield Terrace is high (91.5%), second only to the remains recovered from Ephesus (Kanz and Grossschmidt 2006; Table 14 and Figure 9). However, the proportion of adults at Horncastle was not much lower (88.2%; Caffell and Holst 2008). The site with the lowest percentage of adults was Mill Mount 04 (61.5%; Holst 2005). The proportion of adolescents at Driffield Terrace (42.9%) was also high compared to the comparative sites; for example, of the 82 non-adults at Ancaster that could be aged more specifically, only 7.3% were adolescents (Cox 1989). A total of 11% of the combined Mill Mount/ The Mount cemeteries (1/9 non-adults) were adolescents (Holst 2005, Holst 2006).

Table 14 Comparative sites - proportion of adults and non-adults

Site	Adults		Non-adults		Total Skeletons
	n	%	n	%	
Ephesus[1]	68	100.0%	0	0.0%	68[*]
Driffield Terrace	**75**	**91.5%**	**7**	**8.5%**	**82**
Horncastle[2]	30	88.2%	4	11.8%	34
Trentholme Drive[3]	246[§]	84.8%	44	15.2%	290
89 The Mount[4]	7	77.8%	2	22.2%	9
Ancaster[5]	243	74.3%	84	25.7%	327
Mill Mount 05[6]	4	66.7%	2	33.3%	6
Mill Mount 04[7]	8	61.5%	5	38.5%	13

* Based on MNI of disarticulated remains; § individuals aged 20+ years

[1] Kanz and Grossschmidt (2006, 209); [2] Caffell and Holst (2008, 8-9); [3] based on data provided in Warwick (Table I; 1968,163); [4] based on unpublished data provided by M. Holst; [5] based on data provided in Cox (1989); [6] based on data provided in Holst (2006, 2-3); [7] based on data provided in Holst (2005, 3)

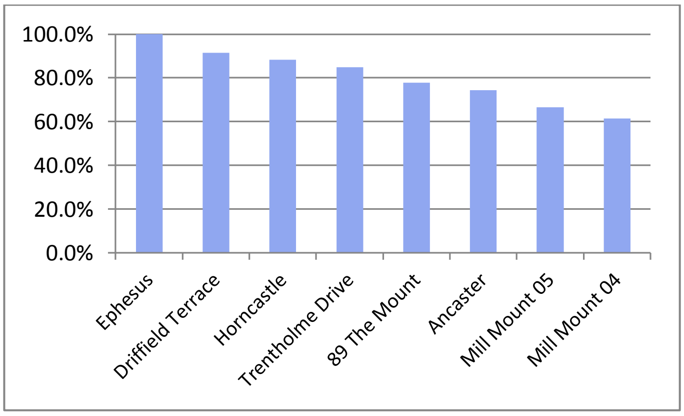


Figure 9 Comparative sites - proportion of adults

Direct comparison of the adult age distribution is hampered by differences in the age categories used and in the methods used to estimate age. Nevertheless, of the 67 Ephesus individuals where an age estimate is provided, 66 were aged between 20-30 years (98.5%) and one was aged 45-55 years (1.5%; Table 15 and Figure 10; Kanz and Grossschmidt 2006). This echoes the age distribution at Driffield Terrace, where none of the individuals were aged over 46 years, although 29.7% of the aged adults were between 36-45 years old. Ancaster also had a relatively high proportion of younger adults (77.7% between 17-35 years), but did have a small proportion of adults aged over 45 years (8.7%; Cox 1989). However, these age estimates are based on dental wear only, which is affected by diet. At Driffield Terrace it was noted that the dental wear frequently suggested a younger age than the evidence from the rest of the skeleton, so it is possible that the Ancaster skeletons have been under-aged. In the other comparative cemeteries, a higher proportion of older adults is present, for example: at Horncastle 85.7% were aged over 36 years and 42.9% were over 45 years (Caffell and Holst 2008); at Trentholme Drive 69.5% were aged over 30 years and 22.4% were aged over 40 years (Warwick 1968); and at the combined Mill Mount/ The Mount cemeteries 55.6% were aged over 36 years and 31.3% were aged over 46 years (Holst 2005, Holst 2006).

Table 15 Comparative sites - proportion of younger and older adults

Site	c. 18-30/35 years		c. 30/36+ years		Total Adults*
	n	%	n	%	
Ephesus[1]	66	98.5%	1	1.5%	67
Ancaster[2]	80	77.7%	23	22.3%	103
Driffield Terrace	**45**	**70.3%**	**19**	**29.7%**	**64**
89 The Mount[3]	4	57.1%	3	42.9%	7
Mill Mount 05[4]	2	50.0%	2	50.0%	4
Trentholme Drive[5]	75	30.5%	171	69.5%	246
Mill Mount 04[6]	2	28.6%	5	71.4%	7
Horncastle[7]	2	14.3%	12	85.7%	14

* aged adults only; those identified simply as 'adult' excluded

[1] Kanz and Grossschmidt (2006, 209); [2] based on data provided in Cox (1989); [3] based on unpublished data provided by M. Holst; [4] based on data provided in Holst (2006, 2-3); [5] based on data provided in Warwick (Table I; 1968,163); [6] based on data provided in Holst (2005, 3); [7] Caffell and Holst (2008, 8-9)

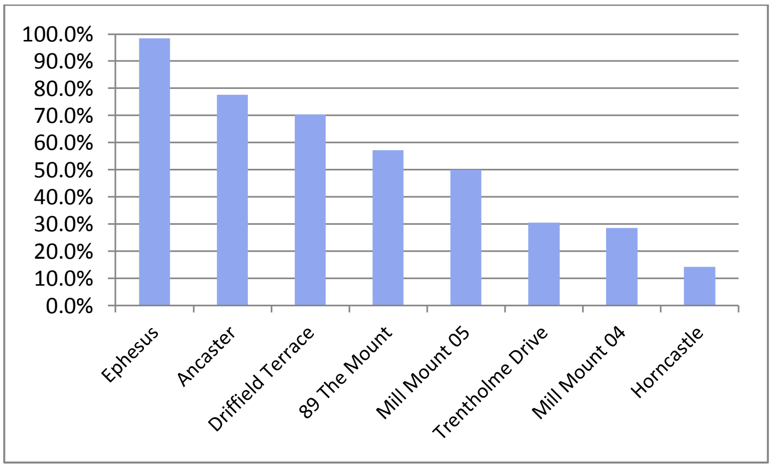


Figure 10 Comparative sites - proportion of younger adults (c.18-35 years old)

2.3.2 Age Distribution in the Cremation Burials

Unfortunately, the age of the individual could not be determined in sixteen (43.2%) of the features containing cremated remains. A total of 27% of the features contained adult individuals, 18.9% contained possible adult individuals, and 10.8% contained adults or older adolescents (Table 16). Two fragments of immature bone were present in Context 4057 (cremation burial); if human these represent the presence of a non-adult, but they could be animal bone. In none of the deposits was it possible to provide a more precise age estimate. For data on individual contexts, please see Table 5.

Table 16 Cremated bone age estimates

Context Type	Adult		Adult?		Adult/Adolescent		Unknown		Total
Cremation Burials	8	57.1%	2	14.3%	3	21.4%	1	7.1%	14
Possible cremation burials	1	25.0%	1	25.0%	0	0.0%	2	50.0%	4
Grave cuts	0	0.0%	4	50.0%	0	0.0%	4	50.0%	8
Empty graves	0	0.0%	0	0.0%	1	50.0%	1	50.0%	2
Large pit	1	20.0%	0	0.0%	0	0.0%	4	80.0%	5
Ploughsoil/ upper cemetery	0	0.0%	0	0.0%	0	0.0%	2	100.0%	2
Unstratified	0	0.0%	0	0.0%	0	0.0%	2	100.0%	2
Total	**10**	**27.0%**	**7**	**18.9%**	**4**	**10.8%**	**16**	**43.2%**	**37**

2.4 SEX DETERMINATION

Sex determination was carried out using standard osteological techniques, such as those described by Mays and Cox (2000). Assessment of sex involves examination of the shape of the skull and the pelvis and can only be carried out once sexual characteristics have developed, during late puberty and early adulthood. Evidence from the pelvis was favoured as its shape is directly linked to biological sex (the requirements of childbirth in females) whereas the shape of the skull can be influenced by factors such as age (Walker 1995). Measurements of certain bones were used to supplement the morphological assessment.

The sex of eight of the adults (10.7%) could not be determined due to truncation of the skeletons and loss of the pelvis and skull (Table 17 and Figure 11). Sixty-six of the adults (88.0%) were males (including 11 possible males). Only one of the adults (1.3%) was a female (Skeleton 3DT42). The high proportion of males is even more striking when considered as a proportion of the 67 sexed adults, of which 98.5% were males. This ratio was significantly different from a normal sex distribution (X^2 = 63.0597, p>0.01, 1 d.f.).

2.4.1 Sex Distribution of the Inhumations

Table 17 Adult sex distribution

Age Group	3DT		6DT		Total	
	n	**%**	**n**	**%**	**n**	**%**
Male	45	86.5%	21	91.3%	66	88.0%
Female	1	1.9%	0	0.0%	1	1.3%
Unsexed	6	11.5%	2	8.7%	8	10.7%
Total	**52**		**23**		**75**	

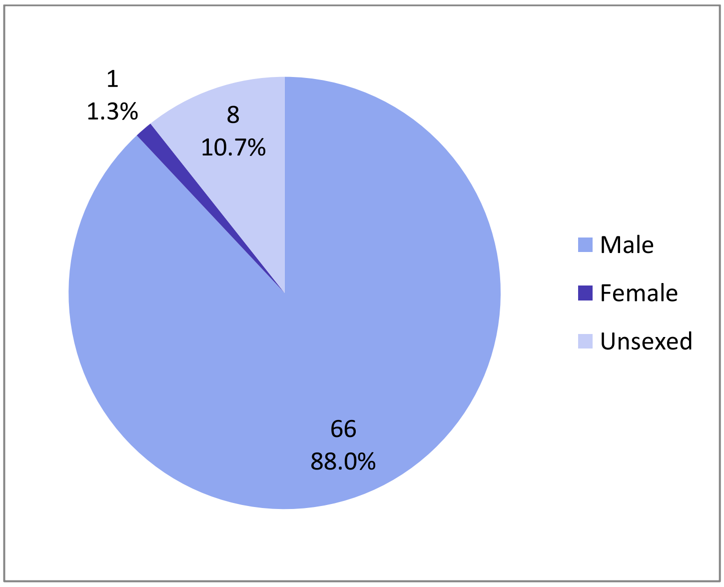


Figure 11 Adult sex distribution

Two of the adolescents were tentatively sexed as males and the sex of the third was indeterminate. These individuals were excluded from the analysis of the adults as their skeletons were not fully mature.

A minimum of four males had contributed to the disarticulated remains, but no female remains were identified, confirming the male bias of the adult articulated skeletons. The young adult pelvis and lower spine (discussed above) and two mandibles from Context 1048 were from male individuals, suggesting that at least two of the three burials (Skeletons 6DT10, 6DT11 and 6DT13) truncated by the large pit were males. Bones from males or possible males were found in Contexts 4019, 4104 (and by extension 4103), 4205, 4361, 4400, 4504, 4508, and 4510 from 3 Driffield Terrace, and 1018, 1048, 1054, 1107, and 1158 from 6 Driffield Terrace.

The proportion of males and females at Driffield Terrace was identical to that seen at Ephesus (98.5% of sexed adults from both sites were males; Kanz and Grossschmidt 2006). The majority of the comparison sites also had a higher than expected proportion of males (Table 18 and Figure 12), but not to such an extreme. At Horncastle (Caffell and Holst 2008) and Ancaster (Cox 1989) 58.8% and 60.8% of the sexed adults were males. If the data for Mill Mount and The Mount are combined, a similar percentage of males is present (58.1%, 18/31 sexed adults; Holst 2005, Holst 2006). At Trentholme Drive around 80% of the individuals were reported to be male (Warwick 1968), although this figure includes children (some potentially as young as five years old), which makes the data less comparable.

Table 18 Comparative sites - proportion of males and females (sexed adults only)

Site	Male		Female		Total Skeletons
	n	%	n	%	
Ephesus[1]	67	98.5%	1	1.5%	68
Driffield Terrace	**66**	**98.5%**	**1**	**1.5%**	**67**
Trentholme Drive[2*]	231	81.6%	52	18.4%	283
Mill Mount 05[3]	3	75.0%	1	25.0%	4
Mill Mount 04[4]	6	75.0%	2	25.0%	8
Ancaster[5]	129	60.8%	83	39.2%	212

Horncastle[6]	10	58.8%	7	41.2%	17
89 The Mount[7]	2	33.3%	4	66.7%	6

* Data from Trentholme Drive includes non-adults

[1] Kanz and Grossschmidt (2006, 209); [2] based on data provided in Warwick (Table I; 1968,163); [3] based on data provided in Holst (2006, 2-3); [4] based on data provided in Holst (2005, 3); [5] based on data provided in Cox (1989); [6] Caffell and Holst (2008, 11); [7] based on unpublished data provided by M. Holst

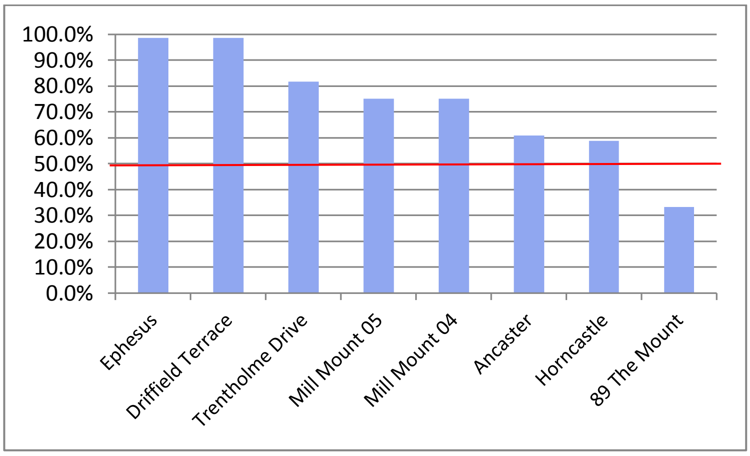


Figure 12 Comparative sites - proportion of males

2.4.2 Sex Distribution of the Cremated Bone Assemblages

Potential sex could only be estimated in four of the cremated bone deposits, including three cremation burials (Contexts 4023, 4270 and 1022) and one potential cremation burial (Context 4037). In all instances the evidence for sex was derived from surviving skull fragments, which are less reliable than the pelvis, and consequently the estimation given is extremely tentative. Three of the individuals were possibly males (from Contexts 4037, 4270 and 1022) and the fourth was possibly female (Context 4023).

2.5 ANCESTRY

The term 'ancestry' is used to describe the genetic background of individuals. An attempt was made to determine the ancestry of each individual based on the visual appearance of traits in the cranial skeleton, as described by Byers (2010, 154-165). A metric method was also applied based on eight cranial measurements (Giles and Elliot 1962 in Byers 2010, 168-171). Unfortunately, the expression of the various traits used to define ancestral groups can be ambiguous and assessing them is subjective; consequently, it can be very difficult to determine ancestry (Byers 2010, 152-154). Preservation is also an issue as most of the traits occur in the cranium and the cranium frequently does not survive intact. At Driffield Terrace many of the crania had previously been reconstructed, which enabled observation and measurement of more crania than would otherwise have been possible. However, sometimes the joins between fragments were not tight and fragments had been blocked out which will have introduced a level of error into the measurements.

Based on visual assessment of the crania it was possible to assign 56.0% (42/75) of the adults to an ancestral group. Ancestry for the remaining 44.0% of the skeletons could not be determined due to absence of, or damage to, the cranium (Figure 13). Of these 42 individuals, two-thirds (66.7%) were white or possibly white, 6.7% were black or possibly black, and 21.4% displayed a mixture of traits (Table 19). All the black individuals were from the 3 Driffield Terrace group, but a higher proportion of mixed individuals was present at 6 Driffield Terrace; the dominant ancestral group at both sites was white (Table 19 and Figure 14).

Table 19 Ancestry

Ancestral Group	3DT		6DT		Total	
	n	%	n	%	n	%
White/ white?	19	70.4%	9	60.0%	28	66.7%
Mixed/ mixed?	3	11.1%	6	40.0%	9	21.4%
Black/ black?	5	18.5%	0	0.0%	5	11.9%
Total	**27**		**15**		**42**	

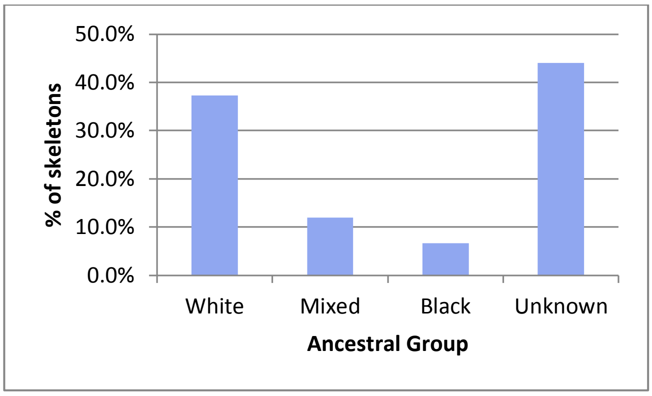


Figure 13 Overall ancestry

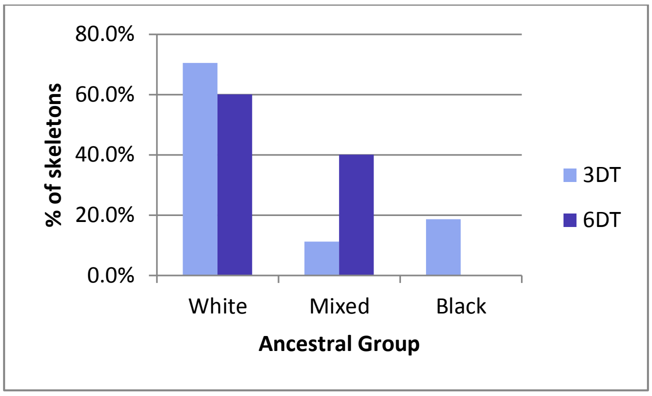


Figure 14 Ancestry: 3DT and 6DT

When the skeletons are divided into the different phase groups some interesting patterns emerge. All of the skeletons from the earliest phase of the cemetery (phase 21/31) were white, as were the majority from the later two phases (phase 23/33 and phase 24/34; Table 20 and Figure 15). Over a third of the skeletons from the latter phase were of mixed or black ancestry. However, only a third of the skeletons from phase 22/32 were white, with the majority (40.0%) being of mixed ancestry and a quarter (26.7%) being black. However, it is important to reiterate the relative unreliability of ancestral assessment when only a small portion of the population was suitable for assessment (33.3% (phase 21/31), 46.4% (phase 22/32), 50.0% (phase 23/33) and 33.3% (phase 24/34)).

Table 20 Ancestry by phase

Ancestral Group	21/31		22/32		23/33		24/34		Unphased		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
White	8	100.0%	5	33.3%	10	90.9%	5	62.5%	0	-	28	66.7%
Mixed	0	0.0%	6	40.0%	1	9.1%	2	25.0%	0	-	9	21.4%
Black	0	0.0%	4	26.7%	0	0.0%	1	12.5%	0	-	5	11.9%
Total	**8**		**15**		**11**		**8**		**0**		**42**	

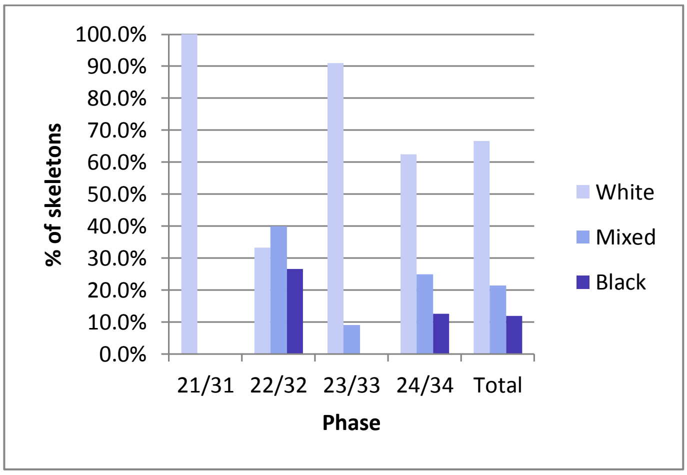


Figure 15 Ancestry by phase

Even with the reconstruction work that had been carried out it was still only possible to apply the metric assessment to eight crania (three from 3 Driffield Terrace and five from 6 Driffield Terrace). All but one of the visual assessments correlated with the metric assessments (Table 21): Skeleton 6DT12 was visually assessed as having mixed ancestry, but the metric assessment suggested this individual was white. Isotope analysis may be able to aid in determining geographical origin for some of these skeletons but this may not necessarily correlate with ancestry.

Table 21 Comparison of visual and metric assessment of ancestry

Skeleton	Phase	Visual Assessment	Metric Assessment
3DT15	33	White?	White
3DT23	32	White?	White
3DT31	32	Black?	Black
6DT2	24	White	White
6DT8	24	White?	White
6DT12	**22**	**Mixed**	**White**
6DT15	23	White	White
6DT24	21	White	White

It was not possible to estimate ancestry in any of the cremated or disarticulated human remains.

2.6 METRIC ANALYSIS

2.6.1 Stature

Stature depends on two main factors, heredity and environment; it can also fluctuate between chronological periods. Stature can only be established in skeletons if at least one complete and fully fused long bone is present, but preferably using the combined femur and tibia. The bone is measured on an osteometric board, and stature is then calculated using a regression formula developed upon individuals of known stature (Trotter 1970). Where possible, bones from the legs were used in preference to those of the upper limb as these carry the lowest error margin (*ibid*).

It was possible to calculate stature for 51 skeletons (68.0% of 75 adults): 40 from 3 Driffield Terrace (76.9% of 52 adults) and eleven from 6 Driffield Terrace (47.8% of 23 adults). The greater fragmentation of the skeletons from 6 Driffield Terrace no doubt contributed to the fact that stature could be calculated for less than half the sample. Overall, leg bones could be used to calculate stature for 74.5% of the sample, and stature was based on the femur and tibia combined in 43.1% of the individuals. A higher proportion of the stature estimates for 3 Driffield Terrace were based on leg bones (80.0%, compared to 54.5% for 6 Driffield Terrace), and the femur and tibia combined were used for stature estimates in 52.5% of the skeletons from 3 Driffield Terrace, but only 9.1% of the skeletons from 6 Driffield Terrace. The data on stature from 6 Driffield Terrace is therefore less reliable than the stature data from 3 Driffield Terrace.

Different formulae have been developed for different ancestral groups (Trotter 1970). Consequently, where ancestry had been identified as 'white' or 'black', the 'white' or 'black' regression formulae were applied. Where individuals were assessed as mixed ancestry, or ancestry was unknown, the choice of which formula to use was an issue. According to Byers (2010, 153), individuals with mixed white and black traits should be classified as black, so applying the black formula could be appropriate. However, for the one individual of mixed ancestry where metric analysis could be applied (Skeleton 6DT12), the metric analysis suggested the individual was white (see above); in which case maybe the white formula should be used. Those individuals of unknown ancestry could be either white or black. Since the majority of individuals from most phases were white, it possibly makes sense to use the white formula for these individuals. However, if any of these individuals were black, then their stature would be overestimated. As an illustration of the effect on the use of the different formulae, see Table 22, Table 23 and Table 24.

Table 22 Male stature (white formula used for individuals of mixed or unknown ancestry)

	Ancestral Group				**Total**
	White	**Black**	**Mixed**	**Unknown**	
Formula used	White	Black	White	White	-
Number of Sks	24	5	6	15	**50**
Min (cm)	156.2	154.7	165.1	160.7	**154.7**
Mean (cm)	173.1	163.3	171.5	171.2	**171.4**
Max (cm)	182.7	170.8	176.2	179.9	**182.7**

Table 23 Male stature (black formula used for individuals of mixed or unknown ancestry)

	Ancestral Group				**Total**
	White	**Black**	**Mixed**	**Unknown**	
Formula used	White	Black	Black	Black	-
Number of Sks	24	5	6	15	**50**
Min (cm)	156.2	154.7	162.1	158.3	**154.7**
Mean (cm)	173.1	163.3	166.2	166.5	**169.3**
Max (cm)	182.7	170.8	170.9	173.6	**182.7**

Table 24 Male stature (black formula used for individuals of mixed ancestry; white formula used for individuals of unknown ancestry)

	Ancestral Group				**Total**
	White	**Black**	**Mixed**	**Unknown**	
Formula used	White	Black	Black	White	-

Number of Sks	24	5	6	15	**50**
Min (cm)	156.2	154.7	162.1	160.7	**154.7**
Mean (cm)	173.1	163.3	166.2	171.2	**170.7**
Max (cm)	182.7	170.8	170.9	179.9	**182.7**

If the white formula is used for all individuals of mixed or unknown ancestry, the mean male stature (171.4 cm, 5'7½", see Table 22) is two centimetres higher than if the black formula is used for these individuals (169.3 cm, 5'6½", see Table 23). Where the black formula is used for those of mixed ancestry and the white formula is used for those of unknown ancestry, the mean is 170.7cm (5'7", see Table 24). These figures are either equivalent to, or slightly higher than the mean male stature of 169cm reported for the Roman period in Britain (Roberts and Cox 2003, 142). The range in male height observed at Driffield Terrace (154.7cm to 182.7cm, or 5'1" to 6'0") was far greater than that observed by those authors (159-178cm, *ibid*).

The stature of the two adolescent possible males was 165.0cm (Skeleton 3DT19, based on the femur and tibia using the white formula) and 173.6cm (Skeleton 3DT13, based on the tibia using the white formula). These individuals were not included with the analysis of the adult male stature as they had not reached skeletal maturity; the epiphyses of the bones measured had begun to fuse to the diaphyses, but the process of fusion was not complete. These two individuals fall well within the wide range of statures seen amongst the adult males.

The single female individual from Driffield Terrace (Skeleton 3DT42) was 160.9cm tall (5'3½"), slightly taller than female average for the Roman period (159cm, Roberts and Cox 2003, 142).

The individuals from 3 Driffield Terrace were slightly shorter on average than those from 6 Driffield Terrace (Table 25 and Table 26). Males from 3 Driffield Terrace ranged in height from 154.7cm to 180.9cm (5'1" to 5'11"), whilst those from 6 Driffield Terrace ranged in height from 164.9cm to 182.7cm (5'5" to 6'0"). The mean stature of the males from 3 Driffield Terrace was 170.6cm (5'7"), whereas that from 6 Driffield Terrace was 171.5cm (5'7½"), based on applying the black formula to individuals of mixed ancestry, and the white formula to those of unknown ancestry.

Table 25 Male stature, 3 Driffield Terrace (black formula used for individuals of mixed ancestry; white formula used for individuals of unknown ancestry)

	Ancestral Group				**Total**
	White	**Black**	**Mixed**	**Unknown**	
Formula used	White	Black	Black	White	-
Number of Sks	17	5	3	14	**39**
Min (cm)	156.2	154.7	162.1	160.7	**154.7**
Mean (cm)	172.6	163.3	167.3	171.5	**170.6**
Max (cm)	180.9	170.8	170.9	179.9	**180.9**

Table 26 Male stature, 6 Driffield Terrace (black formula used for individuals of mixed ancestry; white formula used for individuals of unknown ancestry)

	Ancestral Group				**Total**
	White	**Black**	**Mixed**	**Unknown**	
Formula used	White	Black	Black	White	-
Number of Sks	7	0	3	1	**11**
Min (cm)	167.3	-	164.9	167.2	**164.9**

Mean (cm)	174.3	-	166.4	167.2	**171.5**
Max (cm)	182.7	-	169.3	167.2	**182.7**

Comparison with other Roman populations (Table 27) indicates that although the males from Driffield Terrace are slightly taller than average (169cm according to Roberts and Cox 2003, 142), they were slightly shorter than those from The Mount (Holst 2005, Holst 2006) and Horncastle (Caffell and Holst 2008; although both these samples are small). If the mean stature is calculated for the males from The Mount and Mill Mount combined (169.0cm), the result is comparable with the overall British average stature. The males from Ephesus were shortest on average (Kanz and Grossschmidt 2006; 168cm), but since this population was not British (and probably had a different genetic background and environment) it is misleading to compare the mean directly with these British sites. Stature estimates for Trentholme Drive were based on an earlier version of the regression formula (Trotter and Gleser 1952), and were also given in feet and inches only. The mean male stature was 5'7", with a range of 5'3" to 6'0" (Warwick 1968, 149), which suggests the males were similar in height to those from Driffield Terrace.

Table 27 Comparative sites - mean stature

Site	Male (cm)	Site	Female (cm)
Horncastle[1]	172.2	Mill Mount 04[5]	165.2
89 The Mount[2]	171.4	**Driffield Terrace**	**160.9**
Driffield Terrace	**170.7**	Horncastle[1]	159.8
Roman Britain[3]	169	Ephesus[7]	159
Ancaster[4]	168.7	Roman Britain[3]	159
Mill Mount 04[5]	168.6	Ancaster[4]	157.0
Mill Mount 05[6]	168.4	89 The Mount[2]	153.7
Ephesus[7]	168	Mill Mount 05[6]	149.7

[1] Caffell and Holst (2008, 11); [2] based on unpublished data provided by M. Holst; [3] Roberts and Cox (2003, 142); [4] based on data provided in Cox (1989); [5] based on data provided in Holst (2005, 3); [6] based on data provided in Holst (2006, 2-3); [7] Kanz and Grossschmidt (2006, 209)

The single Driffield Terrace female was above average height for almost all comparative sites (see Table 27), including Trentholme Drive, where the mean female height was 5'1", with a range of 4'8" to 5'6" (Warwick 1968, 149).

2.6.2 Platymeric and Platycnemic Indices

Leg measurements were obtained from the femora and tibiae and used to calculate the shape and robusticity of the femoral shaft (*platymeric* index) and the tibial shaft (*platycnemic* index; Bass 1987).

Two-thirds of the right femora and three-quarters of left femora were *platymeric* (broad and flattened from front to back; Table 28). The remaining femora were *eurymeric* (rounded). The male mean was similar between 3 and 6 Driffield Terrace for both right femora (82.58 and 81.01) and left femora (81.80 and 81.01).

Table 28 Platymeric index

		Female		Male		Unsexed		Total	
R Femora	Platymeric	1	100.0%	36	67.9%	1	50.0%	**38**	67.9%
	Eurymeric	0	0.0%	17	32.1%	1	50.0%	**18**	32.1%
	Total	**1**		**53**		**2**		**56**	
	Mean	**70.28**		**82.10**		**82.00**		**81.88**	
	Range	70.28	70.28	70.87	94.08	78.72	85.28	70.28	94.08
L Femora	Platymeric	-	-	39	73.6%	1	100.0%	**40**	74.1%
	Eurymeric	-	-	14	26.4%	0	0.0%	**14**	25.9%
	Total	**-**		**53**		**1**		**54**	
	Mean	**-**		**81.58**		**83.92**		**81.62**	
	Range	-	-	70.22	92.74	83.92	83.92	70.22	92.74

Overall, the tibiae had a tendency to be *eurycnemic* (broad), with 58.3% of right and 55.1% of left tibiae falling into this category (Table 29). The majority of the remaining tibiae were *mesocnemic* (average), with a small percentage being *platycnemic* (flattened). The male mean was similar between 3 and 6 Driffield Terrace for the left tibiae (70.74 and 70.66), but slightly different for the right tibiae (70.90 and 72.54). All means fell into the *eurymeric* range.

Table 29 Platycnemic index

		Female		Male		Unsexed		Total	
R Tibiae	Platycnemic	0	0.0%	3	7.0%	0	0.0%	**3**	6.3%
	Mesocnemic	1	100.0%	14	32.6%	2	50.0%	**17**	35.4%
	Eurycnemic	0	0.0%	26	60.5%	2	50.0%	**28**	58.3%
	Total	**1**		**43**		**4**		**48**	
	Mean	**66.75**		**71.35**		**71.60**		**71.28**	
	Range	66.75	66.75	55.01	83.04	63.06	83.17	55.01	83.17
L Tibiae	Platycnemic	0	0.0%	2	4.4%	0	0.0%	**2**	4.1%
	Mesocnemic	1	100.0%	17	37.8%	2	66.7%	**20**	40.8%
	Eurycnemic	0	0.0%	26	57.8%	1	33.3%	**27**	55.1%
	Total	**1**		**45**		**3**		**49**	
	Mean	**68.84**		**70.71**		**71.40**		**70.72**	
	Range	68.84	68.84	55.39	81.71	66.89	78.04	55.39	81.71

2.6.3 Pilasterism

Several individuals had femora with bars of bone running the length of the posterior surface of the shaft, a shape typical of pilasterism. Further measurements would be required to assess the frequency of pilasterism in this population.

2.6.4 Cranial Indices

Standard measurements of the cranium and mandible were taken where preservation allowed, including from reconstructed skulls. The cranial index, which describes the shape of the cranium, could be calculated for 33 adults (44.0% of 75): twenty from 3 Driffield Terrace (38.5% of 52) and thirteen from 6 Driffield Terrace (56.5% of 23). The majority of crania were either *dolichocranic* (long and narrow) or *mesocranic* (average), with a slightly higher percentage being *dolichocranic* although the mean fell into the *mesocranic* range (Table 30). A small percentage of skulls were *brachycranic* (round, 9.1%) or *hyperbrachycranic* (very round, 3.0%). The female individual had an average-shaped head.

Table 30 Cranial index

	Male		Female		Total	
Dolichocranic	15	46.9%	0	0.0%	15	45.5%
Mesocranic	13	40.6%	1	100.0%	14	42.4%
Brachycranic	3	9.4%	0	0.0%	3	9.1%
Hyperbrachycranic	1	3.1%	0	0.0%	1	3.0%
Total	**32**		**1**		**33**	
Mean	**76.01**		**75.53**		**75.99**	
Range	70.85	85.39	75.53	75.53	70.85	85.39

The mean cranial index for males from 3 and 6 Driffield Terrace both fell into the *mesocranic* range (75.20 and 77.19 respectively), but those from 3 Driffield Terrace were more likely to be long-headed: 57.9% were *dolichocranic*, 5.3% were *brachycranic* and none were *hyperbrachycranic* (Table 31). In comparison, 30.8% of the males from 6 Driffield Terrace were *dolichocranic*, 15.4% were *brachycranic* and 7.7% were *hyperbrachycranic*.

Table 31 Cranial index: males from 3 Driffield Terrace and 6 Driffield Terrace

	3DT		6DT		Total	
Dolichocranic	11	57.9%	4	30.8%	15	46.9%
Mesocranic	7	36.8%	6	46.2%	13	40.6%
Brachycranic	1	5.3%	2	15.4%	3	9.4%
Hyperbrachycranic	0	0.0%	1	7.7%	1	3.1%
Total	**19**		**13**		**32**	
Mean	**75.20**		**76.01**		**76.01**	
Range	70.85	80.65	72.92	85.39	70.85	85.39

2.7 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). A total of thirty cranial (skull) and thirty post-cranial (bones of the body and limbs) non-metric traits were selected from the osteological literature (Buikstra and Ubelaker 1994; Finnegan 1978; Berry and Berry 1967) and recorded. Only the results for the adult skeletons are presented here.

2.7.1 Cranial Traits

Ossicles (small additional bones in the sutures of the cranium) were observed, most frequently in the lambdoid suture (57.8% on the right side, 56.3% on the left side), but also in the coronal suture (4.0% on the right, 2.0% on the left) and at various other locations in the cranium (pterion, asterion, parietal notch, lambda, and bregma,

Table 32). Variation in the small holes found in the base of the cranium occurred, with *open posterior condylar canals* being particularly frequent (65.9% on the right, 65.8% on the left). *Parietal foramina* (small holes near the sagittal suture) were present in 40.7% of right and 40.0% of left parietal bones. Variation also occurred in the number or form of small holes in the facial skeleton: z*ygomaticofacial foramina* were absent in 11.1% of right and 23.6% of left cheekbones, the *supraorbital notch* was bridged (15.5% on the right and 17.6% on the left), *accessory supraorbital foramina* were present (19.3% right, 13.5% left), and a small percentage of individuals had *accessory infraorbital foramina* (3.8% right, 5.4% left). Retention of the metopic suture in the frontal bone was observed in 6.8% of crania. *Highest nuchal lines* (additional ridges of bone on the back of the cranium) were present on 21.6% of right and 22.6% of left occipital bones. Bony nodules were present on the jaw bones and palate, with 16.3% of individuals having a *palatine torus*; *mandibular tori* (10.3% on the right, 11.9% on the left) and *maxillary tori* (7.5% on the right, 5.6% on the left) were less frequent. Various other traits were also observed, and the prevalence rates are given in Table 32.

Table 32 Cranial non-metric traits (adults)

Midline Traits	**Trait Present**	**Part Present**	**%**
Ossicle at Lambda	7	51	13.7%
Ossicle at Bregma	1	51	2.0%
Metopic Suture	4	59	6.8%
Palatine Torus	8	49	16.3%
Precondylar Tubercle	5	56	8.9%

Paired Traits	**Right**			**Left**		
	Trait Present	**Part Present**	**%**	**Trait Present**	**Part Present**	**%**
Highest Nuchal Line	11	51	21.6%	12	53	22.6%
Lambdoid Ossicle	26	45	57.8%	27	48	56.3%
Coronal Ossicle	2	50	4.0%	1	49	2.0%
Ossicle at Asterion	11	44	25.0%	11	49	22.4%
Ossicle at Parietal Notch	9	51	17.6%	4	48	8.3%
Ossicle at Pterion	7	24	29.2%	3	22	13.6%
Parietal Foramen	22	54	40.7%	22	55	40.0%
Auditory Torus	0	55	0.0%	2	57	3.5%
Foramen of Huschke	0	54	0.0%	0	55	0.0%
Mastoid For. Extrasutural	28	48	58.3%	23	43	53.5%
Sutural Mastoid Foramen	22	48	45.8%	17	43	39.5%
Open Post. Condylar Canal	27	41	65.9%	25	38	65.8%
Double Condylar Facet	3	51	5.9%	2	53	3.8%
Double Ant. Condylar Canal	14	54	25.9%	9	52	17.3%
For. Ovale Incomplete	1	46	2.2%	0	41	0.0%
Open For. Spinosum	13	41	31.7%	12	43	27.9%
Access. Less. Palat. For.	16	30	53.3%	10	25	40.0%
Maxillary Torus	4	53	7.5%	3	54	5.6%
Mandibular Torus	6	58	10.3%	7	59	11.9%
Staphne's Defect	0	55	0.0%	0	54	0.0%
Zygomatic. Facial For. Abs.	6	54	11.1%	13	55	23.6%
Access. Infra-orb. For.	1	26	3.8%	2	37	5.4%
Access. Supraorbital For.	11	57	19.3%	7	52	13.5%
Bridging Supraorbital Notch	9	58	15.5%	9	51	17.6%
Anterior Ethmoid For. Ex.	4	8	50.0%	5	9	55.6%

Posterior Ethmoid For. Ex.	1	6	16.7%	1	9	11.1%

2.7.2 Post-Cranial Traits

Traits occurring in the cervical (neck) vertebrae were observed, most frequently *bipartite transverse foramina* (40.0% on the right, 42.0% on the left side), but also *posterior atlas bridging* (7.3% right, 8.8% left), *double atlas facets* (8.9% right, 5.5% left) and *lateral atlas bridging* (0.0% right, 2.0% left). *Sternal foramina* (a hole in the centre of the breastbone) were observed in 6.5% of individuals. *Septal apertures* (a hole in the humerus near the elbow) occurred in 5.4% of right and 10.3% of left humeri. Variations in the femur were observed, most frequently *hypotrochanteric fossae* (elongated depressions on the posterior shaft, seen in 48.3% of right and 50.0% of left femora), followed by *plaque* (rough areas on the femoral neck, seen in 36.5% of right and 42.9% of left femora) and *Poirier's facets* (extension of the joint surface of the femoral head, 34.7% of right and 44.4% of left femora); e*xostosis in the trochanteric fossa* (spicules of bone), third trochanters (additional nodules of bone on the posterior shaft), and *Allen's fossae* (honeycombed areas of bone on the femoral neck) were present, but less frequent (Table 33).

Table 33 Post-cranial non-metric traits (adults)

Midline Traits	Trait Present	Part Present	%
Sternal Foramen	2	31	6.5%

Paired Traits	**Right**			**Left**		
	Trait Present	Part Present	%	Trait Present	Part Present	%
Lateral Atlas Bridging	0	52	0.0%	1	51	2.0%
Double Atlas Facet	5	56	8.9%	3	55	5.5%
Posterior Atlas Bridging	4	55	7.3%	5	57	8.8%
Transverse For. Bipartite	22	55	40.0%	21	50	42.0%
Suprascapular Foramen	0	44	0.0%	0	41	0.0%
Accessory Acromial Facet	1	28	3.6%	0	30	0.0%
Circumflex Sulcus	21	57	36.8%	14	55	25.5%
Supracondyloid Process	1	58	1.7%	0	58	0.0%
Septal Aperture	3	56	5.4%	6	58	10.3%
Accessory Sacral Facet	6	50	12.0%	3	46	6.5%
Acetabular Crease	19	59	32.2%	22	60	36.7%
Allen's Fossa	6	46	13.0%	7	55	12.7%
Poirier's Facet	17	49	34.7%	24	54	44.4%
Plaque	19	52	36.5%	24	56	42.9%
Hypotrochanteric Fossa	29	60	48.3%	30	60	50.0%
Exostosis in Troch. Fossa	14	51	27.5%	11	52	21.2%
Third Trochanter	9	59	15.3%	9	58	15.5%
Emarginate Patella	1	38	2.6%	1	39	2.6%
Vastus Notch	12	36	33.3%	11	39	28.2%
Vastus Fossa	27	37	73.0%	28	38	73.7%
Med. Tib. Squatting Facet	0	54	0.0%	0	52	0.0%
Lat. Tib. Squatting Facet	32	53	60.4%	32	52	61.5%
Peroneal Tubercle	19	36	52.8%	18	36	50.0%
Double Ant. Calc. Facet	19	50	38.0%	21	46	45.7%
Absent Ant. Calc. Facet	4	50	8.0%	2	46	4.3%
Double Inf. Talar Facet	17	48	35.4%	21	48	43.8%

Med. Talar Facet	23	51	45.1%	17	48	35.4%
Lat. Talar Extension	14	52	26.9%	11	49	22.4%
Os Trigonum	5	49	10.2%	4	50	8.0%

Non-metric traits were observed in the patella (kneecap), most frequently *vastus fossae* (depressions), but also *vastus notches*; a small percentage of patellae were *emarginate* (2.6%, 2.6% left; Table 33). *Lateral tibial squatting facets* (additional facets in the ankle region were common (seen in 60.4% of right and 61.5% of left tibiae), but *medial tibial squatting facets* were not observed at all. *Medial talar facets* and *lateral talar extensions* (additional ankle facets) were also relatively frequent (affecting between 35-46% of individuals, Table 33). *Peroneal tubercles* (nodules of bone on the calcaneus) were seen in 50-53% of individuals (Table 33). Variation in the joint between the talus and calcaneus included *double anterior calcaneal facets* and *double inferior talar facets*; *absent anterior calcaneal facets* were observed much less frequently (Table 33). *Os trigonum* was present in 10.2% of right and 8.0% of left tali. Data on other traits observed are provided in Table 33.

2.8 CONCLUSION

Osteological investigation has shown the demographic profile of the population buried at Driffield Terrace to be most unusual. By far the majority of the individuals were young to middle-aged adult males. Only one female was present (aged 26-35 years), and older individuals were completely absent. A small number of non-adults were present at 3 Driffield Terrace, three of whom were older adolescents who may have been socially accepted as adults; two of these were possibly males. The remaining non-adults included a foetus, a newborn baby, and two young children. The population was apparently genetically diverse, including individuals from white, black, and mixed ancestral groups. Males ranged considerably in height (from 154.7cm to 182.7cm/ 5’1” to 6’0”), but on average were slightly tall for the period. The female was also slightly above average height.

Analysis of the disarticulated remains confirms the impression given by the articulated burials. The majority of bones derived from adults. Where age and sex could be determined, only bones from young to middle aged males could be identified, and there was no evidence for the presence of females or mature individuals. There was scant evidence for the presence of non-adults, but adolescents and foetal/ neonate/ infant bones were present in small numbers at 3 Driffield Terrace. One femur might indicate the presence of at least one infant, an age group absent from the articulated burials.

Most of the cremated bone was derived from the fourteen identified cremation burials, but cremated bone was also recovered from other features. The amount of cremated bone recovered ranged from 0.3g to 1,289.3g, but only three burials contained a quantity of bone comparable to that produced during modern cremations. In the cremated bone assemblages, limited information on age and sex could be gathered: where age could be determined, the burials were either of adults or possibly adults/adolescents; and three of the individuals were possibly males, and one was possibly female. Almost all of the assemblages contained poorly burnt, partially oxidised bone.

3.0 PATHOLOGICAL ANALYSIS

Pathological conditions (disease) can manifest themselves on the skeleton, especially when these are chronic conditions or the result of trauma to the bone. The bone elements to which muscles attach can also provide information on muscle trauma and excessive use of muscles. All bones were examined macroscopically for evidence of pathological changes. Fuller descriptions of the pathological lesions observed can be found in Appendix A.

3.1 CONGENITAL CONDITIONS

Heredity and environment can influence the embryological development of an individual, leading to the formation of a congenital defect or anomaly (Barnes 1994). The most severe defects are often lethal, and if the baby is not miscarried or stillborn, it will usually die shortly after birth. Such severe defects are rarely seen in archaeological populations, but the less severe expressions often are, and in many of these cases the individual affected will have been unaware of their condition. Moreover, the frequency with which these minor anomalies occur may provide information on the occurrence of the severe expressions of these defects in the population involved (*ibid*), and may provide information on maternal health (Sture 2001).

3.1.1 Variation in Number of Vertebral Segments

The usual number of segments in the spine is 33, including seven cervical (neck) vertebrae, twelve thoracic vertebrae (bearing the ribs), five lumbar vertebrae (lower back), five fused segments in the sacrum (back of the pelvis), and four segments in the coccyx (tailbone). Occasionally the overall number of segments may vary. It is more common for an individual to have an additional vertebra than to have a reduction in the number of vertebrae (Barnes 1994, 78). Assessing the number of vertebrae in the spine of archaeological individuals can be difficult, due to the fact that skeletons may be incomplete, or because disarticulated bone can be present in the backfill of the grave and become intermixed with those of the articulated skeleton. For this reason, when calculating the prevalence rates, only individuals with relatively complete spines were included.

When additional vertebrae occur they often appear at the borders between the thoracic and lumbar spine, or between the lumbar vertebrae and sacrum. They may appear as a fully-fledged thoracic or lumbar vertebra, but frequently they will take on a mixture of the characteristics of the vertebrae on either side of the border, so appearing to be part-thoracic/ part-lumbar, or part-lumbar/ part-sacrum (Barnes 1994, 78). When this occurs they are described as ‘transitional vertebrae’ (see Section 3.1.2 below).

Eight adults (17.4% of 46 with relatively complete spines) had an additional vertebra in their spine, including seven from 3 Driffield Terrace (20.6%, 7/34) and one from 6 Driffield Terrace (8.3%, 1/12). All affected individuals were males (Table 34). Six of these individuals had a sixth lumbar vertebra, and in five the additional lumbar vertebra had become partially or completely incorporated into the sacrum. In two individuals the additional vertebra had manifested at the border between the thoracic and lumbar vertebrae. In Skeleton 3DT32 (young adult male?) the vertebra was transitional: it was lumbar in shape but had a small rib facet on the left side, and a small thirteenth left rib was present. In Skeleton 6DT22 (young middle adult male), the additional vertebra appeared to be more fully thoracic in shape with a rib facet on the right side, but post-mortem damage prevented observation of the left side.

Sture (2001) has suggested that individuals with an additional vertebra are more likely to die young, and it is interesting to note that the majority of Driffield Terrace individuals with additional vertebrae were young middle adults.

Table 34 Individuals with additional vertebrae

Skeleton No.	Phase	Age	Sex	Additional Segment
3DT6	33	YMA	M	L6, sacralised
3DT8	32	YMA	M	L6, sacralised
3DT16	33	OMA	M	L6, sacralised
3DT32	32	YA	M	Transitional vertebra at thoraco-lumbar border (T13?)
3DT37	32	YMA	M	L6, sacralised
3DT51	32	YA	M	L6
3DT53	31	YMA	M	L6, sacralised
6DT22	23	YMA	M	T13

Reduction in the number of vertebral segments, occurring in 4.3% of adults (2/46) and 6.3% of adults/ adolescents combined, was less common than additional vertebrae. Three individuals (two adult males and an adolescent) had a reduced number of vertebrae, and all three had multiple border-shifts (see Section 3.1.2 below) which made it difficult to interpret the changes observed. Skeleton 3DT19 (adolescent) had eleven thoracic vertebrae and eleven pairs of ribs (rather than the usual twelve); the first lumbar vertebra was slightly thoracic in shape (flattened superior apophyseal facets). Skeletons 3DT34 (young adult male) and 3DT35 (old middle adult male) both had eleven full thoracic vertebrae, but the vertebra beneath the eleventh thoracic vertebra (T12/L1) was partially lumbar in shape and partially thoracic. Both skeletons had small unilateral twelfth ribs, on the right side in Skeleton 3DT34 and on the left side in Skeleton 3DT35.

Table 35 Individuals with a reduced number of vertebrae

Skeleton No.	Phase	Age	Sex	
3DT19	31	Ad	(M?)	Eleven thoracic vertebrae, eleven pairs of ribs
3DT34	33	YA	M	Eleven full thoracic vertebrae, T12/L1 transitional, 11 left and 12 right ribs
3DT35	31	OMA	M	Eleven full thoracic vertebrae, T12/L1 transitional, 11 right and 12 left ribs

3.1.2 Transitional Vertebrae

The vertebrae are divided into different groups by 'borders', and during development each group receives instructions governing the type of vertebrae into which they will develop. If these borders move up or down the spine then a vertebra becomes incorporated into an adjacent group, receives the wrong instructions, and takes on the characteristics of the new vertebra type (Barnes 1994, 79). The resulting vertebrae are termed 'transitional vertebrae'. Border-shifts have the effect of increasing the number of vertebrae in a particular group, but do so by reducing the number present in the adjacent group. The overall number of vertebrae remains the same, which is not the case with genuine additional segments or reductions in the number of segments (see Section 3.1.1 above).

Transitional vertebrae were seen in 33 individuals, including 26 from 3 Driffield Terrace and seven from 6 Driffield Terrace. If prevalence rates are calculated as a proportion of individuals with at least one border between vertebra types observable, then over half the adults (54.2%, 32/59) and a third of the adolescents (1/3) were affected. Transitional vertebrae were more frequently observed among the males of 3 Driffield Terrace (62.5%, 25/40) than those at 6 Driffield Terrace (41.2%, 7/17). These individuals included seven of the eleven individuals with an increase or reduction in the number of vertebrae (see Section 3.1.1 above). Nine individuals had a border shift at more than one border, so had multiple transitional vertebrae (including the three individuals with a reduction in the number of vertebrae). One individual had transitional vertebrae at four borders, combined with a reduction in vertebral segments, which made determining the direction of the shift at each border difficult.

Most of the border shifts occurred at the border between the thoracic and lumbar vertebrae. Twenty-five transitional vertebrae were observed in this location (45.5%, 25/55 spines were it was possible to observe the thoraco-lumbar border). Most of the shifts (16) were in a cranial (upwards) direction, leading to the twelfth thoracic vertebra assuming some of the characteristics of a lumbar vertebra. In the majority of individuals (12) these cranial shifts were relatively minor, just affecting the shape of the apophyseal facets between the vertebrae. In four individuals the shift had also affected the ribs to an extent. Skeletons 3DT7 (young middle adult male) and 3DT22 (old middle adult male) both had short twelfth ribs. Skeleton 3DT47 (young middle adult male) had underdeveloped rib facets on his twelfth thoracic vertebra, and a small left rib was present. Skeleton 6DT24 (young adult male?) lacked a rib facet on the right side of the twelfth thoracic vertebra, and had a small nodule on the left side in the usual location for the rib facet; only eleven pairs of ribs were present.

Eight of the shifts at the thoraco-lumbar border were probably in a caudal (downwards) direction, and it was difficult to assess the direction of the shift in the final individual (Skeleton 3DT19, who had a reduced number of vertebrae). Of those with a caudal shift, three of the shifts just affected the shape of the apophyseal facets between the twelfth thoracic and first lumbar vertebrae, meaning they were flat and thoracic in shape rather than curved and lumbar in shape. In Skeleton 6DT18 (young adult male), the flattened facets were accompanied by a small facet on the side of the first lumbar vertebra, which suggests a lumbar rib was present (although no additional ribs were recovered). In Skeleton 3DT26 (old middle adult male?), there was a flattened facet immediately adjacent to the upper left apophyseal facet on the first lumbar vertebra, which again might have been related to the presence of a lumbar rib, although no additional ribs were found. The two adults with a reduced number of vertebrae (Skeletons 3DT34 and 3DT35) possibly had associated caudal shifts: both had a small rib facet on one side of the first lumbar vertebra (or T12) with related small unilateral twelfth ribs. Skeleton 32 (young adult male), probably had a caudal shift associated with his additional vertebra: the thirteenth thoracic vertebra had lumbar-shaped superior facets, and a small left rib facet; a small thirteenth rib was present. Individuals with additional ribs in the lumbar region may experience pain or soreness in their lower backs as a result (Barnes 1994, 105).

The next most frequent location for transitional vertebrae was the lumbo-sacral border, where twelve transitional vertebrae were seen (25.5%, 12/47 lumbo-sacral borders). Six of the shifts had occurred in a cranial direction, and these included the five sacralised additional lumbar vertebrae discussed above (Section 3.1.2). In Skeleton 3DT40 (young adult male), the fifth lumbar vertebra was only partially sacralised on the right side, with a pseudoarthrosis (fake joint) between the right transverse process of the fifth lumbar vertebra and the right ala (wing) of the sacrum. The remaining six individuals had a caudal shift, leading to lumbarisation (partial or complete) of the first sacral vertebra.

Sacralisation or lumbarisation has been reported to occur in 3-5% of the population, with sacralisation being more frequent (Aufderheide and Rodríguez-Martín 1998, 65). Sacralisation has been associated with lower back pain (Sture 2001; Barnes 1994, 110), although when the sacralisation is symmetrical the individual usually experiences no symptoms (Barnes 1994, 109). Thus, Skeleton 3DT40 was most likely to have experienced discomfort, since his sacralisation occurred only on the right side. Reduced mobility due to sacralisation may also lead to degenerative changes and disc herniation further up the vertebral column (Sture 2001).

Five transitional vertebrae were observed at the border between the sacrum and coccyx (12.8%, 5/39 sacro-coccygeal borders). In all five individuals the first segment of the coccyx had apparently become incorporated into the sacrum, so all were caudal shifts. Caudal border shifts at this location appear to be more common than cranial shifts, and they occur more frequently among males than females (Barnes 1994, 114; Aufderheide and Rodríguez-Martín 1998, 66). They are usually asymptomatic (Barnes 1994, 114).

Two border shifts, both in a cranial direction, occurred at the border between the cervical and thoracic vertebrae (3.8%, 2/53 cervico-thoracic borders). Skeleton 3DT38 (old middle adult male) had a possible cervical rib on the left side (there was a raised area on the superior surface of the left first rib shaft near the sternal end, but the seventh cervical vertebra and the right rib were too damaged to assess whether a cervical rib was present). The first ribs of Skeleton 3DT45 (young middle adult male) were partially articulating with the body of the seventh cervical vertebra, and the left transverse process of the seventh cervical vertebra was enlarged and flattened (possibly a cervical rib Type I, Barnes 1994, 100-101). Between half to three-quarters of individuals with cervical ribs do not experience symptoms, but pain in the neck or shoulder, and loss of feeling or tingling in the hand and fingers can occur, often following trauma or stress (Barnes 1994, 101)

One possible border shift was noted between the occipital bone at the base of the skull and the first cervical vertebra (atlas). This occurred in Skeleton 3DT19 (adolescent), who had a reduced number of vertebrae and transitional vertebrae at three other borders. The occipital condyles at the base of the skull and superior articular facets on the atlas were round and flatter than usual, probably indicating a mild caudal shift. Caudal shifts at this border are more common than cranial shifts (Barnes 1994, 88).

3.1.3 Cleft Neural Arches

The two halves of the neural arch normally surround and protect the spinal cord, but they can fail to unite during development leaving a cleft in the back of the vertebra. However, the spinal cord remains protected as the gap is bridged by a tough fibrous tissue (Barnes 1994, 117-120). Cleft neural arches are most common at the border regions between the vertebra types, especially in the sacrum where the entire bone may be involved (Barnes 1994, 119-120). Cleft sacral arches have often been termed '*spina bifida occulta*' in the palaeopathological literature, but the causes of cleft arches and true spina bifida are quite different, and cleft neural arches are not related to the more severe *spina bifida cystica* (*ibid*).

Seven individuals (six adults and an adolescent) had clefts in the arches of at least one sacral vertebra, and two of these individuals had clefts in the first sacral vertebra, while three had clefts in the first, fourth and fifth sacral vertebrae. Roberts and Manchester (2005, 55) have suggested that cleft arches in these locations may be part of normal variation. Notably, both young middle adult males with cleft neural arches in the first sacral vertebra alone also experienced a border shift in this region: Skeleton 3DT6 had a sacralised additional lumber vertebra, while Skeleton 3DT54 had a slightly lumbarised first sacral vertebra. Two individuals had more extensive clefting in the posterior sacrum. The arches of all sacral vertebrae were cleft in Skeleton 3DT26 (old middle adult male?), and in Skeleton 3DT7 (young middle adult male) the cleft was almost complete apart from a small area of contact around the level of the third sacral vertebra. Barnes (1994, 199) has reported frequencies of cleft neural arches as high as 25%.

3.1.4 Other Spinal Anomalies

Three adults had stenosis (narrowing) of the transverse foramen of the seventh cervical vertebra. More research is required to determine whether the narrowing might have affected the soft tissues that pass through this foramen (the vertebral vein and sympathetic nerves; the vertebral artery does not pass through the transverse foramen of C7).

Two pairs of vertebrae belonging to Skeleton 3DT13 (adolescent) were unusual in their appearance. The vertebrae had not quite finished development, as the annular rings (which complete the upper and lower body surfaces) had not fused. The bodies of the fifth and sixth cervical vertebrae appeared to have been fused in a small area of the posterior third of the body surface, since broken post-mortem, and the bodies of the first and second thoracic vertebrae had a similar appearance although did not seem to have been fully fused. These might be very mild expressions of block vertebrae (where two vertebrae fail to separate during development, Barnes 1994, 65-67), but the appearance was not typical of block vertebrae.

Variations in the shape of the vertebral bodies occurred. In Skeleton 3DT15 (young adult male) the superior surfaces of the bodies of the tenth and eleventh thoracic vertebrae were slightly depressed. This was more pronounced on the right side and more extensive in the eleventh thoracic vertebra. These did not appear to be crush fractures of the vertebral bodies, as there was no evidence for bone remodelling and the appearance of the lesions was consistent with a developmental cause. It is possible the vertebrae experienced slight underdevelopment of one half of the vertebral body (hemimetamere hypoplasia, Barnes 1994, 62). Skeleton 3DT21 (old middle adult male) had a small notch in the midline of the anterior margin of the superior body surface of the second thoracic vertebra. The facets between his first ribs and the transverse processes of his first thoracic vertebra also appeared underdeveloped. Skeleton 3DT41 (young adult male) also had a small notch in the margin of the superior body of his fourth thoracic vertebra, but on the left side rather than in the midline. This individual also had very slight scoliosis (spinal curvature).

Two individuals may have had very slight scoliosis, or sideways curvature, of the spine. In Skeleton 3DT34 (young adult male) the eighth thoracic vertebra was slightly compressed on the right side and the right wall of the body was more concave than the left wall. The fifth and sixth thoracic vertebrae of Skeleton 3DT41 (young adult male) were slightly wedged to the left, with body walls more concave on the left side, and with the left pedicles slightly thinner than the right (this is the bridge of bone that joins the arch to the body). In both individuals the degree of curvature would have been fairly minimal, and it is unlikely to have been enough to be noticeable. Skeleton 3DT28 (young middle adult male) had a slightly asymmetric sacrum, which was slightly curved to the right with a raised right ala (wing). This asymmetry appears to have been compensated for by the fifth lumbar vertebra and does not appear to have led to scoliosis.

Variations in the shape of the spinous processes (part of the vertebra that protrudes posteriorly) were also observed. The upper part of the spinous process of the eleventh thoracic vertebra in Skeleton 3DT1 (young middle adult male?) deviated to the left, while the lower part deviated to the right. This is probably related to a discrepancy in the timing of the development between both halves of the neural arch. The spinous processes of the upper to mid thoracic vertebrae of Skeleton 3DT53 deviated markedly to one side or the other: those of the third, sixth and seventh vertebrae deviated to the right, whereas those of the fourth, fifth and eighth thoracic vertebrae deviated to the left.

Two individuals had vertebral apophyseal facets (joints between vertebrae) that had partially divided into two, both occurring on the right side and affecting similar regions of the spine. In Skeleton 3DT26 (old middle adult male?) the right apophyseal facets between the eighth and ninth thoracic vertebra were affected, and in Skeleton 3DT47 (young middle adult male) the right apophyseal facets between the ninth and tenth thoracic vertebrae were affected. Two other individuals had grooves through apophyseal facets that might have been developmental or might have been traumatic in origin. These were Skeleton 6DT3 (young adult male), who had a groove through the left apophyseal facet of his first sacral vertebra, and Skeleton 6DT19 (young middle adult male) who had a groove through the superior right apophyseal facet of his fifth lumbar vertebra.

Skeleton 3DT 46 (young middle adult male) had a circular hole penetrating fully through the left lamina of his third cervical vertebra. In Skeleton 3DT55 (young middle adult male), the second and third cervical vertebrae were asymmetric, being larger and more sturdy on the right side. The spinous process of the second cervical vertebra deviated to the right, while the left tip of the spinous process of the third cervical vertebra was underdeveloped.

3.1.5 Anomalies of the Manubrium and Sternum

Seven individuals (six adults and an adolescent) had developmental anomalies that affected their manubrium and sternum (breastbone; Table 36). The most frequent anomalies were developmental fusion of the manubrium and sternum (normally two separate bones), which was seen in three individuals, and unusually broad sternal bodies (also seen in three individuals). One of the latter individuals also had an abnormally large xiphoid process (lowermost part of the breastbone) and another individual had a fused manubrium and sternum. Developmental fusion of the manubrium and sternum can interfere with breathing and has been associated with lung infections (Barnes 1994, 211). Of the three individuals with fusion of the manubrium and sternum, only Skeleton 3DT54 (young middle adult male) had new bone formation on the internal surfaces of his ribs indicating the presence of a lung infection.

Table 36 Individuals with anomalies of the manubrium and sternum

Skeleton No.	Phase	Age	Sex	
3DT19	31	Ad	(M?)	Elongated manubrium
3DT21	31	OMA	M?	Manubrium and sternum fused
3ST32	32	YA	M	Broad sternum
3DT35	31	OMA	M	Manubrium and sternum fused
3DT41	32	YA	M	Broad sternum; large xiphoid process
3DT53	31	YMA	M	Asymmetrical manubrium

3DT54	31	YMA	M	Manubrium and sternum fused; broad sternum

Skeleton 3DT19 (adolescent) had an elongated manubrium, which was 67mm long. It is possible that the joint between the manubrium and first segment of the sternal body had formed between the first and second segments of the sternum instead, leading to the first sternal segment being incorporated into the manubrium (Barnes 1994, 212-213).

Skeleton 3DT53 (young middle adult male) had an asymmetrical manubrium, where the upper part was off-set to the right, and the right clavicular facet was higher than the left. The appearance of this joint surface suggested the development may have been affected (with the flake of bone that fuses to this facet being fused in a slightly incorrect location). Asymmetry of the clavicles was observed in the same individual, and could have been associated.

3.1.6 *Os Acromiale*

The acromion process is the part of the scapula that projects over the shoulder joint and meets the clavicle. The tip of this process develops as a separate element that in most individuals fuses to the rest of the scapula during adolescence. When it fails to fuse, the condition is known as *os acromiale*. It has been suggested that severe stress to the rotator cuff muscles of the shoulder during growth prevents the natural fusion of the bones. The presence of *os acromiale* in two modern boxers was attributed to their intensive training during adolescence (Hershkovitz *et al.* 1996, 170), and in medieval populations it has been suggested that intensive practice of archery from a young age may have contributed to the development of this condition (Roberts and Manchester 2005, 151-152; Knüsel 2000; Stirland 2005). However, Mann and Hunt (2005, 140) have suggested there may be a genetic component to the condition. *Os acromiale* leads to increased flexibility at the shoulder joint, allowing a greater range of movement (Knüsel 2000).

Os acromiale was observed in twelve adults (23.5% of 51 with at least one acromion process preserved), including eleven males and one unsexed individual. The proportion of individuals affected decreased with age (Table 37), from 30.8% of the young adults (three males and one unsexed), to 18.2% of the old middle adults. Three individuals had bilateral *os acromiale* (Skeletons 3DT4, 3DT51, and 6DT21), and two had just one scapula affected (Skeletons 3DT6 and 3DT47). In the remaining seven skeletons the opposite scapula was either not present or too damaged to determine whether the condition had affected both sides.

Table 37 Prevalence of os acromiale (individuals)

Age	Skeletons		
	Os Acromiale	**Total**	**%**
YA	4	13	30.8%
YMA	6	25	24.0%
OMA	2	11	18.2%
A	0	2	0.0%
Total	12	51	23.5%

The proportion of scapulae affected by *os acromiale* was 18.8% (15/80; Table 38). The highest prevalence of *os acromiale* occurred in the young adults (26.1%), while the young middle adults and old middle adults had identical prevalence rates of 16.7%. Since the tip of the acromion fuses to the scapula in the late teens, it is possible that the scapula of some of the young adults had not completed development. However, all those observed showed the rough, porous surface associated with *os acromiale* with no evidence that fusion had begun, rather than the billowed surface expected with an unfused epiphysis. The left scapula was more frequently affected than the right (23.7% compared to 14.3%; Table 38), and while the left scapula showed a decrease in prevalence with age, the highest prevalence of *os acromiale* in the right scapula was seen in the old middle adults.

Table 38 Prevalence of *os acromiale* (scapulae)

Age	Right Scapulae			Left Scapulae			Total Scapulae		
	Os Ac	P	%	Os Ac	P	%	Os Ac	P	%
YA	2	11	18.2%	4	12	33.3%	6	23	26.1%
YMA	2	19	10.5%	4	17	23.5%	6	36	16.7%
OMA	2	10	20.0%	1	8	12.5%	3	18	16.7%
A	0	2	0.0%	0	1	0.0%	0	3	0.0%
Total	6	42	14.3%	9	38	23.7%	15	80	18.8%

Os acromiale was observed much more frequently among the individuals from 6 Driffield Terrace (Figure 16), where the proportion of individuals affected was 46.2% (6/13) and the proportion of scapulae affected was 38.9% (7/18). This compares to 15.8% of individuals (6/38) and 12.9% of scapulae (8/62) affected at 3 Driffield Terrace. It is possible that preservation may have influenced the prevalence rates at the two sites. The preservation of scapulae was worse at 6 Driffield Terrace: eighteen scapulae comprise just 39.1% of the 46 scapulae that would be expected from 23 individuals. In contrast, 59.6% (62/104) of the expected scapulae were present at 3 Driffield Terrace.

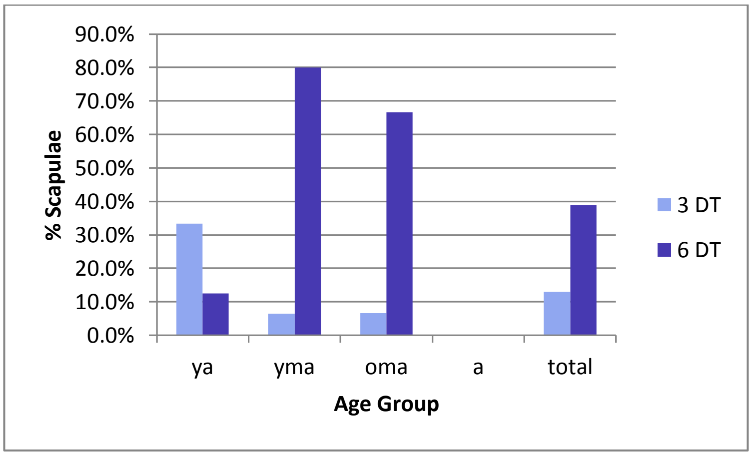


Figure 16 Prevalence of *os acromiale* (scapulae): 3DT and 6DT

The prevalence of *os acromiale* at Driffield Terrace (18.8%) was much higher than the modern prevalence of 3-6% reported by Roberts and Manchester (2005, 152), and the 3.3% prevalence reported for Roman Britain (Roberts and Cox 2003, 158). It was also higher than that observed at Horncastle, where 8.3% of scapulae and 7.1% of individuals were affected (Caffell and Holst 2008, 26; Figure 17).

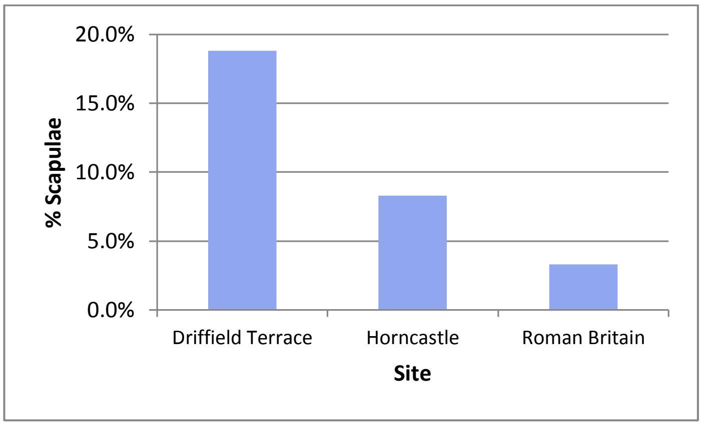


Figure 17 Comparative sites: *os acromiale* (scapulae affected)

3.1.7 Primary Scapular Neck Dysplasia

Skeleton 3DT37 (young middle adult male) had changes to his right scapula that were consistent with primary dysplasia of the scapular neck (the area medial to the joint with the humerus on the shoulder blade), or birth injury to the brachial plexus (Mays 2009). The former results from an abnormality of growth, whereas the latter results from the head and shoulder being forced apart during birth, thus damaging the complex of nerves that pass from the neck to the upper arm (brachial plexus; *ibid*). In Skeleton 3DT37, the glenoid fossa of the scapula (joint surface for the head of the humerus) was retroverted (tilted backwards), and there was a shallow horizontal groove through the centre of the joint surface. The inferior part of the scapular neck (immediately beneath the glenoid fossa) was underdeveloped, and osteophytes indicative of degenerative joint disease were located along the posterior margin (particularly pronounced on the inferior half). Mays (2009) described identical changes in two skeletons from Blackfriars Friary, Ipswich, and concluded that scapular neck dysplasia was the more likely cause of the lesions observed.

Individuals with primary scapular neck dysplasia do not usually experience symptoms during childhood, but may develop pain and limited range of movement in adolescence or early adulthood (Mays 2009, 648-649). Damage to the glenoid labrum (which surrounds the joint surface) is common along the posterior margin, and the osteophytes along the posterior glenoid fossa may indicate such damage occurred to the shoulder of Skeleton 3DT37. Mays (2009) found that primary scapular neck dysplasia has rarely been reported in past populations. At Driffield Terrace 0.9% of adult glenoid fossae (1/109) and 1.8% of right adult glenoid fossae (1/55) were affected.

3.1.8 *Calcaneus Secundarius*

The calcaneus (heel bone) can have a small ossicle of bone, known as the *calcaneus secundarius*, located in a crescent-shaped notch in the anterior calcaneal facet (Hodge 1999). In most individuals these ossicles do not cause any symptoms, but they can occasionally cause pain or a restriction in movement at the joint between the talus and calcaneus (Ceroni *et al.* 2006). In archaeological remains the actual ossicle is usually not recovered, but a small crescent with a rough porous surface will be missing from the anterior surface of the anterior facet (Mann and Hunt 2005, 206-207). *Calcaneus secundarius* can be difficult to differentiate from avulsion fractures to the anterior calcaneus (Hodge 1999).

Four individuals from Driffield Terrace had *calcaneus secundarius*. The right calcaneus was affected in Skeleton 3DT42 (young middle adult female) and Skeleton 6DT2 (old middle adult male), and the left calcaneus in two young middle adult males (Skeletons 6DT14 and 6DT20). The prevalence was similar for both right (4.3%, 2/47) and left (4.7%, 2/43) adult calcanei, with an overall prevalence of 4.4% (4/90). This is comparable with the frequency observed in modern populations, cited as up to 5% by Hodge (1999), and between 0.6-3.4% by Ceroni *et al.* (2006). Mann and Hunt (2005, 207) note that most populations probably have frequencies of between 1.4% and 6.0%.

3.1.9 Non-Osseous Tarsal Coalition

Distinctive defects in the articular surfaces between the third metatarsal and the lateral cuneiform (foot arch) have been attributed to failure of the bones to separate correctly during early development. In life the two bones would have been joined by a bridge of fibrous or cartilaginous material, and so the lesions can be described as non-osseous tarsal coalitions (Regan *et al.* 1999). The lesions manifest as hollows with porous floors on the plantar third of the joint surface.

Two individuals at Driffield Terrace had non-osseous tarsal coalitions. These included Skeleton 3DT8 (young middle adult male), whose right side was affected, and Skeleton 6DT2 (old middle adult male), whose left side was affected. The overall frequency among the lateral cuneiforms was 2.7% (2/74, adult and adolescent combined), with 2.9% of right (1/35) and 2.6% of left (1/39) lateral cuneiforms affected. Among the proximal third metatarsals, 2.2% (2/90, adult and adolescent combined) were affected; the prevalence was the same on left and right sides (2.2%, 1/45 each). Frequencies up to 26% have been reported in the literature for various archaeological and modern populations (Regan *et al.* 1999).

3.1.10 Fused Foot Phalanges (Biphalangia)

The intermediate and distal fifth foot phalanges (toe bones) of four individuals were fused, probably due to a failure of the two bones to separate correctly during development (Scheuer and Black 2000b, 437). This occurs with such frequency that Scheuer and Black (2000b, 437) consider it to be normal variation: they report prevalence rates of 36-43% in European populations, and note that the fifth (little) toe is more frequently affected than any other. The right foot was affected in Skeletons 3DT34 (young adult male), 3DT35 (old middle adult male), and 3DT47 (young middle adult male), whilst the left foot was affected in Skeleton 3DT38 (old middle adult male).

3.1.11 Cortical Defects

Occasionally small depressions or folds occur in the joint surfaces, often with rounded edges and usually with no other signs of joint degeneration (such as osteophyte formation or other porosity). Roberts and Manchester (2005, 121) stress the importance of not confusing these with osteochondritis dissecans (where a fragment of the joint surface becomes detached leaving behind a usually circular and porous depression). These joint lesions are probably developmental. Suspected cortical defects were observed in the joint surfaces of sixteen individuals, affecting many different joints, however, prevalence rate calculation of these lesions has not been undertaken.

3.1.12 Other Developmental Anomalies

Skull

Several individuals displayed asymmetry of various parts of the skeleton which may have been developmental in origin. Skeleton 3DT21 (old middle adult male) had asymmetry of the cranium, mandible and maxilla, and several post-cranial bones. His cranium was low and broad, with a posterior bulge in the left side of the occipital bone at the back of the head, and asymmetry of features such as the mastoid process (protrusion of bone behind the ear) and eye orbit margins. The right half of the upper dental arch was concave on the buccal (cheek) side, rather than convex, and the right half of the lower dental arch was straighter than normal with crowding and rotation of the anterior teeth. In the post-cranial skeleton, his right humerus was longer and the head (joint with the shoulder) was larger than his left humerus, but the distal end of his left humerus was larger than his right and the muscle attachments were more pronounced. The right half of the pelvis was slightly different in shape compared to the left half, and his left tibia was longer than his right tibia. Other developmental anomalies were also observed. Further research is required to determine whether some of this asymmetry may be related to activity, or whether it is entirely due to a developmental anomaly.

Two other individuals, Skeletons 3DT31 (young middle adult male) and 6DT15 (young adult male), also had asymmetric crania with a bulge in the left side of the occipital bone. Skeleton 3DT31 (young middle adult male) also had a large ossicle (52 x 28mm in size), occupying the left lambdoid suture that was probably associated. A third individual (Skeleton 6DT24, young adult male) had a bulge on the inferior right part of his occipital bone. None of the individuals had definite evidence for premature fusion of a cranial suture, or failure of a suture to develop, both of which may lead to variations in cranial shape (Barnes 1994, 152-157). The presence of ossicles in the lambdoid suture has been associated with cranial deformation, both through premature suture fusion and deliberate cultural practice (Sanchez-Lara *et al.* 2007). Overall, the prevalence of asymmetry in the occipital bone occurred in 7.4% (4/54) of adult occipital bones, with 5.6% bulging in a posterior direction (3/54).

The mandible of Skeleton 6DT9 (adult male?) was noticeably asymmetric. The left side was generally smaller than the right (both the ramus and body were shorter on the left side, with the left ramus being 10mm shorter than the right) and the left condyle was rotated by 45º. This rotation of the condyle was mirrored in the shape and position of the glenoid fossa of the left temporal bone, which forms the other half of the joint between the mandible and the base of the cranium. This individual might have suffered slight hypoplasia (underdevelopment) of the mandible on the left side (Barnes 1994, 161). Overall, 1.8% (1/57) of the adult mandibles were affected in this way.

A bridge of bone between the anterior and middle clinoid processes of the sphenoid bone in the skull (forming the clinocarotid canal) occurred in two individuals, Skeleton 3DT2 (old middle adult male) and 3DT32 (young adult male). In Skeleton 3DT32 an additional bridge was present between the middle and posterior clinoid processes, and in Skeleton 3DT2 a partial bridge was present in this location. Anterior bridging is more common than posterior bridging, and Scheuer and Black (2000b, 86) report that bridging of the clinoid processes may be inherited.

Skeleton 3DT38 (old middle adult male) had agenesis (absence) or hypoplasia (underdevelopment) of his nasal bones, with associated asymmetry of his nasal aperture. Unfortunately, it was difficult to observe the morphology of this area as the bones were covered in clear nail varnish and had been marked over the top of the defining features. Absence or underdevelopment of the nasal bones results from a delay in development and is relatively common (Barnes 1994, 193). This pathological condition had an impact on the estimation of ancestry for this individual, since the nasal area often shows distinctive morphology associated with particular ancestral groups. The absence of the nasal bones led the nasal bridge to assume an appearance more typical of ‘black’ or ‘Asian’ individuals, but other features of the nasal area were more consistent with a ‘white’ ancestry.

Hand

The hamate is one of the eight small carpal bones found in the wrist, and it usually has a prominent ‘hook’ on the palmar surface. Two young adult males had absent or underdeveloped hooks of hamate. In Skeleton 6DT24 the hooks of both hamates were underdeveloped, while in Skeleton 3DT43 the hook was absent on the right hamate (the left hamate was too damaged to observe). The overall prevalence for absent or underdeveloped hook of hamate at Driffield Terrace was 3.9% (3/77 adult hamates), with right hamates more frequently affected (4.8%, 2/42) compared to left hamates (2.9%, 1/35). In a modern population, absence or underdevelopment of the hook of hamate was found to correlate with the development of carpal tunnel syndrome (Chow *et al.* 2005).

The styloid process of the right third metacarpal (palm bone) had fused to the capitate (a wrist bone) in Skeleton 3DT13 (adolescent), but it is not clear whether it had separated from the third metacarpal due to a fracture during life, or whether it had never fused to the metacarpal in the first place. In Old World monkeys the group of cells that form the styloid process in humans actually fuse to the capitate instead, and occasional fusion of the styloid process to the capitate has been reported in humans (Marzke and Marzke 1987). At Driffield Terrace, the proportion of capitate bones affected was 1.3% (1/77, adult and adolescent combined); and the proportion of third metacarpals affected was 0.9% (1/109, adult and adolescent combined).

Foot

Skeletons 3DT8 (young middle adult male) and 6DT3 (young adult male) were missing the tuberosities of the right navicular bone (located on the inside of the arch of the foot). The tuberosity of the navicular can develop as a separate ossicle that does not fuse in around 5-10% of the population, known as *os tibiale externum* (Scheuer and Black 2000b, 460-462). Alternatively, these individuals may have experienced avulsion fractures of the navicular. At Driffield Terrace, the condition had affected 2.4% of adult navicular bones (2/82), or 5.0% of right navicular bones (2/40).

In Skeleton 3DT18 (adolescent) the cuboid bones (arch of the foot) were partially articulating with the head of the talus (ankle bone), which is abnormal. In these instances, part of the cuboid bones contributed to the joint surface of the systentaculum tali of the calcaneus. This unusual articulation occurred in 2.5% of cuboid bones (2/81, adolescent and adult combined), and 2.1% of calcanei (2/96, adult and adolescent combined). A similar proportion of left and right bones were affected: 2.4% (1/41) of right cuboids and 2.5% (1/40) of left cuboids; and 2.0% of right calcanei (1/50) and 2.2% of left calcanei (1/46) were affected.

The medial cuneiforms (arch of foot) of Skeleton 6DT7 (old middle adult male) had a horizontal groove dividing the superior and inferior halves. This reflects the frequent ossification of the bone from two separate centres that later fuse together into a single bone (Scheuer and Black 2000b, 451). The frequency of occurrence at Driffield Terrace was 2.5% (2/80) of adult medial cuneiforms were affected.

Skeleton 3DT6 (young middle adult male) had a foot sesamoid bone (small additional foot bone) with a cleft, suggesting it had probably developed from two separate ossification centres. Foot sesamoid bones sit in the tendons that run beneath the head of the first metatarsal and help prevent damage to the soft tissues underneath the big toe caused by weight-bearing. At Driffield Terrace the prevalence of cleft sesamoid bones was 5.0% (1/20).

3.2 METABOLIC CONDITIONS

3.2.1 *Cribra Orbitalia*

Cribra orbitalia is a term used to describe fine pitting in the orbital roof which develops during childhood and often recedes during adolescence or early adulthood. Until recently, iron deficiency anaemia was the accepted cause of these lesions (Stuart-Macadam 1992), but a strong case has been made by Walker *et al.* (2009) for different types of anaemia as the causative factor. These include megaloblastic anaemia in the New World, suggesting a diet deficient in Vitamin B_{12} (i.e. plant-based and lacking in animal products) and/or folic acid. Such dietary deficiency could have been exacerbated through poor sanitation leading to infection and infestation with gut parasites (*ibid*). In malarious areas of the Old World, haemolytic anaemia (e.g. sickle cell anaemia and thalassemia) may be important in the development of *cribra orbitalia* (*ibid*). However, for areas such as northern Europe they have proposed that *cribra orbitalia* may be more likely related to conditions such as scurvy (Vitamin C deficiency) or chronic infections (*ibid*). *Cribra orbitalia* is often used as an indicator of general stress (Lewis 2000, Roberts and Manchester 2005) and is often found associated with agricultural economies (Roberts and Cox 2003).

Cribra orbitalia was observed in the orbits of seventeen adults (29.3% of the 58 adults with at least one orbit preserved), and two adolescents (50.0% of the non-adults with orbits preserved). Nearly a quarter of all adult orbits were affected (23.4%), with the condition being more frequent in non-adult orbits (42.9%; Table 39). In both adults and non-adults, the right orbit was more frequently affected, possibly due to a tendency for the left orbits to be less-well preserved. *Cribra orbitalia* was observed in both orbits of nine adults and one adolescent, and just in one of the orbits of four adults. In the remaining four adults and one adolescent, one orbit was too damaged or incomplete to observe, so it was impossible to determine whether the condition was bilateral or not.

Table 39 Prevalence of *cribra orbitalia*

Age/Sex	**Right Orbit**			**Left Orbit**			**Total Orbits**			**Individuals**		
	CO	**T**	**%**	**CO**	**T**	**%**	**CO**	**T**	**%**	**CO**	**T**	**%**
Juveniles	0	1	0.0%	0	1	0.0%	0	2	0.0%	0	1	0.0%
Adolescents	2	3	66.7%	1	2	50.0%	3	5	60.0%	2	3	66.7%
Non-Adults	2	4	50.0%	1	3	33.3%	3	7	42.9%	2	4	50.0%
Males	15	56	26.8%	11	53	20.8%	26	109	23.9%	17	57	29.8%
Females	0	1	0.0%	0	1	0.0%	0	2	0.0%	0	1	0.0%
Adults	15	57	26.3%	11	54	20.4%	26	111	23.4%	17	58	29.3%

Total	17	61	27.9%	12	57	21.1%	29	118	24.6%	19	62	30.6%

CO = Affected with cribra orbitalia; T = number of orbits/individuals with orbits present

Cribra orbitalia was slightly more frequent among the males from 6 Driffield Terrace, with 33.3% (6/18) individuals and 31.4% (11/35) orbits affected, compared to 28.2% of males (11/39) and 20.3% of orbits (15/74) at 3 Driffield Terrace.

The prevalence of *cribra orbitalia* at Driffield Terrace was higher than average for the Roman period, both in terms of the number of orbits affected and the number of individuals. Roberts and Cox (2003, 141) reported the former to be 16.9% and the latter to be 9.6%. However, their true prevalence rate (proportion of orbits affected) was based only on two sites. The Driffield Terrace prevalence was higher than that seen at Mill Mount 04 (Holst 2005, 10), where 21.4% of orbits and 15.4% of individuals were affected, but considerably lower than that seen at Horncastle (Caffell and Holst 2008, 18-19), where 46.7% of individuals and 44.4% or orbits were affected.

3.3 TRAUMA

Obviously, the evidence for trauma in archaeological populations is restricted to that visible in the skeletal remains, unless soft tissue is preserved (Roberts and Manchester 2005, 85-86). Therefore, most of the soft-tissue injuries sustained by archaeological populations will be invisible, although occasionally soft tissue injuries can be inferred though ossification of the tissues at the site of damage, known as *myositis ossificans* (*ibid*). Much of the evidence for trauma in archaeological populations focuses on fractures to the bones (Roberts and Manchester 2005, 84-85), although long standing well-healed fractures may be hard to detect (Jurmain 1999, 186).

Ante-mortem injuries occurred during life and show evidence for healing, whereas peri-mortem injuries occurred around the time of death and consequently no evidence for healing will be seen. Peri-mortem injuries did not necessarily occur at the instant of death. It takes time for evidence of healing to be visible in the bone following an injury, and also for bone to lose the physical characteristics it had in life following death. Therefore ‘peri-mortem’ really refers to a three-week window either side of death (Roberts and Manchester 2005, 114). It is impossible to determine from the macroscopic appearance of the bone whether an injury occurred a week before the person died, or minutes before they died; or whether the injury was caused the day or a week after they had died. Distinguishing between peri-mortem trauma and post-mortem damage can be difficult. Generally, post-mortem breaks will have a paler surface than the surrounding bone and broken edges will usually be perpendicular to the bone (Roberts and Manchester 2005, 114-116; Lovell 1997, 145; Sauer 1998). Recent post-mortem breaks are usually easily distinguished, but breaks that occurred while the skeleton was in the burial environment and long before the skeleton was excavated may be much harder to identify as such.

In the following sections prevalence rates are calculated for adults and adolescents combined.

3.3.1 Ante-Mortem Cranial Trauma

Thirteen adults and one adolescent had healed fractures or possible healed fractures to the skull (23.3% of 60 individuals with at least some part of the cranium preserved). Three of these individuals had also experienced dental fractures, and an additional sixteen individuals had dental fractures with no other cranial trauma. The dental fractures are discussed in Section 4.7. The proportion of individuals with cranial trauma was similar at 3 Driffield Terrace (23.8%, 10/42) and 6 Driffield Terrace (22.2%, 4/18).

The frontal bones, which make up the forehead, were most frequently affected by ante-mortem fractures, with 13.6% of 59 frontal bones displaying trauma (Table 40). These were followed by the parietal bones (6.0%), which make up the sides of the cranium, and occipital bones (3.5%), which form the back and part of the base of the cranium. Facial bones were least frequently fractured, with 2.3% of nasal bones (bridge of the nose) and 1.0% of maxillae affected. It is clear that the left side of the vault more frequently suffered trauma than the right side. Trauma was observed in 10.7% of left halves of the frontal bone and 8.6% of left parietal bones, compared to 1.8% of right halves of the frontal bone 3.4% of left parietal bones (Table 40 and Figure 18). The left half of the occipital bone was also more frequently affected by trauma than the right half (3.5% compared to 0.0%). In contrast, the facial fractures were less clearly patterned. The nasal bones were fractured with similar frequency on both sides (perhaps reflecting the fact that they lie adjacent to each other so it may be difficult to fracture one without involving the other) and the right maxilla was more frequently fractured than the left.

Table 40 Prevalence of ante-mortem cranial fractures

Bone	Right			Left			Total		
	Fracture	Total	%	Fracture	Total	%	Fracture	Total	%
Frontal	1	56	1.8%	6	56	10.7%	8*	59**	13.6%
Parietal	2	59	3.4%	5	58	8.6%	7	117	6.0%
Occipital	0	57	0.0%	2	57	3.5%	1	57**	3.5%
Nasal	1	44	2.3%	1	42	2.4%	2	86	2.3%
Maxilla	1	53	1.9%	0	52	0.0%	1	105	1.0%

* one frontal bone had a fracture in the midline, which could not be counted as left or right side

** the frontal and occipital are midline bones, so the total number of bones is given here, with the number of right and left halves provided in the previous columns

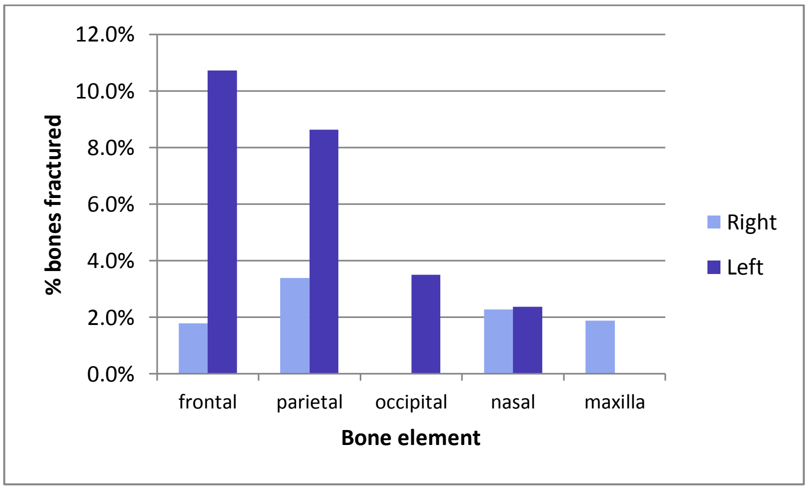


Figure 18 Prevalence of ante-mortem cranial trauma by side (bones affected)

Unfortunately, average prevalence rates for cranial trauma in Roman Britain cannot be determined, but injuries to the cranium certainly occurred in Roman skeletal reports examined by Roberts and Cox (2003, 151-153). These included injuries to the frontal bone (12), parietal bones (11), a single injury to the occipital bone and eleven injuries to the face. These figures are uninformative, since frequencies cannot be determined. A similar lesion to the majority of those observed in the crania at Driffield Terrace (see below) was observed in a child from Mill Mount 05 (Holst 2006, 8), but again no prevalence rate is provided. The Trentholme Drive population displayed ‘no clear instances of fractures to the skull’ (Warwick 1968, 151), and no healed cranial injuries were observed at Horncastle (Caffell and Holst 2008). At Ephesus, 16% of the minimum number of individuals had experienced healed cranial trauma (Kanz and Grossschmidt 2006), the prevalence of which is lower than the 23.3% of individuals affected at Driffield Terrace. They state that the majority of the lesions (69%) were located on the frontal bone, with 19% of the lesions located on the right parietal and 12% on the left parietal (*ibid*, 212), but since they fail to provide true prevalence rates (i.e. the proportion of each bone type affected) this data cannot be compared directly with that from Driffield Terrace.

Injuries to the skull are often interpreted as indicative of inter-personal violence (Roberts and Manchester 2005, 108), although it should be borne in mind that accidents can also lead to cranial trauma (for example falling and banging the head, or objects falling onto the head from a high point; Walker 1989, 318). Nevertheless, the fact that often most cranial injuries are found on the left side of the head (particularly the frontal and parietal bones) has led to the inference that hand-to-hand combat with a right handed opponent was the cause (Roberts and Manchester 2005, 108-109). Walker (1989) makes such an interpretation for the high prevalence of cranial trauma observed in archaeological populations from southern California, where 19.3% of the crania displayed an injury, the majority of which occurred on the frontal and parietal bones, with a small percentage on the occipital; over half of the injuries occurred on the left side of the skull.

A list of the Driffield Terrace individuals and a short description of the cranial trauma is given in Table 41. The majority of the cranial injuries took the form of small shallow depressions in the external surface of the cranium (frontal, parietal and occipital bones), probably indicative of healed depressed fractures as a result of blunt-force trauma, although the possibility they were caused by cranial cysts should also be considered, particularly since none of these lesions had affected the internal surface of the cranial vault (Ortner 2003, 121). These lesions were observed in twelve individuals, four of whom had two depressed fractures each. The smallest lesion was around 4mm in diameter, and the largest were 20mm long. The majority were either oval (43.8%, 7/16) or circular (37.5%, 6/16) in shape; the remaining three were linear, crescent-shaped and semi-circular. The lesions appear to be very similar in character to those reported by Walker (1989), which he attributed to ritualised aggression where the intent was not to kill the opponent.

Table 41 Individuals with skull fractures

Skeleton Number	Age	Sex	Bone	Description
3DT3	Old middle adult	Male	Occipital	Shallow depression (11 x 9mm), external surface, left occipital squama adjacent to lambdoid suture c. a third of the way from asterion
3DT6	Young middle adult	Male	Nasal bones	Healed fracture, diagonal line extending from inferior lateral corner of left nasal bone towards lateral border of right nasal bone c. a third of the way from the superior corner, minimal displacement on the right side
3DT17	Young adult	Male	Left parietal	Shallow indistinct depression (13 x 8.7 mm), external surface, c. 30mm posterior to coronal suture and half way between sagittal and squamous borders
3DT19	Adolescent	(Male?)	Left	Shallow circular depression (8mm diameter), external surface, 13mm

			parietal	lateral to midpoint of sagittal suture
3DT23	Young middle adult	Male	Right parietal	Shallow oval depression (14 x 9.5mm), external surface, just superior to parietal boss
3DT28	Young middle adult	Male	Frontal	Shallow oval depression (16 x 9mm), external surface, in the midline c. 10mm anterior to coronal suture
			Left parietal	Shallow indistinct oval depression (16 x 8mm), external surface, area of parietal boss
3DT31	Young middle adult	Male	Frontal	Shallow indistinct depression (15 x 6mm), slightly crescent shaped, external surface, left frontal squama c. 25mm superior to frontal boss & c. 10mm to left of midline Second circular shallow depression at lateral end of first depression (9mm diameter) Both depressions surrounded by pale lamellar bone
3DT37	Young middle adult	Male	Frontal	Shallow indistinct oval depression (13 x 6mm), external surface, frontal squama just to left of midline, superior and medial to left frontal boss Second even shallower circular depression (4mm diameter) just lateral to the first
3DT43	Young adult	Male	Right maxilla	Possible healed fracture of frontal process/ nasal border, superior half of nasal margin angled medially
3DT45	Young middle adult	Male	Frontal	Shallow circular depression (7mm diameter), external surface, left frontal squama just superior to frontal boss
6DT4	Old middle adult	Male	Right parietal	Shallow oval depression (17 x 9mm), external surface, antero-medial corner of squama
6DT6	Young middle adult	Male	Left parietal	Shallow circular depression (4.2mm diameter), external surface, central squama just superior to temporal line
6DT15	Young adult	Male	Left parietal	Shallow roughly circular depression (7mm diameter) surrounded by slightly raised area of bone, external surface, adjacent to lambdoid suture c. a third of the way along from lambda
6DT17	Old middle adult	Male?	Frontal	Shallow indistinct linear depression (19 x 6.6mm), external surface, running parallel to coronal suture just to right of midline Shallow semi-circular depression (c.20mm long), external surface, immediately anterior to left coronal suture c. 25mm lateral to bregma
6DT22	Young middle adult	Male	Occipital	Possible healed penetrating injury; irregular slightly 'L' shaped lytic lesion in left squama, just superior to the lateral end of the nuchal crest, margins rounded, floor flat and even, small hole penetrating through to internal surface; internal surface bevelled, surface covered in 'capillary impressions', lamellar bone on internal surface

One potential penetrating injury was observed in the left half of the occipital bone of Skeleton 6DT22 (young middle adult male), although the penetration may have resulted from a blunt-force injury. This individual had an irregular 'L' shaped lesion, part of which penetrated to the internal surface of the skull, where lamellar bone suggested healed inflammation.

Two individuals had fractures in the nasal region. This area is frequently injured as a result of direct trauma to the face (Galloway 1999a, 73) and Jurmain (1999, 192) has indicated that facial injuries in particular may be related to aggression. Skeleton 3DT6 (young middle adult male) had fractured both nasal bones (the bridge of his nose) and there was a slight displacement of the inferior part of the bone on the right side. Skeleton 3DT43 had possibly fractured his right maxilla along the border of the nasal aperture. Galloway (1999a, 75) reports that nasal bone fractures commonly result from 'punches, kicks and automobile accidents'.

At Ephesus, 44% of the healed cranial trauma was attributed to blunt force injuries (Kanz and Grossschmidt 2006). Two individuals at Ephesus had lesions similar to the majority of ante-mortem cranial trauma noted at Driffield Terrace (small shallow circular or oval depressions). The authors question whether these injuries were sustained during gladiator training or combat, and suggest that they may have occurred before the individuals began with gladiatorial training (Kanz and Grossschmidt 2006, 212). They noted five blunt force injuries to the superior orbit margins, which they suggest were caused by the helmets worn; no such lesions were observed at Driffield Terrace. Kanz and Grossschmidt also recorded nine healed sharp force and puncture wounds (*ibid*). Only one potential penetrating injury had occurred at Driffield Terrace, and no healed sharp force injuries to the cranium were observed. This implies that although the crude prevalence of healed ante-mortem cranial trauma was higher in Driffield Terrace than at Ephesus, the type of traumatic lesions observed at each site was different.

3.3.2 Ante-Mortem Fractures to the Vertebrae and Ribs

Eighteen males had fractures or possible fractures to their vertebrae and/or ribs, listed in Table 42. Overall, nine individuals had fractured ribs (13.4% of 67 individuals with at least one rib present), seven of whom had fractured one rib and two of whom had fractured three ribs each. A higher proportion of individuals from 3 Driffield Terrace had fractured ribs (16.7%, 8/48) compared to 6 Driffield Terrace (5.3%, 1/19). The prevalence of fractured ribs as a proportion of ribs present was 0.9% (12/1333) and there was no difference in frequency by side (0.9% right ribs, 6/667; 0.9% left ribs, 6/666); these prevalence rates do not include the single fracture in an unsided rib shaft fragment. These prevalence rates at Driffield Terrace are higher than those reported for Horncastle, where 5.6% of the individuals had fractured ribs, and 0.4% of the ribs had been fractured.

Table 42 Individuals with torso fractures (spine and ribs)

Skeleton Number	Age	Sex	Bone	Description
3DT2	Old middle adult	Male	T1	Clay shoveler's fracture to tip of spinous process
3DT6	Young middle adult	Male	Right rib (5th?)	Healed fracture close to sternal end, distal end slightly displaced inferiorly and laterally
3DT12	Young middle adult	Male	T11	Probable crush fracture, body wedge-shaped, compressed at anterior right
			L4	Traumatic anterior disc herniation
			Left rib (6th?)	Healed fracture halfway between tubercle and angle, minimal displacement
3DT16	Old middle adult	Male	T4	Healed fracture to spinous process, located halfway along the spinous process, distal end displaced inferiorly
3DT21	Old middle adult	Male?	L4	Traumatic anterior disc herniation
			Right rib (10th)	Healed fracture to the head, small flake of bone on the anterior (internal) border of the joint surface displaced anteriorly
3DT26	Old middle adult	Male?	Right rib (10th)	Fracture through shaft c. half- to a third- of the way from the sternal end, distal shaft displaced inferiorly
			L2	Healed fracture of left transverse process, tip displaced posteriorly
			L3	Healed fracture of right transverse process, tip displaced posteriorly and inferiorly

3DT27	Adult	Male	Rib (unsided)	Healed fracture of shaft fragment
3DT33	Young middle adult	Male	Left rib (12th)	Healed fracture close to sternal end
3DT38	Old middle adult	Male	Left rib (7th?)	Healed fracture at junction between mid and sternal thirds of shaft
3DT45	Young middle adult	Male	T4	Healed fracture to left transverse process
			T5	Healed fracture to left transverse process
			T6	Healed fracture to left transverse process
			L3	Healed fracture to left transverse process
3DT54	Young middle adult	Male	L3	Possible fracture left transverse process
3DT55	Young middle adult	Male	T4	Healed fracture to tip spinous process, tip displaced and angled to left
			Right rib (7th?)	Healed fracture in shaft c. 30mm distal to angle
			Right rib (8th)	Healed fracture in shaft c. 50mm distal to angle
			Left rib (7th?)	Healed fracture in shaft just distal to tubercle
6DT2	Old middle adult	Male	Left rib (9th?)	Healed fracture between tubercle and angle, slight inferior displacement of distal shaft
			Left rib (11th)	Probable healed fracture just proximal to angle
			Right rib (11th)	Healed fracture c. 30mm distal to angle
6DT8	Old middle adult	Male	L2	Traumatic anterior disc herniation
6DT14	Young middle adult	Male	L4	Traumatic anterior disc herniation
			L2	Possible fracture of inferior left apophyseal facet
6DT15	Young adult	Male	T8	Fracture of tip of spinous process, horizontal groove through tip and distal part of tip angled to left
6DT18	Young adult	Male	T1	Clay shoveler's fracture of spinous process
6DT19	Young middle adult	Male	L5	Possible fracture through superior right apophyseal facet

Rib fractures can occur as a result of a direct blow or though a fall (Roberts and Manchester 2005, 105; Galloway 1999b, 107). Although coughing can also cause rib fractures (Roberts and Manchester 2005, 105), the latter is more common in elderly individuals (Dandy and Edwards 2003, 161). Isolated rib fractures usually heal well without active treatment (*ibid*). Most of the fractured ribs were central to lower ribs, and the majority of fractures had occurred towards the posterior part of the rib. In comparison, Galloway (1999b, 107) observed that most rib fractures occur in the sixth to eighth ribs, and the left side is often more frequently affected. She notes that the eleventh and twelfth ribs do not usually break as a result of compression, presumably because the sternal end is unattached, rather than being attached to the sternum via cartilage.

One individual (Skeleton 3DT12) had suffered a probable crush fracture to the body of his eleventh thoracic vertebra. Crush fractures had affected 0.1% (1/1191) of all vertebral bodies (C3-L5), and 1.7% of eleventh thoracic vertebral bodies (1/58). Crush fractures in young individuals are usually caused through landing on the feet after a fall from a height; in elderly individuals a fall onto the bottom can lead to a crush fracture (Dandy and Edwards 2003, 154). Other causes include a weight falling onto a hunched over person, or a person being struck from behind by a moving object (Galloway 1999b, 96). The lower thoracic and upper lumbar vertebrae are particularly vulnerable to crush fractures due to the change in vertebral shape and altered function (Galloway 1999b, 95).

Four individuals had a lytic lesion (destruction of bone through a disease process) to the anterior body margin of one of the lumbar vertebrae. Three lesions occurred in the superior margin of the vertebra, and one in the inferior margin. These were identical in appearance to those described by Mays (2007), which he suggested were caused by traumatic anterior disc herniation. He does caution that other conditions, such as brucellosis may lead to lesions of a similar appearance, and that not all lesions of this type will be due to trauma. However, the lesions observed at Driffield Terrace shared characteristics with those described by Mays (*ibid*). They were restricted to the lumbar spine, and occurred predominantly in the upper anterior margin of the vertebral body. The lesions in all four individuals were consistent in their appearance, a fact which is used by Mays (*ibid*) to argue against an infectious cause. Anterior disc herniation is caused by mechanical overload of the vertebral discs, causing the discs to be displaced into the anterior margin of the vertebral body. The vertebral bodies are more vulnerable to anterior disc herniation before they complete development in early adulthood and this has been observed to occur more frequently in athletes (*ibid*).

Anterior disc herniation occurred in four lumbar vertebrae, affecting 0.3% of all vertebral bodies (4/1,191) and 1.3% of lumbar bodies (4/297). The fourth lumbar vertebra was most frequently affected (5.1%, 3/59), followed by the second lumbar vertebra (1.7%, 1/58). Although Mays (2007) suggested there may be a link between anterior disc herniation and additional vertebral segments, and between anterior disc herniation and *spondylolysis*, none of the Driffield Terrace individuals with anterior disc herniation had either condition.

Fractures to the spinous processes of the thoracic vertebrae occurred in five individuals. The spinous processes project behind the vertebrae, and are the protruding parts of the spine that can be felt in the back. Spinous process fractures were most common in the fourth thoracic vertebra (3.8%, 2/53 neural arches), closely followed by the first thoracic vertebra (3.5%, 2/57 neural arches); 1.9% of the eighth thoracic vertebrae were also affected (1/54 neural arches).

In two individuals the tip of the spinous process of the first thoracic vertebra was missing, indicating the fracture had failed to unite. These are known as clay shoveler's fractures, where the action of muscles on the spine during shovelling (specifically throwing the shovel contents upwards) leads to an avulsion fracture of the tip of the spinous process (McKellar 1940; Cancelmo 1972). In short, the tip of the spinous process is pulled away from the rest of the bone through the force exerted by the muscles attached there. Clay shoveler's fractures can affect any vertebrae between the sixth cervical to third thoracic, but are most common around the level of the seventh cervical vertebra (McKellar 1940). A modern patient with a conservatively treated, ununited clay shoveler's fracture experienced pain and tenderness in the neck and shoulder region, with burning, shooting pains in the arms and base of the skull, and as a result was unable to work (McKellar 1940, 71). A crude prevalence of 1.3% was reported for Roman British populations (Roberts and Cox 2003, 158), which is lower than the 3.5% frequency at Driffield Terrace.

Two individuals had a fracture to the spinous process of the fourth thoracic vertebra (one halfway along the spinous process and the other at the tip). This is cannot be considered a clay shoveler's fracture as it is one level below the third thoracic vertebra, which is the lowest vertebra where such fractures have been identified (McKellar 1940; Cancelmo 1972). One individual had a fracture to the tip of the spinous process of the eighth thoracic vertebra. Galloway (1999b, 102) indicates that fractures to the thoracic spinous processes may result from hyperextension (extreme backwards bending of the spine), but Denis (1983, 827) suggests that isolated fractures to the spinous processes may result from direct trauma.

Fractures to the transverse processes of vertebrae were seen in three individuals. The third lumbar vertebra was most frequently affected (5.6%, 3/54 neural arches), but 1.8-1.9% of the fourth, fifth and sixth thoracic vertebrae and second lumbar vertebrae were also fractured (Table 43). All but one of the fractures occurred on the left side. All three individuals had fractured the transverse process of their third lumbar vertebra, but Skeleton 26 (old middle adult male?) had also fractured his second lumbar vertebra, while Skeleton 3DT45 (young middle adult male) had also fractured his fourth, fifth and sixth thoracic vertebrae. Denis (1983, 819) noted that transverse process fractures accounted for 13.6% of spinal fractures, and that they occurred most frequently in the lumbar spine, particularly in the fourth lumbar vertebra, followed by the third lumbar vertebra. Most transverse process fractures were caused by direct blunt force trauma to the lower back, but some were caused by violent flexion to the side (Denis 1983, 818). Possible causes suggested by Galloway (1999b, 102) include direct blows, muscle contraction, falls and motor vehicle accidents.

Table 43 Prevalence of transverse process fractures

Bone	Fracture	Total	%
L3	3	54	5.6%
T4	1	53	1.9%
T5	1	52	1.9%
T6	1	53	1.9%
L2	1	55	1.8%

Finally, two individuals had possible fractures to one apophyseal facet (joint between vertebrae) of a lumbar vertebra. Isolated simple facet fractures are not common (Galloway 1999b, 102).

3.3.3 *Spondylolysis* and *Spondylolisthesis*

Spondylolysis refers to the separation of the neural arch of a vertebra from the body just beneath the superior articular facets at the *pars interarticularis*. Debate has focussed on whether the condition is congenital, develops as a result of trauma, or requires a combination of trauma and an underlying developmental weakness (Ortner 2003). It is possible that repeated stress placed on the lower back, for example through bending and lifting, or movements associated with activities such as dancing, gymnastics, weight lifting, kayaking, wrestling, long jumping and playing football may lead to the development of *spondylolysis* (Roberts and Manchester 2005, 106; Galloway 1999b, 101). Dandy and Edwards (2003, 433) also indicate that *spondylolysis* may be more common in young, active individuals, particularly athletes. The affected individual may suffer from slight discomfort in their lower back (Roberts and Manchester 2005, 107).

Bilateral *spondylolysis* was seen in three individuals. In Skeleton 3DT4 (young adult male), the fourth lumbar vertebra was affected (the fifth lumbar vertebra was present and was unaffected), while in Skeletons 3DT7 (young middle adult male) and 3DT26 (old middle adult male?) the fifth lumbar vertebra was affected. *Spondylolysis* usually occurs most frequently in the fifth lumbar vertebra (Roberts and Manchester 2005, 106), which was the case at Driffield Terrace where 3.4% of fifth lumbar vertebrae were affected (2/58 arches), compared to 1.8% of fourth lumbar vertebrae (1/55 arches). The overall prevalence of fourth and fifth lumbar vertebrae with *spondylolysis* was 2.7%. In comparison, the average crude prevalence of spondylolysis in the Roman period in Britain was 0.04%, but the crude prevalence rates at individual sites ranged from 0.2% to 8.3% (Roberts and Cox 2003, 151-152). At Horncastle, 9.1% of fifth lumbar vertebrae had *spondylolysis* (Caffell and Holst 2008, 25). Dandy and Edwards (2003, 433) note that 5-6% of the normal population will have *spondylolysis*. The prevalence at Driffield Terrace can therefore be considered to be fairly low, or within the realms of normal.

A vertebra with *spondylolysis* is vulnerable to slipping anteriorly, since the detached arch can no longer help to prevent the body from moving forward in relation to the body of the vertebra beneath. This forward slipping, or dislocation, of the vertebra is known as *spondylolisthesis* (Roberts and Manchester 2005, 107; Dandy and Edwards 2003, 432-434). *Spondylolisthesis* is rarely observed in the archaeological record (Roberts and Manchester 2005, 107).

Skeleton 3DT26 (old middle adult male?) was one of the two individuals with *spondylolysis* of his fifth lumbar vertebra, described above. The neural arch was in two pieces, possibly due to developmental failure of the arch to fuse in the midline, as all the sacral vertebrae also had cleft arches (see Section 3.1.3). It is possible that this had contributed to the instability of the joint following *spondylolysis*. The posterior half of the body of the first sacral vertebra exhibited osteophytes (extra bone formation due to degenerative joint disease) and this was no longer in contact with the body of the fifth lumbar vertebra. There was also a large osteophyte at the anterior margin of the body of the first sacral vertebra, which acted to enlarge the joint surface and support the anterior part of the body of the fifth lumbar vertebra above it. It appeared as if the left half of the neural arch of the fifth lumbar vertebra had also moved forwards. Evidence for degenerative joint disease and osteoarthritis were probably secondary complications of the abnormal position of the two vertebrae in relation to one another.

Spondylolisthesis affected 1.8% of the relatively complete fifth lumbar vertebrae (1/57), and 1.9% of relatively complete first sacral vertebrae (1/53).

3.3.4 Ante-Mortem Limb Fractures

Twenty individuals had healed fractures or possible fractures to their limb bones. The prevalence of limb bone fractures is provided in Table 44 and Figure 19. The bone most frequently fractured was the first metacarpal, the bone at the base of the thumb (5.3%, 5/94). This was followed by avulsion fractures of the third metacarpal (in the palm of the hand), fractures of the fibula (on the outer side of the lower leg), ulna (bone on inner side of the forearm) and clavicle (collar bone). Some differences were observed in the prevalence of fractures by side, most notably in the first metacarpal where 10.2% of right bones but no left bones were fractured (Table 44).

Table 44 Prevalence of limb bone fractures

Bone	Right			Left			Total		
	Fracture	**Total**	**%**	**Fracture**	**Total**	**%**	**Fracture**	**Total**	**%**
MC1	5	49	10.2%	0	45	0.0%	5	94	5.3%

MC3	2	55	3.6%	1	54	1.9%	3	109	2.8%
Fibula	1	52	1.9%	2	57	3.5%	3	109	2.8%
Ulna	3	59	5.1%	0	54	0.0%	3	113	2.7%
Clavicle	2	58	3.4%	1	61	1.6%	3	119	2.5%
Tibia	1	58	1.7%	1	58	1.7%	2	116	1.7%
Dist Foot Phalanx	1	35	2.9%	0	24	0.0%	1	59	1.7%
Hamate	1	43	2.3%	0	37	0.0%	1	80	1.3%
Scaphoid	0	45	0.0%	1	37	2.7%	1	82	1.2%
MT5	1	47	2.1%	0	45	0.0%	1	92	1.1%
Radius	0	55	0.0%	1	54	1.9%	1	109	0.9%
Femur	0	57	0.0%	1	60	1.7%	1	117	0.9%
Scapula	1	59	1.7%	0	61	0.0%	1	120	0.8%
Prox Foot Phalanx	1	169	0.6%	1	109	0.9%	2	278	0.7%
Dist Hand Phalanx	-	-	-	-	-	-	1	207	0.5%

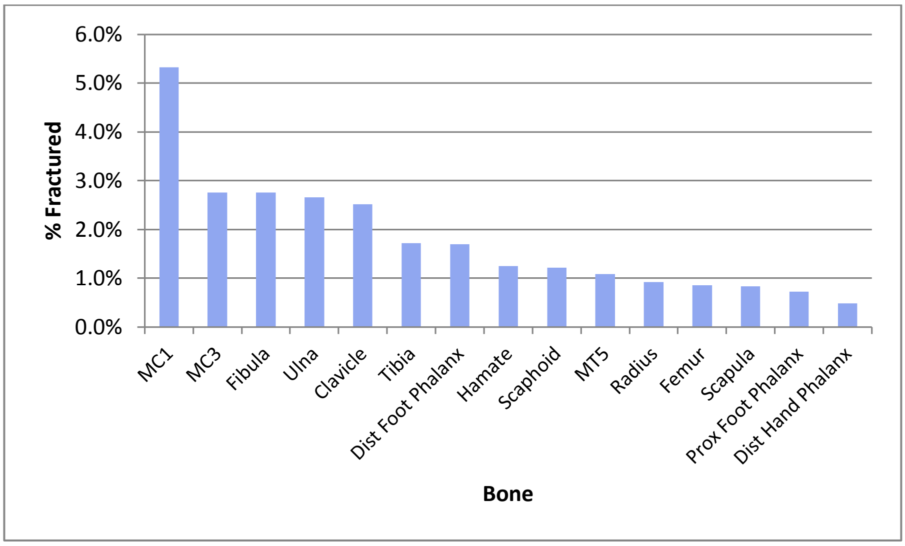


Figure 19 Prevalence of limb bone fractures

There is limited information on the prevalence of fractures in Roman populations in Britain (Roberts and Cox 2003, 151-158), although in one population fibulae were most frequently fractured (4.7%), followed by ulnae (2.9%) and tibiae (2.4%; *ibid* 151). These bones were among those more frequently fractured at Driffield Terrace. At Horncastle, 10.3% of fibulae were fractured, followed by 6.5% of tibiae, and 6.1% of scapulae; the prevalence of other bones fractured included 3.1% of ulnae and 2.8% of distal hand phalanges (Caffell and Holst 2008, 21). These prevalence rates are higher than those observed at Driffield Terrace, but the sample was small. Fractured bones evidently occurred among the individuals from Trentholme Drive, but no figures or prevalence rates are given with which to compare Driffield Terrace (Warwick 1968, 151-152). Unfortunately, data on the post-cranial injuries suffered by the Ephesus population is not available for comparison (Kanz and Grossschmidt 2006).

A list of the individuals with fractured limb bones is provided in Table 45. One individual (Skeleton 3DT2) had suffered a fracture to the right scapula blade (shoulder blade), just beneath the scapular spine, that was still healing at the time the person died. Fragile woven bone deposits flanked the broken edges, being thickest along the margins of the break where woven bone on one side of the break interlocked with woven bone from the opposite side, but the fragments had not yet achieved union. It is likely that this injury had been sustained a few weeks prior to death, but rates of fracture healing can vary with the bone fractured, stability of the fracture, age and nutritional status of the individual (Ortner 2003, 128). Fractures to the scapula are not commonly observed in archaeological populations because the blade is so fragile it often fails to survive in the ground (Roberts and Manchester 2005, 104). Nonetheless, scapula fractures were observed in two males from Horncastle, one of which (to the base of the spine) was in the process of healing at the time the person died (Caffell and Holst 2008, 23) and a healed fracture was observed in a disarticulated scapula blade from Mill Mount 05 (Holst 2006, 13). Fractures to the scapula blade are usually caused by a direct blow to the blade (Dandy and Edwards 2003, 186) and may be indicative of interpersonal violence (Roberts and Manchester 2005, 104).

Table 45 Individuals with limb fractures

Skeleton Number	**Age**	**Sex**	**Bone**	**Side**	**Description**
3DT2	Old middle adult	Male	Scapula	Right	Healing horizontal fracture of blade just inferior to the medial scapular spine
			Ulna	Right	Small fracture to anterior of olecranon process/ superior margin proximal joint
3DT4	Young adult	Male	MC1	Right	Fracture of proximal end
3DT6	Young middle adult	Male	MT5	Right	Avulsion fracture of styloid process
3DT11	Adult	Unsexed	MC1	Right	Fracture of proximal end
3DT12	Young middle adult	Male	Tibia	Left	Avulsion fracture of medial malleolus, probably also trauma to left talus
3DT13	Adolescent	(Male?)	MC3	Right	Possible avulsion fracture of styloid process (or associated with developmental fusion of styloid process to capitate
			MC3	Left	Possible avulsion fracture of styloid process (or associated with developmental fusion of styloid process to capitate
			MC1	Right	Fracture of proximal end
3DT16	Old middle adult	Male	Radius	Left	Comminuted fracture to distal joint surface, slight posterior and proximal displacement of styloid process; associated osteoarthritis
3DT22	Old middle adult	Male	Clavicle	Right	Possible healed fracture to sternal end (or soft tissue trauma?)
3DT26	Old middle adult	Male?	Scaphoid	Left	Ununited diagonal fracture
3DT30	Young middle adult	Male	MC1	Right	Fracture of proximal end
3DT33	Young middle adult	Male	Clavicle	Right	Fracture c. 20mm lateral to sternal end; sternal end angled inferiorly and displaced slightly anteriorly
3DT37	Young middle adult	Male	Fibula	Left	Fracture at junction between proximal and mid thirds of shaft; associated soft tissue trauma to left tibia
3DT40	Young adult	Male	Ulna	Right	Possible greenstick fracture of distal third?
			Proximal foot phalanx	Right	Diagonal fracture through proximal joint
3DT42	Young middle adult	Female	Femur	Left	Possible greenstick fracture of proximal third? Shaft twisted along its length, linea aspera pronounced (similar to pilasterism) and located on the medial margin of posterior midshaft; proximal third of shaft angled posteriorly and rotated medially, femoral head retroverted

3DT50	Adult	Unsexed	First proximal foot phalanx	Left	Crack through medial part of distal joint surface, running from dorsal to plantar, medial part displaced proximally
3DT57	Adult	Male?	Clavicle	Left	Possible fracture of sternal end
			MC1	Right	Possible fracture to proximal end
6DT3	Young adult	Male	MC3	Right	Avulsion fracture of styloid process
6DT7	Old middle adult	Male	Fibula	Right	Fracture to distal third, just superior to the distal joint surface
6DT8	Old middle adult	Male	Distal hand phalanx	Right?	Fracture to proximal joint surface
			First distal foot phalanx	Right	Fracture through dorsal half of proximal joint surface
6DT21	Old middle adult	Male	Ulna	Right	Possible avulsion fracture of medial coronoid process
			Hamate	Right	Possible avulsion fracture of the hook
			Fibula	Left	Fracture at junction of proximal and mid thirds of the shaft
			Tibia	Right	Fracture through the distal joint surface, antero-lateral segment displaced proximally

Clavicle fractures were among the most common limb fractures at Driffield Terrace. One individual (Skeleton 3DT33) had fractured his right clavicle (collar bone) close to the sternal end, and another two individuals had possibly fractured their clavicles in a similar region (one right and one left). In Skeleton 3DT33, the fractured clavicle was associated with a partial dislocation of the acromion-clavicular joint between the clavicle and the acromion process of the scapula. Most clavicle fractures are caused by falling onto an outstretched hand or onto the shoulder (Dandy and Edwards 2003, 181). Injuries to the sternal end are associated with motor vehicle accidents or sporting activities (Galloway 1999c, 115).

Fractures to the ulna were also observed and were prevalent at Driffield Terrace. These included two small fractures to the proximal end of the ulna in the vicinity of the elbow joint: an avulsion fracture of the coronoid process in the right ulna of Skeleton 6DT21 and a fracture to the anterior margin of the olecranon process in the right ulna of Skeleton 3DT2. Avulsion of the coronoid process typically occurs when the elbow is hyper-extended, placing stress on the anterior ligaments of the elbow joint (Galloway 1999c, 143). Most fractures to the olecranon process (the point of the elbow) are the result of falls while the arm is flexed (bent at the elbow), or through direct blows to the point of the elbow (Galloway 1999c, 141). However, the fracture seen in this individual affected the margin of the joint surface and this may have had a different aetiology. Skeleton 3DT40 (young adult male) had possibly sustained a greenstick fracture to the distal ulna. Greenstick fractures, where the bone does not break completely, occur in childhood, and since they usually heal well and in good alignment there is normally little evidence a fracture was ever sustained (Ortner 2003, 122).

Skeleton 3DT16 had fractured his wrist, with a comminuted fracture to the distal joint surface of his left radius. It appeared that the styloid process of the radius had been displaced slightly posteriorly and proximally and showed evidence for osteoarthritis, probably as a secondary complication. Various fractures involving the distal joint of the radius can occur, such as Barton's fracture (following falls onto the hand), die-punch fractures (falls onto the outstretched hand), and Chauffeur's fractures (following an impact such as a blow to the heel of the hand; Galloway 1999c, 139).

Skeleton 3DT26 had also fractured his left wrist: he had an unhealed diagonal break though his scaphoid bone, through the articular facet for the capitate. Only one part of the scaphoid was recovered. The proximal part may have been lost post-mortem, or it may have died due to disruption of the blood supply following the trauma (Salter 1999; Dandy and Edwards 2003, 220). Scaphoid fractures usually occur following a fall onto the outstretched hand (Salter 1999), but can occur following a blow to the palm of the hand (Galloway 1999c, 147). Problems with healing frequently occur in modern patients, meaning the fracture often fails to unite (Dandy and Edwards 2003, 220). Non-union is most common in young males, and in people who did not receive suitable treatment (Morgan and Walters 1984). Since these fractures are difficult to treat successfully in modern patients, non-union must have been frequent in the past. Scaphoid bones are the carpal bone most likely to sustain a fracture (Galloway 1999c, 147).

Skeleton 6DT21 had probably sustained fracture to the hook of his right hamate (one of the small carpal bones of the wrist). Hook fractures are common sport-related injuries, caused by direct violence placing pressure on the anterior wrist, or following a fall onto the wrist (Galloway 1999c, 151).

Five individuals had fractured their right first metacarpal (thumb part of the palm) at the proximal end of the bone and these were the most common ante-mortem limb fractures observed at Driffield Terrace. In all five individuals the proximal part of the bone had been displaced in a palmar direction, leading to a pronounced curvature of the shaft (most noticeable on the palmar side), angling of the proximal joint surface towards the palmar side, and shortening of the bone. The appearance was similar to a Bennett's fracture, but the latter involve the joint (Galloway 1999c, 154-155) and this did not seem to be the case in the Driffield Terrace individuals. Radiographs of the affected bones may help to clarify the type of fracture sustained. Bennett's fractures are usually caused through punching a firm surface with a closed fist (Galloway 1999c, 155) and may be sustained during fights or sporting activities (Dandy and Edwards 2003, 222; Cannon *et al.* 1986). Needless to say, they are most frequently seen in males (*ibid*). Galloway (1999c, 155) notes that Bennett's fractures frequently occur in the dominant hand, which is interesting considering the high prevalence among right first metacarpals at Driffield Terrace. Fractures to the proximal shaft of the first metacarpal are often caused by direct blows or impaction (Galloway 1999c, 154).

Three individuals had avulsion fractures (or potential avulsion fractures) of the styloid process at the base of the third metacarpal (bone in the centre of the palm of the hand) and these were the second most common limb fractures at Driffield Terrace. In one of these individuals (Skeleton 3DT13) the probable avulsion fractures were bilateral, and at least on one side may have been associated with developmental fusion of the styloid process to the capitate (wrist bone).

Skeleton 6DT8 had a fracture through the proximal joint surface of a distal hand phalanx (one of the bones from the tips of the fingers). Twisting or angular velocities are common causes for phalanx fractures (Dandy and Edwards 2003).

Fractures to the lower limb were also seen at Driffield Terrace. Skeleton 3DT42 (young middle adult female) had a possible greenstick fracture to the proximal third of her left femur (thigh). The proximal end was angled posteriorly (backwards) and rotated medially, the femoral shaft was twisted along its length, and the linea aspera was raised on a thick ridge of bone which was located at the medial side of the posterior surface (it is normally central to the posterior surface). Complete fractures to the femur shaft usually heal with overlapping ends due to the strength of the thigh muscles, resulting in marked shortening of the bone. This was not observed in Skeleton 3DT42, suggesting that this was not a full fracture. A partial (greenstick) fracture is a possible cause, as is soft tissue trauma. A radiograph of both femora might help to elucidate the cause of the unusual shape of this left femur.

Fibula fractures were among the most common limb fractures at Driffield Terrace. Two individuals (Skeletons 3DT37 and 6DT21) had fractures to the left fibula at the junction between the proximal and mid thirds of the fibula shaft. In Skeleton 3DT37, the fracture to the fibula was accompanied by evidence for soft tissue damage in the tibia shaft. Fractures to the fibula shaft can be caused by a direct blow to the side of the leg, or through rotation injuries at the ankle (Galloway 1999d, 203; Dandy and Edwards 2003, 255-256). A very similar fracture was seen in an old middle adult probable female individual at Horncastle (Caffell and Holst 2008, 21). A third individual (Skeleton 6DT7) from Driffield Terrace had fractured the right fibula just above the ankle joint. It is likely that this injury was sustained through twisting the ankle (Dandy and Edwards 2003, 261-263).

Two individuals had fractures to the distal tibia in the region of the ankle. In Skeleton 3DT12 the medial malleolus of the left tibia had been avulsed, or pulled away from the rest of the bone, whereas Skeleton 6DT21 had a fracture through the distal joint surface of the right tibia. Most injuries to the distal tibia occur when the foot is in contact with the ground, and the body rotates while the foot is held in place (Galloway 1999d, 198), essentially leading to a twisted ankle. Avulsion of the medial malleolus usually occurs with eversion of the foot, when sole of the foot is turned outwards (Dandy and Edwards 2003, 261-262). Fractures to the anterior margin of the joint may occur when the foot is flexed upwards (Galloway 1999d, 198), with more severe fractures resulting when the foot is caught on a protruding object during a fall and forced upwards (Dandy and Edwards 2003, 265). In Skeleton 3DT12 the talus may also have been damaged as a result of the injury.

Skeleton 3DT6 had an avulsion fracture to the proximal end of the fifth metatarsal (arch of the foot on the lateral side of the foot), where the styloid process at the base was pulled away from the rest of the bone. Galloway (1999d, 221) indicates that this type of fracture occurs when the foot is acutely inverted (sole of the foot turned inwards) usually in combination with plantar-flexion (pointing the foot downwards).

Two proximal foot phalanges (one from the big toe) and one distal foot phalanx (also from the big toe) had fractures through the joint surfaces. The distal joint was involved in the proximal first foot phalanx, and the proximal joint was involved in the remaining two bones. Fractures of the foot phalanges are not uncommon, as these are likely to be fractured when objects are dropped on them (Dandy and Edwards 2003).

3.3.5 Ante-Mortem Blade Injury

One healed blade injury was observed on the right femur of Skeleton 3DT33 (young middle adult male), located on the medial-posterior surface at the junction of the mid and distal thirds of the shaft (on the inside-back of the lower part of the right thigh). The wound faced laterally, was 23mm long, and had been delivered from the posterior right. The edges were smooth and rounded, indicating the injury had healed. Overall, 0.9% of all femora (1/117) and 1.8% of right femora (1/57) had a healed blade injury.

3.3.6 Peri-mortem Blade Injuries (Sharp Force Trauma)

Peri-mortem cuts were most frequently observed on the vertebrae of the upper part of the spine. In total, 81 vertebrae had sustained one or more peri-mortem cut. All these vertebrae were cervical vertebrae or the first thoracic vertebra, so the prevalence of peri-mortem cuts of the first cervical vertebra to the first thoracic vertebra was 18.5% (81/437). The majority of the cuts were located between the fourth and the sixth cervical vertebra, with a slight drop in frequency at the level of the fifth cervical vertebra (Table 46 and Figure 20). The distribution of cuts was similar between 3 Driffield Terrace and 6 Driffield Terrace (Figure 21).

Table 46 Prevalence of peri-mortem cuts to the spine

Bone	Number of Cuts	Total Vertebrae	% of Vertebrae Affected
C1	4	60	6.7%
C2	10	59	16.9%
C3	13	55	23.9%
C4	17	50	34.0%
C5	13	51	25.5%
C6	15	50	30.0%
C7	7	54	13.0%
T1	2	58	3.4%

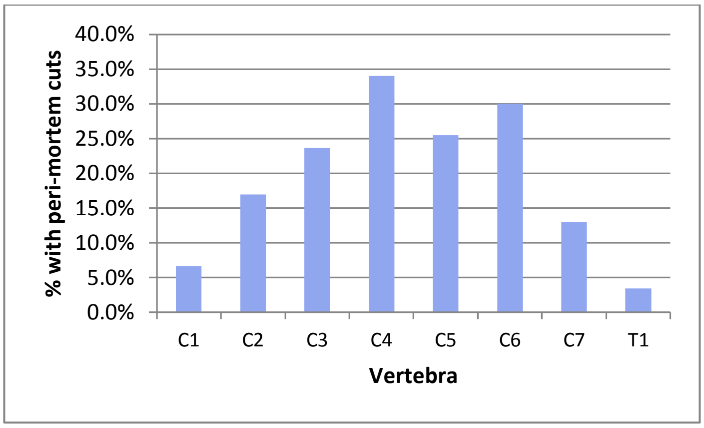


Figure 20 Prevalence of peri-mortem cuts to the spine

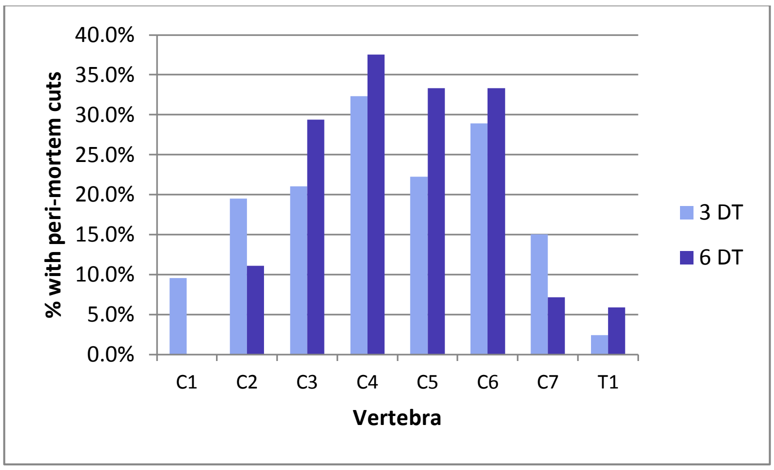


Figure 21 Prevalence of peri-mortem cuts to the spine: 3DT and 6DT

Cuts to the spine sometimes occurred in conjunction with cuts to the mandible, temporal bones (part of the skull around the ear), scapulae, clavicles and first ribs. Cuts to these bones always occurred in conjunction with cuts to the spine (in Skeleton 3DT7 the location of the cut to the clavicle meant that the blow must have passed through the seventh cervical or first thoracic vertebra). The mandible was most frequently involved (15.0%; Table 47), with a much smaller percentage (1-2%) of the other bones sustaining cuts in association with cuts to the spine.

Table 47 Prevalence of peri-mortem cuts to the extra-spinal skeleton

Bone	Right			Left			Total		
	Cut	Total	%	Cut	Total	%	Cut	Total	%
Mandible	5	59	8.5%	7	60	11.7%	9	60*	15.0%
MC5	2	53	3.8%	1	51	2.0%	3	104	2.9%
MC4	2	55	3.6%	0	53	0.0%	2	108	1.9%
Temporal	1	58	1.7%	1	57	1.8%	2	115	1.7%
Clavicle	1	58	1.7%	1	61	1.6%	2	119	1.7%
Scapula	1	40	2.5%	0	41	0.0%	1	81	1.2%
Femur	1	57	1.8%	0	60	0.0%	1	117	0.9%
Prox hand phalanx	0	255	0.0%	2	222	0.9%	1	482**	0.2%

* the mandible is a midline bone, so the total number of bones is given here, with the number of right and left halves provided in the previous columns
** the total includes unsided hand phalanges

It is apparent that the majority of cuts were directed towards the neck, occasionally incorporating the head and upper torso (shoulders/ upper rib cage). The latter cuts seem to be a ‘by-product’ of the cuts to the neck in most instances. There were very few cuts elsewhere in the skeleton, with the exception of cuts in a small percentage of hand bones, including the fifth and fourth metacarpals (bones at the edge of the palm) and proximal phalanges (belonging to the fourth and fifth digits) and one peri-mortem cut in a femur (0.9%). These cuts will be discussed in more detail below.

Four individuals had possible cuts to the spine, but post-mortem damage to the area made it difficult to identify these with confidence. Skeletons 3DT8 and 6DT10 had possible cuts to the fifth cervical vertebra, Skeleton 6DT7 had a possible cut to the third cervical vertebra and Skeleton 6DT24 had a possible cut to the seventh cervical vertebra. Contextual evidence indicated in three of these individuals that they had been decapitated. The skulls of Skeletons 3DT8 and 6DT7 were placed between their knees, whereas the skull of Skeleton 6DT10 was not in the ordinary position, but since the grave was truncated the actual location of the skull was unknown. Because only some of the cervical and first thoracic vertebrae were present in these three decapitated individuals, it is possible that the actual cuts were located on the missing vertebrae. Only Skeleton 6DT24 had a complete upper spine, but no evidence for a cut was observed in the first thoracic vertebra which should have been affected by the possible cut to the seventh cervical vertebra. When examining the prevalence of peri-mortem cuts to the vertebrae, it was decided to exclude these four possible decapitations, since the presence of the cuts was not certain.

Forty individuals (all adult males) had one or more peri-mortem cut to their upper eight vertebrae, including the seven vertebrae of the neck (C1-7) and first thoracic vertebra (T1). Descriptions of these lesions are provided in the catalogue (Appendix A). Calculating the proportion of individuals with peri-mortem cuts to the spine is complicated by the fact that many skeletons do not have all eight upper vertebrae surviving, and of course it is impossible to know whether any cuts occurred on the missing vertebrae. Therefore, two approaches to calculating the proportion of individuals affected have been taken. Firstly, all individuals with cuts to the spine were considered as a proportion of all individuals with any of the upper eight vertebrae surviving. This provided a prevalence of 59.7% (40/67 individuals, including adolescents) or 62.5% of adults (40/64; Table 48). Secondly, only individuals with all upper eight vertebrae present were considered (37 in total), which excluded some of the individuals with cuts to the spine if their spine was incomplete. The prevalence of cuts among individuals with all eight upper vertebrae present was 67.6% (including adolescents) or 73.5% (adults only; Table 49).

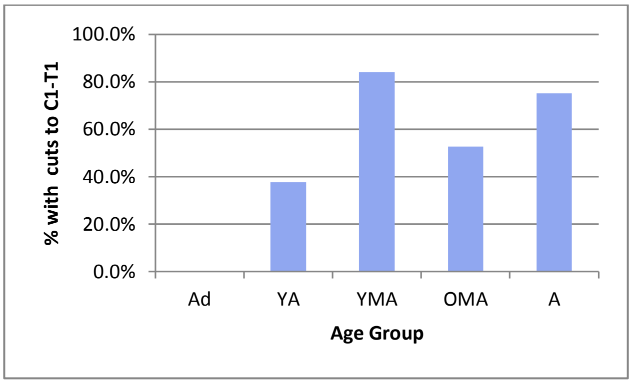
Table 48 Individuals with peri-mortem cuts to C1-T1 (all individuals with any part of C1-T1 surviving)

Age	Male			Female			Unsexed			Total		
	Cut	Total	%	Cut	Total	%	Cut	Total	%	Cut	Total	%
Ad	-	0	-	-	0	-	-	3	-	0	3	0.0%
YA	6	15	40.0%	-	0	-	0	1	0.0%	6	16	37.5%
YMA	21	24	87.5%	0	1	0.0%	-	0	-	21	25	84.0%
OMA	10	19	52.6%	-	0	-	-	0	-	10	19	52.6%
A	3	4	75.0%	-	0	-	-	0	-	3	4	75.0%
Adults	40	62	64.5%	0	1	0.0%	0	1	0.0%	40	64	62.5%
Total	40	65	61.5%	0	1	0.0%	0	4	0.0%	40	67	59.7%

Table 49 Individuals with peri-mortem cuts to C1-T1 (only individuals with all eight vertebrae, C1-T1)

Age	Male			Female			Unsexed			Total		
	Cut	Total	%	Cut	Total	%	Cut	Total	%	Cut	Total	%
Ad	-	0	-	-	0	-	0	3	0.0%	0	3	0.0%
YA	3	9	33.3%	-	0	-	-	0	-	3	9	33.3%
YMA	12	12	100.0%	0	1	0.0%	-	0	-	12	13	92.3%
OMA	8	9	88.9%	-	0	-	-	0	-	8	9	88.9%
A	2	3	66.7%	-	0	-	-	0	-	2	3	66.7%
Adults	25	33	75.8%	0	1	0.0%	-	0	-	25	34	73.5%
Total	25	33	75.8%	0	1	0.0%	-	3	-	25	37	67.6%

As can be noted from Table 48 and Table 49, Figure 22 and Figure 23, the frequency of cuts to the spine was highest among the young middle adults, followed by the old middle adults. Indeed, all the young middle adult males with all eight upper vertebrae present had cuts to the neck. Peri-mortem cuts to the necks of young adults were far less frequent. This pattern holds true for both methods of calculating prevalence.



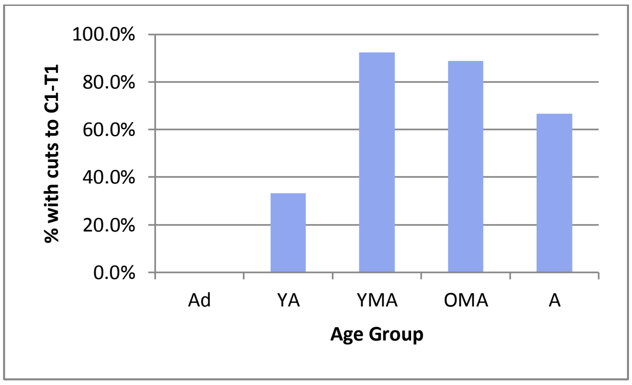


Figure 22 Individuals with peri-mortem cuts to C1-T1 (all individuals with any part of C1-T1 surviving)

Figure 23 Individuals with peri-mortem cuts to C1-T1 (only individuals with all eight vertebrae, C1-T1)

Peri-mortem cuts to the neck were seen in individuals from both 3 Driffield Terrace and 6 Driffield Terrace. A (slightly) higher percentage of individuals from 3 Driffield Terrace had cuts to the neck: 60.0% of all individuals (64.3% of all adults) or 69.0% of individuals with all upper eight vertebrae present (76.9% of adults). In comparison, 59.1% of all adults, or 62.5% of adults with all eight upper vertebrae present, had peri-mortem cuts at 6 Driffield Terrace (there were no adolescents at 6 Driffield Terrace). The preservation of vertebrae was generally worse at 6 Driffield Terrace, so evidence for cuts is more likely to have been lost post-mortem.

The majority of the 40 individuals with peri-mortem cuts to the spine had cuts to either one (37.5%) or two (40.0%) vertebrae; 12.5% had cuts to three vertebrae, 7.5% had cuts to four vertebrae, and one individual (2.5%) had cuts to seven vertebrae (Table 50 and Figure 22).

Table 50 Number of cut vertebrae per individual

No. of cut vertebrae	No. of Individuals	%
1	15	37.5%
2	16	40.0%
3	5	12.5%
4	3	7.5%
5	0	0.0%
6	0	0.0%
7	1	2.5%
Total	40	

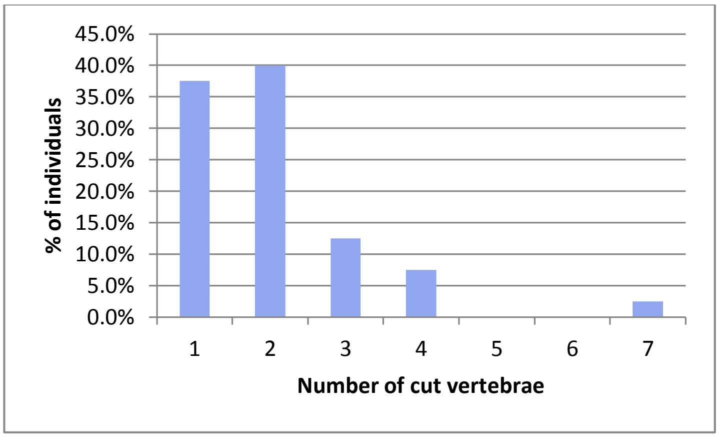


Figure 24 Number of cut vertebrae per individual

Two vertebrae with peri-mortem cuts were found in the disarticulated human bone assemblage. One of these was an adult cervical vertebra found in a grave-like feature (Context 4351) at 3 Driffield Terrace. The second adult cervical vertebra with a cut was found in Context 1048, the fill of a large pit at 6 Driffield Terrace that had truncated Skeletons 6DT10, 6DT11 and 6DT13. Considering the fact that disarticulated bones from this context probably derived from the three skeletons the pit had truncated, it is probable that the cut vertebra belonged to one of the skeletons.

Nine (22.5%) of the 40 individuals with cuts to the spine had cuts to the mandible, and two of these nine individuals also had cuts to the mastoid process of the temporal bones (the protruding bone behind the ear). Two individuals had cuts to the clavicle: one of these (Skeleton 6DT5) is among the 40 skeletons with spinal cuts, but the second individual (Skeleton 3DT7) did not have an upper spine. However, it can be inferred from the location of one of the cuts to the clavicle that the seventh cervical or first thoracic vertebra of this individual must have been affected. Skeleton 3DT7 also had a cut to the scapula. Finally, Skeleton 3DT30 had a cut to the right first rib associated with a cut to the seventh cervical and first thoracic vertebrae.

Of course a single cut can enter more than one bone, so many of the individuals with cuts to more than one bone had actually sustained just a single cut. For example, a single cut at a c. 45º angle had passed from back to front through the second, third and fourth cervical vertebrae of Skeleton 3DT17, and a single blow to the upper neck of Skeleton 3DT33 had cut the left temporal bone (mastoid process), left side of the mandible (posterior ramus), and the first and second cervical vertebrae. It was sometimes difficult to be certain whether cuts on different bones could be caused by the same blow, and this was particularly the case where individuals had sustained multiple cuts. These included Skeleton 3DT23, who had between five or six cuts to the neck and mandible, Skeleton 3DT33, who had a between nine or ten cuts to the neck, mandible and temporal bone; and Skeleton 3DT47, who had a between seventeen or eighteen cuts to the neck and mandible. In the latter individual, some of the cuts may have been sustained once the vertebrae were no longer in normal articulation.

The number of cuts to the neck (and associated bones) sustained by a single individual ranged from one to at least seventeen. However, by far the majority of individuals (63.4%, 26/41) had a single cut to the neck, with 19.5% having two cuts (2/8; Table 51 and Figure 25). Only a small percentage had three or four cuts. Those individuals with five or more cuts include the three individuals described above and Skeleton 3DT12, who had a minimum of nine cuts to the neck and mandible.

Table 51 Number of cuts to the neck and associated bones per individual

No. of cuts	No. of Individuals	%
1	26	63.4%
2	8	19.5%
3	2	4.9%
4	1	2.4%
5+	4	9.8%
Total	41	

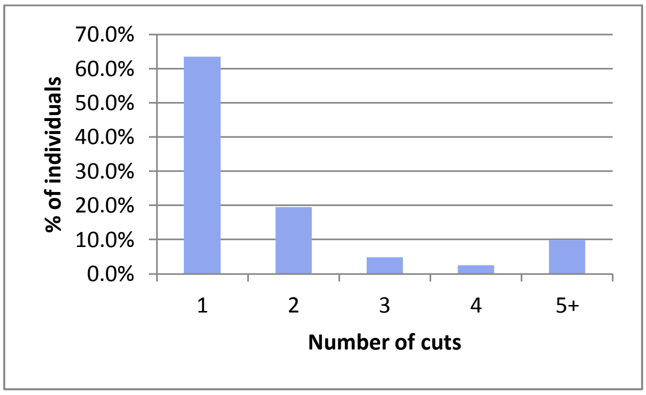


Figure 25 Number of cuts to the neck and associated bones per individual

Actual decapitations had occurred in 39 of the 41 individuals with cuts to the spine and associated bones (including seven who had possibly been decapitated). As a proportion of individuals (including adolescents) with any part of the upper spine preserved, 58.2% had been decapitated and 60.9% of the adults had been decapitated. These figures are based solely on the osteological evidence for decapitation and ignore contextual evidence for decapitation. These prevalence rates are high compared with the 5.5% crude prevalence observed by Roberts and Cox (2003, 158), based on nine Roman cemeteries. The prevalence ranged from 0.3% to 19.7% and Roberts and Cox (*ibid*) report a total of 58 individuals with decapitations at the time of their publication.

Twenty-five of these individuals had been decapitated with a single cut (74.4%). Although the remaining individuals had more than one cut to the spine, there was usually one clear cut that had resulted in the actual decapitation. There were two exceptions, Skeletons 6DT23, and 3DT53. Two cuts to the neck of Skeleton 6DT23 could feasibly have caused complete decapitation (one at the second cervical vertebra and one at the fifth cervical vertebra). However, since the cut at the level of the second cervical vertebra had terminated in the mandible, it is possible that this cut had not succeeded in detaching the head completely, so the cut to the fifth cervical vertebra is more likely to be the full decapitation cut. In Skeleton 3DT53, the full decapitation cut could have occurred at the level of the fourth cervical vertebra or the sixth or seventh cervical vertebrae.

In many of the individuals with multiple cuts to the neck some of the cuts were parallel to each other and on a very similar alignment, suggesting the person delivering the blows had not moved much in relation to the position of the victim (or conversely that the victim had not moved much in between delivery of the blows). Where direction could be determined, the majority of the cuts seemed to have been delivered from behind. However, some cuts to the neck were delivered from the front and sides. In some individuals cuts had been delivered from several directions, for example Skeleton 3DT47, where some cuts had been delivered from the front, some from behind, and some from the right. Two individuals (Skeletons 3DT41 and 3DT47) had cuts that had been directed vertically down the back of the spine (in addition to more horizontal cuts), cutting into (and severing) the tips of the spinous processes. The purpose of these cuts is not clear, unless an attempt was being made to detach soft tissues that were holding the head in place, for example the nuchal ligament (attached to the spinous processes), which anchors the back of the head to the base of the neck. Skeleton 3DT7 (young middle adult male) also had a cut at an unusual angle to the right shoulder. He had two cuts in total, and one of the cuts to the medial clavicle was delivered from behind and was most likely associated with decapitation (or attempted decapitation) at the level of the seventh cervical or first thoracic vertebra, while the second cut was on a different angle. It had penetrated the posterior surface of the lateral end of the clavicle (conoid tubercle) and the acromion process of the scapula, but it had not completely cut through the conoid tubercle (this had fractured at the inferior half) or acromion.

Three of the 41 individuals had potential cuts or stabs to the neck that may not have resulted in decapitation (two of these were delivered from the right, and one from the anterior-left), although one of these individuals also had an attempted decapitation cut. In this individual (Skeleton 3DT30) a roughly horizontal cut had penetrated the posterior of the first thoracic vertebra (also removing the inferior spinous process of the seventh cervical vertebra) and the posterior surface of the right first rib. A peri-mortem fracture extended from the anterior margin of the cut along the shaft of the rib, but did not completely detach the fragment from the rest of the shaft; it seems that the fragment was fully broken post-mortem, as the anterior end of the break was light in colour and on a different angle to the rest of the fracture. This would appear to be an attempted decapitation that was probably not successful and this was also supported by the fact that the head was observed to be in the correct anatomical location *in situ*.

Cuts to the mandible mostly occurred in the posterior ramus (posterior margin of the jaw) or the inferior body (underneath the jaw). These were almost all caused by cuts aimed at the neck, although in Skeleton 3DT23 the cut to the mandible was delivered from the anterior-inferior and could not have been caused by any of the cuts observed in the vertebrae, and in Skeleton 3DT33 cuts to the inferior mandible were so numerous that they were difficult to interpret. Further research into the cut positions and directions of all cuts to the neck and associated bones (providing numbers and frequencies) would provide a clearer picture.

Two individuals had sustained shallow cuts to their hands. Skeleton 3DT47 (young middle adult) and Skeleton 6DT15 (young adult male) had shallow fine cuts to the dorsal surface of the right fourth and fifth metacarpal shafts (palm bones at the edge of the hand), on the lateral side in the fifth and the medial side in the fourth metacarpal. These would be consistent with the point of a blade penetrating the back of the hand slightly. Skeleton 6DT15 also had a possible shallow cut into the dorsal surface of his left fifth metacarpal and two parallel cuts in the fourth and fifth proximal hand phalanges (finger bones). In the fifth phalanx, the cuts were located in the medial midshaft, and penetrated 2-3.5mm into the bone. In the fourth phalanx, the cuts were located on the medial-dorsal surface. These are consistent with two (or three) blade injuries to the side and back of the hand.

Skeleton 3DT45 (young middle adult male) had a shallow linear 30mm long cut to the anterior-medial surface of the distal right femur, on the inside-front of the leg just above the knee. He could have sustained this injury standing with his right leg forwards and bent at the knee. Previous research of the assemblage suggested that this injury was sustained on horse-back (Wysocki *pers. comm.* 2010); however, this can be discounted, as the position of the lesion means the horse is likely to have been in the way.

3.3.7 Peri-Mortem Blunt Force Trauma

No peri-mortem blunt force trauma to the cranium was positively identified during analysis. However, two individuals had cranial lesions that may warrant further study and second opinions, notably a lesion to the right frontal of Skeleton 3DT47 and to the right parietal of Skeleton 3DT16.

Skeleton 6DT3 (young adult male) had a potential peri-mortem injury (butterfly fracture) to the midshaft of his right ulna, originally described by Tucker (2006). The proximal and distal ends had a curved break through the shaft and a triangular fragment of the shaft was missing from the anterior surface. Each end of the shaft almost met at the posterior surface, but there was a gap of approximately 30mm at the anterior surface. The break surfaces were the same colour as the surrounding bone. Ortner (2003, 122-123) and Galloway (1999e, 55) have described the mechanisms by which a butterfly fracture occurs. Essentially, the butterfly fragment occurs on the side of the bone being subjected to compressive force. Galloway (1999e, 55) indicates they are more frequent in the lower limb, but Ortner (2003, 122) notes they may occur in the forearm as a result of parrying a blow. In Skeleton 6DT3, the force would have to have been directed to the anterior of the bone to shear off the fragment. This may be a peri-mortem parry fracture, but further research should be carried out into the mechanics of such a fracture.

3.3.8 Peri-Mortem Bite Marks

Skeleton 6DT19 (young middle adult male) had a series of small depressions in both sides of the pelvis, focussed around the iliac crest and anterior superior iliac spines (ASIS); these are the prominent parts of the pelvis that can be felt just above the hips. In the right ilium (pelvic blade) there was a row of two depressions and a smaller indentation close together on the anterior surface of the ASIS, with two shallow linear crushed areas close to the crest on the posterior surface. In the left ilium there were three spaced out depressions on the anterior surface of the iliac crest, and a depression and a shallow indentation on the posterior surface of the crest. All depressions and indentations have small flakes of bone pushed into the lesions. Most of the lesions were roughly circular, though one was more triangular in shape. They ranged in size from 2mm in diameter to 6.5mm in diameter, and depth varied from 0.8mm to 5mm deep; for a more detailed description see the catalogue (Appendix A) or original recording forms. Tucker (2006) identified these as carnivore bite marks. The lesions require assessment by a bite-mark specialist to evaluate this possibility, and also to determine whether it is possible to identify the animal concerned.

3.3.9 *Osteochondritis Dissecans*

Localised death (necrosis) of a small part of the joint surface can be caused by trauma. When this happens the damaged piece can become detached from the rest of the joint surface, known as *osteochondritis dissecans* (Roberts and Manchester 2005, 121). These lesions appear as roughly circular, porous depressions in the joint surfaces of skeletal remains.

Skeleton 6DT24 (young adult male?) had such an *osteochondritis dissecans* lesion (13mm in diameter) in the medial condyle of his right femur (knee joint). This is the most frequent location for *osteochondritis dissecans*, with 80% of cases located here (Roberts and Manchester 2005, 121). Skeleton 3DT16 (old middle adult) had probable *osteochondritis dissecans* of the distal joint of the left tibia (ankle), manifesting as a roughly circular depression with a porous floor and sharp margins. Finally, two individuals had possible *osteochondritis dissecans* in the superior apophyseal facet of the second cervical vertebra (axis). The left facet was affected in Skeleton 3DT55 (young middle adult male), and the right facet in Skeleton 6DT17 (old middle adult male?). Both manifested as oval depressions with clear margins and a porous floor.

3.3.10 Osgood-Schlatter's Disease

Osgood-Schlatter's disease is an avulsion fracture of the tibial tuberosity, where the large quadriceps muscle on the front of the thigh anchors to the front of the shin below the knee. This muscle acts to extend the knee. In Osgood-Schlatter's disease the bone at the attachment point is pulled away from the rest of the tibia (Dandy and Edwards 2003, 317-318). This can either result from a direct blow to the tibial tuberosity (just below the knee), or by the quadriceps muscle exerting too much pull on the attachment site (Aufderheide and Rodríguez-Martín 1998, 85). It usually occurs in boys between the ages of 10 and 15 years, and is often seen in athletes (*ibid*).

Potential Osgood-Schlatter's disease was seen in both tibiae of Skeleton 3DT6 (young middle adult male). The superior parts of his tibial tuberosities were concave, with a sharp change in contour at the inferior half. This condition affected 1.8% of all proximal tibiae (2/113, adolescents included), and occurred with similar frequency on left and right sides (1.7%, 1/58; and 1.8%, 1/55 respectively).

3.3.11 Dislocation

Dislocation occurs when the normal relationship between two parts of a joint is disrupted. Few dislocations are observed in archaeological remains because if the relationship of the bones of the joint is restored (reduced) then no bone changes will occur. Bone changes are only likely to be seen if the dislocation remains unreduced (Roberts and Manchester 2005, 120). A partial dislocation is termed 'subluxation'.

Skeleton 3DT33 (young middle adult male) had a partial dislocation of his right acromio-clavicular joint (between the collar bone and shoulder blade) that was probably connected with a fracture to the sternal end of his clavicle (see Section 3.3.4 above).

Skeleton 3DT12 (young middle adult male) had potential dislocation or subluxation (partial dislocation) of his left hip. There was a large notch in the supero-posterior margin of the acetabulum, and the left femur head was enlarged with a ring of osteophytes around the superior margin.

Two individuals (Skeletons 3DT7 and 3DT48) had injuries to the feet that may have resulted in soft tissue damage combined with partial dislocation (subluxation) of some of the joints between the tarsals. These injuries are described in Section 3.3.12 below.

3.3.12 Soft Tissue Trauma

Injury to the soft tissues can sometimes lead to ossification at the points where the tendons and ligaments attach to the bone (enthesophytes). A brief description of the potential soft tissue injuries observed is provided below. Further research may enable a better understanding of these lesions and their causes. Prevalence rates should also be calculated to discover the frequency of occurrence. Few of the lesions occurred in young adults.

Torso

The ninth right rib of Skeleton 3DT38 (old middle adult male) had a sheet of bone along the inferior margin (between the angle and the midshaft), projecting inferiorly by up to 10mm. This sheet of bone was not solidly attached along its whole length, and there were areas where oval perforations with rounded edges divided it from the rest of the rib shaft. It also bore a groove along its length on the internal surface. It gave the appearance of the inferior margin bearing the costal groove having been pulled downwards. It is not certain whether this resulted from soft tissue trauma or a fracture. The superior margin of the shaft of the tenth right rib was flattened in the area corresponding to the area affected on the ninth rib, although there was no evidence that the ribs were actually in contact.

Shoulder

Two individuals had potential soft tissue injuries to their left clavicles. The sternal end of the clavicle was affected in Skeleton 3DT44 (young middle adult male), and the acromial end in Skeleton 3DT37 (young middle adult male). The latter was broad and thick, with plaques of bone and irregular bone formation on the inferior surface. A potential fracture should also be considered, and a radiograph may assist a diagnosis.

Skeleton 3DT3 (old middle adult male) had a flat sheet of lamellar bone bordering the posterior margin of the glenoid fossa of the right scapula, probably indicating trauma to the joint capsule of his shoulder.

The rotator cuff of the shoulder is made up of four muscles which originate on the scapula and insert around the humerus head: *supraspinatus*, *infraspinatus*, *teres minor* and s*ubscapularis*. These muscles help to hold the head of the humerus in place, and act to stabilise the shoulder joint during movement. Two young middle adult males had potentially sustained damage to the rotator cuff. Skeleton 3DT33 had a shallow lytic area on the lesser tubercle of his left humerus, which might indicate trauma to the *subscapularis* muscle. Skeleton 6DT14 had sharp edged lytic lesions in the greater tubercle of his right humerus, with smaller lesions in his lesser tubercle.

Another young middle adult male, Skeleton 3DT45, had a spicule of bone projecting from the lateral margin of the lesser tubercle (over the bicipital groove) of his right humerus. The direction of the projecting spicule does not seem typical for damage to the *subscapularis* muscle and it is possible other soft tissues were involved. The bicipital groove houses one of the tendons of the *biceps brachii* muscle.

Arm

Two old middle adult males had potential soft tissue damage to bones of their arm. Skeleton 3DT2 had a thickened crest of bone on the posterior-medial side of the proximal end of his right humerus, on the back of the upper arm close to the armpit. The inferior end of the bone crest projected distally as a thick bony spur tapering to a blunt point. This might indicate trauma to the medial head of *triceps brachii* muscle, which acts to extend the elbow joint. Skeleton 6DT7 had a broad flat bone plaque on the posterior-lateral side of the distal third of his left radius, which may be related to trauma to *brachioradialis*.

Hand

Skeleton 3DT23 (young middle adult male) had a possible soft tissue injury to the styloid process of his left third metacarpal (central bone of the palm); his left capitate (wrist bone) was also affected. Other skeletons in this population also had injuries or developmental anomalies affecting the styloid process of the third metacarpal and the capitate. The mechanism for injury to these bones needs to be further researched.

Four individuals had soft tissue injuries to their hand phalanges (finger bones). Skeleton 3DT45 (young middle adult male) had probable soft tissue trauma to two proximal hand phalanges from the left hand. One phalanx (potentially from the fourth digit) had a roughened nodule of bone on the medial side of the proximal shaft, and the other (potentially from the second digit) had an elongated nodule of bone on the lateral side of the distal end. A right proximal hand phalanx (again possibly the second digit) belonging to Skeleton 3DT37 (young middle adult male) was thickened along the margin of the palmar side of the shaft. Skeleton 6DT13 (old middle adult male) had a small nodule of bone adjacent to the proximal joint surface (medio-dorsal margin) of his right first proximal hand phalanx (thumb). Skeleton 6DT8 (old middle adult male) had a rounded nodule of bone on the edge of the palmar side of a possibly proximal hand phalanx, located just proximal to the head.

Pelvis

Skeleton 3DT30 (young middle adult male) had a large vertical crest of bone that tapered to a point located on the posterior surface of his left ilium (pelvic blade), close to the midpoint of the iliac crest. This was located in the region where *gluteus medius* originates, and may indicate trauma to that muscle.

Two individuals had potential soft tissue trauma to the pubic area at the front of the pelvis. Skeleton 3DT2 (old middle adult male) had a cluster of sharp bone spicules on the anterior margin of the right obturator foramen. Skeleton 3DT41 (young adult male) had a nodule of lamellar bone on the posterior surface of his left pubis, at the inferior margin of his pubic symphysis. He also had a deposit of smooth well remodelled lamellar bone on the dorsal surface of the pubic body which may have been associated or may have been related to an infection.

Leg

The femur was affected in two individuals. Skeleton 3DT26 (old middle adult male?) had a cluster of vertical striations divided by deep grooves on the anterior surface of both proximal femora close to the hip (at the medial end of the intertrochanteric line). These lesions may be associated with the ilio-femoral ligament. The opposite end of the bone was affected in Skeleton 3DT57 (adult male?). He had a ridge of bone on the posterior surface of the distal third of the left femur, on the medial side of the medial supracondylar line.

The two individuals with healed fractures to the proximal end of their left fibulae both had evidence for soft tissue injuries on their left tibiae that were probably sustained as a result of the trauma that caused the fractures. Skeleton 3DT37 (young middle adult male) had a thick spicule of bone projecting from the posterior surface of the proximal left tibia shaft, at a point level with the fracture to his left fibula. Skeleton 6DT21 (old middle adult male) had a spicule of bone just distal to the fibular facet of his left tibia that may indicate damage to the articulation between the two bones

Skeleton 3DT18 (adolescent) had small sharp enthesophytes on the proximal shafts of both fibulae, which may be related to the articulation with the tibia just below the knee.

Four individuals had injuries to the part of the ankle joint between the tibia and fibula. These two bones articulate via a fibrous joint at the distal end just above the ankle. Trauma to the ankle, such as twisting the ankle, can damage the soft tissues binding these two bones together (Dandy and Edwards 2003, 260-264). In Skeleton 6DT7 (old middle adult male) the soft tissue injuries to his distal right tibia (rough bone spicules along the posterior margin of the fibrous joint) were associated with a fracture to the distal right fibula, and both injuries were potentially part of the same incident. In the remaining three individuals, the soft tissue injuries were not associated with fractures, but still indicate trauma to the ankles. Skeleton 3DT45 (young middle adult male) had a nodule of bone on the right fibula at the proximal end of the fibrous joint surface; the corresponding area of the tibia was concave. The right tibia of Skeleton 3DT56 (unsexed adult) had a projection of bone along the anterior margin of the fibrous joint, and the fibula had a thin flange of bone at the proximal end of the fibrous joint. There was a woven bone deposit on the posterior tibia (tibialis posterior groove), which may have been associated. Skeleton 3DT38 (old middle adult male) had a distinct sharp spicule of bone at the anterior margin of the distal end of his left fibula. He also had a sharp spicule of bone on the proximal left tibia, at the inferior margin of the proximal fibular facet (just below the knee). It is possible that a twisting injury to the ankle caused both lesions (Dandy and Edwards 2003, 256).

Foot

Further evidence for ankle injuries was present in the feet. Skeleton 6DT2 (old middle adult male) had rugged spicules of bone on his left talus (inferior to the medial facet for the medial malleolus of the tibia), which was possibly related to injury of the ankle ligaments. Three young middle adult males (Skeletons 3DT6, 3DT23 and 3DT33) and one old middle adult male? (Skeleton 3DT21) had evidence for damage to the bifurcate ligament of the foot, with nodules of bone on the anterior calcaneus at the superior margin of the cuboid facet. Damage to the bifurcate ligament may result from twisting the ankle. Skeletons 3DT23 and 3DT21 also had dorsal bars on other tarsals (described below).

Skeleton 3DT30 (young middle adult male) had a large rounded nodule of bone on the dorso-lateral margin of the neck of his left talus, just proximal to the head. This nodule extended 9mm laterally, then abruptly changed angle to extend 14mm anteriorly.

Two individuals had more extensive injuries to the feet that may have resulted in soft tissue damage combined with partial dislocation (subluxation) of some of the joints between the tarsals. Skeleton 3DT7 (unsexed adult) had subluxation of the talus and calcaneus, calcaneus and cuboid, and the navicular and intermediate cuneiform. Several of his tarsals had thick ridges of bone on the dorsal surfaces, and the joint surfaces were altered. Both feet were affected in Skeleton 3DT48 (old middle adult male), although the changes were more pronounced on the right side. Both tali may have been partially dislocated, with bone spicules on both calcanei (on the medial sides) and osteophytes along the medial margin of the talar heads. Both his fibulae partially articulated with the calcanei (they usually just articulate with the talus).

Ten individuals had thick bars of bone on the dorsal surfaces of their tarsals. The naviculars frequently displayed such bars. Both naviculars were affected in Skeletons 3DT15 (young adult), 3DT11 (unsexed adult) and 3DT23 (young middle adult male), the left navicular was affected in Skeleton 3DT26 (old middle adult male?), and the right navicular was affected in Skeleton 3DT35 (old middle adult male) and two young adult males (Skeletons 3DT45 and 6DT6). Three of these individuals also had other evidence for soft tissue trauma to the feet. Skeleton 3DT23 (young middle adult male) also dorsal bars on the lateral cuneiforms, and his left calcaneus had a thick projection of bone at the lateral anterior margin (see above). Skeleton 3DT11 had dorsal bars on the talar necks and potential alteration of the joint between the talus and cuboid; although bilateral, these changes were more pronounced on the right side. Skeleton 3DT45 (young middle adult male) had a dorsal bar on his right intermediate and lateral cuneiforms. Dorsal bars were seen on the neck of the talus, and these were observed in both tali of Skeletons 3DT12 (young middle adult) and 3DT38 (old middle adult male). The right talus of Skeleton 3DT21 (old middle adult male?) also had a pronounced dorsal bar, accompanied by a spicule of bone at the anterior margin of the right calcaneus.

Two individuals had possible soft tissue trauma to their metatarsals. In Skeleton 3DT22 (old middle adult male) both fifth metatarsals had a small nodule of bone on the lateral midshaft, which might be related to soft tissue. Skeleton 3DT46 (young middle adult male) had a smooth projection of bone on the lateral surface of the midshaft of the left first metatarsal. The proximal half of his right first proximal foot phalanx (big toe) was large and robust, particularly in comparison to the distal half. This may have been as a result of long-standing trauma.

Two additional individuals had also sustained injuries to their toes. Skeleton 3DT38 (old middle adult male) had nodules of bone on the plantar-lateral surfaces around the joint between the proximal and intermediate left fifth foot phalanges. These indicate he probably suffered some form of trauma to the joint of his little toe. In Skeleton 3DT56 (unsexed adult) the right first proximal and distal foot phalanges were fused together. The joint space was visible on the lateral half, but the medial half was bridged by roughened osteophytes. Again this individual had possibly injured his big toe resulting in fusion of the joint.

3.3.13 Possible Trauma

Other lesions of unknown cause were observed, some of which may potentially be due to trauma.

Skeleton 3DT26 (old middle adult male?) had probably suffered some form of trauma to his left shoulder. There was a 'V' shaped lytic area in the posterior surface of his left humerus head. This depressed area divided the posterior half of the greater tubercle from the rest of the joint surface. The floor and walls were irregular and porous, there were clusters of osteophytes on the greater tubercle, and a flatter osteophyte on the surface of the head. He also had bone formation around the inferior margin of his left glenoid fossa of the scapula (joint with the humerus). This individual had also fractured his left wrist (scaphoid), and it is possible the changes seen in the shoulder were related to the injury that caused the scaphoid fracture. Notably, his left arm was slightly more gracile than the right arm, and the left radius shaft was quite rounded in cross-section (due to underdevelopment of the interosseous crest); his left metacarpal shafts were also thinner than those on the right. It is possible that the injuries to his left wrist and shoulder led to disuse of this arm. He might have avoided using the arm if it was painful, or it is possible that the shoulder injury also damaged muscles and nerves in the arm leading to reduced movement.

Skeleton 6DT3 (young adult male) had elongated deposits of lamellar bone along the superior half of the gluteal lines of both femora, occupying the area of the hypotrochanteric fossa. These deposits may be associated with trauma to the muscle attachment.

Skeleton 3DT3 (old middle adult male) had a thickened area of lamellar bone on the antero-medial surface of his right fibula at the junction of the mid and distal thirds of the shaft. There was an oval depression in the centre of this lesion, the floor and walls of which were covered in a rust-coloured deposit. This may be a traumatic injury, although an infectious cause should also be considered.

Skeleton 3DT16 (old middle adult male) had a possible developmental anomaly or trauma to the right foot, affecting the little toe. The fifth metatarsal had a 'V' shaped notch in the dorsal surface of the head, dividing the joint surface. The distal end of the fifth proximal foot phalanx appeared underdeveloped, as if the distal 3mm were missing, and the distal surface was flattened and faced disto-laterally.

The distal joint surface of the left fifth proximal foot phalanx (little toe) of Skeleton 3DT44 (young middle adult male) was rugged and with no trace of the normal joint surface morphology. This may be due to trauma, or could be related to infection.

Finally, Skeleton 3DT30 (young middle adult) had potentially damaged the distal joint capsules of his left first and fourth metacarpals (palm bones), although it is possible that the lesions surrounding the joints may be related to joint disease.

3.4 INFECTIOUS DISEASE

Infectious disease can involve the skeleton, but since bone cannot respond quickly only evidence for chronic, longstanding infections can be observed in archaeological skeletal remains (Roberts and Manchester 2005, 167). Acute conditions, where the patient either recovers or dies within a short space of time will not be seen. Initial bone formation in response to infection is disorganised (woven bone), but with time, as healing takes place, woven bone is remodelled and transformed into lamellar bone. Consequently, woven bone presence indicates an infection that was active at the time the person died, whilst lamellar bone indicates an infection that had healed; a combination of both suggests a recurring or longstanding infection (*ibid*). Although specific diseases may cause new bone to be deposited on the skeleton, it is almost always impossible to diagnose these from the bones alone. Hence, evidence for infection is discussed as 'non-specific' infection.

3.4.1 Maxillary Sinusitis

Infection of the maxillary sinuses can result from upper respiratory tract infections, pollution, smoke, dust, allergies, or a dental abscess that has penetrated the floor of the sinus cavity (Roberts and Manchester 2005, 174-176). It was possible to observe the sinuses of 34 individuals: 30 males, one female and three adolescents. Paradoxically, the good preservation of the crania meant that many sinuses were too intact to be able to see inside them and therefore it was not possible to assess sinusitis in many individuals. Twenty-three individuals had at least one intact sinus, and the number of intact sinuses was 45 (23 right and 22 left). A future study of sinusitis using an endoscope would add valuable data on upper respiratory tract infections in this population.

Thirty-four individuals had a total of 62 observable sinuses, 41.9% of which had sinusitis. Left and right sides were equally affected (Table 52). Overall, 15 individuals had maxillary sinusitis (44.1%). None of the adolescents were affected, so the prevalence of sinusitis among adults alone was 48.4% (15/31).

Table 52 Prevalence of maxillary sinusitis: sinuses affected

Age/ Sex	Right			Left			Total		
	Sinusitis	**Total**	**%**	**Sinusitis**	**Total**	**%**	**Sinusitis**	**Total**	**%**
Juveniles	-	0	-	-	0	-	-	0	-
Adolescents	0	2	0.0%	0	3	0.0%	0	5	0.0%
Non-adults	0	2	0.0%	0	3	0.0%	0	5	0.0%
Males	13	28	46.4%	12	27	44.4%	25	55	45.5%
Females	0	1	0.0%	1	1	100.0%	1	2	50.0%
Unsexed	-	0	-	-	0	-	-	0	-
Adults	13	29	44.8%	13	28	46.4%	26	57	45.6%
Total	13	31	41.9%	13	31	41.9%	26	62	41.9%

Sinusitis was more frequent in the adults from 3 Driffield Terrace than those from 6 Driffield Terrace. The prevalence of sinusitis among the former was 51.2% (22/43), and half the adults were affected (12/24). At 6 Driffield Terrace, the prevalence of sinusitis was 28.6% (4/14), and 42.9% of the adults were affected.

In two young middle adult males, sinusitis may have been associated with dental disease. In Skeleton 3DT12, an abscess at the apex of his upper right second molar had penetrated into the sinus cavity, which was covered in deposits of lamellar bone. In Skeleton 6DT22, the most pronounced sinusitis lesions were located above the position of the upper right first molar, which had a cavity and an associated abscess that may have been draining into the right maxillary sinus.

The crude prevalence of sinusitis among adults in Roman Britain was 1.8% (individuals affected, Roberts and Cox 2003, 113). This is likely to be much lower than the true prevalence. The prevalence of sinusitis at Horncastle was more comparable, although still lower than that seen at Driffield Terrace (41.9% of sinuses or 44% of individuals affected): 38.5% of individuals and 30.4% of sinuses were affected at Horncastle (Caffell and Holst 2008, 27). No prevalence rates for sinusitis were available for the Mill Mount skeletons, but one of the male individuals from Mill Mount 04, and two adults (a female and a male) from Mill Mount 05 had sinusitis (Holst 2005, 10; Holst 2006, 7).

3.4.2 Rib Lesions

The presence of new bone formation on the pleural surfaces of the ribs has been associated with lung infections, including tuberculosis (Roberts and Manchester 2005, 190; Santos and Roberts 2006, 2001; Matos and Santos 2006; Mays *et al*. 2002). However, because other lung infections (such as chronic bronchitis and pneumonia, Roberts and Cox 2003) can also cause these lesions, tuberculosis cannot be diagnosed purely on the presence of rib lesions alone. Exposure to polluted atmospheres and the inhalation of fungal spores may also precipitate the development of rib lesions.

A minimum of eleven individuals had rib lesions (16.2% of all 68 individuals with ribs present). These included Skeletons 6DT14 and/ or 6DT20. These two individuals were sharing a grave with Skeletons 6DT17 and 6DT18, and the ribs of Skeletons 6DT14, 6DT17 and 6DT20 had become co-mingled. Unfortunately, the ribs were heavily fragmented and incomplete, which made it virtually impossible to separate them. Two unsided rib fragments found with Skeleton 6DT14, and one left rib found with Skeleton 6DT17 had lamellar bone deposits, but it is entirely possible that all three rib fragments came from just one individual. Of the remaining ten individuals, one was an adolescent (Skeleton 3DT13), three were young adult males (Skeletons 3DT15, 6DT15 and 6DT24), three were young middle adult males (Skeletons 3DT37, 3DT54, and 6DT22), and three were old middle adult males (Skeletons 3DT26, 6DT8, and 6DT21).

Sixty ribs had deposits of lamellar or woven bone on the visceral (lung) surfaces (excluding the two unsided rib fragments from Skeletons 6DT14), and the overall frequency of rib lesions was 4.4% (Table 53). The right side was affected slightly more frequently than the left side (5.0% and 3.8% respectively). Among the adults 4.2% of ribs were affected, while among the non-adults 8.3% were affected. A higher proportion of non-adult individuals had rib lesions (25.0%, 1/4) compared to the adults (15.6%, 10/64).

Table 53 Prevalence of rib lesions (ribs affected)

Age/ Sex	Right			Left			Total		
	Affected	Total	%	Affected	Total	%	Affected	Total	%
Juveniles	0	12	0.0%	0	12	0.0%	0	24	0.0%
Adolescents	5	31	16.1%	2	29	6.9%	7	60	11.7%
Non-adults	5	43	11.6%	2	41	4.9%	7	84	8.3%
Males	29	621	4.7%	24	617	3.9%	53	1238	4.3%
Females	0	12	0.0%	0	11	0.0%	0	23	0.0%
Unsexed	0	3	0.0%	0	9	0.0%	0	12	0.0%
Adults	29	636	4.6%	24	637	3.8%	53	1273	4.2%
Total	34	679	5.0%	26	678	3.8%	60	1357	4.4%

The prevalence of rib lesions was higher among the 6 Driffield Terrace individuals, with 31.6% of adults and 10.2% of ribs affected, compared to 8.9% of adults and 2.0% of ribs affected at 3 Driffield Terrace.

The prevalence of rib lesions at Driffield Terrace was higher than that reported for Roman Britain, where 2.1% of individuals were affected (Roberts and Cox 2003, 114), but this figure is a crude prevalence rate and is probably lower than the reality. The proportion of adults with rib lesions at Horncastle (16.7%, Caffell and Holst 2008, 27) was far more comparable to that seen at Driffield Terrace (15.6%).

Seven of the individuals had lamellar bone only on their ribs, indicating the infection was no longer active. Two individuals (Skeletons 3DT37 and 3DT26) had woven bone only, meaning the infection was active at the time of death. Two individuals (Skeletons 3DT54 and 3DT13) had a mixture of woven bone, lamellar bone and transitional woven-to-lamellar bone, suggesting either a longstanding or recurrent infection that was active at the time they died. In four individuals rib lesions affected both sides of the rib cage, in three the left side was affected, and in four only the right side was affected. The number of affected ribs per person ranged from one to fourteen.

Skeleton 3DT53 (young middle adult male) had thin horizontal ridges of lamellar bone on the visceral surfaces of the necks of his right and left sixth and seventh ribs. These lesions did not look typical for lesions associated with lung infections and so have been omitted from the prevalence rates calculated above. The cause of these lesions is uncertain.

3.4.3 Endocranial New Bone Formation

Bone formation on the internal surfaces of the cranium is more commonly seen in infants and young children rather than in adults. It has been associated with inflammation or haemorrhage of the meningeal blood vessels, but the potential causes of these lesions are not clear at present. In children, possible causes identified include chronic meningitis, trauma, anaemia, neoplastic disease, metabolic diseases (scurvy and rickets), venous drainage disorders and tuberculosis (Lewis 2007, 2004). Less information is available concerning the aetiology of these lesions in adults.

Two individuals had lamellar bone on the endocranial (inner) surface of their frontal bones. In Skeleton 3DT19 (adolescent) there was a small nodule of lamellar bone close to the frontal crest, and Skeleton 3DT3 (old middle adult male) had small nodules of lamellar bone on either side of the frontal crest. Morphologically, these lesions differ from the thin sheets of woven or lamellar bone sometimes observed on the endocranial surfaces of non-adult crania, and they may have a different cause to those proposed for the non-adult lesions. The proportion of frontal bones affected at Driffield Terrace was 1.7% (1/59), although it should be borne in mind that since many of the crania were intact or reconstructed, it was difficult to view the internal surfaces in all instances.

3.4.4 Periosteal Reactions

New bone deposits on the surfaces of the bones can indicate inflammation of a sheath of tissue (the periosteum) which surrounds all bones (Ortner 2003, 206-207). Inflammation may be due to infection, but low-grade trauma and chronic ulceration can also lead to new bone formation (Roberts and Manchester 2005; Ortner 2003, 206-207). Periosteal reactions are commonly observed in archaeological populations, particularly on the tibiae, and their prevalence has been used as a general measure of stress in past populations (Ortner 2003, 209). Woven bone deposits are indicative of inflammation that was active at the time of death, while lamellar bone indicates that the inflammation was healing.

Skull

One young adult male (Skeleton 3DT17) had lamellar bone on the external surface of his occipital bone, at the back of the head. The deposits were located on the external occipital protuberance (where the nuchal ligament that anchors the back of the skull to the spine is attached) and along the nuchal crest (where the *trapezius* muscle attaches). In the adults 1.9% of occipital bones were affected (1/57).

Two adults had new bone formation on the anterior surface of their zygomatic bones (cheekbones). In Skeleton 3DT6 (young middle adult male) the bone was in the process of remodelling from woven to lamellar, and in Skeleton 6DT7 (old middle adult male) the periosteal reaction was lamellar. In both individuals the lesions were bilateral. Among the adults the frequency of affected zygomas was 3.8% (4/105).

Skeleton 3DT46 (young middle adult male) had a small deposit of woven bone on his right maxilla, located on the internal surface of the frontal process. This part of the maxilla borders the ethmoid bone and the nasal cavity. Woven bone in this location is most likely to be associated with respiratory infections. Skeleton 3DT32 (young adult male) had lamellar bone on his right maxilla, in a band along the external surface of the alveolar bone between the canine and first molar. This was associated with lamellar and woven bone on his mandible (probably the result of dental disease, see below) and porosity on the lateral margins of his nasal aperture (extending onto the frontal processes). The proportion of affected adult maxillae was 1.8% (2/109).

Finally, one young adult male (Skeleton 3DT32), an adolescent (Skeleton 3DT13) and the six to seven year old child (Skeleton 3DT25) had new bone formation on their mandibles, mostly focussed on the internal surface of the ramus. All individuals displayed a mixture of woven and lamellar bone, indicating a recurrent or long standing infection. Skeleton 3DT13 had woven bone on the internal surfaces of the mandibular rami (particularly the coronoid area), and an oval deposit of transitional woven/lamellar bone on the left body of the mandible (on the internal surface in the region of this third molar). Skeleton 3DT25 had woven bone on the internal surface of the left ramus, with remodelled lamellar bone in the equivalent location on the right side. Skeleton 3DT32 also had lamellar bone on the internal rami, particularly near the coronoid processes. He also had deposits of woven bone around an abscess at the apex of his lower left first molar, which had a large carious lesion. These deposits were located on the internal and external surface of the mandible, and it is likely the cavity and associated abscess had resulted in an infection. Overall, 4.9% of mandibles had signs of infection (3/61, adults and non-adults combined). Among the non-adults, the prevalence was 50.0% (2/4), and among adults it was 1.8% (1/57).

All individuals with new bone formation on their skulls also had new bone formation elsewhere in the skeleton, with the exception of Skeleton 3DT46.

Upper Limb

Four adults had periostitis in bones of their upper limbs. The bones most frequently affected were the humeri (2.7%), followed by the radius and third metacarpal (1.0% each), and the clavicle (0.9%; Table 54). In general, the right side was more frequently affected, but a higher proportion of left humeri had periosteal reactions.

Table 54 Prevalence of periostitis in the upper limb (adult bones)

Bone	Right			Left			Total		
	NB	Total	%	NB	Total	%	NB	Total	%
Humerus	1	54	1.9%	2	56	3.6%	3	110	2.7%
Radius	1	53	1.9%	0	51	0.0%	1	104	1.0%
MC3	1	53	1.9%	0	51	0.0%	1	104	1.0%
Clavicle	1	55	1.8%	0	58	0.0%	1	113	0.9%

Two individuals had lamellar bone deposits on their humeri. In Skeleton 6DT15 (young adult male) these deposits were on the distal shafts of both humeri, being thickest around the nutrient foramina where they were full of very fine porosity. Thinner deposits of lamellar bone extended onto the posterior shafts. Skeleton 6DT10 (unsexed young adult) had lamellar bone on the left humerus, on the anterior surface of the distal end in the vicinity of the coronoid fossa. Skeleton 3DT54 (young middle adult male) had a small thin deposit of transitional woven/lamellar bone on the distal end of his right radius, on the medial part of the posterior surface. Skeleton 6DT17 (old middle adult male?) had woven bone on his right clavicle, on the superior surface of the acromial end. Skeleton 6DT24 (young adult male) had a deposit of lamellar bone on the medial surface of the shaft of his right third metacarpal (central palm bone).

Pelvis

Three adults had new bone formation on the bones of their pelvis (os coxae and sacrum). Skeleton 3DT41 (young adult male) had a deposit of smooth, well remodelled lamellar bone on the dorsal surface of his left pubis, possibly associated with soft tissue trauma (see above). The proportion of affected adult pubic bones was 1.0% (1/104). Skeleton 3DT37 (young middle adult male) had a thick band of lamellar bone on the anterior surface of the body of his third sacral vertebra, which extended into the sacral foramina on either side. This individual had other extensive evidence for infection in his legs. Skeleton 3DT45 (young middle adult male) had fragile patchy deposits of woven bone around 1mm thick on the anterior surface of his left iliac blade. These deposits were primarily focussed near the anterior inferior iliac spine, but they extended along the arcuate line towards the auricular surface. These deposits were loosely attached to the underlying bone and are likely to have been recently deposited at the time the person died. The proportion of affected iliac bones was 0.8% (1/118).

Lower Limb

Periosteal reactions were most frequently observed in the lower limb, particularly in the tibia (57.3% of adult tibiae; Table 55). Femora and fibulae were also frequently involved (26.2% and 18.6% respectively). A small percentage of foot bones were also affected (Table 55). The lesions in the feet were always seen in conjunction with lesions in the leg. Both sides of the limbs were practically equally affected (Table 55). The majority of these lesions were in the form of subtle, striated, well-remodelled lamellar bone that was indicative of long healed inflammations. Seven tibiae (6.4%), six fibulae (5.8%), three femora (2.7%), and the fifth metatarsal (arch of foot) (1.1%) had evidence for woven bone or transitional woven/lamellar bone, indicating lesions that were active or in the process of healing at the time the person died. Fourteen tibiae and two femora also had swollen lumps of lamellar bone on their shafts, discussed in more detail below.

Table 55 Prevalence of periostitis in the lower limb (adult bones)

Bone	Right			Left			Total		
	NB	Total	%	NB	Total	%	NB	Total	%
Tibia	31	55	56.4%	32	55	58.2%	63	110	57.3%
Fibula	14	49	28.6%	13	54	24.1%	27	103	26.2%
Femur	10	55	18.2%	11	58	19.0%	21	113	18.6%
MT4	1	42	2.4%	1	42	2.4%	2	84	2.4%
MT5	1	44	2.3%	0	43	0.0%	1	87	1.1%
Talus	1	48	2.1%	0	48	0.0%	1	96	1.0%

Periosteal reactions of the lower limb were also seen in non-adults. Both femora and the right tibia of Skeleton 3DT25 (6-7 year old child) had woven bone that had begun the process of remodelling into lamellar bone (particularly extensive on the tibia), and the left tibia showed lamellar bone deposits. Lamellar bone was observed on both femora of Skeleton 3DT13 (adolescent male?), and also in the first metatarsals and right fifth metatarsal (arch of foot bones). Both these individuals also had new bone formation on their mandibles (see above). If the non-adult data is combined with the adult data, then the frequency of affected bones was: 21.0% of femora (25/119), 55.1% of tibiae (65/118), 2.1% of first metatarsals (2/96), and 2.1% of fifth metatarsals (2/95).

Prevalence rates are not frequently provided for periosteal reactions in the Roman period, but data from two sites indicate that a quarter of tibiae and 12-17% of fibulae were affected (Roberts and Cox 2003, 126-127). The prevalence rates at Driffield Terrace are higher. At Horncastle, 43.2% of adult tibiae, and 28.1% of adult fibulae were affected (Caffell and Holst 2008, 29). The prevalence of periostitis in the tibiae was still higher at Driffield Terrace, but the prevalence of fibulae affected was slightly lower than at Horncastle.

Thirty-eight adults had periosteal reactions in their lower limbs. As noted above, the majority of lesions were subtle. Some individuals had more pronounced deposits of new bone. These included Skeleton 3DT37 (young middle adult male) who had thick deposits of lamellar and woven bone on much of his left tibia shaft, with an oval swollen lump of lamellar bone on the anterior shaft at the junction of the mid and distal thirds. This lump had much in common with swellings seen in other individuals. His right tibia also had deposits of mixed woven and lamellar bone (predominantly lamellar bone), but they were much less pronounced than on the left side. He also had subtle deposits of woven bone on his proximal femora, and subtle woven bone on seven left ribs. This individual was buried with large iron bands encircling each lower leg, and it has been suggested by Tucker (2006) that the inflammation of his lower legs was related to the presence of these bands. It must be noted that this individual also had a left fractured fibula, which was on the same side as the tibia with the most pronounced new bone deposits. This fracture could also have contributed to the infection, if a break in the skin enabled bacteria to enter the leg. However, no evidence for infection was observed on the fibula itself.

Thirteen adults had swollen lumps of lamellar bone on their femur and/or tibia. All lumps had indistinct margins, meaning they blended well into the surrounding bone. Their overall topography was gently rounded, although the surface itself may have been covered in striated, porous or smooth lamellar bone (or a mix of the three). These lumps were often surrounded by lamellar bone on the shaft of the affected bone. The largest lesions observed were 52 x 20mm (on the left femur of Skeleton 3DT32) and 42 x 33mm (on the left tibia of Skeleton 3DT3), but most were much smaller in size.

These lamellar bone lumps were most frequently seen on the tibiae (12.7%), and they were slightly more common on right tibiae (14.5%) compared to left bones (10.9%; Table 56). A smaller percentage of femora were affected (1.8%), with both lesions occurring on the left side (3.4%).

Table 56 Prevalence of long bones with lumps on the shafts (adult bones)

Bone	Right			Left			Total		
	Affected	Total	%	Affected	Total	%	Affected	Total	%
Femur	0	55	0.0%	2	58	3.4%	2	113	1.8%
Tibia	8	55	14.5%	6	55	10.9%	14	110	12.7%

A list of the individuals affected is provided in Table 57. In most individuals (11) only one bone was affected, but both tibiae were affected in Skeleton 3DT40 (young adult male), and both tibiae and the left femur were affected in Skeleton 3DT32 (young adult male). Six individuals had more than one of these lumps. One of the femoral lumps was located on the popliteal surface (on the back of the leg just above the knee), and the other on the medial surface of the midshaft (inner thigh) just above the distal third. Four of the tibia lesions were located on (or just medial to) the anterior crest (the ridge of bone on the front of the shin), six were located on the medial side, at least six were located on the posterior shaft, and three were located on the lateral shaft. The lumps ranged in location between the proximal, mid, and distal thirds of the shaft.

Table 57 Individuals with lumps of lamellar bone on long bone shafts

Skeleton Number	Age	Sex	Bone	Description
3DT3	Old middle adult	Male	Left tibia	Oval swelling (42 x 33mm), projecting 10mm, medial shaft at junction of mid and distal thirds Second less pronounced swelling on lateral shaft, just inferior to the first
3DT7	Young middle adult	Male	Left tibia	Subtle lump of lamellar bone close to posterior margin of medial midshaft
3DT21	Old middle adult	Male?	Right tibia	Raised area on lateral midshaft
3DT22	Old middle adult	Male	Right tibia	Thickened raised lump (35 x 9mm), central lateral midshaft
3DT23	Young middle adult	Male	Left tibia	Small flattened lump on medial surface proximal shaft Indistinct lump on anterior half of medial midshaft
3DT32	Young adult	Male	Left	Oval swelling (52 x 20mm), projecting 5-6mm, on medial

			femur	midshaft, just proximal to distal third
			Left tibia	Three small gentle swellings on posterior shaft
			Right tibia	Small swelling on posterior shaft
3DT37	Young middle adult	Male	Left tibia	Oval swollen area on anterior shaft at junction of mid and distal thirds
3DT38	Old middle adult	Male	Left tibia	Gently rounded shallow nodules of lamellar bone on posterior midshaft
3DT40	Young adult	Male	Left tibia	Small lump on posterior midshaft
			Right tibia	Small lump on medial side of anterior crest
3DT47	Young middle adult	Male	Left femur	Swollen area (40 x 18mm) on the popliteal surface
3DT49	Adult	Unsexed	Right tibia	Swollen area on anterior margin of medial midshaft
3DT54	Young middle adult	Male	Left tibia	Lump on anterior crest at junction between proximal and mid thirds
				Lump on medial surface at junction of mid and distal thirds
6DT9	Adult	Male?	Right tibia	Slightly raised area of lamellar bone just medial to the anterior crest, at the junction of the mid and distal thirds

These lesions may be localised well-remodelled periosteal reactions, or they may indicate a localised area of infection involving the cortex (osteitis, discussed below). An alternative possibility is that they are ossified haematomas. Haematomas are collections of blood within the soft tissues, which can occur following trauma. When a bone is broken they form part of the natural healing process following a fracture (Dandy and Edwards 2003, 47), but occasionally haematomas that occur elsewhere (e.g. in a muscle following damage to the muscle) can become ossified (Dandy and Edwards 2003, 47, 274-275). Dandy and Edwards (2003, 274-285) note that ossification in a muscular haematoma is more common if the muscle is used too soon following the injury. Certainly, none of the lesions looked like those typically associated with leg ulcers, which usually appear as sharply defined raised areas with a flattened surface covered with irregular bone, and whose shape normally follows the outline of the ulcer (Ortner 2003, 207-208, 214-215).

The location of the lesions suggests that a traumatic cause is possible for some (possibly resulting in localised periosteal reactions), as the anterior and medial surfaces of tibia lie just beneath the skin and are particularly vulnerable to injury. The posterior surface is heavily buried in the calf muscles (*gastrocnemius* and *soleus*), while the lateral surface faces the fibula and is protected by the muscles of the lateral calf. The femur shaft is protected by a thick layer of muscles on all sides.

3.4.5 Hypervascularity

Multiple small nutrient foramina were observed in the tibiae of three individuals, predominantly affecting the medial midshafts, but also the lateral midshaft of the right tibia in one individual. Two of the individuals were young adult males (Skeletons 3DT32 and 3DT34) and one was an adolescent (Skeleton 3DT19). These may indicate increased blood supply to the affected area (hence the term ‘hypervascularity’), which could occur in response to infection (Ortner 2003, 206).

3.4.6 Osteitis and Osteomyelitis

Involvement of the cortex of the bone is known as ‘osteitis’, while involvement of the medullary cavity in the centre of the bone is known as ‘osteomyelitis’ (Roberts and Manchester 2005, 168). In the latter, enlargement of the bone shaft is observed as a result of new bone formation, which eventually may surround the original surface completely. Destruction of the internal structures of the bone occurs with pus formation, and a fistula may form allowing the pus to drain into the surrounding tissues. Death of the original bone shaft may occur (Roberts and Manchester 2005, 168-169).

Three bones from three individuals (3.7%), all of whom were adults, had lesions that might be considered as evidence for osteitis or osteomyelitis. Two of the affected bones were left ulnae (1.7% of all adult ulnae, 2/117), and one was a right femur (0.9% of all adult femora, 1/113). In comparison, osteomyelitis has been reported in 0.8% of Roman British individuals (Roberts and Cox 2003, 127). Conversely, an alternative diagnosis that ought to be considered with further research would be neoplasms (bone tumours).

The right femur shaft of Skeleton 3DT56 (unsexed adult) was swollen at the junction of the mid and distal thirds, with the swelling surrounding the entire shaft, but being most pronounced on the medial side. The swollen area occupied 70-80mm of the length of the shaft, and the surface of the lesion was covered in lamellar bone. There were two small but deep lytic lesions, one on the medial side (3 x 2.3mm) and one on the lateral side (2.4 x 1.5mm). Both were located in the thickest areas of the swelling on their respective sides, and both were surrounded by porosity. It was impossible to measure the depth of the lesions, but they were at least 5mm deep. The medial lytic lesion had rounded margins, whilst the lateral lesion had sharper margins.

The left ulna of Skeleton 3DT26 (old middle adult male?) was swollen at the junction between the mid and distal thirds of the shaft, with the swollen area particularly pronounced on the lateral and posterior aspects. The surface was mostly covered in smooth lamellar bone. There were two sharp-edged lytic lesions on the posterior surface in the centre of the swollen area. These lesions measured 5x2mm and 4x1.5mm; both were approximately 2mm deep and did not appear to penetrate the cortex. The bone proximal to the lytic lesions was slightly porous.

The left ulna midshaft of Skeleton 3DT28 (young middle adult male) was greatly expanded in all directions. The lesion occupied around 80mm of the shaft length, and at the widest point the bone measured 26mm in diameter, compared to 18.5mm at the same point on the opposite side. The interosseous crest was transformed into a broad, flat, slightly roughened area. The rest of the surface was mostly composed of fairly smooth lamellar bone, with patches of woven bone on the lateral and posterior surfaces. A post-mortem break through the lesion demonstrated that the cortical bone was very thin, with the posterior cortex measuring 0.8mm thick, the medial cortex measuring 0.9mm thick and the anterior cortex measuring 1.5mm thick. The lateral cortex was thicker, at 6.1mm thick. The cortical bone appeared to be slightly porous in cross-section, and there were shallow scalloped depressions on the internal surface of the shaft. Aside from osteomyelitis, an alternative diagnosis that ought to be considered might be a neoplasm (bone tumour).

One disarticulated right radius from Context 4400 also had potential osteomyelitis. There was a swollen area of slightly porous lamellar bone on the medial-posterior surface of the distal third of the shaft approximately 30mm from the distal end. There was a pronounced lytic lesion in the centre of the lamellar bone (16x4mm in size) which penetrated deep into the bone (possibly to the medullary cavity). The margins of the lytic lesion were clear and relatively sharp.

3.4.7 Sacroilitis

Two adults had possible infections of the auricular surface, the joint between the blade of the pelvis and the sacrum at the base of the spine. In both individuals the infection occurred on the right side. In Skeleton 6DT24 (young adult male) the right auricular surface of the ilium was affected, and in Skeleton 6DT19 (young middle adult male) the right auricular surfaces of the ilium and sacrum were involved.

3.5 JOINT DISEASE

The term joint disease encompasses a large number of conditions with different causes, which all affect the articular joints of the skeleton. Factors influencing joint disease include physical activity, occupation, workload and advancing age, which manifest as degenerative joint disease and osteoarthritis. Alternatively, joint changes may have inflammatory causes in the *spondyloarthropathies,* such as sceptic or rheumatoid arthritis. Different joint diseases affect the articular joints in a different way, and it is the type of lesion, together with the distribution of skeletal manifestations, which determines the diagnosis (Rogers 2000, Roberts and Manchester 2005).

3.5.1 Degenerative Disc Disease (*Spondylosis*)

Degenerative changes to the vertebral bodies were recorded when osteophytes (bony outgrowths) were present around the margins or on the body surfaces, coupled with porosity of the body surfaces (Rogers 2000).

Sixty-eight adults had at least part of their spine surviving, including 46 from 3 Driffield Terrace and 22 from 6 Driffield Terrace. In total, there were 1,269 vertebral bodies (including the first sacral vertebra and excluding the first cervical vertebra, which does not have a body). Preservation was slightly better at 3 Driffield Terrace, with an average of 19.6 vertebral bodies per skeleton (903/46), whereas at 6 Driffield Terrace the average number of vertebral bodies was 16.6 (366/22). As a comparison, the expected number of vertebral bodies per skeleton is 24.

Degenerative changes to the vertebral bodies were only seen in six individuals (8.8% of 68), including four old middle adults (21.1% of 19 old middle adults) and two young middle adults (7.1% of 28 young middle adults). In both the latter individuals, only one vertebral body was affected, whereas between one to seven vertebrae were affected in the older individuals (on average 4.5). In one of the young middle adults, Skeleton 3DT12, degenerative changes in his eleventh thoracic vertebra were associated with a crush fracture of the vertebral body. In Skeleton 3DT26 (old middle adult male?), degeneration of the joint between his fifth lumbar and first sacral vertebra occurred as a result of *spondylolisthesis* (where the body of the lumber vertebra slips forward on the body of the sacrum).

The proportion of vertebrae affected by DJD was 1.6% (Table 58). All types of vertebrae were affected, most frequently the sacrum and neck vertebrae. However, these prevalence rates are misleading in that the sacral bodies number one per individual, whereas there are twelve thoracic vertebral bodies.

Calculating the prevalence per vertebra would provide more accurate information on the distribution of vertebral body degeneration.

Table 58 Frequency of degenerative changes to the vertebral bodies

Vertebra Type	Total		
	A	P	%
Cervical	7	286	2.4%
Thoracic	5	630	0.8%
Lumbar	5	296	1.7%
Sacral	3	57	5.3%
Total	20	1269	1.6%

A = affected (bodies with degenerative changes); P = present (number of bodies present)

At Horncastle, degenerative changes were seen in 29.4% of the vertebral bodies, and half the adults were affected (Caffell and Holst 2008, 33). These prevalence rates were much higher than those at Driffield Terrace, which is only to be expected considering the high proportion of mature adults at Horncastle.

3.5.2 Osteoarthritis

Osteoarthritis (OA) is a degenerative joint disease of synovial joints characterised by the deterioration of the joint cartilage, leading to exposure of the underlying bony joint surface. The resulting bone-to-bone contact can produce polishing of the bone termed ‘eburnation’, which is the most apparent expression of OA. Other features associated with degeneration of the joint include osteophytes (bone formation) on the surface or around the margins, porosity on the surface, and the development of cysts (Rogers 2000; Roberts and Manchester 2005). OA is frequently associated with increasing age, but can be the result of mechanical stress and other factors, including lifestyle, food acquisition and preparation, social status, sex and general health and body weight (Larsen 1997; Roberts and Manchester 2005). OA was recorded as present when at least two of the features associated with OA were present (e.g. osteophytes and porosity); eburnation, even if occurring alone, was always considered to be indicative of OA (Roberts and Manchester 2005).

Twenty-nine adults (38.7%) had osteoarthritis (OA) in either their spine or extra-spinal joints (or both). Older individuals were more likely to have OA, with sixteen old middle adults affected (84.2% of 19), compared to young middle adults (39.3%, 11/28). Two unaged adults also had evidence for OA.

3.5.2.1 Osteoarthritis of the Spine

The vertebrae articulate with each other via pairs of apophyseal joints on the posterior side of the spine. Being synovial joints, they are vulnerable to developing osteoarthritis. If all apophyseal facets were present, each skeleton would have 98. In comparison, the average number of facets per skeleton was 74.2. As with the vertebral bodies, facet preservation was slightly better at 3 Driffield Terrace (79.1 facets on average per skeleton) than at 6 Driffield Terrace (63.9 facets on average per skeleton).

Eighteen adults had OA of the apophyseal facets (26.5% of 68). Almost half the old middle adults (47.4%, 9/19) were affected, along with a third of the young middle adults (32.1%, 9/28). However, the proportion of facets involved was low, at 2.2% (Table 59). Again the sacrum was apparently most frequently involved, but the cervical spine (neck) was least affected. However, as discussed above, calculation of prevalence of osteoarthritis by vertebra would provide a better indication of the pattern of spinal OA.

Table 59 Frequency of osteoarthritis in the apophyseal facets

Vertebra Type	Total		
	A	**P**	**%**
Cervical	11	1328	0.8%
Thoracic	69	2532	2.7%
Lumbar	24	1080	2.2%
Sacral	6	105	5.7%
Total	110	5045	2.2%

A = affected (facets with osteoarthritis); P = present (number of facets present)

Three old middle adult males were particularly affected with OA of the spine. Twenty-six facets in the spine of Skeleton 3DT48 had OA (with eburnation in the cervical spine and the joints between his fifth lumbar and first sacral vertebra), and Skeleton 3DT22 had fourteen affected facets (again some with eburnation, primarily in the thoracic spine). Skeleton 3DT26 had thirteen affected facets, with particularly severe OA (including eburnation) in the facets between his fifth lumbar and first sacral vertebrae. This individual had *spondylolisthesis*, and it is likely that the OA in these joints was a secondary complication of this condition: each half of the neural arch was so altered in form they were barely recognisable, and the facets between the vertebrae were markedly changed in shape. An area of eburnation on the superior part of the neural arch of the fifth lumbar vertebra suggested the fourth lumbar vertebra may have been in contact with the lamina.

The proportion of individuals with spinal OA at Driffield Terrace was higher than the crude prevalence of 7.1% of individuals affected reported by Roberts and Cox (2003, 145). However, the proportion of facets affected was much lower than at Horncastle, where 28.7% of the apophyseal facets had OA (calculated from data in Tables 17 and 19, Caffell and Holst 2008, 34-36), compared to 2.2% of facets at Driffield Terrace. Again, this probably reflects the different age structures of the two populations. At Horncastle, OA of the cervical spine occurred most frequently, which contrasts with the pattern at Driffield Terrace.

Skeleton 3DT26 (old middle adult male?) had a small area of eburnation (bone polishing) on the left side of the body of his sixth cervical vertebra, in the area that articulated with the uncinate process (a hook-like protrusion on the side of the superior vertebral body) of the seventh cervical vertebra. It is unusual to see eburnation on the vertebral bodies, but the area affected was a synovial joint (the type of joint more prone to eburnation). Unfortunately, the uncinate process of the seventh cervical vertebra had been removed during decapitation and the fragment had not been recovered.

3.5.2.2 Extra-Spinal Osteoarthritis

Nineteen adults (25.3%) had developed OA in at least one extra-spinal joint. These included six young middle adult males (21.4%), eleven old middle adult males (57.9%), and two unaged adults (18.2%). Eight of these individuals also had spinal OA.

The prevalence rates for each joint surface are given in Table 60. In general, the prevalence of OA was low in the Driffield Terrace population, probably reflecting the young age bias of the sample. Overall, acetabuli (the socket part of the hip joint) were most frequently affected (14.0%), followed by the medial and lateral ends of the clavicles (13.3% and 12.7% respectively; Table 60). The temporo-mandibular joint (TMJ) was also affected. This is the joint between the jaw and the base of the skull, and the temporal half of the joint (base of the skull) was more frequently involved than the mandibular half (6.5% compared to 1.1%). The frequency of all other joint involvement was minimal, being between 0.3% and 2.2%. These included the scapula (shoulder); the distal radius, distal ulna, scaphoid and lunate (wrist); hand phalanges (fingers); proximal femur (the 'ball' part of the hip joint); distal femur and patella (knee); and talus (ankle). Finally, one individual (Skeleton 3DT26) had degenerative changes to the proximal joints between the fibulae and tibiae. This is a most unusual location for osteoarthritis. Unfortunately, this joint was not scored systematically, so the true prevalence cannot be calculated.

Table 60 Frequency of osteoarthritis in extra-spinal joint surfaces

Total	Right			Left			Total		
	OA	**Total**	**%**	**OA**	**Total**	**%**	**OA**	**Total**	**%**
Acetabulum	8	61	13.1%	9	60	15.0%	17	121	14.0%
Med Clavicle	7	51	13.7%	7	54	13.0%	14	105	13.3%
Lat Clavicle	5	34	14.7%	4	37	10.8%	9	71	12.7%
Temporal TMJ	4	54	7.4%	3	54	5.6%	7	108	6.5%
Patella	0	32	0.0%	2	60	3.3%	2	92	2.2%
Dist Radius	1	53	1.9%	1	51	2.0%	2	104	1.9%
Lunate	0	28	0.0%	1	28	3.6%	1	56	1.8%
Prox Femur	1	58	1.7%	1	60	1.7%	2	118	1.7%
Scaphoid	0	43	0.0%	1	37	2.7%	1	80	1.3%
Mandible TMJ	1	44	2.3%	0	50	0.0%	1	94	1.1%
Talus	0	48	0.0%	1	48	2.1%	1	96	1.0%
Dist Ulna	0	50	0.0%	1	52	1.9%	1	102	1.0%
Dist Femur	0	53	0.0%	1	54	1.9%	1	107	0.9%
Scapula	1	55	1.8%	0	53	0.0%	1	108	0.9%
Prox Hand Phalanx	2	242	0.8%	0	208	0.0%	2	450	0.4%
Int Hand Phalanx	1	162	0.6%	0	135	0.0%	1	297	0.3%

The majority of joint changes observed were restricted to osteophyte formation and porosity, often fairly minimal. Only a small percentage of joints had eburnation. These included two lateral clavicles (2.8% of joints), the distal radius (1.9%), left scaphoid (1.3%), and the proximal and intermediate hand phalanges (0.4% and 0.3% respectively).

As a comparison, the joints most frequently affected at Horncastle were the joints at the medial and lateral ends of the clavicle (69.2% and 15.0% respectively), the hip (41.2%) and the TMJ (18.2%, Caffell and Holst 2008, 31). The overall pattern of joint disease is therefore very similar to that at Driffield Terrace, although the actual prevalence rates at Horncastle were higher. This no doubt reflects the fact that the majority of the Horncastle population were mature adults who would be expected to have a high prevalence of joint disease.

The hips and knees are the major weight-bearing joints of the lower limb, and so frequently develop OA in modern populations (Roberts and Manchester 2005, 138; Aufderheide and Rodríguez-Martín 1998, 94). The joints at either end of the clavicle are also frequent sites of joint disease in modern populations, usually in elderly individuals (Roberts and Manchester 2005, 138). It is probably not surprising that these were the joints most frequently affected at Driffield Terrace. Almost all the individuals with joint degeneration of the clavicles were old middle adults, with the exception of one young middle adult and one unaged adult.

Aufderheide and Rodríguez-Martín (1998, 400) have observed that degeneration of the temporo-mandibular joint is often connected with disruption of normal chewing patterns brought about through ante-mortem tooth loss. Of the four individuals affected, three showed evidence for ante-mortem tooth loss or other dental diseases that may have affected their chewing patterns. Skeleton 3DT26 (old middle adult male?) had long-standing tooth loss his lower left first and second molars, with over-eruption of the opposing molars. Skeleton 3DT22 (old middle adult male) had lost six teeth ante-mortem, as well as sustaining fractured teeth and dental abscesses. Skeleton 6DT7 (old middle adult male) had lost one tooth ante-mortem, but also had a long-standing fracture to his upper left first molar (the lower first molar had over-erupted). Although the remaining individual (Skeleton 6DT9, adult male?) had relatively good dental health, his mandible was asymmetric. The left side was smaller and shorter than the right and the left condyle was twisted at a 45° angle. It seems likely that this would have placed stress on the TMJ joint.

The ankle is rarely affected by joint disease and when it is it is usually as a result of trauma (Aufderheide and Rodríguez-Martín 1998, 95). This was true for Skeleton 3DT9 (unsexed adult) who had degenerative changes to the left talus associated with partial dislocation of several tarsals (including the joint between the talus and calcaneus) and extensive soft tissue trauma to his left foot.

Two other individuals had OA that was secondary to trauma. Skeleton 3DT16 (old middle adult male) had OA of his distal left radius, scaphoid and lunate (wrist joint), with eburnation of his radius and scaphoid, associated with a comminuted fracture to the distal joint surface of the left radius. Skeleton 3DT26 (old middle adult male) had OA of his left scaphoid (wrist) associated with an unhealed fracture to that bone. This means that the majority of OA of the wrist observed at Driffield Terrace was secondary to trauma to the wrist.

3.5.3 Schmorl's Nodes

Schmorl's nodes are another condition that can affect the spine. They manifest as indentations in the upper and lower surfaces of the vertebral bodies caused by the pressure of herniated vertebral discs (Aufderheide and Rodríguez-Martín 1998). Discs may rupture due to trauma, but vertebrae weakened by infection, osteoporosis or neoplastic disease may be more vulnerable (Roberts and Manchester 2005). Schmorl's nodes are often associated with degenerative changes to the vertebral bodies (Aufderheide and Rodríguez-Martín 1998, Hilton *et al.* 1976) and are most commonly seen in the lower thoracic vertebrae (Hilton *et al.* 1976).

Fifty-two adults (76.5%) had Schmorl's nodes in their spines. These included eleven young adults (64.7% of the 16 with spines preserved), 26 young middle adults (92.9% of 28), fourteen old middle adults (73.7% of 19), and one unaged adult (20.0% of the five with spines preserved). Schmorl's nodes were also observed in the spine of one of the adolescents (33.3%). The number of vertebrae affected per skeleton ranged from one to thirteen, with an average of 5.9.

In total, 24.3% of vertebral bodies had Schmorl's nodes (Table 61). Almost all occurred in the thoracic (37.8%)

and lumbar (23.6%) spine, which is relatively typical for the location of these lesions (Hilton *et al.* 1976). As noted above in relation to degeneration of the vertebral bodies, prevalence should be calculated for each vertebra to gain a more informative picture of Schmorl's node distribution.

Table 61 Prevalence of Schmorl's nodes

Vertebra Type	**Total**		
	A	**P**	**%**
Cervical	0	286	0.0%
Thoracic	238	630	37.8%
Lumbar	70	296	23.6%
Sacral	1	57	1.8%
Total	309	1269	24.3%

A = affected (bodies with Schmorl's nodes); P = present (number of vertebral bodies present)

The proportion of Driffield Terrace individuals with Schmorl's nodes (76.5%) was significantly higher than the crude prevalence for Roman Britain (8.9%) reported by Roberts and Cox (2003, 147), and much higher than the proportion of individuals affected at Horncastle (46.7%, Caffell and Holst 2008, 37). However, it was identical to that observed in the study of a modern sample conducted by Hilton *et al.* (76%, 1976). The prevalence of vertebral bodies affected at Driffield Terrace (24.3%) was also high compared to the average reported for Roman Britain (17.7%, Roberts and Cox 2003, 147), and was double the frequency observed at Horncastle (12.3%, Caffell and Holst 2008, 37). Like Driffield Terrace, the highest proportion of Schmorl's nodes at Horncastle occurred in the thoracic spine).

3.5.4 Miscellaneous Joint Disease

Skeleton 6DT4 (old middle adult male) had osteophytes on the palmar side of the head of his right first metacarpal (palm part of the thumb), associated with two small sharp-edged lytic lesions at the joint margins. These lesions may be associated with joint disease.

3.6 NEOPLASTIC CONDITIONS

The term 'neoplastic' literally translates as 'new growth', and it refers to the uncontrolled growth of any tissue, including bone (Roberts and Manchester 2005, 252). Benign lesions are contained within a local area and have discrete boundaries; they are usually slow-growing. In contrast, malignant neoplasms grow and spread at an uncontrolled rate, and frequently distribute themselves throughout the body (Roberts and Manchester 2005). Neoplastic conditions are infrequently reported among archaeological populations, but routine radiography (rarely carried out unless part of a research project) would be required to identify internal bone changes before they become visible macroscopically and it seems likely that the true prevalence is being under-diagnosed (*ibid*).

Ivory osteomas are small dense round nodules of lamellar bone that appear as smooth well-demarcated lumps on the external surface of the cranium (Roberts and Manchester 2005, 255). These are benign lesions, and cause no symptoms (*ibid*). Ivory osteomas were observed on the crania of four individuals from Driffield Terrace, occurring on the left parietal of Skeletons 6DT2 (old middle adult male) and 6DT14 (young middle adult male), the right parietal of Skeleton 6DT20 (young middle adult male), and the frontal bone of Skeleton 3DT12 (young middle adult male). The frontal and parietal bones are the most common locations for ivory osteoma (Ortner 2003, 506). The percentage of the respective bones affected at Driffield Terrace was 3.6% of left parietals (2/55), 1.8% of right parietals (1/56), and 1.7% of frontal bones (1/59). Overall, the proportion of crania affected was 6.7% (4/60), which is comparable with the frequency of ivory osteomas at Horncastle (5.0% of crania, Caffell and Holst 2008, 39) and Ancaster (4.4% of individuals, Cox 1989).

One young adult male (Skeleton 3DT51) had a smooth round nodule of lamellar bone inside his left frontal sinus, on the anterior wall. This may be another example of an ivory osteoma, as they can be found inside the facial sinuses (Roberts and Manchester 2005, 255). Alternatively, this lesion may indicate lamellar bone formed in response to inflammation of the sinus, but no other signs of infection were observed inside the sinus cavities.

Skeleton 6DT2 (old middle adult male) had a large rounded nodule of bone (26 x 19mm) projecting 13mm on the posterior surface of his right humerus, located just inferior to the surgical neck. Post-mortem damage to the surface showed that the nodule had a thin outer cortex (<0.5mm thick) and internally was occupied by trabecular bone. The location close to the end of the bone shaft and presence of trabecular bone inside the lesion suggest this is probably an osteochondroma (Roberts and Manchester 2005, 254). These outgrowths of bone occur due to a localised fault in the normal growth mechanism of the bone, hence the location close to the metaphysis (the area of the long bone shaft where longitudinal growth takes place; Ortner 2003, 508). They begin to form during childhood, but cease development once growth is completed (Roberts and Manchester 2005, 254; Ortner 2003, 208-209). Ortner (2003, 509) notes that the shape of osteochondromas on the proximal humerus are usually broad-based and bulky, which fits the appearance of the lesion on the humerus of Skeleton 6DT2. Generally these lesions are symptomless, although the individual may have been aware of the localised swelling (Roberts and Manchester 2005, 254).

3.7 MISCELLANEOUS PATHOLOGY

3.7.1 Calcified Objects

Two individuals were found with unidentified ossified objects, possibly some form of calcified soft tissues. Two of these ossifications were found with Skeleton 3DT2 (old middle adult male). Both objects were roughly crescent-shaped, with a smooth convex surface and rougher concave surface. One measured 17.5x14.5x 10mm, and the other measured 11.4x 8.0x5.0mm. This individual also had ossified costal and thyroid cartilages. Skeleton 3DT47 (young middle adult male) had a roughly triangular ossified object (25.9x11.2mm) that was gently curved along its length. The convex side was smooth, and the concave side had a small ridge running along the centre of the long axis.

Soft tissues can calcify in response to factors such as trauma and disease (Giachelli 1999), and there are many different sources for calcified objects making specific identification difficult (Baud and Kramar 1991). Recent attempts to identify calcified objects found with archaeological skeletons have illustrated the wide range of possible options, with Perry *et al.* (2008) considering 30 types of calcified object and Komar and Buikstra (2003) considering nineteen in their differential diagnoses. Further research into the Driffield Terrace objects might enable them to be identified.

3.7.2 *Hallux Valgus*/Gout

Both gout and *hallux valgus* can cause similar lytic lesions on the medial side of the head of the first metatarsal (arch of the foot on the medial side). The lesions in gout are caused through the deposition of excess uric acid crystals in the soft tissues around the joint (Aufderheide and Rodríguez-Martín 1998, 109). Gout usually affects older males (*ibid*), and is associated with obesity, excessive alcohol consumption, kidney problems and high blood pressure (Roberts and Cox 2003). *Hallux valgus* refers to deviation of the big toe from the midline, leading to the formation of bunions (Mays 2005). This condition is often caused through wearing tight-fitting, pointed shoes, although in some individual the cause may be genetic (*ibid*).

Six individuals had lytic lesions in the medial head of the left first metatarsal, including four young middle adult males (Skeletons 3DT1, 3DT6, 3DT28 and 3DT33), a young adult male (Skeleton 6DT24), and an adolescent (Skeleton 3DT19). None of the lesions had the hook-like overhanging margins typical of gout. This, and the young age of the individuals concerned, suggests *hallux valgus* is the more likely cause. Furthermore, in Skeleton 6DT24, the left proximal foot phalanx was markedly asymmetric with the main axis diverging laterally. This would be consistent with the angulation of the big toe seen with *hallux valgus*. The frequency of *hallux valgus* at Driffield Terrace was 9.2% of first metatarsals (6/65, adults and adolescents combined), with 18.8% of left first metatarsals affected (6/32).

3.7.3 Cysts

Fourteen individuals had possible cysts, manifested as oval or circular smooth hollows in the bone. Two individuals had potential cysts in the spine, including Skeleton 3DT48 (old middle adult male), who possibly had a cyst in his fourth thoracic vertebra, and Skeleton 6DT14 (young middle adult male) who probably had a cyst in his second lumbar vertebra. The pelvis was affected in four individuals. Two had a cyst at the margin of the right auricular surface (Skeletons 3DT36, young adult male, and 6DT20, young middle adult male?). Skeleton 6DT20 also had a cyst in his left iliac blade just superior to the anterior inferior iliac spine. Skeleton 6DT19 (young middle adult male) had a cyst in his right ischium.

Three individuals had cysts in the leg, including two young middle adult males with cysts in the distal end of the femur adjacent to the joint surface (Skeletons 3DT17 and 6DT20); the latter also had two cysts in his pelvis mentioned above. Skeleton 3DT17 (young adult male) had a cyst at the margin of the distal joint of his left fibula.

The other areas where cysts were seen were the hands and feet. Three individuals had cysts in the hand, including in the lateral shaft of the third metacarpal (Skeleton 6DT13, old middle adult male), near the head of the second metacarpal (Skeleton 3DT11, unsexed adult), and the left hamate (Skeleton 3DT43, young adult male). Cysts were seen in the feet of five individuals. Locations included the head of the first metatarsal (Skeleton 3DT3, old middle adult male), head of the fifth metatarsal (Skeleton 3DT43, young adult male), the first proximal foot phalanx (Skeleton 3DT8, young middle adult male), a proximal foot phalanx (Skeleton 6DT24, young adult male?), and a distal foot phalanx (Skeleton 3DT44 (young middle adult male).

3.7.4 *Ischial Bursitis* ('Weaver's Bottom')

Inflammation of the bursa (a fluid-filled sac that cushions bones and tendons) that overlies the ischial tuberosity ('sitting bones') of the pelvis is often observed in individuals who sit for long periods of time on hard surfaces, but can also be caused through falling onto the backside (Cho *et al.* 2004). Symptoms include chronic buttock pain that may radiate down the posterior thigh, which can be disabling and cause problems with walking (*ibid*).

Two old middle adult males (Skeletons 3DT22 and 6DT4) had porosity and irregular nodules of lamellar bone on the superior halves of both ischial tuberosities. Skeleton 6DT4 also had diamond-shaped depressions in the centre of the affected area. These lesions may indicate these individuals suffered from *ischial bursitis* (also known as 'weaver's bottom').

3.7.5 Other Pathological Conditions

Various other pathological lesions were observed, but the cause of the lesions remains unknown. These are described briefly here.

Seven individuals (six males and the female) had shallow depressions at the anterior margins of the vertebral bodies. These depressions had rough, porous floors and occupied the area normally occupied by the annular ring. The lesions were found on the inferior and superior vertebral body surfaces. The inferior surface of the twelfth thoracic vertebra was affected in Skeleton 3DT12 (young middle adult male), the inferior surfaces of the tenth and eleventh thoracic vertebrae were affected in Skeleton 6DT24 (young adult male?), and the superior surface of the eleventh thoracic vertebra was affected in Skeleton 3DT42 (young middle adult female). Four individuals had more extensive involvement of vertebral bodies, including Skeleton 3DT32 (young adult male; superior and/or inferior surfaces of T3, T5-T10 and T13), Skeleton 3DT33 (young middle adult male; superior surfaces of T7-9); Skeleton 3DT35 (old middle adult male; inferior surfaces of T4-6), and Skeleton 3DT45 (young middle adult male; superior and/or inferior surfaces of T3-T9 and T11).

The body of the ninth thoracic vertebra of Skeleton 6DT16 (young middle adult male) was slightly compressed, and there was a well-defined crescent-shaped depression occupying the anterior part of the superior body surface. This individual may have suffered from Scheuermann's disease. This condition manifests during adolescence, affects more males than females, and tends to affect the eighth to tenth thoracic vertebrae (Ortner 2003, 463-464). It involves damage to the anterior disc space that leads to a reduction in growth of the anterior vertebral body, resulting in a wedge-shaped vertebra (*ibid*). The individual may develop kyphosis (forward bending) of the spine as a result. However, the degree of compression in the ninth thoracic vertebra of Skeleton 6DT16 was not pronounced, and the diagnosis is tentative.

Two skeletons from 6 Driffield Terrace had very similar lesions in their lumbar spine. In Skeleton 6DT19 (young middle adult male) the second and fourth lumbar bodies were affected, and in Skeleton 6DT21 (old middle adult male) the first and second lumbar bodies were involved. The inferior surfaces were affected in all vertebrae except the fourth lumbar of Skeleton 6DT19 (where the superior surface was affected). The lesions manifested as deep depressed lesions with rough, irregular floors that occupied the anterior half of the body surface, but the annular ring was preserved.

Skeleton 3DT15 (young adult male) had a groove running across the superior body surface of this fifth thoracic vertebra, from the anterior-left margin to the posterior-right margin. There was a shallow depression in the anterior part of the superior body surface of his sixth thoracic vertebra, with an indistinct groove running diagonally along the posterior margin of the depression.

Three individuals had lesions that may have been associated with soft tissues. There was a slightly raised, flattened area on the dorsal surface of the shaft of the right first metatarsal of Skeleton 3DT46 (young middle adult male), located approximately 4mm proximal to the head. The left first metatarsal has a raised nodule of bone in the equivalent location. These may relate to the joint capsule. Three distal hand phalanges of Skeleton 6DT24 (young adult male?) had well-defined triangular depressions on the palmar surface of the proximal end, at the insertion points for *flexor digitorum profundus*. Skeleton 3DT56 (unsexed adult) had a small teardrop-shaped depression in the head of his right femur, extending from the inferior border of the *fovea capitis* (attachment point for *ligamentum teres*, the ligament that helps anchor the head of the femur in the acetabulum). This lesion might relate to this ligament.

The right maxilla of Skeleton 3DT32 (young adult male) had a small circular nodule of bone located approximately 14mm superior to the upper right second premolar. Post-mortem damage revealed trabecular bone inside the nodule.

Both tibiae of Skeleton 3DT4 (young adult male) had post-mortem breaks through the midshaft, exposing the medullary cavity. Both tibiae had a deposit of lamellar bone occupying the posterior part of the medullary cavity. These bone deposits appeared to be layers of bone twisted into an ‘S’ shape.

The right tibia of Skeleton 3DT47 (young middle adult male) had a small prominent nodule of lamellar bone on the medial midshaft, close to the posterior border.

Finally, Skeleton 3DT26 (old middle adult male?) had an enlarged nutrient foramen in the shaft of his left first metatarsal.

3.8 CONCLUSION

A variety of pathological conditions were observed. Many of the individuals had minor developmental anomalies, often affecting the spine, but also affecting the skull, feet and other areas of the skeleton. Most of these are unlikely to have caused symptoms, although one male had a developmental condition affecting his right shoulder that may have led to pain and limited range of movement of the arm when he reached adulthood.

A high frequency of *os acromiale* (non-fusion of the lateral part of the shoulder blade that extends over the shoulder joint with the remainder of the shoulder blade) was observed, which could indicate that these individuals had experienced repeated stress to the rotator cuff muscles during development.

A relatively high prevalence of *cribra orbitalia* in the Driffield Terrace individuals suggested these individuals may have suffered from poor diet, illness and infection with parasites during childhood, although the aetiology of the lesions is complex.

Evidence for healed ante-mortem trauma was frequent, some of which potentially indicated interpersonal violence, although other injuries could have been sustained through non-aggressive means (such as falls). Nearly a quarter of the adults and adolescents had healed cranial trauma, including small, depressed fractures in the crania which were particularly frequent in the forehead and on the left side of the skull vault. This pattern of lesions could suggest injuries received during hand-to-hand combat with a right-handed opponent. One individual had an injury to the back of the head, and two had fractures in the region of the nose. Again facial injuries are frequently attributable to aggression. There were healed fractures to the torso, including rib fractures which could be due to blows or falls. Clay shoveler's fractures to the first thoracic vertebrae occurred in two males, an injury previously associated with digging. Fractures to the spinous processes of other thoracic vertebrae (central spine), and transverse processes of lumbar and thoracic vertebrae (central and lower spine), could potentially have resulted from direct blows to the back (although falls can also be implicated).

Two types of spinal injury that have been associated with athletes were also observed, namely anterior disc herniation in the vertebrae, an injury probably sustained during adolescence, and *spondylolysis* (a fracture usually seen in the base of the spine, the cause of which is debated; some suggest a congenital weakness in the spine predisposes to the fracture). One of the old adult males with *spondylolysis* had developed the unfortunate complication of *spondylolisthesis*, where the injured vertebra slips forward. One male had probably suffered an injury to the lower limb during adolescence, and again this type of injury (Osgood-Schlatter's disease) is often associated with athletes.

Twenty individuals had healed fractures to their limb bones. Notably, there was a high prevalence of fractures to the first metacarpal at the base of the thumb, an injury usually caused by punching and often sustained during fights or sporting activities. All these fractures occurred in the right thumb, which correlates with modern data indicating they are usually sustained in the dominant hand. An unhealed fracture to a scapula blade had probably also been sustained through a direct blow, and could be another indication for interpersonal violence. The male that sustained this injury had probably only survived a couple of weeks before he died. Two individuals may have received direct blows to the lower leg resulting in fractured fibulae. Other lesions were more indicative of accidental injuries. Some injuries to the upper limb were suggestive of falls onto an outstretched hand, and included fractures to the clavicle and wrist. The latter included a comminuted fracture to the distal joint of the left radius, an unhealed fracture to the left scaphoid, and a fracture to the hook of the hamate (although this could have been caused by a direct blow to the palm of the hand). In the lower limb fractures to the ankle region and foot would typically have been caused through twisting the ankle. Twisted ankles could also be inferred through the evidence for soft tissue damage to the feet and ankles. There was also evidence for soft tissue damage to the shoulder joint and shoulder muscles, as well as other locations in the torso, pelvis, and limbs. Other healed traumatic lesions observed included osteochondritis dissecans, and potential joint dislocation or partial dislocation.

There was only one healed blade injury, which had occurred to the back of the right thigh. However, the frequency of peri-mortem blade injuries was high, and between 63-68% of adults had experienced cuts to the neck, most of which were associated with decapitation or attempted decapitation (not all attempts had been successful), while three cuts were possibly the result of stabbing injuries to the neck. Cuts to the neck were most frequent in the young middle adults, and least frequent in young adults (none occurred in non-adults). Cuts were seen in all of the seven cervical vertebrae, but were most frequent in the fourth cervical vertebra (central part of the neck). Cuts to the spine had sometimes also penetrated the mandible, temporal bones (area of the skull around the ear), scapula, clavicles and first ribs. Although 63% of the individuals had a single cut to the neck, the maximum number of cuts sustained was seventeen to eighteen. Most of these cuts (where it was possible to ascertain direction) had been delivered from behind, but some had been delivered from the sides or front. Two individuals also had vertical cuts down the back of the neck. Two individuals had shallow peri-mortem cuts to the bones on the little-finger side of the hand, and one male had a cut to the front of the thigh just above the knee. No convincing peri-mortem trauma (sharp or blunt force) was observed in the skull. However, one individual may have had a peri-mortem blunt force fracture to his right forearm, possibly the result of parrying a blow. It should be noted that no healed parry fractures were observed. One individual had potential carnivore bite marks in the pelvic bones, which require further specialist study.

Infection was relatively common. There was evidence for respiratory tract infections, including both maxillary sinusitis and lung infections, some of which were active at the time the person died. The lower limbs, particularly the shins, were particularly prone to inflammation, which could have been due to infection or trauma. Most of these lesions were subtle, but more extensive lesions were observed, including in the male buried with iron bands around his shins. Inflammation was also observed on the bones of the skull, upper limb and pelvis. Smooth, swollen lumps were observed on the tibiae and femora of thirteen adults, which may have been localised periosteal reactions or ossified haematomas and it is possible these occurred in response to trauma. Potential osteomyelitis (where infection is also present inside the bone) was observed in three adults, affecting the left ulna in two adults and the femur in the third. A disarticulated radius was also affected. Two individuals may have had infection of the joints between the pelvic blades and the base of the spine.

Unsurprisingly, considering the fact that there were no mature adults in the Driffield Terrace population, evidence for joint disease was relatively infrequent. Joint disease was seen far more often in the old middle adults, rather than younger adults, as would be expected. Osteoarthritis was seen in a very small proportion of the joints in the spine, and also in the extra-spinal joints. Those most frequently affected were the hip (major weight bearing joint of the lower limb) and clavicles (which are commonly involved in modern populations). Degeneration of the joints between the jaw and base of the cranium was associated with changed patterns of occlusion (contact between teeth) in three individuals and with an asymmetric mandible in a fourth. Some of the osteoarthritis observed had occurred as a complication of trauma, notably in the ankle and wrist, but also related to *spondylolisthesis* (discussed above). Degenerative changes to the vertebral bodies were particularly infrequent. However, Schmorl's nodes (caused by ruptured spinal discs) were common, particularly in the thoracic (central) spine. It is probable that the majority of these lesions were due to trauma, although other causes also ought to be considered.

A small number of individuals had small benign growths of bone (ivory osteomas) on their crania, and one had an *osteochondroma*, a lump of bone on his humerus that had formed during childhood. Cysts were frequently observed and distributed throughout the skeleton. Calcified objects were present with two individuals, but are as yet unidentified. A small proportion of individuals probably had bunions through wearing poorly-fitting shoes, and two may have developed a painful inflammation of the soft tissue protecting the bone in the bottom. Various undiagnosed pathological conditions were also observed.

4.0 DENTAL HEALTH

Analysis of the teeth from archaeological populations provides vital clues about health, diet and oral hygiene, as well as information about environmental and congenital conditions (Roberts and Manchester 2005). All teeth and jaws were examined macroscopically for evidence of pathological changes. True prevalence rates were calculated as a proportion of tooth positions or teeth (as appropriate for the condition observed), and also as a proportion of the individuals with tooth positions or teeth present.

Fifty-nine adults (58 males and 1 female) had surviving dentitions comprising teeth and jaw bones. Forty-one of these adults were from 3 Driffield Terrace (78.8% of 52 adults) and eighteen were from 6 Driffield Terrace (78.3%). These individuals provided a total of 1,729 tooth positions and 1,590 fully erupted permanent teeth for observation (Table 62). Males had 1,699 tooth positions and 1,561 teeth, while the female had 30 tooth positions and 29 teeth. At 3 Driffield Terrace the number of tooth positions was 1,174 and teeth numbered 1,079. At 6 Driffield Terrace the figures were 555 tooth positions and 511 teeth (Table 62).

Table 62 Summary of tooth and socket preservation in the adult individuals

	3 DT	6 DT	Total
Tooth positions	1174	555	1729
Teeth lost PM	52	9	61
Teeth removed for sampling	0	18 (2 loose)	18 (2 loose)
Teeth present	1079	511	1590
Loose Teeth	15	10	25

A small percentage of teeth had been lost post-mortem (61/1,729, 3.5%), with a higher proportion of teeth lost post-mortem at 3 Driffield Terrace (4.4%, 52/1,174) compared to 6 Driffield Terrace (1.6%, 9/555). Eighteen teeth (3.2%, 18/555) had also been removed for sampling at 6 Driffield Terrace, further reducing the number of teeth present for observation. Nine skeletons (8 males, 1 female) had 25 loose teeth whose sockets had been lost (23 male teeth, 2 female teeth). This explains the discrepancy between the number of teeth present, number of teeth lost/absent for various reasons, and the number of tooth positions present for observation.

The three adolescents all had surviving dentitions, comprising 96 tooth positions and 87 fully erupted permanent teeth. The two juveniles also had teeth and jaws present. The young juvenile (Skeleton 3DT20) had eight erupted deciduous teeth, whereas the older juvenile (Skeleton 3DT25) had a mixed dentition comprising fifteen erupted deciduous teeth and four fully erupted permanent teeth.

Six mandibles/partial mandibles (from a minimum of five adults) and three partial maxillae (from a minimum of two adults) containing teeth and/or tooth sockets were present among the disarticulated bone. A left and right maxilla and one of the mandibles (from Context 4099) were from the same individual. Sixteen loose teeth were also recovered. Overall, the disarticulated material yielded 94 tooth positions and 98 teeth. Eight teeth (8.5%) had been lost post-mortem, which is higher than the prevalence of post-mortem loss among the articulated skeletons.

The data for Driffield Terrace has been compared, where possible, to other sites throughout the following section. No data was available on the dental health of the Ephesus population. Data on the frequency of teeth affected by different dental conditions was not available for the individuals from 89 The Mount, and was rarely provided for Trentholme Drive. The data from Ancaster was also variable, and where possible prevalence rates were calculated from the data provided in the report. The data on both Mill Mount populations has been used to calculate the proportion of adult teeth affected in order to provide a more consistent comparison with the Driffield Terrace data. It is important to bear in mind that the age distribution of the population will have had an impact on the frequency of dental disease observed, since many conditions accumulate during life. Therefore, a population containing a large proportion of older adults (e.g. Horncastle) would be expected to have a higher prevalence of many dental diseases than a population containing a large proportion of younger adults (e.g. Driffield Terrace). A more detailed comparison of dental disease between different age groups would be more informative, but was beyond the scope of the current report.

4.1 CALCULUS

If plaque is not removed from the teeth effectively (or on a regular basis) then it can mineralise and form concretions of calculus on the tooth crowns or roots (if these are exposed), along the line of the gums (Hillson 1996, 255-257). Mineralisation of plaque can also be common when the diet is high in protein (Roberts and Manchester 2005, 71). Calculus is commonly observed in archaeological populations of all periods, although poor preservation or damage caused during cleaning can result in the loss of these deposits from the teeth (Roberts and Manchester 2005, 64).

Calculus deposits were seen on the teeth of all but one of the adult individuals, and affected 86.9% of the teeth present (1,381/1,590; Table 63). Calculus deposits were marginally less common on the young adult teeth (83.3%) compared to the young middle and old middle adults (Table 63). By far the majority of teeth with calculus (89.3%, 1,233/1,381) had flecks or slight deposits. A small percentage had medium (8.3%, 114/1,381) or heavy deposits (2.5%, 34/1381). Calculus was observed on 93 (94.9%) of the disarticulated teeth, and all of these deposits were flecks or slight.

Table 63 Dental calculus (teeth from adults)

Age Group	Male Teeth			Female Teeth			Total Teeth		
	Calculus	Total	%	Calculus	Total	%	Calculus	Total	%
YA	320	384	83.3%	-	0	-	320	384	83.3%
YMA	553	630	87.8%	27	29	93.1%	580	659	88.0%
OMA	385	442	87.1%	-	0	-	385	442	87.1%
MA	-	0	-	-	0	-	-	0	-
A	96	105	91.4%	-	0	-	96	105	91.4%
Total	1354	1561	86.7%	27	29	93.1%	1381	1590	86.9%

Calculus also affected all three of the adolescent individuals, and the proportion of teeth affected (75.9%, 66/87) was slightly lower than that of the young adults. All of these deposits were flecks or slight. Both the juveniles had calculus deposits on their deciduous teeth, affecting fifteen teeth in total (65.2%, 15/23 deciduous teeth); none of their permanent teeth were affected. The data thus suggests a general increase in calculus prevalence throughout childhood into early adulthood.

The pattern of calculus prevalence differed between the males from 3 Driffield Terrace and 6 Driffield Terrace (Table 64 and Figure 26). It was more frequently observed at 6 Driffield Terrace, but differences in preservation/ post-excavation treatment between the sites could potentially explain this. At 3 Driffield Terrace calculus prevalence was fairly similar between the three adult age groups present, even decreasing slightly with age, whereas at 6 Driffield Terrace there was a marked increase in calculus prevalence from the young adult to the young middle adult age group.

Table 64 Male calculus prevalence (teeth affected): 3 Driffield Terrace and 6 Driffield Terrace

Age Group	3DT Males			6DT Males			Total Males		
	Calculus	Total	%	Calculus	Total	%	Calculus	Total	%
YA	208	239	87.0%	112	145	77.2%	320	384	83.3%
YMA	421	496	84.9%	132	134	98.5%	553	630	87.8%
OMA	222	268	82.8%	163	174	93.7%	385	442	87.1%
MA	-	0	-	-	0	-	-	0	-
A	38	47	80.9%	58	58	100.0%	96	105	91.4%
Total	889	1050	84.7%	465	511	91.0%	1354	1561	86.7%

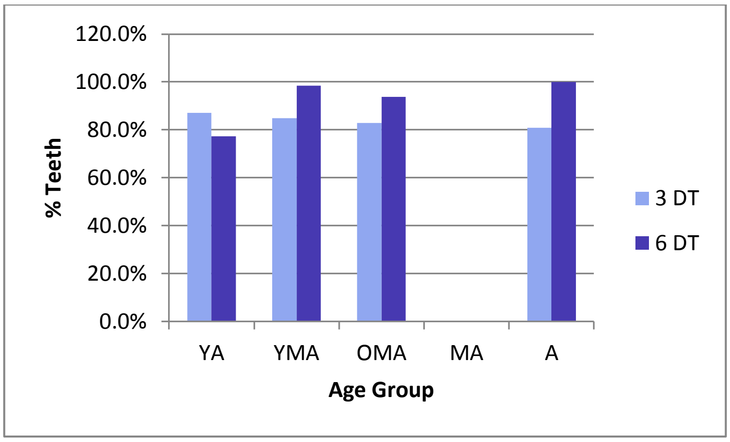


Figure 26 Male calculus prevalence (teeth affected): 3DT and 6DT

Markedly asymmetric and/or occlusal calculus (on the biting surfaces of the teeth) was observed in the dentitions of twelve individuals (20.3% of 59 adults), nine from 3 Driffield Terrace and three from 6 Driffield Terrace. In five of these individuals the heavier deposits and/or occlusal calculus were seen on the same side of the mouth as a fractured tooth (Skeletons 3DT34 (young adult male), 3DT27 (adult male), and 6DT7 (old middle adult male)) or a carious tooth with an associated abscess (Skeletons 6DT19 (young middle adult male), and 6DT21 (old middle adult male)). Another skeleton (3DT54, young middle adult male) also had a single carious tooth on the same side as the heavy deposits of calculus, although the cavity was medium in size and no abscess was apparent. In these individuals, pain on one side of the mouth may have led to preferential chewing on the opposite side and encouraged the build-up of calculus on the side less used. However, two young adult males (Skeletons 3DT32 and 3DT41) had dental caries on both sides of the mouth, but the larger cavities and associated abscesses occurred on the opposite side to the heavier/occlusal deposits of calculus. This would appear to contradict the pattern observed in the previous skeletons.

The occlusal calculus in two individuals can be explained through unusual occlusion patterns, meaning the biting surfaces of the teeth were not meeting in the normal way: in Skeleton 3DT8 (young middle adult male) many teeth were displaced and had erupted at unusual angles; and in Skeleton 3DT21 (old middle adult male?) the upper right dental arcade was concave on the buccal (cheek) side rather than convex, and the lower right dental arcade was straighter than normal. In Skeleton 3DT26 (old middle adult male?) the lower left first and second molars had been lost during life, and the fact that occlusal calculus was present on the upper left first and second molars (which had also over-erupted) suggests this loss may have been long-standing. The lower jaw of Skeleton 3DT3 (old middle adult male) had been lost post-mortem, so it was impossible to gauge the possible reason for the occlusal calculus on the left upper teeth.

The percentage of teeth with calculus at Driffield Terrace was double the Roman British average (43.4%; Roberts and Cox 2003, 132), and it was also higher than the prevalence of calculus in the adult teeth from the Mill Mount sites (Holst 2005, Holst 2006). However, it was lower than the prevalence of calculus seen in the adult teeth from Horncastle (Caffell and Holst 2008; Table 65). Variation in the way different individuals record calculus could account for some of this variation, and notably the two sites with the highest prevalence rates were both recorded by the same author. At Ancaster, calculus had affected 70.9% of the adults, but no data was provided on the proportion of teeth affected (Cox 1989). Calculus was observed in the individuals from Trentholme Drive, and was noted to be particularly heavy in the vicinity of severe carious lesions, dental abscesses and partial impaction (Cooke and Rowbotham 1968, 204-205). This is consistent with the observations made at Driffield Terrace.

Table 65 Comparative sites: calculus prevalence (adult teeth)

Site	Calculus %
Horncastle[1]	95.1%
Driffield Terrace	**86.9%**
Mill Mount 05[2]	78.6%
Mill Mount 04[3]	56.0%
Roman Britain[4]	43.4%

[1] Caffell and Holst (2008, 43-44); [2] prevalence of adult teeth affected calculated from data in Holst (2006); [3] prevalence of adult teeth affected calculated from data in Holst (2005); [4] Roberts and Cox (2003, 132)

At Driffield Terrace calculus deposits were observed on the deciduous teeth of the juveniles (65.2%); no calculus was seen on their permanent teeth. In comparison, among the Horncastle juveniles 62.5% of the deciduous teeth and 33.3% of the permanent teeth had calculus deposits (Caffell and Holst 2008, 43), but no calculus was seen on the deciduous teeth from the Mill Mount 04 juvenile (Holst 2005, 16). Three-quarters of the permanent teeth from the Driffield Terrace adolescents had calculus deposits. At Mill Mount 05, 13.3% of the adolescent permanent teeth had calculus deposits (Holst 2006, 10), but again at Mill Mount 04 no calculus deposits were seen on the adolescent teeth (Holst 2005, 16).

4.2 PERIODONTAL DISEASE

Calculus deposits in-between and around the necks of the teeth can aggravate the gums leading to inflammation of the soft tissues (gingivitis). In turn, gingivitis can progress to involve the bone itself, leading to resorption of the bone supporting the tooth, and the loss of the periodontal ligament that helps to anchor the tooth into the socket (Roberts and Manchester 2005, 73). It can be difficult to differentiate between periodontal disease and continuous eruption (whereby the teeth maintain occlusion despite heavy wear) in skeletal material, since both result in exposure of the tooth roots (Roberts and Manchester 2005, 74).

The presence/absence of periodontal disease could be observed for 58 of the adults (the jaw bones of one adult were too damaged to observe). Over half of the adults (55.2%, 32/58) showed signs of periodontal disease. The condition was most prevalent among the old middle adults, but was least frequent among the young middle adults (Table 66 and Figure 27). One adolescent (33.3%) had slight periodontal disease.

Table 66 Periodontal disease (adult individuals affected)

Age Group	Males			Females			Total		
	PD	Total	%	PD	Total	%	PD	Total	%
YA	6	12	50.0%	-	0	-	6	12	50.0%
YMA	10	25	40.0%	0	1	0.0%	10	26	38.5%
OMA	14	16	87.5%	-	0	-	14	16	87.5%
MA	-	0	-	-	0	-	-	0	-
A	2	4	50.0%	-	0	-	2	4	50.0%
Total	32	57	56.1%	0	1	0.0%	32	58	55.2%

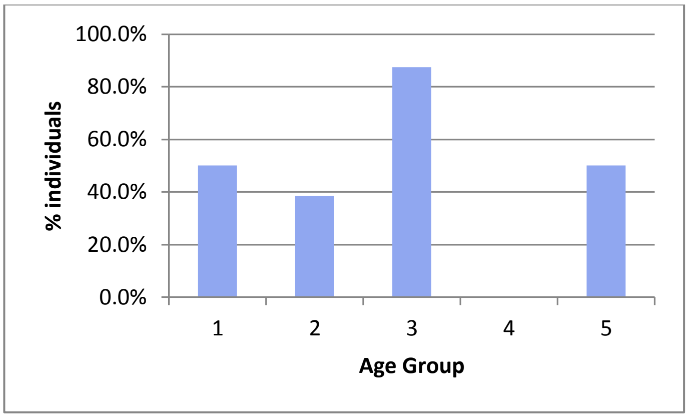


Figure 27 Periodontal disease (individuals affected)

The majority of the periodontal disease observed was slight. Only five individuals (8.6%) had moderate or considerable periodontal disease, and these more severe expressions showed a more marked correlation with age, from 0.0% of young adults to 25.0% of old mature adults affected (Table 67).

Table 67 Moderate and considerable periodontal disease (adult individuals affected)

Age Group	Males			Females			Total		
	PD	Total	%	PD	Total	%	PD	Total	%
YA	0	12	0.0%	-	0	-	0	12	0.0%
YMA	1	25	4.0%	0	1	0.0%	1	26	3.8%
OMA	4	16	25.0%	-	0	-	4	16	25.0%
MA	-	0	-	-	0	-	-	0	-
A	0	4	0.0%	-	0	-	0	4	0.0%
Total	5	57	8.8%	0	1	0.0%	5	58	8.6%

In comparison, periodontal disease was reported in 29.3% of individuals from Roman Britain (Roberts and Cox 2003, 137), and all individuals from Horncastle (Caffell and Holst 2008, 47) and both Mill Mount sites (Holst 2005, 16-17; 2006, 10). At Trentholme Drive, the proportion of individuals suffering from more severe periodontal disease was probably around 21% (based on data provided in Table XVI, Cooke and Rowbotham 1968, 204).

4.3 DENTAL CARIES

Dental caries (tooth decay) forms when bacteria in the plaque metabolise sugars in the diet and produce acid, which then causes the loss of minerals from the teeth and eventually leads to the formation of a cavity (Zero 1999). Simple sugars can be found naturally in fruits, vegetables, dried fruits and honey, as well as processed, refined sugar; since the latter three contain the most sucrose they are most cariogenic. Complex sugars are usually less cariogenic and are found in carbohydrates, such as cereals. However, processing carbohydrates, including grinding grains into fine powders or cooking them, will usually increase their cariogenicity (Moynihan 2003).

Thirty-three (55.9%) of the adults had dental caries, including 32 males and the female individual, and the proportion of teeth affected was 5.6% (Table 68). The prevalence of caries among the disarticulated teeth was only slightly higher, at 6.1% (6 teeth affected). Since cavities cannot be repaired by the body, they accumulate with age, and so a higher prevalence is usually seen in older individuals. At Driffield Terrace an increase in caries was observed between the young middle and old middle adult age groups (as expected), but the prevalence among young adults was high (Table 68). If the caries prevalence among adolescents (2.3%, 2/87 teeth) is considered along with the adult data, the general progression from low to high caries prevalence with age is more apparent, disrupted by the young adult peak in caries frequency (Figure 28). Dental caries was not observed in any of the non-adults, other than the single adolescent affected.

Table 68 Dental caries (teeth from adults)

Age Group	Male Teeth			Female Teeth			Total Teeth		
	Caries	**Total**	**%**	**Caries**	**Total**	**%**	**Caries**	**Total**	**%**
YA	24	384	6.3%	-	0	-	24	384	6.3%
YMA	22	630	3.5%	2	29	6.9%	24	659	3.6%
OMA	35	442	7.9%	-	0	-	35	442	7.9%
MA	-	0	-	-	0	-	-	0	-
A	6	105	5.7%	-	0	-	6	105	5.7%
Total	87	1561	5.6%	2	29	6.9%	89	1590	5.6%

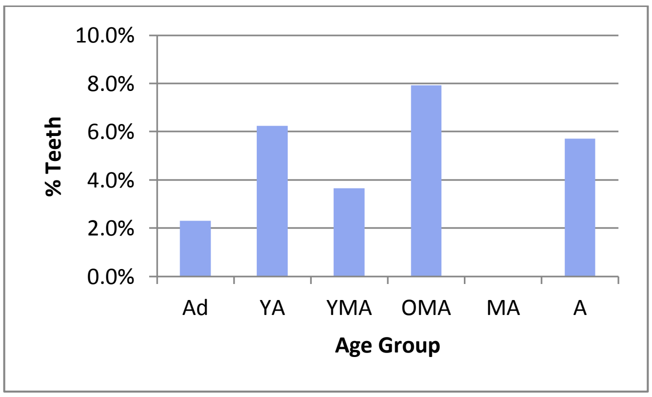


Figure 28 Caries prevalence (teeth affected)

The males from 3 Driffield Terrace had a slightly higher caries prevalence (5.9%) compared to the males from 6 Driffield Terrace (4.9%). Examining the pattern of caries prevalence by age is interesting (Table 69 and Figure 29). The prevalence rates are very similar between the two sites for the young middle and old middle adults, and in fact the prevalence at 6 Driffield Terrace is marginally higher in these two age groups. However, the caries prevalence among the young adult males at 3 Driffield Terrace is more than double that of the young males at 6 Driffield Terrace. The males at 6 Driffield Terrace show the expected pattern of increased caries with age, so it seems that the anomalous spike in young adult caries prevalence occurs mainly among the males of 3 Driffield Terrace.

Table 69 Male caries prevalence (teeth affected): 3 Driffield Terrace and 6 Driffield Terrace

Age Group	3DT Males			6DT Males			Total Males		
	Caries	Total	%	Caries	Total	%	Caries	Total	%
YA	19	239	7.9%	5	145	3.4%	24	384	6.3%
YMA	17	496	3.4%	5	134	3.7%	22	630	3.5%
OMA	21	268	7.8%	14	174	8.0%	35	442	7.9%
MA	-	0	-	-	0	-	-	0	-
A	5	47	10.6%	1	58	1.7%	6	105	5.7%
Total	62	1050	5.9%	25	511	4.9%	87	1561	5.6%

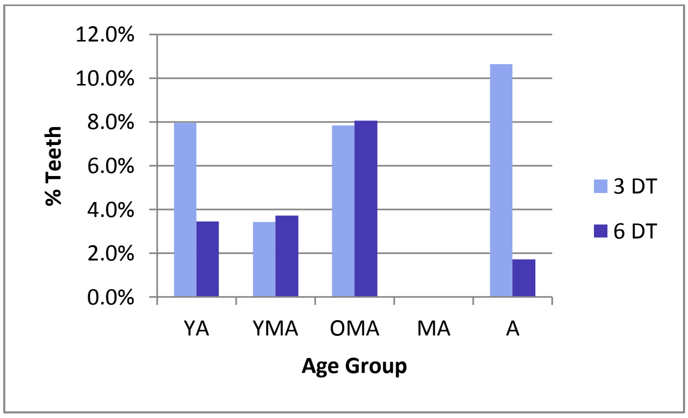


Figure 29 Male caries prevalence (teeth affected): 3DT and 6DT

Ninety-two cavities were observed, as three teeth each had two lesions. Half of these lesions (46/92, 50.0%) occurred in either the mesial or distal surfaces of the teeth (these are the surfaces in contact with the neighbouring teeth). Just over a quarter of the cavities were in the occlusal (biting) surfaces of the teeth (24/92, 26.1%). The remaining cavities (22/92, 23.9%) were so large that the point of origin could not be determined. Moore and Corbett (1973) found that cavities occurred most frequently on the surfaces between the teeth in the Roman period, although cavities in the occlusal surfaces were more common in younger individuals.

The prevalence of caries among the adult teeth at Driffield Terrace (5.6%) was lower than average for the Roman period in Britain (7.5%, Roberts and Cox 2003, 132). It was also lower than several of the comparative sites, and was half the prevalence of caries seen at Horncastle (Caffell and Holst 2008; Table 70 and Figure 30). Considering the young age bias of the Driffield Terrace population, this is not surprising. Horncastle, with the highest caries prevalence, had a large proportion of older adults, but even if the mature adults were discounted and the prevalence calculated for the three younger age groups the prevalence was still high (10.9%). The Driffield Terrace caries prevalence was similar to (slightly higher than) that seen at Mill Mount 04, but lower than that seen at Mill Mount 05 (Holst 2005, Holst 2006; Table 70). The Driffield Terrace prevalence was also slightly higher than that seen at Trentholme Drive (4.9%, calculation based on data in Table XIX, Cooke and Rowbotham 1968, 206).

Table 70 Comparative sites: caries prevalence (adult teeth)

Site	Caries %
Horncastle[1]	11.4%
Mill Mount 05[2]	8.6%
Roman Britain[3]	7.5%
Ancaster[4]	7.5%
Driffield Terrace	**5.6%**
Mill Mount 04[5]	5.2%
Trentholme Drive[6]	4.9%

[1] Caffell and Holst (2008, 44-45); [2] prevalence of adult teeth affected calculated from data in Holst (2006); [3] Roberts and Cox (2003, 132); [4] prevalence of adult teeth affected calculated from data in Cox (1989); [5] prevalence of adult teeth affected calculated from data in Holst (2005); [6] prevalence of adult teeth affected calculated from data in Cooke and Rowbotham (Table XIX, 1968, 206)

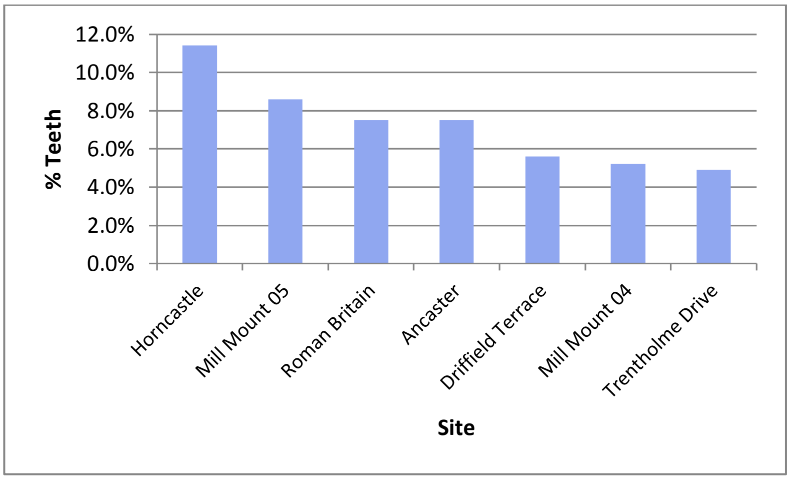


Figure 30 Comparative sites: caries prevalence (adult teeth)

The prevalence of caries among the Driffield Terrace adolescents (2.3%) is almost identical to the prevalence of the Trentholme Drive adolescents (2.2%, Cooke and Rowbotham 1968, 206). Dental caries was not observed among any of the adolescents or juveniles from Mill Mount (Holst 2005, Holst 2006). At Ancaster, dental caries was seen in both deciduous and permanent teeth from non-adults, with prevalence rates of 5.9% and 0.7% respectively (calculated using data provided in Cox 1989).

4.4 ABSCESSES

Dental abscesses occur when bacteria enter the pulp cavity of a tooth causing inflammation and a build-up of pus at the apex of the root. Eventually, a hole forms in the surrounding bone allowing the pus to drain out and relieve the pressure. They can form as a result of dental caries, heavy wear of the teeth, damage to the teeth (e.g. fractures), or periodontal disease (Roberts and Manchester 2005).

Sixteen individuals (27.1% of 59 adults) had developed at least one dental abscess, all of whom were males. Abscesses had formed at 1.5% of the surviving tooth positions, and a general increase in prevalence with age (from 1.0% in the young adults to 2.4% in the old middle adults) could be observed (Table 71 and Figure 31). Abscesses were not observed in the disarticulated jaws.

Table 71 Dental abscesses (adult tooth positions)

Age Group	Male Tooth Positions			Female Tooth Positions			Total Tooth Positions		
	Abscess	Total	%	Abscess	Total	%	Abscess	Total	%
YA	4	408	1.0%	-	0	-	4	408	1.0%
YMA	8	678	1.2%	0	30	0.0%	8	708	1.1%
OMA	12	499	2.4%	-	0	-	12	499	2.4%
MA	-	0	-	-	0	-	-	0	-
A	2	114	1.8%	-	0	-	2	114	1.8%
Total	26	1699	1.5%	0	30	0.0%	26	1729	1.5%

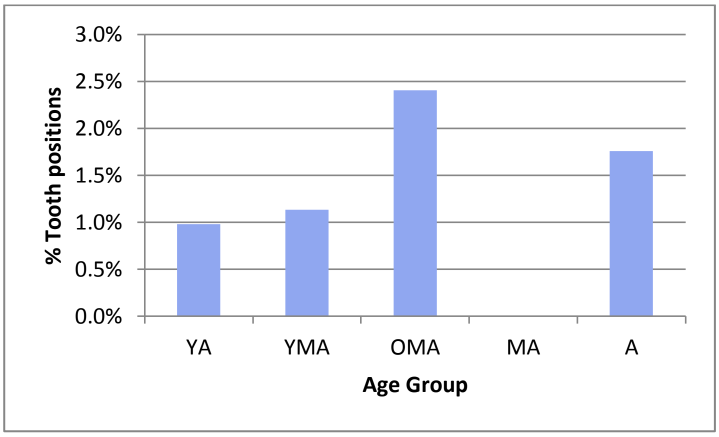


Figure 31 Abscess prevalence (tooth positions affected)

Abscess prevalence among the males from 3 Driffield Terrace and 6 Driffield Terrace was very similar overall, at 1.5% and 1.6% respectively, but there were differences in prevalence in different age groups. As with caries prevalence, the 3 Driffield Terrace males did not show the progressive increase in abscess prevalence with age that was apparent in the 6 Driffield Terrace males (Table 72 and Figure 32). The raised abscess prevalence among the young adult males from 3 Driffield Terrace may be related to the high caries prevalence observed in this group (see above).

Table 72 Male abscess prevalence (tooth positions affected): 3 Driffield Terrace and 6 Driffield Terrace

Age Group	3DT Males			6DT Males			Total Males		
	Abscess	Total	%	Abscess	Total	%	Abscess	Total	%
YA	3	249	1.2%	1	159	0.6%	4	408	1.0%
YMA	5	530	0.9%	3	148	2.0%	8	678	1.2%
OMA	7	314	2.2%	5	185	2.7%	12	499	2.4%
MA	-	0	-	-	0	-	-	0	-
A	2	51	3.9%	0	63	0.0%	2	114	1.8%
Total	17	1144	1.5%	9	555	1.6%	26	1699	1.5%

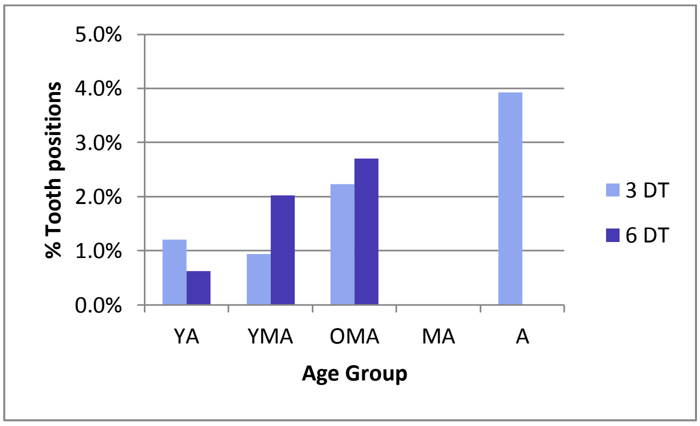


Figure 32 Male abscess prevalence (tooth positions affected): 3DT and 6DT

Over half of the abscesses (57.7%, 15/26) were associated with large or medium sized carious lesions. Three abscesses (11.5%) were associated with fractured teeth, and a further four (15.4%) were associated with teeth displaying both a fracture and a cavity. The likely cause could not be determined for the remaining four abscesses: one tooth had been lost post-mortem, two lost ante-mortem, and one tooth was present and appeared fully intact. Two abscesses had penetrated the maxillary sinus cavity, causing sinusitis.

The prevalence of dental abscesses at Driffield Terrace (1.5%) was very low in comparison to the average for Roman Britain (3.9%, Roberts and Cox 2003, 137), and it was lower than the prevalence at all other sites bar Ancaster, which had a similar prevalence (1.2%, calculated using data provided in Cox 1989; Table 73 and Figure 33). Abscesses were observed in the Trentholme Drive population, but no prevalence rates were given. It was noted that 42.9% of the carious teeth and heavy dental wear had associated abscesses (Cooke and Rowbotham 1968, 208-209).

Table 73 Comparative sites: abscess prevalence (adult tooth positions)

Site	Abscess %
Mill Mount 05[1]	7.9%
Horncastle[2]	4.6%
Mill Mount 04[3]	4.3%
Roman Britain[4]	3.9%
Driffield Terrace	**1.5%**
Ancaster[5]	1.2%

[1] prevalence of adult tooth positions affected calculated from data in Holst (2006); [2] Caffell and Holst (2008, 45-46); [3] prevalence of adult tooth positions affected calculated from data in Holst (2005); [4] Roberts and Cox (2003, 137); [5] prevalence of adult tooth positions affected calculated from data in Cox (1989)

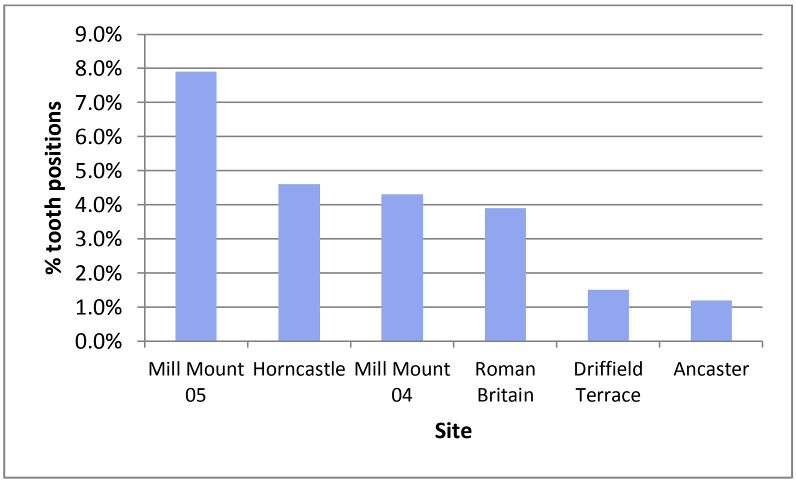


Figure 33 Comparative sites: abscess prevalence (adult tooth positions)

4.5 ANTE-MORTEM TOOTH LOSS

Ante-mortem tooth loss (AMTL), or the loss of teeth during life, can occur as a result of a variety of factors, including dental caries, pulp-exposure from heavy tooth wear, or periodontal disease (occurring when inflammation of the gums, gingivitis, spreads to the underlying bone). Gingivitis can result when deposits of calculus on the teeth aggravate the gums. Once the tooth has been lost, the empty socket is filled in with bone (Hillson 1996, Roberts and Manchester 2005).

Just over a third of the adults (35.6%, 21/59) had experienced AMTL. As would be expected, the proportion of adults affected increased with age from 7.7% of the young adults (1/13), through 36.0% of the young middle adults (9/25) to 58.8% of the old middle adults (10/17). This increase in AMTL with age could also be observed in the proportion of tooth positions affected, from a low of 0.7% of the young adult tooth positions to 5.0% of the old middle adult tooth positions (Table 74 and Figure 34). The overall frequency of AMTL was 2.4%. The prevalence of AMTL among the disarticulated jaws was 4.3% (4 tooth positions affected).

Table 74 Ante-mortem tooth loss (adult tooth positions)

Age Group	Male Tooth Positions			Female Tooth Positions			Total Tooth Positions		
	AMTL	Total	%	AMTL	Total	%	AMTL	Total	%
YA	3	408	0.7%	-	0	-	3	408	0.7%
YMA	11	678	1.6%	0	30	0.0%	11	708	1.6%
OMA	25	499	5.0%	-	0	-	25	499	5.0%
MA	-	0	-	-	0	-	-	0	-
A	2	114	1.8%	-	0	-	2	114	1.8%
Total	41	1699	2.4%	0	30	0.0%	41	1729	2.4%

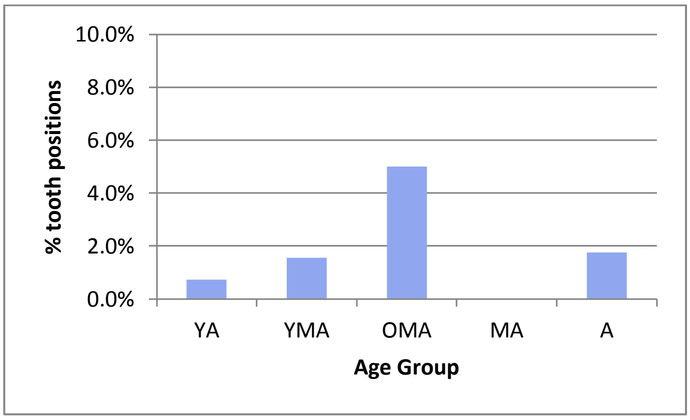


Figure 34 Ante-mortem tooth loss (tooth positions affected)

The prevalence of AMTL among the males at 3 and 6 Driffield Terrace was similar (2.4% and 2.3% of tooth positions affected, respectively). This time, it was 3 Driffield Terrace that showed the typical pattern of AMTL, whereas AMTL tooth loss was highest among the young middle adults at 6 Driffield Terrace (Table 75 and Figure 35). Rather surprisingly, given the higher prevalence of dental caries and abscesses among the young males from 3 Driffield Terrace, no AMTL was observed in this group.

Table 75 Male AMTL (tooth positions affected): 3 Driffield Terrace and 6 Driffield Terrace

Age Group	3DT Males			6DT Males			Total Males		
	AMTL	Total	%	AMTL	Total	%	AMTL	Total	%
YA	0	249	0.0%	3	159	1.9%	3	408	0.7%
YMA	7	530	1.3%	4	148	2.7%	11	678	1.6%
OMA	21	314	6.7%	4	185	2.2%	25	499	5.0%
MA	-	0	-	-	0	-	-	0	-
A	0	51	0.0%	2	63	3.2%	2	114	1.8%
Total	28	1144	2.4%	13	555	2.3%	41	1729	2.4%

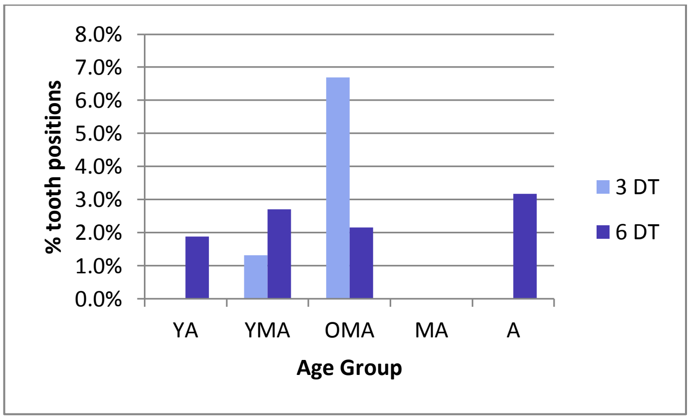


Figure 35 Male AMTL (tooth positions affected): 3DT and 6DT

Several of the conditions that predispose to AMTL were observed in this population, including periodontal disease (see Section 4.2), tooth decay (see Section 4.3), abscesses (see Section 4.4) and trauma (see Section 4.7). As well as natural loss of teeth following one of these conditions, it is possible some painful teeth were deliberately extracted.

The proportion of teeth lost ante-mortem at Driffield Terrace (2.4%) was incredibly low compared to the average for Roman British populations (14.1%, Roberts and Cox 2003, 136). Almost all the comparative sites had an AMTL frequency between 13-16% (Table 76 and Figure 36). The only exception was Mill Mount 04, where the prevalence (6.5%) was around half that seen in the other sites (Holst 2005). Like Driffield Terrace, the adults at this site tended to be from younger age groups. AMTL was not mentioned at Trentholme Drive, although it must have been present. The low prevalence of AMTL at Driffield Terrace is probably connected to the lack of mature adults in the population, and to their relatively low frequency of dental caries and abscesses.

Table 76 Comparative sites: AMTL (adult tooth positions)

Site	AMTL %
Horncastle[1]	15.9%
Ancaster[2]	15.6%
Roman Britain[3]	14.1%
Mill Mount 05[4]	13.5%
Mill Mount 04[5]	6.5%
Driffield Terrace	**2.4%**

[1] Caffell and Holst (2008, 46-47); [2] prevalence of adult tooth positions affected calculated from data in Cox (1989); [3] Roberts and Cox (2003, 136); [4] prevalence of adult tooth positions affected calculated from data in Holst (2006); [5] prevalence of adult tooth positions affected calculated from data in Holst (2005)

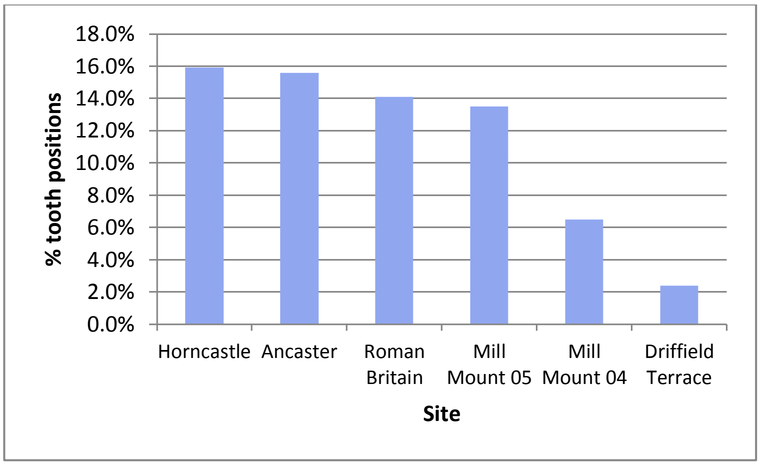


Figure 36 Comparative sites: AMTL (adult tooth positions)

4.6 DENTAL ENAMEL HYPOPLASIA

Dental enamel hypoplasia (DEH) is the presence of lines, grooves or pits on the surface of the tooth crown, and occurs as a result of defective formation of tooth enamel during growth (Hillson 1996). Essentially, they represent a period when the crown formation is halted, and they are caused by periods of severe stress, such as episodes of malnutrition or disease, during the first seven years of childhood. Involvement of the deciduous (milk) teeth can indicate pre-natal stress (Lewis 2007). Trauma can also cause DEH formation, usually in single teeth.

DEH was observed in 38 adults (64.4%), and affected 17.9% of their teeth (Table 77). The prevalence was similar in the young and old middle adult groups (22.1% and 21.5% respectively), but was much lower in the young middle adults (10.9%; Table 77 and Figure 37). The prevalence of DEH among the disarticulated teeth was much lower than among the articulated skeletons, at 8.2% (8/98 teeth).

Table 77 Enamel hypoplasia (adult teeth)

Age Group	Male Teeth			Female Teeth			Total Teeth		
	DEH	Total	%	DEH	Total	%	DEH	Total	%
YA	85	384	22.1%	-	0	-	85	384	22.1%
YMA	72	630	11.4%	0	29	0.0%	72	659	10.9%
OMA	95	442	21.5%	-	0	-	95	442	21.5%
MA	-	0	-	-	0	-	-	0	-
A	32	105	30.5%	-	0	-	32	105	30.5%
Total	284	1561	18.2%	0	29	0.0%	284	1590	17.9%

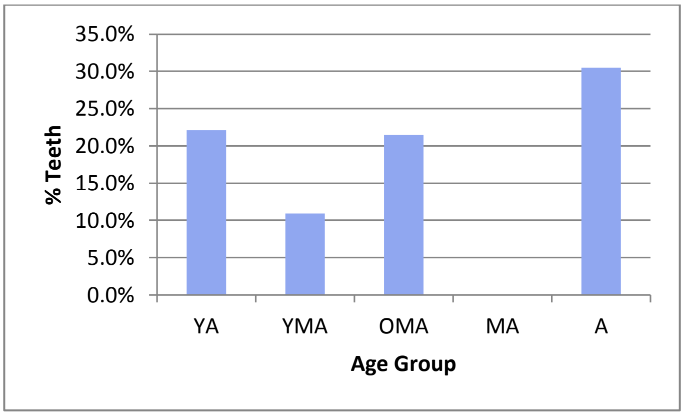


Figure 37 Enamel hypoplasia (teeth affected)

DEH was more prevalent among the males from 6 Driffield Terrace, where 21.5% of their teeth were affected, compared to 16.5% of the teeth from 3 Driffield Terrace. However, the overall pattern of prevalence by age group was similar (Table 78 and Figure 38). The most pronounced difference was the higher frequency of DEH among the young middle adults at 3 Driffield Terrace compared to the prevalence among the same group at 6 Driffield Terrace.

Table 78 Male DEH (teeth affected): 3 Driffield Terrace and 6 Driffield Terrace

Age Group	3DT Males			6DT Males			Total Males		
	DEH	Total	%	DEH	Total	%	DEH	Total	%
YA	51	239	21.3%	34	145	23.4%	85	384	22.1%
YMA	68	496	13.7%	4	134	3.0%	72	630	11.4%
OMA	55	268	20.5%	40	174	23.0%	95	442	21.5%
MA	-	0	-	-	0	-	-	0	-
A	0	47	0.0%	32	58	55.2%	32	105	30.5%
Total	174	1050	16.6%	110	511	21.5%	284	1561	18.2%

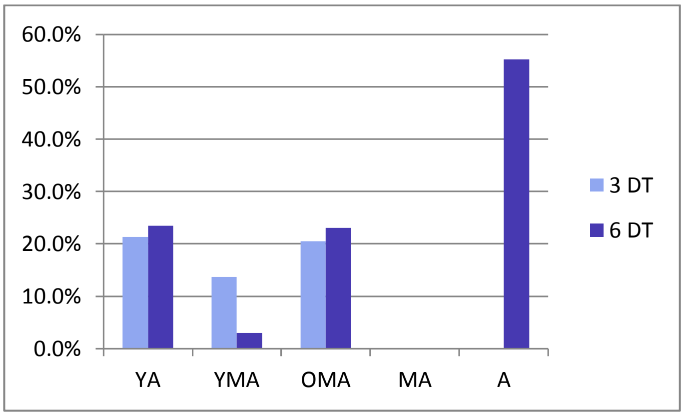


Figure 38 Male DEH (teeth affected): 3DT and 6DT

The proportion of teeth with DEH at Driffield Terrace (17.9%) was nearly double the average for the Roman British population (9.1%, Roberts and Cox 2003, 140). It was most similar to the prevalence at Mill Mount 05 (18.6%; Holst 2006) and Horncastle (14.8%; Caffell and Holst 2008; Table 79 and Figure 39). However, the individuals from Mill Mount 04 had a much higher prevalence (nearly double that of Driffield Terrace; Holst 2005). DEH was recorded at Ancaster, affecting nineteen adults and one child, but the proportion of teeth affected was not given (Cox 1989). DEH was not mentioned at Trentholme Drive, and was possibly not recorded.

Table 79 Comparative sites: DEH (adult teeth)

Site	DEH teeth %
Mill Mount 04[1]	34.5%
Mill Mount 05[2]	18.6%
Driffield Terrace	**17.9%**
Horncastle[3]	14.8%
Roman Britain[4]	9.1%

[1] prevalence of adult teeth affected calculated from data in Holst (2005); [2] prevalence of adult teeth affected calculated from data in Holst (2006); [3] Caffell and Holst (2008, 48-49); [4] Roberts and Cox (2003, 140)

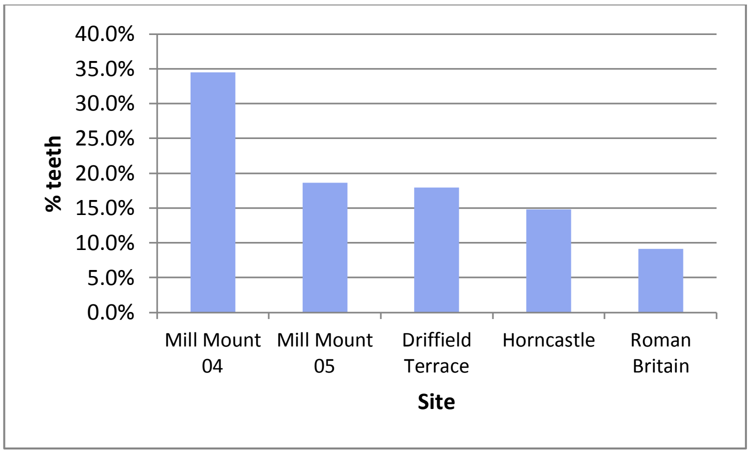


Figure 39 Comparative sites: DEH (adult teeth)

4.7 DENTAL TRAUMA

Injuries to the teeth and surrounding tissues are relatively common in modern populations (Glendor *et al.* 2007, 224), and the causes cited include violence, sporting activities, traffic accidents, falls, rough play, use of teeth as a tool, and biting hard objects (*ibid*, 228-229). In modern populations most dental injuries occur before the age of twenty, and they are more common amongst boys than girls (*ibid*, 226); the causes range from falls, sports, fighting and abuse (*ibid*, 228-233). Concerns have been expressed that violent causes of dental trauma are under-reported in the clinical literature, so the prevalence of trauma resulting from physical abuse (e.g. child abuse, domestic violence) and fighting is probably higher than the figures suggest (*ibid*, 228-229).

Dental fractures range in severity from a crack in the enamel to a fracture that extends through the enamel and dentin to expose the pulp chamber, and they can occur in the crown only, root only, or both the crown and the root. Teeth can also be partially or completely dislocated (Glendor *et al.* 2007, 217-223). At Driffield Terrace a considerable number of individuals had small chips to the enamel of their teeth, usually along the labial/buccal (lip/cheek) side of the incisive/occlusal (biting) surfaces. Such enamel chips have been attributed to using the teeth as tools, or eating foods that might cause such minor damage to the teeth (Roberts and Manchester 2005, 81). More extensive fractures were also observed, and both types will be discussed separately below.

4.7.1 Enamel chips

Small enamel chips were observed in 16.5% of the teeth from 51 adults (86.4%), and an increase in prevalence with age was observed (Table 80). Enamel chips were also observed in the teeth of two adolescents, affecting 6.9% (6/87) of their teeth, and in one of the deciduous teeth from the older child (6-7 years old; Skeleton 3DT25). Enamel chips were more frequent among the 6 Driffield Terrace males (19.0%, 97/511 teeth) than among the 3 Driffield Terrace males (15.6%, 164/1050 teeth). They were also seen in eleven of the disarticulated teeth (11.2%).

Table 80 Enamel chips (adult teeth)

Age Group	Male Teeth			Female Teeth			Total Teeth		
	Chip	Total	%	Chip	Total	%	Chip	Total	%
YA	32	384	8.3%	-	0	-	32	384	8.3%
YMA	120	630	19.0%	2	29	6.9%	122	659	18.5%
OMA	90	442	20.4%	-	0	-	90	442	20.4%
MA	-	0	-	-	0	-	-	0	-
A	19	105	18.1%	-	0	-	19	105	18.1%
Total	261	1561	16.7%	2	29	6.9%	263	1590	16.5%

Upper teeth in general were more likely than lower teeth to display enamel chips, and chips were most frequent in the upper central incisors (54.5%), followed by the upper lateral incisors (46.0%) and upper canines (39.2%; Table 81 and Figure 40). Chips were least frequently observed on the posterior teeth.

Table 81 Enamel chip prevalence according to tooth type

Tooth	Upper			Lower		
	Chipped	Present	%	Chipped	Present	%

I1	54	99	54.5%	16	100	16.0%
I2	46	100	46.0%	19	103	18.4%
C	40	102	39.2%	12	105	11.4%
P1	19	103	18.4%	7	109	6.4%
P2	17	97	17.5%	9	91	9.9%
M1	11	98	11.2%	6	102	5.9%
M2	3	101	3.0%	1	109	0.9%
M3	0	84	0.0%	3	87	3.4%

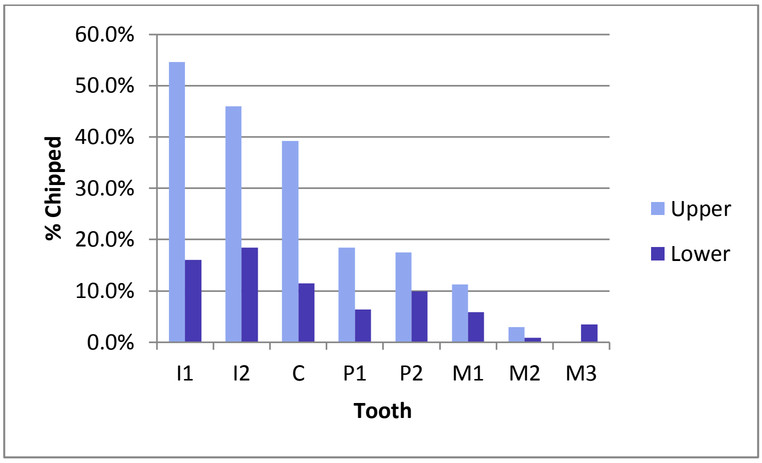


Figure 40 Enamel chip prevalence according to tooth type

Enamel chips occurred with similar frequency on the left and right sides, being slightly more common on the right side for the upper lateral incisors and canines, but slightly more common on the left side for the upper premolars (Table 82 and Figure 41). This suggests that whatever mechanism was causing these chips to the enamel, it was something that affected both sides of the jaw fairly equally.

Table 82 Enamel chip prevalence according to tooth type and side

%		0.0%	0.0%	10.0%	10.6%	13.2%	42.3%	50.0%	54.0%	55.1%	41.7%	36.0%	24.0%	24.0%	12.5%	5.7%	0.0%	
C		0	0	5	5	7	22	26	27	27	20	18	12	12	6	3	0	
P		46	48	50	47	53	52	52	50	49	48	50	50	50	48	53	38	
TP	**R**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**L**
TP		**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
P		44	55	51	42	54	53	52	51	49	51	52	55	49	51	54	43	
C		3	1	2	5	4	5	9	8	8	10	7	3	4	4	0	0	
%		6.8%	1.8%	3.9%	11.9%	7.4%	9.4%	17.3%	15.7%	16.3%	19.6%	13.5%	5.5%	8.2%	7.8%	0.0%	0.0%	

* C = number of teeth with enamel chips; P = number of teeth present; TP = tooth position

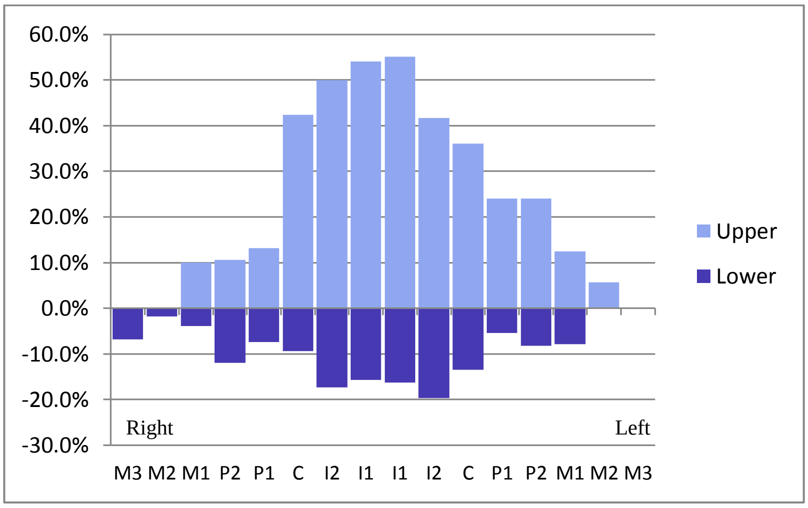


Figure 41 Enamel chip prevalence according to tooth type and side

Enamel chips are not frequently reported. They were observed in the Horncastle population, where they affected eleven adults (84.6%) and 14.4% of the teeth (Caffell and Holst 2008, 50-51). This is a similar proportion to the 86.4% of adults and 16.5% of teeth affected at Driffield Terrace. As with Driffield Terrace, the upper teeth were most frequently involved (31.3%) compared to the lower teeth (2.0%). However, whereas chips were more likely seen in the upper anterior teeth at Driffield Terrace, they were more frequent in the upper canines, premolars, first and second molars at Horncastle. Enamel chips were also observed in 12.9% of the adult teeth from Mill Mount 05 (Holst 2006) and 2.6% of the adult teeth from Mill Mount 04 (Holst 2005).

4.7.2 Dental Fractures

Nearly a third of the adults (32.2%, 19/59) had fractured one or more teeth, including the female individual. The proportion of individuals with dental fractures rose with age, from 15.4% of young adults (2/13), to 32.0% of young middle adults (8/25), and 41.2% of old middle adults (7/17), consistent with the fact that dental trauma tends to accumulate with age (Glendor *et al.* 2007. 225). The number of teeth fractured per individual ranged from one to five. Overall, 49 teeth had been fractured, giving a prevalence of 3.1%. There was an increase in prevalence from the young adult teeth (1.0%) to the old middle adult teeth (3.2%), but the highest frequency of tooth fractures was observed in the young middle adult group (3.9%; Table 83 and Figure 42). One of the disarticulated teeth had also been fractured (1.0%).

Table 83 Dental fractures (adult teeth)

Age Group	Male Teeth			Female Teeth			Total Teeth		
	Fracture	**Total**	**%**	**Fracture**	**Total**	**%**	**Fracture**	**Total**	**%**
YA	4	384	1.0%	-	0	-	4	384	1.0%
YMA	25	630	4.0%	1	29	3.4%	26	659	3.9%
OMA	14	442	3.2%	-	0	-	14	442	3.2%
MA	-	0	-	-	0	-	-	0	-
A	5	105	4.8%	-	0	-	5	105	4.8%
Total	48	1561	3.1%	1	29	3.4%	49	1590	3.1%

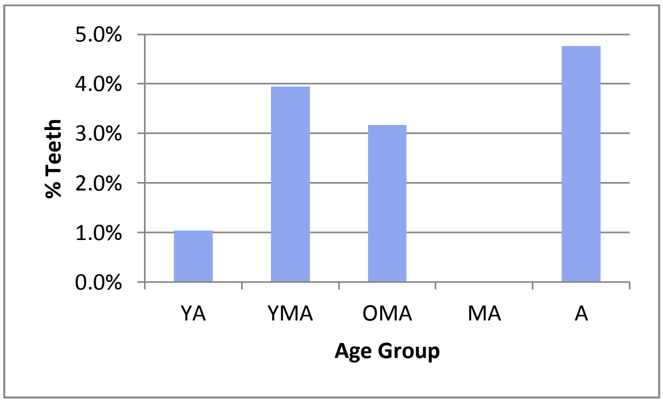


Figure 42 Dental fractures (teeth affected)

Tooth fractures were more common among the males of 3 Driffield Terrace, where 32.5% individuals (13/40) and 3.3% of teeth were affected, compared to 27.8% of individuals (5/18) and 2.5% of teeth affected at 6 Driffield Terrace (Table 84). Overall a similar age distribution was observed between the two sites: both had the highest prevalence in the young middle adults, and the lowest in the young adults (Table 84 and Figure 43).

Table 84 Male dental fractures (teeth affected): 3 Driffield Terrace and 6 Driffield Terrace

Age Group	3DT Males			6DT Males			Total Males		
	Fracture	**Total**	**%**	**Fracture**	**Total**	**%**	**Fracture**	**Total**	**%**
YA	2	239	0.8%	2	145	1.4%	4	384	1.0%
YMA	21	496	4.2%	4	134	3.0%	25	630	4.0%
OMA	10	268	3.7%	4	174	2.3%	14	442	3.2%
MA	-	0	-	-	0	-	-	0	-
A	2	47	4.3%	3	58	5.2%	5	105	4.8%
Total	35	1050	3.3%	13	511	2.5%	48	1561	3.1%

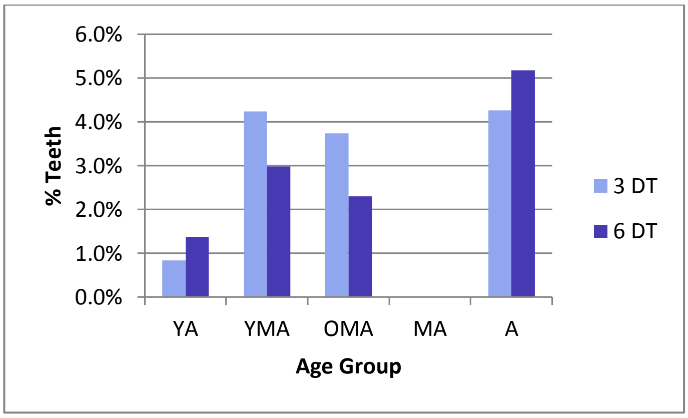


Figure 43 Male dental fractures (teeth affected): 3DT and 6DT

The type of force applied to the teeth results in differences in the pattern of teeth fractured. The anterior (front) teeth are usually fractured if they are hit directly (e.g. banging the teeth against an object in a fall, or following a direct blow to the face), whereas the molars and premolars are more likely to be injured when the lower jaw is forced against the upper jaw (e.g. following a fall onto, or a blow delivered to, the underside of the chin; Glendor *et al.* 2007, 235). Crown fractures of the molars and premolars have also been reported due to violent tooth clenching seen in drug addicts (*ibid* 233). Damage to the teeth without damage to the surrounding tissues is more common with high velocity impacts, and sharp objects are more likely to cause crown fractures with minimal tooth displacement, whereas blunt objects are more likely to cause root fractures and displacement of teeth (*ibid* 235-236).

At Driffield Terrace, upper central incisors were the teeth most frequently fractured (6.1%), closely followed by upper second molars (5.9%) and lower second molars (5.5%; Table 85 and Figure 44). Fractures were seen in almost all teeth, apart from the lower incisors, and the lowest frequency was observed in lower canines (1.0%). Thus, upper anterior teeth were far more prone to fractures than their lower equivalents. In contrast, lower third molars showed a much higher prevalence than upper third molars (Table 85 and Figure 44). The fact that both anterior and posterior teeth were fractured suggests the injuries followed both direct force to the upper front teeth and indirect force to the posterior teeth.

Table 85 Dental fracture prevalence according to tooth type

Tooth	Upper			Lower		
	Fractured	**Present**	**%**	**Fractured**	**Present**	**%**
I1	6	99	6.1%	0	100	0.0%
I2	3	100	3.0%	0	103	0.0%
C	4	102	3.9%	1	105	1.0%
P1	3	103	2.9%	3	109	2.8%
P2	2	97	2.1%	3	91	3.3%
M1	3	98	3.1%	4	102	3.9%
M2	6	101	5.9%	6	109	5.5%
M3	1	84	1.2%	4	87	4.6%

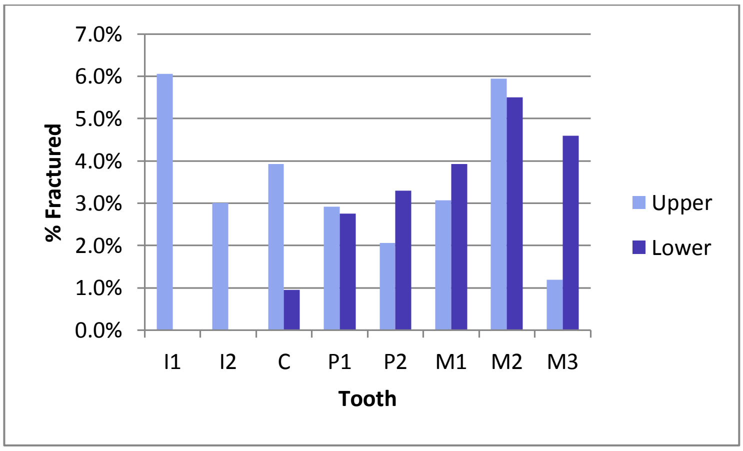


Figure 44 Dental fracture prevalence according to tooth type

Examining the prevalence by tooth type and side revealed that whilst dental fractures in the lower dentition were reasonably evenly distributed between left and right sides (although more common on the left side in the second and third molars), the upper dental fractures were markedly more common on the left side (Table 86 and Figure 45). This suggests that the direct forces injuring the upper incisors and canines were more likely to be delivered from the left side. Since falls would presumably result in a more even distribution of fractures between the right and left sides, interpersonal violence (deliberate blows delivered from the left side by right-handed assailants, assuming face-to-face combat) might explain the left-side bias. A similar explanation might be proposed for the posterior dental fractures, which are certainly more common on the left side in the upper dentition and in the lower second and third molars. However, since these posterior injuries are usually caused by indirect force (i.e. a blow to the underside of the jaw), the force is often spread to both sides of the jaw, and similar fractures may occur in the molars/ premolars on each side (Andreasen *et al.* 2007a, 255, 259).

Table 86 Dental fracture prevalence according to tooth type and side

%		0.0%	2.1%	0.0%	0.0%	1.9%	3.8%	0.0%	6.0%	6.1%	6.3%	4.0%	4.0%	4.0%	6.3%	9.4%	2.6%	
F		0	1	0	0	1	2	0	3	3	3	2	2	2	3	5	1	
P		46	48	50	47	53	52	52	50	49	48	50	50	50	48	53	38	
TP	**R**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**L**
TP		**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
P		44	55	51	42	54	53	52	51	49	51	52	55	49	51	54	43	
F		1	2	3	1	2	0	0	0	0	0	1	1	2	1	4	3	
%		2.3%	3.6%	5.9%	2.4%	3.7%	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%	1.8%	4.1%	2.0%	7.4%	7.0%	

* F = number of teeth fractured; P = number of teeth present; TP = tooth position

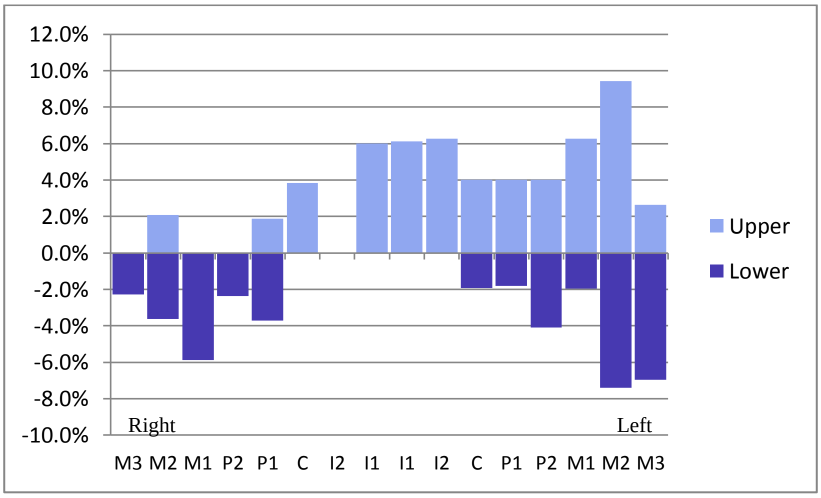


Figure 45 Dental fracture prevalence according to tooth type and side

A summary of the individuals with dental fractures is given in Table 87. It is apparent that of the four individuals with fractured upper incisors, all are young adult males. Two have fractured three consecutive teeth (upper right first, upper left first and second incisors), and one has fractured both upper left incisors. All four individuals had also fractured at least one other tooth. Four individuals show bilateral fractures of molars or premolars, for example, both lower second molars (Skeleton 3DT22), which would be consistent with the clinical observation that similar injuries are likely to occur on both sides of the jaw (Andreasen *et al.* 2007a, 255, 259).

Table 87 Individuals with dental fractures

Skeleton Number	Age	Sex	Teeth fractured
3DT2	Old middle adult	Male	Lower right first molar Upper left canine
3DT6	Young middle adult	Male	Upper right first incisor Upper left first incisor Upper left second incisor Upper left second premolar
3DT12	Young middle adult	Male	Upper left second molar Upper left second premolar Lower left third molar

3DT16	Old middle adult	Male	Lower left canine
3DT22	Old middle adult	Male	Upper left canine Upper left first premolar Lower right second molar Lower left second molar
3DT27	Adult	Male	Lower right first molar Upper left canine
3DT30	Young middle adult	Male	Lower left first premolar Lower left second premolar Lower right first premolar Lower right second premolar
3DT33	Young middle adult	Male	Upper right first incisor Upper left first incisor Upper left second incisor Upper left second molar
3DT34	Young adult	Male	Lower right second molar Lower left second molar
3DT35	Old middle adult	Male	Lower right first molar Upper left first molar
3DT37	Young middle adult	Male	Upper left second molar Upper right first incisor
3DT42	Young middle adult	Female	Upper right second molar
3DT44	Young middle adult	Male	Lower left second premolar Lower left first molar Lower left second molar
3DT48	Old middle adult	Male	Upper left second molar
6DT2	Old middle adult	Male	Lower left second molar Lower right first molar Upper left second molar
6DT7	Old middle adult	Male	Upper left first molar
6DT9	Adult	Male?	Upper right canine Upper right first premolar Upper left first premolar
6DT15	Young adult	Male	Upper left third molar Lower left third molar
6DT20	Young middle adult	Male?	Upper left first molar Upper left first incisor Upper left second incisor Upper right canine

Detailed study of the types of dental fractures would probably shed light on the likely causes of the injuries. For example, Skeleton 3DT6 (young middle adult male) had fractures through the roots of his upper incisors (central right and both left). Root fractures are not commonly seen in modern populations, but when they do occur they are most frequent in the upper incisors and often result from fights or the teeth being struck by an object (Andreasen *et al.* 2007b, 337). Although exactly the same teeth were fractured in Skeleton 3DT33 (young middle adult male), his upper left incisors had a steep oblique fracture through the crown and root on the lingual (tongue) side. Crown-root fractures are reported to occur most frequently as a result of falls, traffic accidents, and objects striking the teeth and such fractures to the upper anterior teeth are often the result of direct trauma (possibly a frontal blow; Andreasen *et al.* 2007, 314). Further research into dental fractures is required in order to understand the implications of the different fractures observed in the Driffield Terrace population.

Fractured teeth were observed at Horncastle, where two females had each fractured an upper premolar (Caffell and Holst 2008, 50). Overall, the prevalence of fractured teeth at Horncastle was 0.8%, considerably lower than the 3.1% of teeth fractured at Driffield Terrace.

4.8 DENTAL ANOMALIES

4.8.1 Crowding

Crowding of teeth in the anterior mandible was seen in 21 adults (37.5% of the 56 with the anterior mandible preserved), but in most individuals this crowding was fairly slight. It was also observed in one of the disarticulated mandibles. Crowding was more common among the adults from 3 Driffield Terrace (42.1%, 16/38) than those from 6 Driffield Terrace (27.8%, 5/18). One of the adolescents (Skeleton 3DT13) also had a crowded anterior mandible (33.3% of the adolescent individuals). Crowding of the maxilla was far less common, with only two individuals affected (3.6% of adults with the anterior maxillae preserved); both individuals also had crowded mandibles. Twelve of the individuals with crowding (57.1%) also had rotated teeth.

4.8.2 Rotation

Rotation of one or more teeth was observed in 22 of the 59 adults with dentitions preserved (37.3%). The percentage of individuals affected was similar at both 3 Driffield Terrace (36.6%, 15/41) and 6 Driffield Terrace (38.9%, 7/18). Rotated teeth were also observed among the disarticulated material (2.0% of 98 teeth). The tooth most frequently rotated was the lower canine (12.4%), with the next most frequent being the upper second and first premolars (5.2% and 4.9% respectively) and the upper second incisors (4.0%; Table 88 and Figure 46). Lower canines were not equally affected on both sides: rotation was far more common in the lower right canines (18.9%) compared to lower left canines (5.8%); the frequency of rotation in the latter was equivalent to that observed in the upper premolars (Table 89 and Figure 47).

Table 88 Rotation according to tooth type

Tooth	Upper			Lower		
	Rotated	Present	%	Rotated	Present	%
I1	1	99	1.0%	2	100	2.0%
I2	4	100	4.0%	2	103	1.9%
C	0	102	0.0%	13	105	12.4%
P1	5	103	4.9%	3	109	2.8%
P2	5	97	5.2%	1	91	1.1%
M1	0	98	0.0%	0	102	0.0%
M2	0	101	0.0%	0	109	0.0%
M3	0	84	0.0%	1	87	1.1%

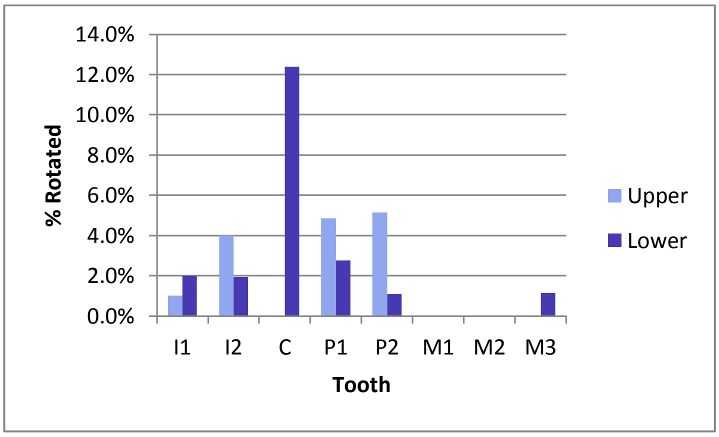


Figure 46 Rotation prevalence according to tooth type

Table 89 Rotation prevalence according to tooth type and side

%		0.0%	0.0%	0.0%	6.4%	3.8%	0.0%	1.9%	2.0%	0.0%	6.3%	0.0%	6.0%	4.0%	0.0%	0.0%	0.0%	
R		0	0	0	3	2	0	1	1	0	3	0	3	2	0	0	0	
P		46	48	50	47	53	52	52	50	49	48	50	50	50	48	53	38	
TP	**R**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**L**
TP		**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
P		44	55	51	42	54	53	52	51	49	51	52	55	49	51	54	43	
R		0	0	0	0	2	10	2	1	1	0	3	1	1	0	0	1	
%		0.0%	0.0%	0.0%	0.0%	3.7%	18.9%	3.8%	2.0%	2.0%	0.0%	5.8%	1.8%	2.0%	0.0%	0.0%	2.3%	

* R = number of teeth rotated; P = number of teeth present; TP = tooth position

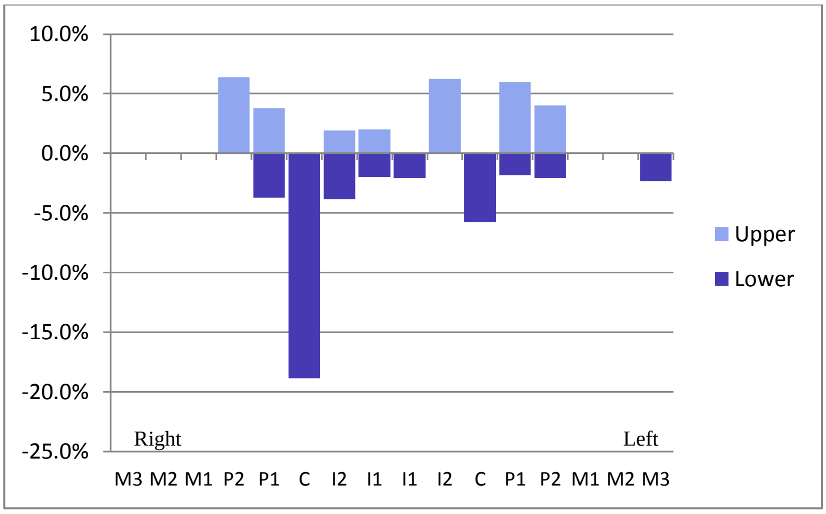


Figure 47 Rotation prevalence according to tooth type and side

4.8.3 Congenitally Absent and Impacted Teeth

Teeth can be absent from the erupted dentition due to a genuine failure of the tooth to develop (congenital absence), or because the tooth develops but fails to erupt (impaction). Full impaction means the tooth remains completely within the jaw, but teeth that erupt at an angle can be considered partially impacted. In well preserved archaeological skeletal remains it is usually impossible to tell without a radiograph whether a tooth has not erupted because it is impacted or because it is congenitally absent. Occasionally, it is possible to observe that a tooth is impacted if post-mortem damage exposes the impacted tooth. Since systematic radiographs were not taken of all the jaws from Driffield Terrace, teeth that were absent from the erupted dentition were recorded as 'not present/ unerupted' unless there was definite evidence for impaction.

Twenty adults (33.9%) had teeth that were not present/ unerupted, and this proportion was similar at 3 Driffield Terrace (34.1%, 14/41) and 6 Driffield Terrace (33.3%, 6/18). Overall, 39 teeth were not present/ unerupted (2.3% of 1729 tooth positions). The lower third molars were the teeth most frequently not present/ unerupted (20.4%), followed by the upper third molars (9.6%). A small proportion of upper second incisors, and second premolars (both upper and lower) were also not present/ unerupted; no other teeth were affected (Table 90 and Figure 48). As can be seen from Table 91 and Figure 49, teeth from both sides of the mouth were affected almost equally.

Table 90 Teeth not present/ unerupted according to tooth type

Tooth	Upper			Lower		
	NP/U	Present	%	NP/U	Present	%
I1	0	107	0.0%	0	108	0.0%
I2	2	106	1.9%	0	108	0.0%
C	0	107	0.0%	0	110	0.0%
P1	0	106	0.0%	0	110	0.0%
P2	2	106	1.9%	2	112	1.8%
M1	0	105	0.0%	0	112	0.0%
M2	0	103	0.0%	0	111	0.0%
M3	10	104	9.6%	23	113	20.4%
M4	0	1	0.0%			

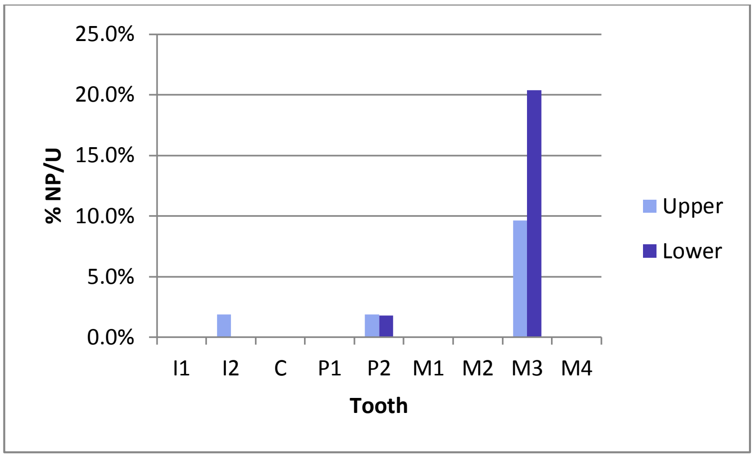


Figure 48 Prevalence of teeth not present/ unerupted according to tooth type

Table 91 Prevalence of teeth not present/ unerupted according to tooth type and side

%		9.8%	0.0%	0.0%	1.9%	0.0%	0.0%	1.9%	0.0%	0.0%	1.9%	0.0%	0.0%	1.9%	0.0%	0.0%	9.4%	0.0%
NP		5	0	0	1	0	0	1	0	0	1	0	0	1	0	0	5	0
P		51	51	53	53	53	54	54	55	52	52	53	53	53	52	52	53	1
TP	**R**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**L**
TP		**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
P		56	56	56	55	55	54	54	54	54	54	56	55	57	56	55	57	
NP		11	0	0	1	0	0	0	0	0	0	0	0	1	0	0	12	
%		19.6%	0.0%	0.0%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.8%	0.0%	0.0%	21.1%	

* NP = number of teeth not present/ unerupted; P = number of teeth present; TP = tooth position

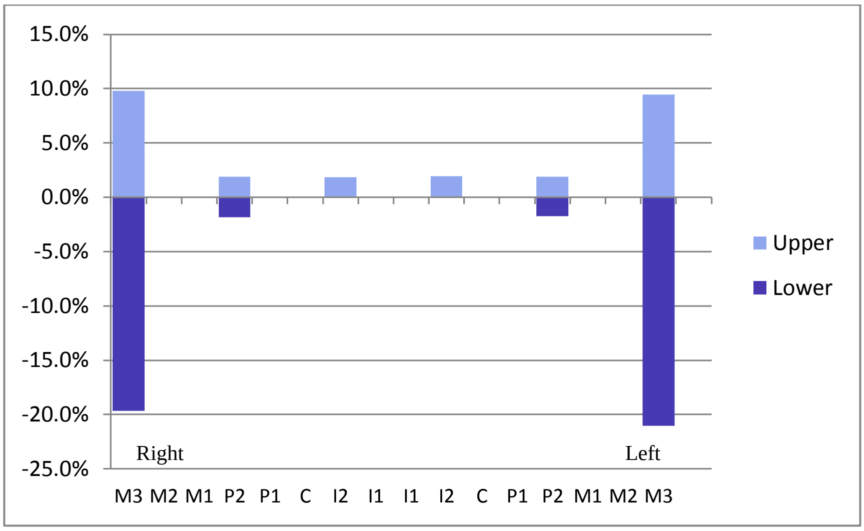


Figure 49 Prevalence of teeth not present/ unerupted according to tooth type and side

The high frequency of third molars that were not present/ unerupted is consistent with these teeth being the most likely to be impacted or congenitally absent, and lower third molars are more prone to impaction than the upper third molars (Hillson 1996, 113-114). Following the third molars, the teeth most likely to be congenitally absent are the upper second incisors and upper/lower second premolars (*ibid*; Meza 2003), which is the pattern at Driffield Terrace.

Hillson (1996, 114) has noted that congenital absence of teeth may be inherited, and that absence of teeth may be associated with other dental anomalies. Other dental anomalies were certainly observed in the three individuals with absent/ unerupted upper incisors/ premolars. The upper right second incisor was not present/ unerupted in Skeleton 3DT12 (young middle adult male). The crown of his upper left second incisor was small, and his upper third molar was enlarged (with extra cusps) and also partially impacted. The upper left second incisor of Skeleton 3DT15 (young adult male) was possibly not present/ unerupted, and there may have been a cyst at the location of this tooth; both his upper third molars had small additional cusps (parastyles) located on the buccal (cheek) sides of the crowns. Finally, all four second premolars and the lower left third molar were missing in Skeleton 3DT57 (adult male?), and a range of other dental anomalies were present: his lower right third molar was enlarged (additional cusp and root); his upper first premolars were rotated by 90°; his lower first premolars were tilted distally into the gap left by the absent second premolars; and the deciduous lower second molars had been retained (see Section 4.8.4).

Impacted or partially impacted teeth were observed in seven adults (11.9% of 59) and one adolescent (33.3% of 3). Three of these adults did not have any other teeth that were not present/ unerupted; three of the adults also had third molars that were not present/ unerupted; and one had an upper second incisor that was not present/ unerupted (discussed above). Amongst the adult individuals upper third molars were the teeth most frequently impacted (2.9%), followed by upper canines (1.9%) and lower third molars (1.8%, Table 92 and Figure 50). Third molars are usually the teeth most frequently impacted (Hillson 1996, 113), and at Driffield Terrace many impacted third molars were likely to be among the 9.6%/ 20.4% of third molars recorded as 'not present/ unerupted' (discussed above).

Five adults had third molars that were partially impacted. The upper left third molar of Skeleton 6DT7 (old middle adult male) was partially impacted, and both his lower third molars were not present/ unerupted. The lower left third molar of Skeleton 3DT46 (young middle adult male) had partially erupted into the ramus of the mandible; his upper left third molar was not present/ unerupted. The upper right third molar of Skeleton 3DT17 (young adult male) was tilted distally (backwards) and buccally (towards the cheek) and was probably partially impacted. The lower right third molar of Skeleton 3DT6 (young middle adult male) had erupted at a 45º angle mesially, so it was angled to face the crown of the tooth in front. The same anomaly affected with the upper left third molar of Skeleton 3DT12 (young middle adult male), but in this individual the molar was enlarged (see Section 4.8.6 below), which might have contributed to the impaction.

Table 92 Impacted teeth according to tooth type

Tooth	Upper			Lower		
	Impacted	Present	%	Impacted	Present	%
I1	0	107	0.0%	0	108	0.0%
I2	0	106	0.0%	0	108	0.0%
C	2	107	1.9%	0	110	0.0%
P1	0	106	0.0%	0	110	0.0%
P2	0	106	0.0%	0	112	0.0%
M1	0	105	0.0%	0	112	0.0%
M2	0	103	0.0%	0	111	0.0%
M3	3	104	2.9%	2	113	1.8%
M4	0	1	0.0%			

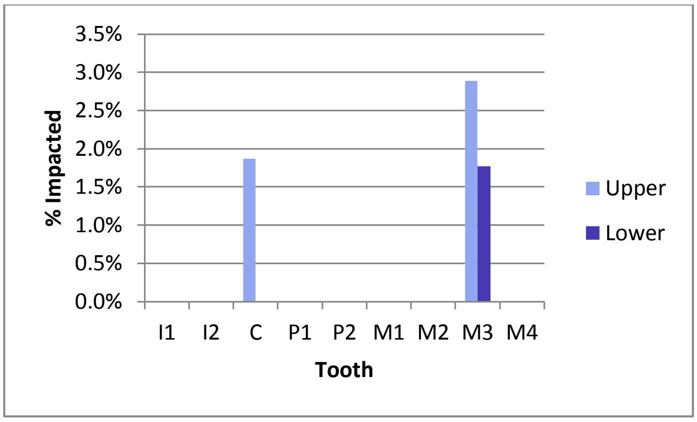


Figure 50 Prevalence of impacted teeth according to tooth type

After the third molar, the upper canines are the teeth that tend to be most frequently impacted (Hillson 1996, 113; McSherry 1998), and these were the only other impacted teeth observed at Driffield Terrace. In modern populations between 1% and 2.2% of upper canines are impacted (Al-Nimri and Gharaibeh 2005), consistent with the 1.9% prevalence among the adults at Driffield Terrace. If the adolescent teeth are included in the calculation, the prevalence of impacted upper canines rises to 2.7% (3/113), which is slightly higher than modern prevalence rates. Both the adults affected at Driffield Terrace were male, which is contrary to the finding that females are more frequently affected in modern populations (McSherry 1998; Warford 2003). The upper right canines were more frequently impacted (3.5%) than the upper left canines (1.8%; Table 93 and Figure 51; data includes adults and adolescents).

Table 93 Prevalence of impacted teeth according to tooth type and side (adults and adolescents combined)

%		1.9 %	0.0 %	0.0 %	0.0 %	0.0 %	3.5 %	0.0 %	0.0 %	0.0 %	0.0 %	1.8 %	0.0 %	0.0 %	0.0 %	0.0 %	3.6 %	0.0 %	
I		1	0	0	0	0	2	0	0	0	0	1	0	0	0	0	2	0	
P		54	54	56	56	56	57	57	58	55	55	56	56	56	55	55	56	1	
TP	**R**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**L**
TP		**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**		
P		59	59	59	58	58	57	57	57	57	57	59	58	60	59	58	60		
I		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
%		1.7 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	1.7 %		

* I = number of teeth impacted; P = number of teeth present; TP = tooth position

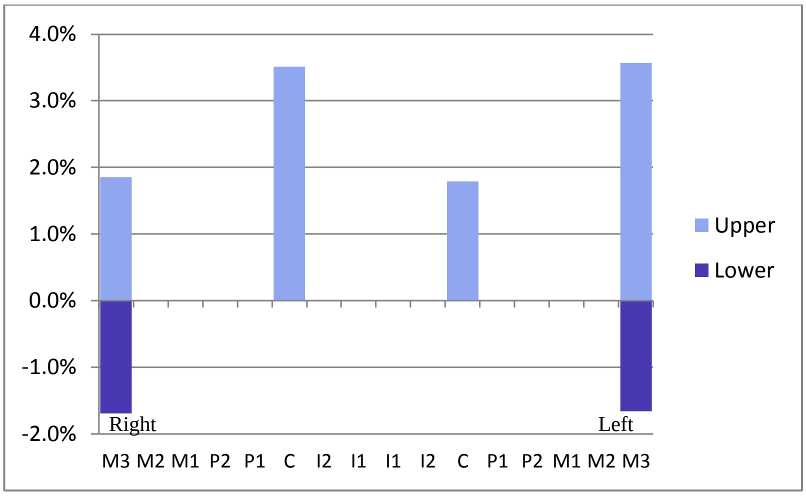


Figure 51 Prevalence of impacted teeth according to tooth type and side (adolescents and adults combined)

In all three individuals, the canines were fully impacted and were located beneath the anterior palate (lingual to the upper incisors), where a smooth bulge could be observed in the palate surface. This is the most frequent location for canine impaction, as 85% of impacted upper canines become impacted in the palate (Warford *et al.* 2003; McSherry 1998). The upper right canine was impacted in Skeleton 3DT19 (adolescent) and Skeleton 3DT51 (young adult male). In both individuals a tiny part of the canine crown was visible through a small hole, and the presence of the impacted canine was confirmed with a radiograph in Skeleton 3DT51. The radiograph demonstrated that the canine was close to horizontal, with the tip of the crown at the midline of the palate and the root lying distally. The upper left canine was impacted in Skeleton 3DT10 (old middle adult male), with the crown partially visible through post-mortem damage to the maxilla. Based on what could be observed of the canine, it was probably lying in a similar position to that of Skeleton 3DT51.

One of the factors often associated with impacted upper canines is the retention of deciduous canines, although it is not clear whether the permanent teeth become impacted as a result of the retention of the deciduous tooth, or whether the deciduous tooth is not shed as a result of failure of the permanent canine to erupt normally (McSherry 1998). Retention of deciduous canines was suspected in two of the individuals with impacted canines (see Section 4.8.4 below), but whether or not a deciduous canine had been retained in the third individual could not be assessed. Impaction of upper canines may be inherited (McSherry and Richardson 1999), and is often associated with other dental anomalies (McSherry 1998; Warford 2003; Al-Nimri and Gharaibeh 2005). However, other possible causes include issues that might affect the eruption path of the tooth during growth and development (McSherry 1998).

Another individual (Skeleton 3DT8, young middle adult male) had a retained upper right deciduous canine (see Section 4.8.4 below), but rather than being fully impacted, the permanent canine had erupted through the palate in the same location where the other canines had become impacted. Overall, 2.8% of adult upper canines were either impacted or displaced (3/107), and the prevalence rises to 3.5% if adolescent teeth are included in the calculation (4/113).

4.8.4 Retained Deciduous Teeth

Deciduous (milk) teeth are usually exfoliated (shed) between the ages of six to twelve years. Once the individual reaches around twelve years of age, their dentition should be comprised entirely of permanent teeth. Occasionally, deciduous teeth are retained beyond the age at which they are normally exfoliated, and they may be kept into adulthood (Hillson 1996, 114).

Two individuals (an adolescent and an adult) had retained deciduous teeth that were still present, and it was suspected that an additional two adults had retained deciduous teeth that had since been lost post-mortem. Overall three adults (5.1% of 59) and one adolescent (33.3% of 3) were affected. Two of these individuals had retained an upper deciduous canine in conjunction with impaction of the permanent canine, and one individual had retained an upper deciduous canine in conjunction with displacement of the permanent canine (see Section 4.8.3 above). These included Skeleton 3DT19 (adolescent), whose upper right deciduous canine was retained and present in the dental arcade, and Skeletons 3DT51 (young adult male) and 3DT8 (young middle adult male), where retention of the upper right deciduous canine was inferred from the presence of a small empty socket between the second incisor and first premolar. In these latter individuals it is presumed the deciduous tooth was lost post-mortem. As noted above, it was not possible to determine whether the third individual with an impacted permanent canine (Skeleton 3DT10, old middle adult male) had also a retained deciduous tooth since the relevant part of the jaw was damaged post-mortem.

Skeleton 3DT57 (adult male?) had probably retained both lower second deciduous molars. The lower deciduous second molar was present on the left side, despite the fact that the roots were almost completely resorped and only a shallow socket was present in the alveolar bone, possibly because the first premolar was tilted distally so its crown rested on top of the deciduous tooth (which was partially submerged). The position of the first premolar would have helped to prevent the loss of the deciduous tooth. The similar appearance of the alveolar bone on the right side, and similar tilting of the first premolar suggested the right deciduous second molar had also been retained but had been lost post-mortem. Retention of the deciduous second molars in this individual was associated with absence (either due to failure to develop or impaction) of all four permanent second premolars (see Section 4.8.3 above).

Overall, upper deciduous canines were the teeth most frequently retained, occurring in 1.9% of upper canine tooth positions amongst the adults (2/107), or 2.7% if data for the adolescents and adults are combined (3/113). The frequency of lower deciduous second molar retention was 1.8% amongst the adults (2/112 lower deciduous second molar/ first premolar tooth positions), and 1.7% for adolescents and adults combined (2/118).

Retention of deciduous canines is frequently associated with impaction of permanent canines, so the higher prevalence of deciduous canine retention at Driffield Terrace is probably connected to the prevalence of permanent canine impaction (discussed in Section 4.8.3 above). Retention of deciduous second molars is often associated with congenital absence of the lower second premolars (Sletten *et al.* 2003). In Skeleton 3DT57, a radiograph would be required to determine whether the lower second premolars were either absent or impacted.

Five retained deciduous teeth were observed at Trentholme Drive, all of which were lower second molars associated with absence of the second premolar (Cooke and Rowbotham 1968, 193). Despite the fact that six impacted upper canines were observed, none were associated with retained deciduous canines (*ibid*).

4.8.5 Supernumerary Teeth

The usual adult dentition comprises 32 permanent teeth. Occasionally, additional teeth can develop, known as supernumerary teeth (Hillson 1996, 114; Rajab and Hamdan 2002), and these can take many forms and appear in many locations (Rajab and Hamdan 2002). Supernumerary teeth are more often seen in males, and are most often located in the anterior maxilla (Rajab and Hamdan 2002). Genetic causes have been proposed for supernumerary teeth, but environmental factors may also influence their development (*ibid*).

Two adults from Driffield Terrace had developed supernumerary teeth (3.4% of 59 adults), both located in the posterior maxilla. This is contrary to the usual finding that supernumerary teeth are most common in the anterior maxilla (Rajab and Hamdan 2002). Skeleton 6DT3 (young adult male) had a small supernumerary tooth in the left maxilla, located in the dental arcade immediately posterior to the third molar. The tooth appeared to be in the early stages of eruption, with the crown visible through an aperture in the alveolar bone. Since this individual was young, it is possible that had he lived the tooth may have fully erupted and taken the position of a fourth molar. This tooth is unlikely to have caused any complications, since the jaw was large and there was plenty of space for the additional tooth without crowding the existing teeth. This tooth and tooth position were included in all prevalence rates, since it was erupting into the oral environment and so could have been affected by anything that would have affected any other normal tooth.

Skeleton 3DT44 (young middle adult male) had a small supernumerary tooth in the wall of the left maxillary sinus above the first molar. It was therefore also ectopic (since it was not in the normal dental arcade) and hypoplastic (since it was very small, being 8.5mm long and with a crown 2.3mm in diameter). The tooth was almost horizontal with the crown facing posteriorly, and it was contained within the sinus wall; it was only visible because a post-mortem break had exposed it. Eruption of teeth into areas other than the mouth is rare, but ectopic teeth in the maxillary sinuses have been recorded previously (Baykul *et al.* 2006). The majority of such teeth do not cause symptoms, but some individuals experienced symptoms similar to sinusitis, and an ectopic tooth in the maxillary sinus was reported to have caused sinusitis in one patient (*ibid*). Since the ectopic tooth in Skeleton 3DT44 was apparently within the sinus wall, it is doubtful that it caused sinusitis-like symptoms, and no evidence for chronic sinusitis was observed. This tooth was excluded from prevalence rates, since it would never have experienced the normal oral environment.

Two individuals from Trentholme Drive (0.7%) had supernumerary teeth in the upper incisor region (Cooke and Rowbotham 1968, 193).

4.8.6 Germination and Fusion

Enlarged teeth can result from fusion of two teeth during development (this can include fusion with a supernumerary tooth), or from failure of a dental follicle to divide (Ferreira-Junior *et al.* 2009). Either germination or fusion of teeth was suspected in three adults from Driffield Terrace who had enlarged and irregularly shaped third molars (5.1% of 59 adults). The upper left third molar of Skeleton 3DT12 (young middle adult male) was larger than usual, having two additional cusps on the buccal side, and enlarged lingual cusps. The upper right third molar of 3DT33 (young middle adult male) had a large, irregular crown, and a fourth root extending distally. The lower right third molar of Skeleton 3DT57 (adult male?) had an additional cusp and four roots (rather than the usual two).

4.8.7 Super-Eruption

Teeth usually continue to erupt in order to maintain occlusion with their opposites. If a tooth is lost ante-mortem, failed to develop or erupt, then the opposing tooth is likely to over-erupt as its occlusal surface has lost contact with the opposing tooth.

Super-eruption was observed in nine individuals. The teeth most frequently over-erupted were the lower third molars (5.7%, 5/87) and upper third molars (4.8%, 4/84). In four of these teeth the opposing molars were not present or unerupted, two were not in contact with the opposing teeth because the alveolar bone and opposing teeth were slightly tilted distally, one was opposite a partially impacted tooth, one was opposite a tooth lost post-mortem, and one had not obvious cause. Two first molars were also over-erupted (1.0% of upper first molars, 1/98, and 1.0% of lower third molars, 1/102). In Skeleton 6DT7 (old middle adult male) the upper left first molar was fractured with loss of most of the crown, and the over-eruption of the lower first molar suggested this fracture was probably long-standing. In Skeleton 3DT26 (old middle adult male?) the over-erupted upper left first molar corresponded with the ante-mortem loss of the lower first and second molars, again suggesting that the loss of these teeth had occurred a while before death.

4.8.8 *Diastemata*

Diastemata are gaps between the teeth, and they occur most frequently in the upper dentition (Hillson 1996, 110). They were observed in three adults (5.1% of 59), and occurred most often in the canine/premolar region. Skeleton 6DT9 (adult male) had bilateral *diastemata* between both upper canines and first premolars, Skeleton 6DT6 (young middle adult male) had a *diastema* between his upper left premolars, and Skeleton 3DT10 (old middle adult male) had *diastemata* between his lower right canine and first premolar, and between his lower right first and second molars.

4.8.9 Unusual Wear (Grooves)

Shallow grooves in the incisive surfaces of the teeth were observed in seven adults (11.9% of 59 individuals), all of whom were males, including six from 3 Driffield Terrace and one from 6 Driffield Terrace. The central incisors were the only teeth affected, and the upper central incisors were far more frequently involved than the lower central incisors (7.1% compared to 2.0%; Table 94 and Figure 52). Grooves were only observed in the lower central incisors when there were corresponding grooves in the upper central incisor from the same side. When differences in side were examined, it was apparent that the number of upper left incisors with grooves (10.2%) occurred in more than double the number compared to the upper right incisors (4.0%), but that equal numbers of lower incisors were affected on each side (2.0%; Table 95 and Figure 53). It is likely that these grooves were related to the use of the mouth as a tool (Roberts and Manchester 2005, Capasso *et al.* 1999), carrying out an activity that predominantly involved using the upper left central incisors.

Table 94 Grooved teeth according to tooth type

Tooth	Upper			Lower		
	Grooved	**Present**	**%**	**Grooved**	**Present**	**%**
I1	7	99	7.1%	2	100	2.0%
I2	0	100	0.0%	0	103	0.0%
C	0	102	0.0%	0	105	0.0%
P1	0	103	0.0%	0	109	0.0%
P2	0	97	0.0%	0	91	0.0%
M1	0	98	0.0%	0	102	0.0%
M2	0	101	0.0%	0	109	0.0%
M3	0	84	0.0%	0	87	0.0%

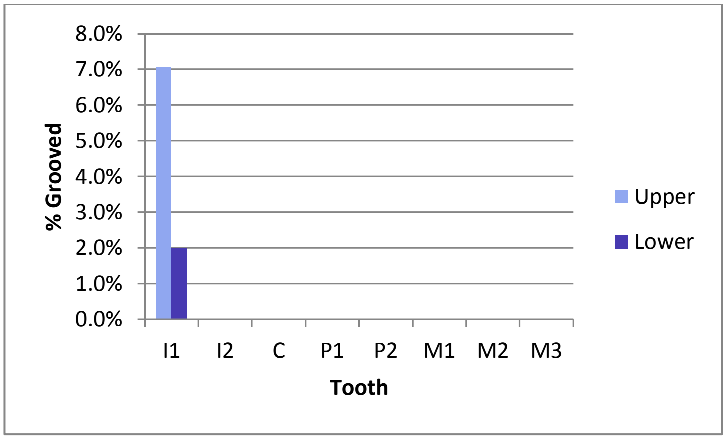


Figure 52 Prevalence of grooved teeth according to tooth type

Table 95 Prevalence of grooved teeth according to tooth type and side

%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	10.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
G		0	0	0	0	0	0	0	2	5	0	0	0	0	0	0	0	
P		46	48	50	47	53	52	52	50	49	48	50	50	50	48	53	38	
TP	**R**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**L**
TP		**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
G		44	55	51	42	54	53	52	51	49	51	52	55	49	51	54	43	
F		0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	
%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

* G = number of teeth with grooves in the incisive surfaces; P = number of teeth present; TP = tooth position

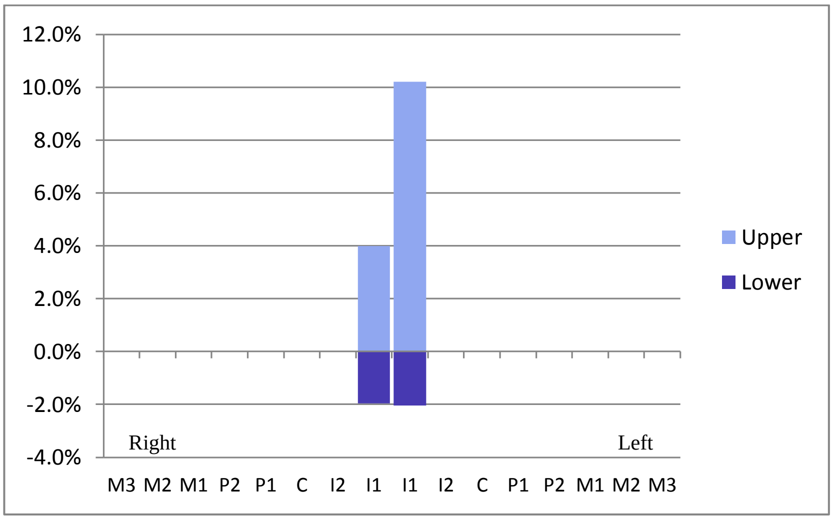


Figure 53 Prevalence of grooved teeth according to tooth type and side

4.8.10 Other Dental Anomalies

Two individuals had parastyles, additional cusps on the buccal (cheek) sides of the tooth crown. Parastyles are considered to be a non-metric variation in tooth shape (Hillson 1996, 91). Skeleton 3DT48 (old middle adult male) had a parastyle on his upper right second molar, and Skeleton 3DT15 (young adult male) had parastyles on both his upper third molars.

Four individuals had variations in the shape and size of the roots of some of their teeth. These variations happened to be observable due to the fact that the teeth were not fixed in their sockets. Any variation of teeth that were firmly in place would have passed unnoticed, as the jaws were not systematically radiographed. Teeth with short roots (i.e. the root was equivalent in length to, or not much longer than the crown) were observed in two individuals: the upper left first incisor of Skeleton 3DT27 (adult male) and both upper premolars of Skeleton 3DT42 (young middle adult female) were affected. Two individuals had upper right incisors with a 90º curve in the root tip (angled distally). The first incisor was affected in Skeleton 3DT13 (adolescent) and the second incisor was affected in Skeleton 6DT2 (old middle adult male).

Cysts were observed in three individuals. Skeleton 3DT1 (young middle adult male) had a cyst at the apex of his lower right first molar, Skeleton 3DT18 (adolescent) had a cyst below the left nasal aperture (superior to the apex of the upper left canine), and Skeleton 3DT15 (young adult male) had a possible cyst at the location of his upper left second incisor (tooth itself not present).

Unusually shaped dental arches were observed in three individuals. In two of these individuals, both old middle adult males, the upper dental arch was concave on the cheek side, rather than being gently convex. The left side was concave in Skeleton 6DT2, and the right side was concave in Skeleton 3DT21. In the latter individual the right half of the mandible was straighter than normal and also displayed crowding and rotation of teeth. The palate of Skeleton 3DT42 (young middle adult female) was narrow anteriorly, and as a result the dental arch was almost triangular in shape.

Skeleton 3DT8 (young middle adult male) had multiple dental anomalies. He had a retained upper right deciduous canine (lost post-mortem) associated with a palatally displaced permanent canine. Two other upper teeth (right second molar and left second premolar) were displaced buccally (towards the cheek). In his lower jaw two teeth were displaced lingually (towards the tongue), including his right second molar and left first premolar. Both molars were also angled slightly in the direction of displacement. His lower anterior teeth were all tilted to the left. Needless to say, his teeth had unusual patterns of wear and calculus deposition.

4.9 DENTAL CONCLUSIONS

The majority of individuals from Driffield Terrace had surviving teeth and jaws, and post-mortem tooth loss was minimal. The prevalence of dental diseases was comparatively similar between 3 and 6 Driffield Terrace, although there were some variations in the prevalence according to age group. Deposits of mineralised plaque (calculus) on the teeth were a frequent occurrence, as is often the case in archaeological populations. However, the deposit prevalence per tooth was higher than at most comparative Roman cemeteries and almost double the Roman British average. Most deposits were relatively slight, but heavier deposits and deposits on the biting surfaces of the teeth occurred in some individuals, usually associated with other dental problems that might have affected chewing patterns. These included conditions that cause pain (such as tooth decay and abscesses) or unusual occlusion (such as teeth in unusual positions). Mineralised plaque deposits began to accumulate during childhood, becoming more frequent during adolescence and into adulthood. The high prevalence of dental plaque may have contributed to periodontal disease, the frequency of which was higher than the Roman British average.

The frequency of tooth decay, dental abscesses and ante-mortem tooth loss was low for the Roman period (particularly the latter two conditions). These three conditions are all inter-related (with cavities leading to the development of abscesses and both potentially leading to the loss of teeth during life), and tend to become more common with age. The fact that the Driffield Terrace population was heavily biased towards the younger adult age groups, with no mature adults present, is likely to account for the low prevalence of these dental diseases.

The low caries prevalence may also suggest relatively low intake of refined sugars (e.g. dried fruits, honey, and fruit) in the diet. The location of cavities in the teeth was fairly typical for the period, with half found on the surfaces in between the teeth. The frequency of cavities in the pits and fissures of the chewing surfaces may be a reflection of the young age distribution, as cavities in the occlusal surfaces are usually more frequent in younger individuals. There was a spike in caries prevalence among the young adults, particularly notable in those from 3 Driffield Terrace, which does not follow the typical age pattern for tooth decay. The slightly raised prevalence of dental abscesses among the 3 Driffield Terrace young adults is likely to be connected to this pattern, as the majority of abscesses recorded were associated with cavities in the teeth. Dental fractures had also led to the development of abscesses in some individuals. Overall, abscesses and ante-mortem tooth loss tended to increase in frequency with age, as would be expected. Periodontal disease may also have contributed to ante-mortem tooth loss, as it tended to be more severe in the old middle adults.

The frequency of tooth fractures was high and had affected all teeth apart from the lower incisors. The distribution of the injuries suggested the fractures had been caused both by direct force to the front teeth (either as a result of being hit or falling and banging the teeth against an object) and indirect force to the back teeth (either falling onto chin or being hit underneath the jaw). Many of the injuries had probably been caused by high-velocity impacts, since there was minimal evidence for damage to the structure of the jaw. Fractures were more common on the left side of the upper jaw, but were more evenly distributed between left and right sides of the lower jaw. More research is required into the type of fractures observed and their likely causes.

Smaller chips to the tooth enamel were mostly observed on the upper front teeth and were not unusually high, unlike the dental fracture prevalence. Small grooves in the biting surfaces of the first incisors (predominantly the upper ones) may have been connected with repeated activities involving using the mouth as a tool.

Various dental anomalies were observed, including retained milk teeth associated with dental displacement, impaction or absence of their permanent successors, rotation and crowding of teeth, additional teeth and enlarged teeth due to fusion of developing teeth or failure of developing teeth to separate.

The prevalence of stress lesions that occur during the first seven years of child hood in the teeth was almost double the Roman British mean, but was only slightly higher than two of the comparative examples. The fact that two thirds of the Driffield Terrace population had these lesions suggested that the Driffield Terrace individuals had been exposed to widespread childhood stress.

5.0 FUNERARY ARCHEOLOGY

The skeletal remains from 3 and 6 Driffield Terrace were part of an elongated cemetery that borders the eastern and western side of a Roman road, which lies approximately on the same alignment as the modern road leading from Micklegate at the south-western part of the city in a south-western direction. This road is also called the A1036 or, along the majority of its length, Tadcaster Road (also Blossom Street, The Mount and Mount Vale). Driffield Terrace is located on the western side of the Roman road, just below and to the south of the summit of the road, at The Mount and the junction between this, Dalton Terrace and Albemarle Road. The cemeteries discussed here are located approximately 600m to the southwest of the medieval city walls. A summary of the orientation, burial position, and arm position of each skeleton, together with evidence for decapitation and skull location, and the presence of grave goods or coffins within each grave is provided in Table 96.

The cemeteries at 3 and 6 Driffield Terrace are by no means the only burials found in the area. The majority of burials are nineteenth and early twentieth century chance finds (Ottaway 1993) and are only haphazardly recorded and preserved. However, in the 1950s, Wenham excavated a Roman cemetery at Trentholme Drive in advance of a housing development (Wenham 1968). Trentholme Drive lies on the opposite side of the Roman road and is located much lower down the slope of Mount Vale compared with Driffield Terrace. It is thought that it was in use from 140 AD to 400 AD (*ibid*). A total of 350 Roman inhumations and 40 cremation burials were excavated at Trentholme Drive. Additionally, several *ustrina*, or cremation pyres were found (*ibid*). The majority of skeletons were probably male adults, but a small proportion of females and children's skeletons were also found (Warwick 1968). Unfortunately, the fact that children are included with the sexed individuals prevents a clear understanding of the demography at Trentholme Drive, as it is currently thought that sexing of non-adults is not possible. Also on the eastern side of the road, but on the highest point of it, lies the cemetery of Mill Mount (Figure 54). This was excavated in 2004 and 2005 and received osteological analysis. A total of nineteen inhumations were excavated, as well as two cremation burials and a Roman sarcophagus, containing an adolescent covered in gypsum (Holst 2005, Holst 2006, Holst 2008). The individuals are thought to date to the second and third centuries AD and represented a mixed population of males and females and children of all ages. Many of the individuals were interred in wooden coffins.

Table 96 Summary of funerary data

Sk No	Grave No.	Period	Age group	Age	Sex	Orientation	Position	Arm Position	Decapitation		Head location	Multiple Burial	Grave Goods	Coffin
									Ost	Ctx				
3DT1	4002	32	yma	26-35	M?	SW-NE	Disarticulated	Unknown	Y	-	-			
3DT2	4029	34	oma	36-45	M	SSW-NNE	Supine extended	R arm slightly flexed at elbow, hand over R pelvis; L arm flexed at elbow, hand with R hand over R pelvis	Y	Y?	Skull on right shoulder, upright, facing to left shoulder			
3DT3	4027	34	oma	36-45	M	E-W	Flexed on right side	Unknown	-	N?	Skull probably in anatomical position, though not clear. On right side, facing forward			
3DT4	4033	32	ya	18-25	M	SSE-NNW	Supine extended	R arm alongside torso, hand over R hip; L arm flexed at elbow, hand over R ilium (under R forearm)	Y	N	Skull in anatomical position, almost upright, facing towards feet			
3DT5	4043	32	yma	26-35	M	SE-NW	Supine extended	R upper arm alongside torso, tightly flexed at elbow (lower arm over upper) and hand over R shoulder; L arm flexed at elbow, hand lateral to R ilium	Y	Y	Fragments of skull to right of the right arm, probably upright, facing to feet			
3DT6	4045	33	yma	26-35	M	SSW-NNE	Prone, slightly flexed	R arm alongside torso, hand next to right thigh; L arm probably slightly abducted with left elbow away from torso, hand next to L hip	Y	Y	Skull under left ilium, on left side, looking towards left elbow			
3DT7	4064	34	yma	26-35	M	SW-NE	Supine extended	R arm flexed at elbow, hand on L side of torso; L arm position not clear	Y	-	-			
3DT8	4083	32	yma	26-35	M	ENE-WSW	Flexed on left side	R elbow over L abdomen, hand over L shoulder; L arm underneath body/ behind back (position unclear)	?	Y	Skull between knees, on left side facing against left knee			
3DT9	4086	33	a	18+	U	SW-NE	Flexed on left?	Unknown	-	-	-			
3DT10	4090	32	oma	36-45	M	NE-SW	Flexed on right or supine extended?	R arm tightly flexed at elbow, hand next to R shoulder near chin; L arm flexed at elbow, hand over R arm at midshaft humerus/radius/ulna	N	N	Anatomical position, on right side, looking right			
3DT11	4093	34	a	18+	U	NE-SW	Supine extended	R lower arm alongside torso, hand over R hip; L arm not present	-	-	-			
3DT12	4107	32	yma	26-35	M	SW-NE	Supine extended	R arm flexed at elbow, hand over groin/ between thighs; L arm flexed at elbow, hand over R elbow	Y	Y	Skull on right shoulder, lying on left side, facing to head end of grave			
3DT13	4113	33	ad	16-19	M?	NE-SW	Supine extended	R arm alongside torso, hand next to R hip; L arm flexed at elbow, hand over pubic area	N	N	Anatomical position, on right side, looking right		Hob nails, 2 beakers from knee area, 1 beaker from pelvis area, base of	Coffin

													cremation urn, 3 vessel frags, 1 grey ware	
3DT14	4145	34	f	30-32wiu	-	NE-SW	Flexed on right???	R arm extended at shoulder, flexed at elbow with forearm beneath R torso; L arm flexed at shoulder, lying out in front of torso, hand near skull	-	-	-			
3DT15	4149	33	ya	18-25	M	SW-NE	Supine extended	R slightly abducted with elbow away from torso, hand next to R thigh (and L knee of 3DT16); L arm flexed at elbow, hand over R abdomen	Y	Y	Anatomical position for 3DT16, skull on left on top of left hand and left shoulder	Double burial		
3DT16	4149	33	oma	36-45	M	NE-SW	Supine extended	R arm alongside torso, hand next to R thigh; L arm abducted 90º at shoulder, elbow tightly flexed, hand just above shoulder	Y	Y	At feet of 3DT15, skull on right, looking towards feet	Double burial		
3DT17	4131	33	ya	18-25	M	NE-SW	Supine extended	R arm alongside torso, hand next to R thigh; L arm alongside torso, hand next to L thigh	Y	N	Anatomical position, skull on left, looking left			
3DT18	4116	33	ad	15-19	I	N-S	Supine extended	R arm tightly flexed at elbow, hand over L shoulder?; L arm position unclear	N	?	Anatomical position, on left side, almost looking face down?		Hob nailed shoes	
3DT19	4160	31	ad	16½-20	M?	NE-SW	Flexed slightly on left	R arm adducted at shoulder, flexed at elbow, wrist over L elbow, hand lateral to L elbow; L arm flexed at elbow, hand over pelvic inlet and fingers over R hip	N	N	Anatomical position, skull on left, looking onto left shoulder			
3DT20	4142	32	j	1-2	-	NW-SE???	?	Unknown	-	-	-		Chicken, glass vessel	Coffin
3DT21	4110	31	oma	36-45	M?	NE-SW	Supine extended	R arm alongside torso, hand next to R hip; L arm flexed at elbow, hand over pubic area	Y	Y	Skull on right arm, upright, facing to head end of grave			
3DT22	4166	33	oma	36-45	M	NW-SE	Supine extended	R arm slightly abducted so elbow slightly away from torso, hand next to/ beneath R hip; L arm abducted at shoulder, elbow flexed so fore-arm parallel with torso, wrist flexed and hand angled back towards L hip	N	N	Anatomical position, on occipital, looking up			
3DT23	4169	32	yma	26-35	M	SE-NW	Supine extended	R arm alongside torso, hand next to R hip; L arm flexed at elbow, hand over R hip (under R hand)	Y	N?	Anatomical position, but upright, looking towards feet			
3DT24	4182	33	n	0-1m	-	NE-SW?	Supine extended???	Unknown	-	-	-			
3DT25	4195	34	j	6-7	-	N-S	Supine extended	Arms flexed at elbows, hands together over pelvis	N	N	Anatomical position			
3DT26	4200	33	oma	36-45	M?	NE-SW	Flexed on left	R arm flexed at elbow, hand close to L knee; L arm extended alongside torso, hand next to L hip	Y	Y	Skull between thighs, on left side, looking to right femur		Hob nailed shoes	
3DT27	4204	32	a	25+	M	NW-SE	Supine extended?	Unknown	Y	N?	Skull probably in anatomical position, though not certain. On left side, looking left.			

3DT28	4218	33	yma	26-35	M	SE-NW	Supine extended	R arm alongside torso, hand next to R thigh (below skull); L arm slightly flexed at elbow, hand between thighs	Y	Y	Skull on right femur, on left side, looking to right side of grave			
3DT29	4281	32	oma	36-45	M	NW-SE	Flexed on right	R arm flexed at elbow, hand over L hip; L arm flexed at elbow, hand over R hip (right arm crossed over left)	-	-	-			
3DT30	4283	32	yma	26-35	M	NNE-SSW	Supine extended	R arm alongside torso, hand over R pubic area; L arm slightly flexed at elbow, hand over L pelvis	Y	N	Anatomical position			
3DT31	4285	32	yma	26-35	M	NE-SW	Supine extended	R arm slightly abducted so elbow out to side, tightly flexed at elbow, hand over R shoulder; L arm tightly flexed at L elbow, hand over neck	Y	N?	Anatomical position, lying on left, looking left and up			
3DT32	4235	32	ya	17-23	M	NNE-SSW	Supine extended	R arm alongside torso, hand next to R hip; L arm slightly flexed at elbow, hand over upper sacrum	N	N	Anatomical position, on occipital, looking up			Coffin
3DT33	4254	32	yma	26-35	M	SW-NE	Supine extended	R arm slightly flexed at elbow, hand over pelvis; L arm abducted at shoulder so elbow out to side, flexed at elbow, hand next to L pelvis	Y	Y	Skull to right of right mid tibia, lying on right side, looking right			
3DT34	4260	33	ya	17-23	M	NE-SW	Supine extended	R arm flexed at elbow, hand over L hip; L arm alongside torso, hand over L hip	N	N	Anatomical position, on occipital, looking up		Hob nailed shoes	Coffin
3DT35	4264	31	oma	36-45	M	NE-SW	Supine extended	R arm flexed at elbow, hand over L forearm; L arm abducted at shoulder so elbow out to side, flexed at elbow, hand over mid pelvis	N?	-	Mandible in anatomical position		Hob nailed shoes	
3DT36	4352	32	ya	18-25	M	SE-NW	Supine extended	R arm alongside torso, lower arm truncated and hand lost; L arm flexed at elbow, hand over R forearm & R os coxa	-	-	-	Double burial		
3DT37	4367	32	yma	26-35	M	SE-NW	Supine extended	R arm alongside torso, wrist flexed and rotated, hand next to R ilium; L arm flexed at elbow, hand over R hand	Y	Y	Skull to left of left leg, face down	Double burial	Hob nailed shoes and leather, Iron rings around ankles	
3DT38	4372	31	oma	36-45	M	SSW-NNE	Supine, slightly flexed to right	R arm alongside torso, hand next to R thigh; L arm flexed at elbow, hand over R forearm	Y	Y	Skull on right arm, face down			
3DT39	4347	32	a	18+	U	NW-SE	Flexed on left	Unknown	-	-	-			
3DT40	4350	33	ya	16-22	M	NE-SW	Supine extended	R arm adducted at shoulder so elbow over mid-spine, flexed at elbow, hand lateral to L shoulder; L arm flexed at elbow, hand over L shoulder (right arm crosses over left)	-	-	-		Horse bones	
3DT41	4387	32	ya	18-25	M	SE-NW	Supine extended	R arm flexed at elbow, hand over L pelvis; L arm flexed at elbow, hand over R pelvis	Y	Y	Skull lateral to left knee/ shin		Horse bones?	

3DT42	4407	32	yma	26-35	F	NE-SW	Prone, extended	R upper arm alongside torso, probably flexed at elbow, hand position unclear (forearm possibly underneath torso?); L arm flexed at shoulder so humerus next to skull, flexed at elbow, hand in line with R shoulder (as if hand raised over head with bent elbow)	N?	N	Anatomical position, lying face down		Horse bones	
3DT43	4439	33	ya	18-25	M	SW-NE?	Flexed on left???	Unknown	-	Y	Skull lateral to left leg, on right side, facing laterally			
3DT44	4446	32	yma	26-35	M	SW-NE	Supine extended	R arm flexed at elbow, hand over L elbow; L arm alongside torso, hand next to L hip	Y	Y	Skull between knees, on left, facing towards feet			Coffin
3DT45	4449	31	yma	26-35	M	NW-SE	Flexed on left	R arm flexed at elbow, hand over R shoulder; L arm alongside torso, hand next to L hip	Y	Y	Skull under right ilium and ribs, on right side, looking towards spine			
3DT46	4430	32	yma	26-35	M	SW-NE	Supine extended	R arm flexed at elbow, hand over L ilium; L arm flexed at elbow, hand over R ilium (right arm crossed over left)	Y	Y	Skull on chest, on left side, looking to right humerus			
3DT47	4472	31	yma	26-35	M	SE-NW	Supine extended	R arm flexed at elbow, hand over L forearm just below L elbow; L arm alongside torso, hand next to L thigh	Y	Y	Skull in almost anatomical position, on left side, looking towards feet			
3DT48	4475	31	oma	36-45	M	S-N	Supine extended	R arm flexed at elbow, hand over upper L chest; L arm flexed at elbow, hand over R pelvis	Y	Y	Skull between knees, on left, looking to right leg and upwards			
3DT49	4488	33	a	18+	U	SE-NW	Supine extended	Unknown	-	-	-			
3DT50	4434	32	a	18+	U	SSW-NNE	Supine extended	Unknown	-	-	-		Hob nails	
3DT51	4490	32	ya	18-25	M	SW-NE	Supine extended	R arm flexed at elbow, hand over L pelvis; L arm alongside torso, hand on L hip	N	N	Skull in anatomical position, on left side, facing left		Hob nails	Coffin
3DT52	4494	31	ya	18-25	M	S-N	Supine extended	R hand next to R hip (upper arm truncated); L arm truncated	-	-	-	Double burial		
3DT53	4494	31	yma	26-35	M	N-S	Supine extended	R arm alongside torso, hand next to R hip; L arm alongside torso, hand next to L hip	Y	N	Anatomical position, appears to be upright, looking towards feet?	Double burial		
3DT54	4497	31	yma	26-35	M	SE-NW	Supine extended	R arm flexed at elbow, hand over L pelvis; R arm flexed at elbow, hand over sternum	N?	N	Anatomical position, skull on right, looking to lower right			
3DT55	4500	31	yma	26-35	M	SE-NW	Supine extended	R arm alongside torso, hand next to R hip; L arm abducted at shoulder and tightly flexed at elbow so hand over L shoulder/ to L of neck	Y	Y	Skull tucked under left ilium, on left, looking left and towards head end of grave	Part of double burial		
3DT56	4500	31	a	18+	U	NW-SE	Supine extended	Unknown	-	-	-	Part of double burial		
3DT57	1001 0	33	a	18+	M?	SE-NW	Flexed on left	R arm truncated; L arm beneath torso, L elbow flexed and hand possibly in front of torso	N?	N	Anatomical position, on left side			

3DT58	1000 3	33	oma	36-45	M?	S-N	Flexed on left	L hand on L side of chest with fingers pointing downwards (little survives of rest of arm)	-	N?	Anatomical position?			
3DT59	4039	U	yma	26-35	M	?	?	Unknown	-	-	-			
6DT2	1021	24	oma	36-45	M	SW-NE	Flexed on right	R arm alongside/ front of torso, hand near knees; L arm truncated	-	Y	Skull to right of right hip (between pelvis and right arm), upright, facing to feet		Hob nails?	Coffin
6DT3	1027	24	ya	18-25	M	N-S	Supine extended	R arm flexed at elbow, hand over L elbow; L arm alongside torso, hand next to L hip	Y	Y	Skull between femora			Coffin
6DT4	1028	24	oma	36-45	M	SE-NW	Supine extended	R arm alongside torso, hand on R hip; L arm alongside torso, hand on L hip	Y	Y	Skull on lower femora on right side, facing away from left leg			
6DT5	1039	24	yma	26-35	M	SE-NW	Supine extended	R arm prone (scapula angled so glenoid facing upwards), arm alongside torso, slightly flexed at elbow, hand position unclear; L arm possibly alongside torso (unclear)	Y	-	Skull to right of right shoulder, upright, facing towards spine			
6DT6	1036	24	yma	26-35	M	N-S	Supine extended	R arm flexed at elbow, hand over groin; L arm alongside torso, hand over L hip	-	Y	Skull on left side of chest, foramen magnum up, facing towards head end of grave			Coffin
6DT7	1042	24	oma	36-45	M	SW-NE	Supine, slightly flexed left	R arm flexed at elbow, hand over groin; L arm alongside torso, hand next to L thigh	?	Y	Skull between thighs, upright, facing towards feet			
6DT8	1065	24	oma	36-45	M	NW-SE?	Supine extended	R arm flexed at elbow, hand over L hip and L hand; L arm alongside torso, hand over L hip (under R hand)	Y	Y	Skull to left of left tibia, upright, facing to feet			Coffin
6DT9	1056	24	a	18+	M?	SE-NW?	Supine extended	R hand next to R hip (upper R arm and L arm truncated)	Y	Y	Skull between central femora, occipital up, facing into base of grave			Coffin
6DT10	1047	23	ya	18-25	U	NW-SE	Possibly supine	L humerus alongside torso (rest truncated, R arm truncated)	?	Y	Skull not in anatomical position, grave truncated so location not known	Double grave		Coffin
6DT11	1047	23	a	18+	U	SE-NW	Supine extended	Unknown	-	-	-	Double grave		
6DT12	1085	22	a	18+	M?	NE-SW	Supine extended?	Both upper arms alongside torso, lower arms truncated	Y	Y	Skull appears to be in correct position, but not certain (looks like it is resting on clavicles), upright, looking to feet			
6DT13	1063	23	oma	36-45	M?	SE-NW?	Supine extended?	R hand resting on top of pelvis; L hand under L hip	Y	-	-			
6DT14	1103	22	yma	26-35	M	S-N	Supine extended	R arm almost perpendicular to body; L arm alongside torso	(S)	?	Unclear	Quadrupl e burial	Pottery	In box with 14, 17, 18, 20
6DT15	1128	23	ya	18-25	M	NW-SE	Flexed on left	R arm flexed at elbow, hand over L elbow; L arm flexed at elbow, hand over R elbow	N	N	Skull in anatomical position, upright, facing to feet			
6DT16	1118	22	yma	26-35	M	N-S	Supine extended	R arm truncated; L arm alongside torso, hand next to L hip?	-	-	-			In coffin
6DT17	1103	22	oma	36-45?	M?	S-N	Supine extended	Unclear	-	-	Unclear	Quadrupl e burial	Pottery	In box with 14, 17, 18, 20

6DT18	1103	22	ya	17-21	M	N-S	Supine extended	R arm alongside torso, hand next to R hip; L arm alongside torso, hand next to L hip	N	N	Anatomical position, almost upright, facing to right shoulder	Quadruple burial	Pottery	In box with 14, 17, 18, 20
6DT19	1130	23	yma	26-35	M	NE-SW	Supine extended	R arm slightly abducted at shoulder so elbow out to side (and lying on top of L leg of 6DT21), lower arm on outside of leg of 6DT21; L arm truncated	Y	N	Anatomical position, on back, facing upwards to right	Triple burial	Hob nails, horse bones	
6DT20	1103	22	yma	26-35	M?	S-N	Supine extended	R arm unclear; L arm flexed at elbow, hand over R abdomen	Y	N	Anatomical position	Quadruple burial	Pottery	In box with 14, 17, 18, 20
6DT21	1130	23	oma	36-45	M	SW-NE	Supine extended	R arm behind back; L arm alongside torso, hand next to/on L hip	Y	Y	Skull to right of right elbow, upright, facing to feet	Triple burial	Hob nails	
6DT22	1130	23	yma	26-35	M	NE-SW	Prone extended	R arm alongside torso, hand next to R thigh; L arm abducted and extended at shoulder (so elbow out to side and raised), elbow flexed, hand on L side of lower back	(S)	Y	Skull underneath L side of torso	Triple burial	Hob nails	
6DT23	1150	23	ya	18-25	M	NW-SE	Supine extended?	R arm flexed at elbow, hand over L hip; L arm flexed at elbow, hand over R hip	Y	Y	Skull over L shoulder, on R side, facing upwards	Torso supine, R leg extended, L leg flexed so knee over R thigh	Horse bones, architectural stone fragments	
6DT24	1183	21	ya	18-25	M?	SW-NE	Supine extended	R arm flexed at elbow, hand over L pelvis; L arm flexed at elbow, hand over R pelvis	?	N	Anatomical position, on right side, facing to right		Hob nails, horse bones	

The skeletal remains from 3 and 6 Driffield Terrace were part of an elongated cemetery that borders the eastern and western side of a Roman road, which lies approximately on the same alignment as the modern road leading from Micklegate at the south-western part of the city in a south-western direction. This road is also called the A1036 or, along the majority of its length, Tadcaster Road (also Blossom Street, The Mount and Mount Vale). Driffield Terrace is located on the western side of the Roman road, just below and to the south of the summit of the road, at The Mount and the junction between this, Dalton Terrace and Albemarle Road. The cemeteries discussed here are located approximately 600m to the southwest of the medieval city walls (Figure 54).

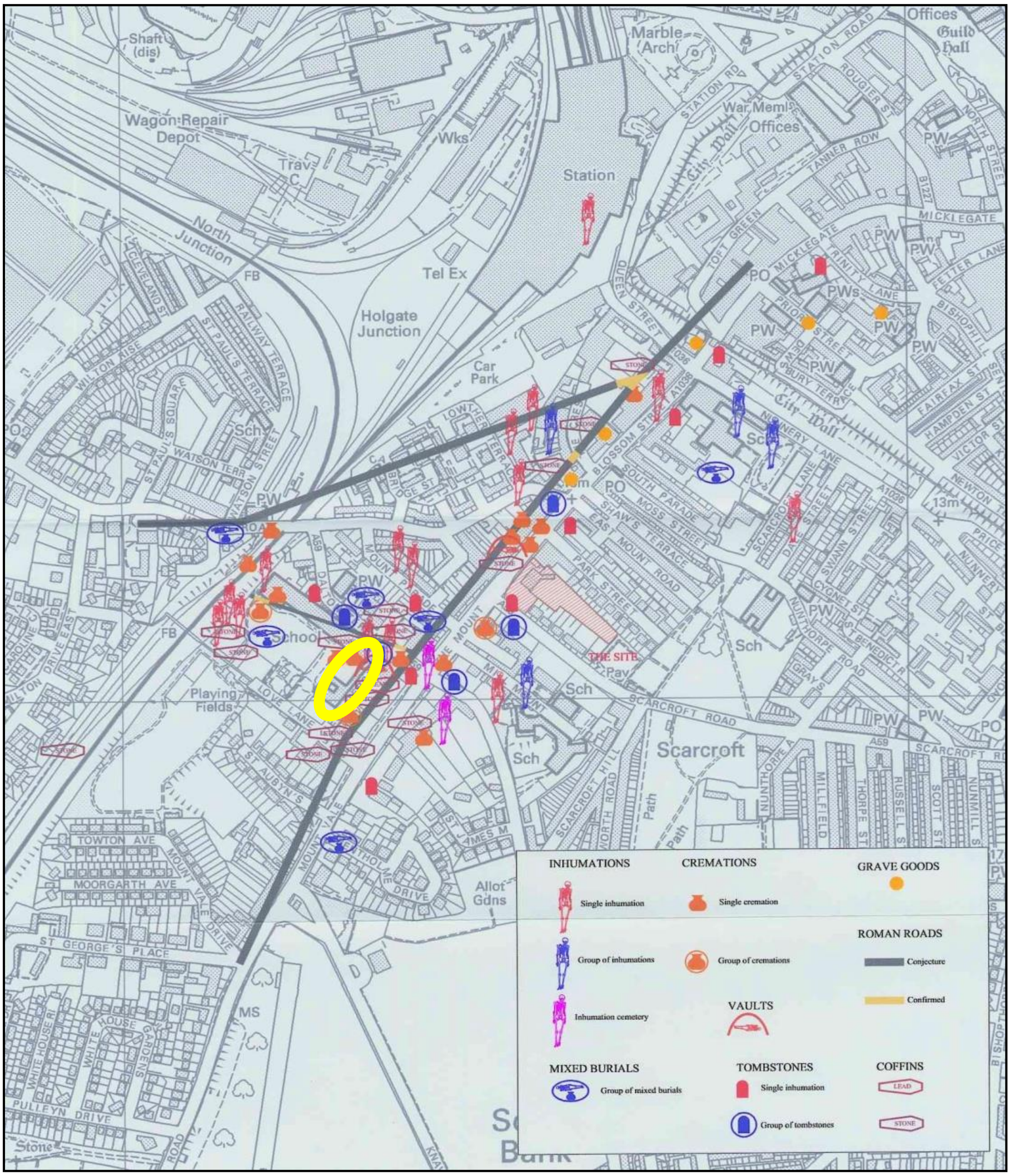


Figure 54 Location of burials along the Roman road leading to Tadcaster, showing the Mill Mount cemetery in red (reproduced with kind permission by Mike Griffiths and Associates Ltd); the location of Driffield Terrace has been highlighted with a yellow oval

The cemeteries at 3 and 6 Driffield Terrace are by no means the only burials found in the area. The majority of burials are nineteenth and early twentieth century chance finds (Ottaway 1993) and are only haphazardly recorded and preserved. However, in the 1950s, Wenham excavated a Roman cemetery at Trentholme Drive in advance of a housing development (Wenham 1968). Trentholme Drive lies on the opposite side of the Roman road and is located much lower down the slope of Mount Vale compared with Driffield Terrace. It is thought that it was in use from 140 AD to 400 AD (*ibid*). A total of 350 Roman inhumations and 40 cremation burials were excavated at Trentholme Drive. Additionally, several *ustrina*, or cremation pyres were found (*ibid*). The majority of skeletons were probably male adults, but a small proportion of females and children's skeletons were also found (Warwick 1968). Unfortunately the fact that children are included with the sexed individuals prevents a clear understanding of the demography at Trentholme Drive.

Also on the eastern side of the road, but on the highest point of it, lies the cemetery of Mill Mount. This was excavated in 2004 and 2005 and received osteological analysis. A total of nineteen inhumations were excavated, as well as two cremation burials and a Roman sarcophagus, containing an adolescent covered in gypsum (Holst 2005, Holst 2006, Holst 2008). The individuals are thought to date to the second and third centuries AD and represented a mixed population of males and females and children of all ages. Many of the individuals were interred in wooden coffins.

Further north, towards the city and also located on the eastern side of the Roman road, a further nine burials were excavated at 89 The Mount, as well as another stone sarcophagus gypsum burial. These included two males, four females and two non-adults (Holst 2007).

Other evidence of burials that are probably part of the Roman roadside cemetery includes a multiple burial of three males at the Moss Street depot (Holst 2003). Although this site lies 100m to the east of The Mount, it is likely to be part of the same cemetery.

The evidence suggests that Driffield Terrace was part of a long and wide cemetery along a Roman road, which follows the alignment of the current A1036.

As discussed in Section 1.0, the cemetery covered four phases (see Table 1), dating from the late first or early second century AD to the late fourth century AD. The majority of skeletons were thought to date to the late second and early third century AD (35.4%), followed by those dating to the late third to late fourth centuries AD (30.5%). Late fourth century burials were more common at 6 Driffield Terrace, but occurred at both sites (17.0%) and late first to early second century graves were more common at 3 Driffield Terrace (in total 15.9%) of burials.

Notably, dating evidence suggests that the cemeteries along the Roman road were in use at the same time, with Trentholme Drive dating from 140AD to 400 AD, Mill Mount from the second and third century AD and 89 The Mount from the first to the third century AD.

5.1 BURIAL DISTRIBUTION

Burial distribution of the skeletons at 3 and 6 Driffield Terrace was relatively chaotic, unlike in some Roman cemeteries, where burial orientation can be very orderly. It has been argued that orderly burial became increasingly widespread towards the later Roman period, particularly in the fourth century AD (Clarke 1979, 352).

At 3 Driffield Terrace, the majority of burials were located in the southern part of the excavation area (approximately 15x25m in size), to the east of a ditch running in a north to south orientation. However, it must be noted that there was also a small number of burials to the west of the ditch and that burial continued to the north, south and east of the current distribution of burials. The limit of excavation meant that no further burials were recorded to the south and east of the excavation area and a number of post-medieval features appear to have destroyed the Roman burials located in the northern part of the excavation trench.

The excavation Trench at 6 Driffield Terrace was considerably smaller compared with that at 3 Driffield Terrace (just over 5x5m). The burials were mostly located along the edges of the trench, with some non-grave features in the centre of the excavation trench.

It is also notable that many of the graves at both 3 and 6 Driffield Terrace truncated one another, suggesting either a lack of burial markers or disregard for earlier burials. Other Roman cemeteries, such as those at Mill Mount in York (Holst 2005, Holst 2006), Cannington in Somerset (Rahtz, *et al.* 2000) and Horncastle (Caffell and Holst 2008), were much more orderly in nature and graves respected one another with little inter-cutting between burials. In contrast, the more disorganised grave distribution at Trentholme Drive (Wenham 1968) had more in common with the pattern of burials at Driffield Terrace.

5.2 ORIENTATION

The most common orientation at the cemetery was in a northeast (head) to southwest (feet) direction (22%). However, other orientations were also common, such as the opposite way around (17.1%). Burial with the head to the southeast and the feet to the northwest (19.5%), or the opposite way around was also prevalent (13.4%), as was burial in a north to south (8.5%) or south to north orientation (7.3%). The typical Christian orientation, with the head to the west and the feet to the east were not seen at either site and only 1.2% of individuals were interred in an east to west orientation (see Table 96, Table 97, Figure 55).

Table 97 Burial orientation at Driffield Terrace

Position	3DT		6DT		Total	
	n	%	n	%	n	%
N-S	3	5.1%	4	17.4%	7	8.5%
NNE-SSW	2	3.4%	0	0.0%	2	2.4%
NE-SW	15	25.4%	3	13.0%	18	22.0%
NNW-SSE	0	0.0%	0	0.0%	0	0.0%
NW-SE	7	11.9%	4	17.4%	11	13.4%
S-N	3	5.1%	3	13.0%	6	7.3%
SSE-NNW	1	1.7%	0	0.0%	1	1.2%
SE-NW	11	18.6%	5	21.7%	16	19.5%
SSW-NNE	4	6.8%	0	0.0%	4	4.9%
SW-NE	10	16.9%	4	17.4%	14	17.1%
W-E	0	0.0%	0	0.0%	0	0.0%
ENE-WSW	1	1.7%	0	0.0%	1	1.2%

E-W	1	1.7%	0	0.0%	1	1.2%
?	1	1.7%	0	0.0%	1	1.2%
Total	59		23		82	

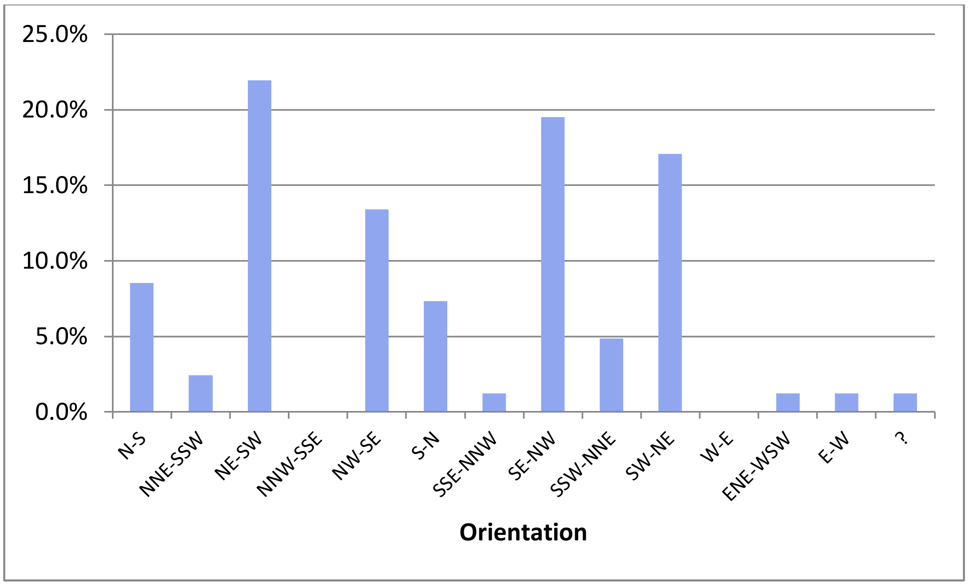


Figure 55 Burial orientation

At 3 Driffield Terrace, the most common direction of orientation was with the head to the northeast and the feet to the southwest, while at 6 Driffield Terrace the most common orientation was in a southeast to northwest direction (Figure 56). Figure 56 shows clearly that there was greater variation with regards to burial orientation at 3 Driffield Terrace compared with 6 Driffield Terrace. This may be due to the relatively small area uncovered at 6 Driffield Terrace.

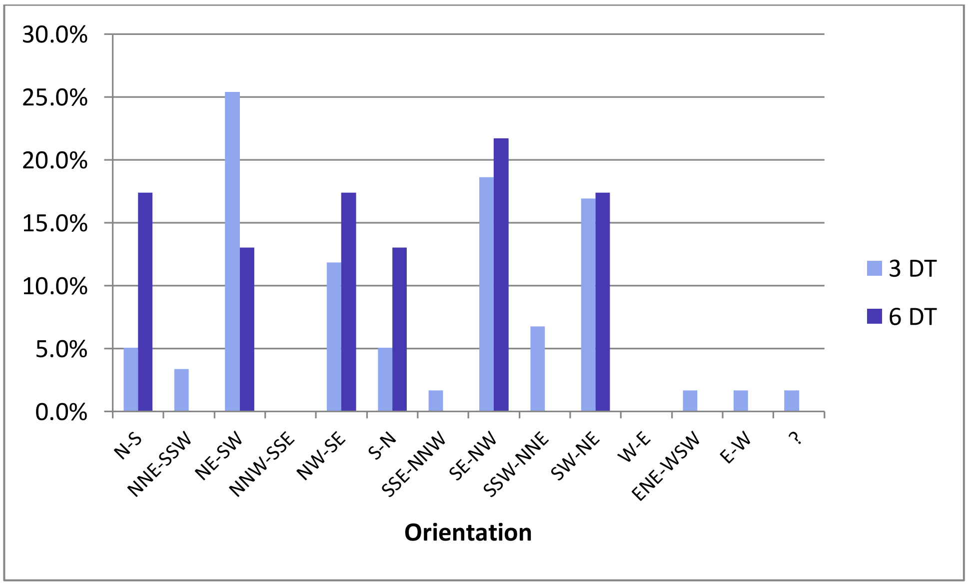


Figure 56 Burial orientation at 3 and 6 Driffield Terrace

When analysing orientation by phase of burial, there was considerable variation of burial orientation in each phase. However, it was found that in the late first and early second century, burial in a northeast to southwest or southeast to northwest direction was favoured. In the late second, early third century the most common orientation was burial in a southeast to northwest or southwest to northeast direction. In the late third and early fourth century, most burials were orientated in a northeast to southwest direction. In the late fourth century, burial was common in a north to south orientation, as well as in a southeast to northwest or southwest to northeast orientation.

When comparing the orientation of the Driffield Terrace skeletons with those from Mill Mount, 89 The Mount and Trentholme Drive in York, it is notable that there are considerable differences between the four sites. The orientation of the burials at Trentholme Drive and at 89 The Mount was as disordered as at Driffield Terrace. At Mill Mount, however, the burials all followed the same orientation, with a single exception. All individuals had been interred in a northwest to southeast orientation, apart from one skeleton, who had been interred exactly the opposite way around. As this individual had been buried in a coffin, there is a slight possibility that the coffin had been accidentally buried in the opposite direction to that intended.

The direction of burial orientation varies considerably between different cemeteries in Roman Britain (Clarke 1979, 352). At Horncastle, the majority of skeletons were oriented in a north to south direction (Caffell and Holst 2008), whereas at Cannington most skeletons were broadly aligned west-east (Rahtz, *et al.* 2000). It is possible that a west-east orientation may have been more widely adopted in the later Roman period (Rahtz, *et al.* 2000). O'Brien (1999, 5) has observed that burial orientation at many of the smaller cemeteries favoured a north-south (or inverted) alignment, whereas burials in the larger organised cemeteries near urban or military centres were more likely to have a west-east alignment.

5.3 POSITION

Burial position was also varied at Driffield Terrace. However, the majority of burials (70.7%) lay in extended supine positions (see Table 96, Table 98, Figure 57). The position was more common at 6 Driffield Terrace (79.3%), than at 3 Driffield Terrace (67.8%, Figure 58). A small number of individuals were lying in a flexed position on their left (12.2%) or right sides (6.1%) and both of these positions were more common at 3 Driffield Terrace compared to 6 Driffield Terrace. A total of three individuals (3.7%) were interred facing down, or prone. Interestingly, one of these was the only female skeleton buried at the sites (3DT42). A small number of individuals (one from each site) were buried in supine, but partly flexed positions.

Table 98 Skeletal position

Position	**3DT**		**6DT**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**
Supine extended	40	67.8%	18	78.3%	58	70.7%
Supine, slightly flexed left	0	0.0%	1	4.3%	1	1.2%
Supine, slightly flexed right	1	1.7%	0	0.0%	1	1.2%
Supine?	0	0.0%	1	4.3%	1	1.2%
Flexed on left	9	15.3%	1	4.3%	10	12.2%
Flexed on right	4	6.8%	1	4.3%	5	6.1%
Prone	2	3.4%	1	4.3%	3	3.7%
Unknown	3	5.1%	0	0.0%	3	3.7%
Total	59		23		82	

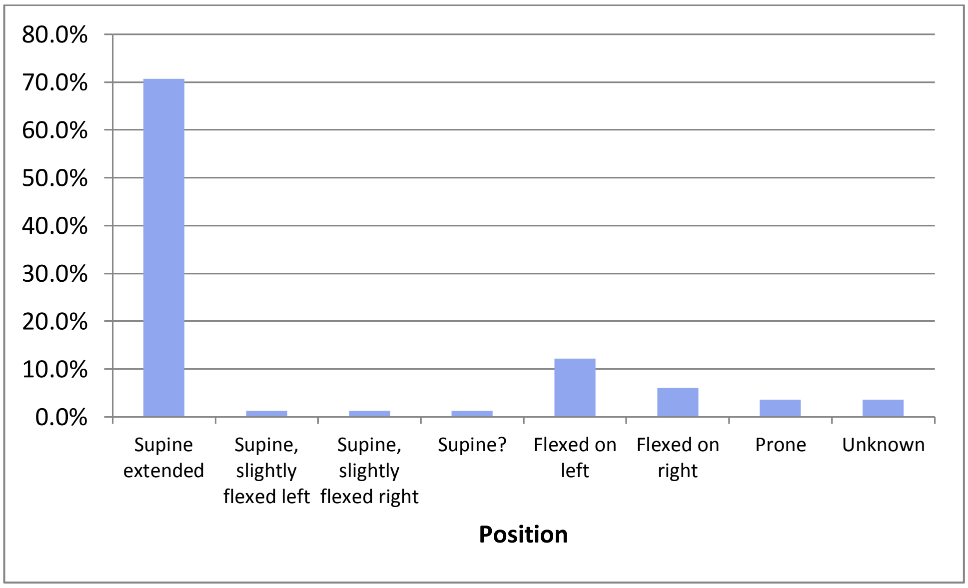


Figure 57 Skeletal position

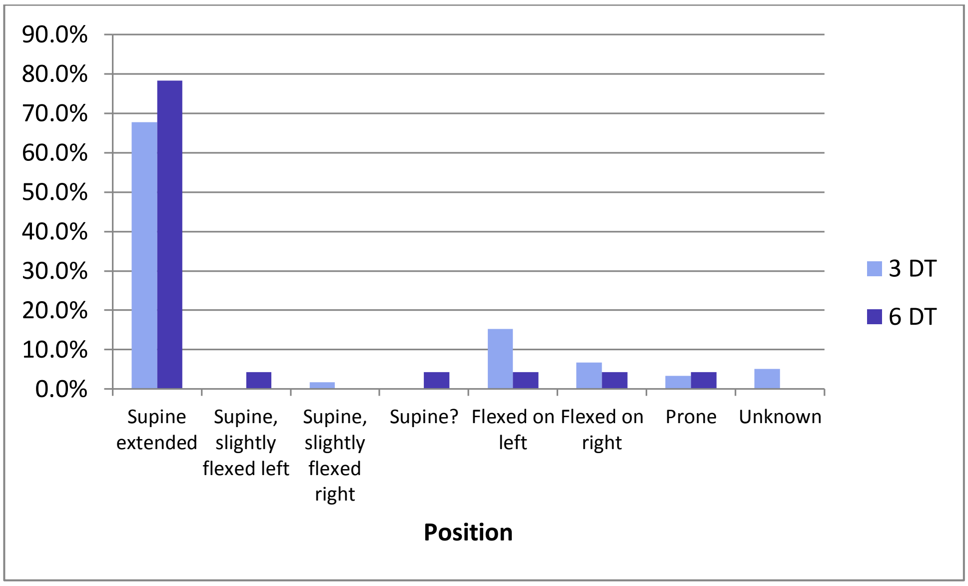


Figure 58 Skeletal positions at 3 and 6 Driffield Terrace

Burial position at Trentholme Drive varied considerably (Wenham 1968). At 89 The Mount, 77.8% of skeletons were in supine extended positions. At Mill Mount, all of the skeletons were buried in supine extended positions, with the exception of two children, one of whom was interred in a prone position and the other was a neonate who had been interred in a crouched position over the feet of an adult (Holst 2005, Holst 2006).

At other Roman cemeteries, extended supine positions also tend to be most common. At Horncastle, for example, 93.9% of skeletons were buried in an extended supine position, while two individuals were buried in a prone position (6.1%; Caffell and Holst 2008). The burial ritual at Horncastle corresponded with that frequently observed during the mid Roman period. The majority of burials during this period tend to lie on their backs, with extended legs and the arms in a variety of relatively orderly positions. At Cannington, 98.3% of the burials were arranged in this way (Rahtz, *et al.* 2000). Those burials that differed from the norm (semi-flexed or flexed) were located at the periphery of the main burial area (*ibid*).

According to Philpott (1991), prone burials were more common in rural or small town cemeteries, particularly in the fourth century, although earlier prone burials do exist. Prone burial may be used to signify 'outcast' status and these burials were often located at the periphery of an ordered cemetery. This was true in the case of Skeleton 3DT42 to a degree; her burial was located to the west of a ditch, while most of the graves at 3 Driffield Terrace were located to the east of this ditch, suggesting her burial marked a boundary of some sort. Her arm position, with one arm reaching above her head and the other apparently beneath her torso, suggested a lack of care in arranging the body. The second prone burial at 3 Driffield Terrace (3DT6) was, however, located in a densely packed area of burials. It was not clear how many burials would have been located around the only prone burial (6DT22) at 6 Driffield Terrace, as this was located at the edge of excavation. Notably, 6DT22 was interred in a grave together with two other skeletons, who were interred in opposite positions (supine extended).

There was no direct association between skeletal orientation and position. The majority of skeletons from all phases were interred in supine extended positions. The clearest correlation between a phase and a skeletal position was noted in the late third to early fourth century, where almost a quarter of the skeletons (24%) were interred on the left sides in a flexed position.

5.4 GRAVE GOODS

Grave goods were relatively infrequent at Driffield Terrace. The artefactual evidence from the burials is still being examined and it will only be possible to determine for certain which artefacts and animal bone assemblages are residual, and which have been deliberately included in the burials once this has been completed. This section must therefore be regarded as a tentative attempt at analysing the grave goods, which is likely to be subject to revision.

The majority of artefacts recovered from burials were animal bone, pottery and ferrous nails (see Table 96). Of these, it was possible to determine for certain during preliminary analysis that a small number were definitely grave goods, rather than residual. These included chicken bones and a glass vessel in the burial of a one to two year old juvenile (Skeleton 3DT20).

Horse bones were found as deliberate deposits with six individuals: Skeletons 3DT40 (young adult male, Phase 33), 3DT41 (young adult male, Phase 32), 3DT42 (young middle adult female, Phase 32), 6DT19 (young middle adult male, Phase 23), 6DT23 (young adult male, Phase 23) and 6DT24 (young adult male, Phase 21). It is interesting that not only males, but also the single female has been interred with horse bones. Cremated horse bones were found with ten different cremation-related contexts at the cemetery at Brougham, Cumbria (Bond and Worley 2004, 325-326). These included four cist burials, two of which contained the burials of adult females, and two of which did not contain human bone. Horse bones were also found with an urned cremation burial (adult male, aged over 45 years), a possible pyre site, three deposits of pyre debris and an unstratified context (Bond and Worley 2004, 325). Three deposits probably contained the remains of horses that had been cremated as whole animals. McKinley (2004d, 332) briefly discusses the significance of the horse remains, including whether the horse was a status symbol, a personal possession of the deceased, and whether the horse had any ritual symbolic meaning.

Skeleton 3DT13 (adolescent male?, Phase 33) was interred with a number of pottery beakers. Pottery was recovered from within the wooden box that contained the quadruple burial of 6DT14, 6DT17, 6DT18 and 6DT20. Although pottery was found in a large number of graves, it has not yet been established whether these were residual or not.

The iron rings around the ankles of Skeleton 3DT37 (see Table 96), a young middle adult male, were unusual and no known parallels from Britain have been identified. The rings do not appear to have been connected by a chain or other link, suggesting that these are unlikely to be shackles.

By far the most common finds were hob nailed shoes, which were found with ten skeletons (12.2%; see Table 96). These were found with Skeletons 3DT13 (adolescent male?, Phase 33), 3DT18 (adolescent, Phase 33), 3DT27 (old middle adult male, Phase 32), 3DT34 (young adult male, Phase 33), 3DT37 (young middle adult male, Phase 32), 3DT50 (undetermined adult, Phase 32), 3DT51 (young adult male, Phase 32), 6DT2 (old middle adult male, Phase 24), 6DT19/21/22 (triple grave, Phase 23) and 6DT24 (young adult male, Phase 21). The majority of individuals with hob nailed shoes belonged to Phase 23/33, so date to the late third and early fourth century AD, however, hob nails were also found in graves from the other three phases.

Quensel-von-Kalben (2000, 218-219) examined ten cemeteries, eight of which contained burials with a prevalence of hob nails ranging from 1% to 33%. The highest frequency of hob nailed shoes in burials was identified in late Roman urban cemeteries (*ibid*). It is thought that the dead were provided with or wore their shoes so that they were equipped for their journey into the underworld (Wardle 2000, 29).

It has been argued that because the Trentholme Drive cemetery is located towards the foot of the slope making up The Mount and Mount Vale, this cemetery is likely to be of lower social status than the cemeteries on the upper parts of the slope (Wenham 1968). However, it is notable that no grave goods were found at the 89 The Mount (Holst 2007) or Mill Mount (Holst 2005, Holst 2006) cemeteries, with the exception of two coins in the sarcophagus from Mill Mount (Holst 2008). Grave goods were also not found at Moss Street Depot (Holst 2003). The inclusions of artefacts and animal bone at Driffield Terrace are limited, though further work on these may reveal different conclusions. It is notable, in contrast, that several burials at Trentholme Drive contained grave goods, suggesting perhaps that this is actually not such a low status cemetery. It is suggested that further work on this subject is required.

5.5 COFFINS

Of the 71 graves (there were five double burials, two multiple burials, and one skeleton was found redeposited in a charnel pit), fourteen (19.7%) contained wooden coffins. These included the quadruple burial at 6 Driffield Terrace containing Skeletons 6DT14, 6DT17, 6DT18 and 6DT20, who were interred together in a large wooden box (see Table 96). In the majority of burials, identification of the coffin was made using the quantity and distribution of ferrous nails within the grave.

Interestingly, there were some notable differences between the coffin burials at 3 Driffield Terrace and at 6 Driffield Terrace. Six graves (11.1%) at 3 Driffield Terrace contained coffins. The coffins contained four young adult or young middle adult males, as well as an adolescent possible male (Skeleton 3DT13) and a one to two year old juvenile (Skeleton 3DT20). What is most interesting is that none of the coffined burials at

3Driffield Terrace, with the exception of Skeleton 3DT44, have been decapitated. The pattern is very different at 6 Driffield Terrace, where all of the eight coffined burials showed evidence for decapitation, although in the case of the quadruple burial that was contained within a coffin, only one of the four individuals (Skeleton 6DT20) is definitely decapitated.

Notably, there was a much higher proportion of coffin burials at 6 Driffield Terrace, with 47.1% of graves containing coffins, as opposed to only 11.1% of graves at 3 Driffield Terrace. The coffined burials at 6 Driffield Terrace date to the later two phases (Phases 23 and 24) and therefore to the late third to late fourth centuries AD, unlike the 3 Driffield Terrace coffin burials, which dated to the late second to early fourth centuries (Phases 32 and 33).

Notably, at Mill Mount, all of the skeletons were buried in wooden coffins with the exception of one individual, a four to six year old juvenile (Holst 2006). The presence of 2,300 coffin nails at Trentholme Drive was used to infer that many if not the majority of the individuals had been buried in coffins (Wenham 1968, 39).

5.6 MULIPLE BURIALS

A total of seven double or multiple graves were excavated. There were four double burials at 3 Driffield Terrace (3DT15 and 3DT16, 3DT36 and 3DT37, 3DT52 and 3DT53, 3DT55 and 3DT56) and one double grave (6DT10 and 6DT11), a triple (6DT19, 6DT21 and 6DT22) and a quadruple burial (Skeletons 6DT14, 6DT17, 6DT18 and 6DT20) at 6 Driffield Terrace (see Table 96).

Skeletons 3DT15 (young adult male) and 3DT16 (old middle adult male) were interred in opposing directions (southwest to northeast and northeast to northwest respectively) in the same grave, and were both buried in supine extended positions. Notably, the skull for 3DT15 (uppermost skeleton) was located in the correct anatomical position for the skull of 3DT16 (lowermost skeleton). It was only noted during the initial analysis of the skeletal remains carried out by Tucker that this was not the correct skull for the skeleton. The skull of 3DT16 had been placed by the feet of 3DT15. This double burial has been assigned to the late third or early fourth century AD.

Skeletons 3DT36 (young adult male) and 3DT37 (young middle adult male) were both interred in supine extended positions in a southeast to northwest orientation and date to the late second or early third century AD. Notably, 3DT37, which lay below 3DT36 had iron bands around his shins and wore hob nail shoes.

Skeleton 3DT52 (young adult male) and 3DT53 (young middle adult male) were interred in supine extended positions, with 3DT52 being buried in a south to north direction and 3DT53 being buried in a north to south direction. It is thought the skeletons date to the late first or early second century.

Skeletons 3DT55 (young middle adult male) and 3DT56 (adult of undermined sex) were also interred in a double grave, with both individuals lying in supine extended positions. Skeleton 3DT55 was buried in a southeast to northwest alignment and Skeleton 3DT56 in a northwest to southeast direction. The burial has been assigned to the late first or early second century.

There was one double burial at 6 Driffield Terrace, which contained Skeletons 6DT10 (young adult of undetermined sex) and 6DT11 (adult of undetermined sex). The individuals lay in extended supine positions in opposing directions and were truncated by a large pit. They dated to the late third or early fourth century AD.

A quadruple grave was excavated at 6 Driffield Terrace, which dated to the late second or early third century, containing Skeletons 6DT14 (young middle adult male; uppermost in the grave), 6DT17 (old middle adult male?; below 6DT14), 6DT18 (young adult male; below 6DT17) and 6DT20 (young middle adult male?; lowermost in the grave). The skeletons were placed together in what appears to be a wooden box, with Skeleton 6DT18 arranged in the opposite orientation (north-south) to the other three. Pottery was found within the burial.

A triple burial dating to the late third/ early fourth century AD was also found at 6 Driffield Terrace. This contained Skeletons 6DT19 (young middle adult male), 6DT21 (old middle adult male) and 6DT22 (young middle adult male). Skeletons 6DT19 (uppermost) and 6DT22 (lowermost) were both buried in a northeast to southwest orientation, in a supine and a prone extended position respectively. Skeleton 6DT21 was buried in a supine extended position, in the opposing orientation (southwest to northeast). The skeletons were found with hob nails.

Two double burials were found at Mill Mount. One of the double burials contained a neonate overlying the feet of an adult within a coffin (Holst 2005), while the other double burial contained two adults. It is not clear whether the adults were interred in a single, or two wooden coffins (Holst 2006).

5.7 CONTEXTUAL EVIDENCE FOR DECAPITATION

As discussed in Section 3.3.6, around 60% of the skeletons had osteological evidence for decapitation. Archaeological contextual evidence for decapitation, in the form of the head not being in the correct anatomical location, was also noted in many instances.

For eighteen adults and three non-adults from Driffield Terrace (Skeleton 3DT14, foetus; Skeleton 3DT20, 1-2 year old juvenile; Skeleton 3DT24, neonate) contextual information on decapitation was absent (due to truncation of the grave or poor preservation) and for a further two adults and one adolescent it was not clear from the context whether or not the person had been decapitated. Osteological evidence demonstrated that three of these twenty adults had in fact been decapitated (Skeletons 3DT1, 3DT7, and 6DT13), but one probably had not (Skeleton 3DT35; no cuts were observed on the surviving vertebrae but one of the cervical vertebrae was lost post-mortem). One Skeleton (6DT14) had cuts to the vertebrae that might not be consistent with decapitation.

Of the 59 individuals where contextual information on decapitation was present, the position of the skulls of 34 individuals indicated they had been decapitated (57.6%). Twenty-seven (79.4%) of these 34 individuals also had osteological evidence for decapitation or probable decapitation. Of the remaining seven skeletons, three individuals had potential cuts to the vertebrae, but the bones were so damaged that it was difficult to be certain the cuts were present (Skeletons 3DT8, 6DT7 and 6DT10). Three individuals had incomplete cervical spines, and though no cuts were observed on the surviving vertebrae, it is entirely possible the cuts were located on the missing vertebrae (Skeletons 3DT43, 6DT2, and 6DT6). One individual (Skeleton 6DT22) had an oblique cut to the right side of the fifth(?) cervical vertebra that may not be consistent with decapitation. However, his cervical spine was also incomplete, so decapitation cuts may have been located on the missing vertebrae.

The heads of 25 individuals were in the correct anatomical location (43.1%), including one where the head was probably in the correct location. Thirteen of these individuals (including the adult female, two adolescents and the 6-7 year old juvenile) had no osteological evidence for decapitation. However, osteological evidence for decapitation was observed in nine of these individuals despite the fact that the head was located in the correct anatomical position. Some of these decapitations may have been partial, for example a horizontal cut to the first thoracic vertebra in Skeleton 3DT30 (young middle adult male) had also partially penetrated the right first rib, but it does not seem that this cut would have completely severed the head and the individual's head was located in the correct anatomical location. One individual (Skeleton 6DT24) possibly had a cut to the spinous process of the seventh cervical vertebra, but this might have been caused by post-mortem damage and there were no cuts to the first thoracic vertebra. The cervical spines of the remaining two individuals (Skeletons 3DT3 and 3DT58) were so incomplete that although no cuts were evident, it was impossible to be sure that they had not been decapitated.

If contextual and osteological evidence for decapitation are combined, at least 46 individuals had been decapitated. This provides a crude prevalence of 56.1% of all 82 individuals, or a more refined prevalence of 70.8% of those individuals where either contextual or osteological evidence of decapitation could be observed.

Decapitated heads had been placed in the grave in a variety of locations, but were most frequently seen in the vicinity of the legs (30.4%; Table 99 and Figure 59). Positions included between/on/beside the thighs, knees and shins. Just over a quarter of decapitated skulls had been placed in the 'correct' anatomical position, though this figure does include individuals where the head may have been partially decapitated. The next most frequent location was the torso (13.0%), and these included skulls placed under the lower torso, between the torso and arm, and on the chest. Skulls were also placed in the shoulder region, or on/beside the arm. The skull positions of Skeletons 3DT15 and 3DT16, who shared a grave, are particularly interesting. The skull of Skeleton 3DT15 (young adult male) had been placed in the correct anatomical location for Skeleton 3DT16 (old middle adult male), and the head of Skeleton 3DT16 had been placed at the feet of Skeleton 3DT15. These two individuals were classified as 'other' in Table 99 and Figure 59.

Table 99 Location of decapitated skulls

Skull position	3 DT		6 DT		Total	
	n	%	n	%	n	%
Correct	8	26.7%	4	25.0%	12	26.1%
Shoulder	2	6.7%	2	12.5%	4	8.7%
Arm	3	10.0%	1	6.3%	4	8.7%
Torso	4	13.3%	2	12.5%	6	13.0%
Leg	9	30.0%	5	31.3%	14	30.4%
Other	2	6.7%	0	0.0%	2	4.3%
Unknown	2	6.7%	2	12.5%	4	8.7%
Total	30		16		46	

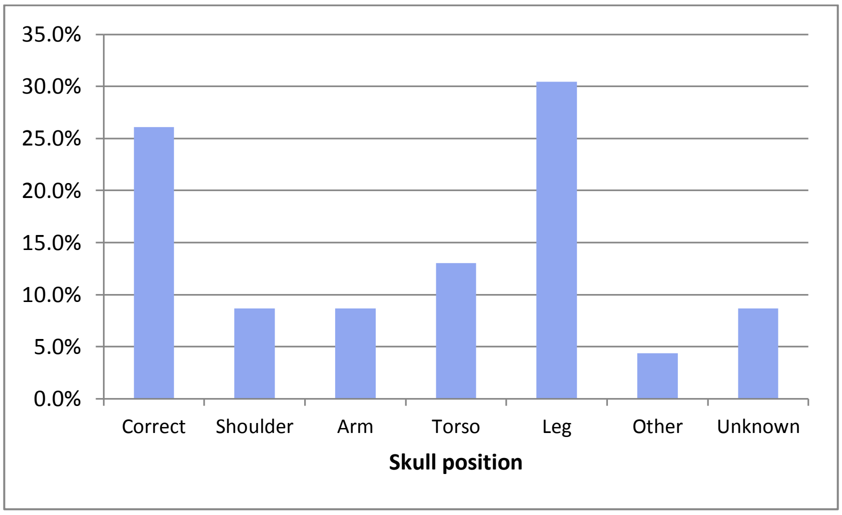


Figure 59 Location of decapitated skulls

The pattern of skull location was similar between 3 Driffield Terrace and 6 Driffield Terrace (see Table 99 and Figure 60). At both sites the majority of skulls were placed with the legs, followed by skulls placed in the correct position. A slightly higher proportion of skulls were located in the shoulder region at 6 Driffield Terrace, with a slightly higher proportion of skulls located in the arm region at 3 Driffield Terrace. There was a higher percentage of decapitated skulls placed in unknown locations at 6 Driffield Terrace.

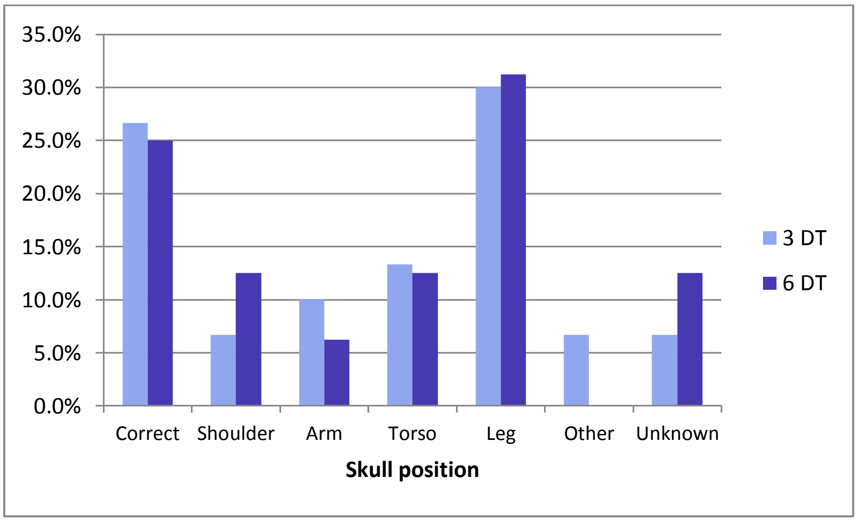


Figure 60 Location of decapitated skulls: 3 DT and 6 DT

Other skeletons with decapitations have been reported from the surrounding cemeteries in York. At 89 The Mount, a mature adult female had been stabbed in the throat numerous times. Her skull had been placed beside the left leg. The three skeletons from the Moss Street Depot who had been buried in an orderly fashion beside one another in a triple grave were also decapitated, according to Tucker (pers. comm. 2005).

5.8 THE CREMATION BURIALS

A total of 37 features contained cremated bone and fourteen of these features had been identified on site as cremation burials (thirteen at 3 Driffield Terrace and one at 6 Driffield Terrace; Table 2). Four contexts from 3

Driffield Terrace were identified post-excavation as possible cremation burials (4037, 4099, 4104, and 4143). The remaining assemblages of cremated bone are likely to have derived from truncated cremation burials and are residual and will therefore be ignored in this section (see Table 5).

None of the cremation burials were urned. However, it is thought that Context 6DT1022 had been interred in a wooden box, as indicated by the presence of ferrous nails. Unworked jet and second and third century pottery were found with this burial. Other artefacts were found with some of the other cremation burials. These included a burnt Ebor Ware flagon and Samian bowl with Context 3DT4050/4071/4073/4079, a Trajan coin (97-118AD), plated buckle and two sherds of pottery with Context 3DT4057, a Samian bowl with Context 3DT4179, wood indicative of ash tree in Context 3DT4270, a horse phalanx in Context 3DT4299, burnt Samian ware in Context 3DT4310 and a biconical grey bowl in Context 3DT 4376.

When analysing the bone colour from the cremation burials, it was obvious that the bone had not been fully calcined in all of the burials, suggesting either that the pyre temperature was not high enough or that the pyre had not been maintained for a sufficient period of time to allow full calcination of the bone.

A number of cremation burials have been found along the Roman road running past Driffield Terrace, including at least 40 cremation burials at Trentholme Drive (Wenham 1968). At Mill Mount, two cremation burials were found, both of which had been interred in urns (Holst 2005). These burials contained small quantities of bone of an adult and a juvenile that were well-burnt (*ibid*). Interestingly, a possible *ustrina*, or funerary pyre site was found at Trentholme Drive, in the form of a stone structure, associated with dense charcoal deposits (Wenham 1968).

It has been suggested by many that the funerary ritual of cremating the body was largely replaced by inhumation in the later second century (Ottaway 2004, Hope 1999, Jones 1984) and although this is largely true, several cremation burials have now been found in the north of England that date to the later part of the Roman period. All of the examples have been found in the vicinity of Roman forts. The large cremation burial cemetery at Brougham, Cumbria dated to the third or very early fourth century AD (Cool 2004; McKinley 2004c, 283). Contemporary cremation burials have been found at Petty Knowes, Northumberland, and dating from the second and fourth centuries AD (Charlton and Mitcheson 1984), and at Lanchester, County Durham between the mid second and late third century AD (Turner 1990). An isolated third or fourth century AD cremation burial was discovered at Chester-le-Street, County Durham (Caffell 2010).

At Trentholme Drive, some of the cremation burials have been found to post-date inhumations (Wenham 1968, 27) and this was also the case at Driffield Terrace. Notably, the only cremation burial from 6 Driffield Terrace (Context 1022) truncated the grave of inhumation Skeleton 6DT3. The skull of the inhumation, which had been disturbed by the cremation burial, was subsequently placed on top of the cremation burial. Whether this was a deliberate act, or the skull was simply placed on top of the cremation burial out of respect is unclear. 6DT3 dates to the last phase of cemetery use, to the late fourth century AD, indicating that the practice of cremation burial continued into the latest phase of Roman burial in York.

At 3 Driffield Terrace many of the cremation burials were located to the west of the ditch, whereas most of the inhumation burials occur on the east side of the ditch. However, this division is not exclusive, and cremation burials were found to the east of the ditch, just as inhumation burials occurred to the west of it. Although some cremation burials are located among the dense areas of inhumation burial, there does appear to be an area of cremation burials without inhumation burials in the western part of the site.

5.9 CONCLUSION

In conclusion, the funerary ritual at Driffield Terrace shows both some similarities to, and some differences from, the Roman burials in the immediate surrounding area of York. The orientation of the burials at Driffield Terrace is chaotic, with individuals lying in various orientations. This is also the case at Trentholme Drive and 89 The Mount, but not at Mill Mount.

Skeletal positions are also varied at Driffield Terrace, although supine and extended positions were more common. This was also the case at Mill Mount and at 89 The Mount. The data on body position at Trentholme Drive is limited, but there did appear to be a variety of positions used. Wenham (1968, 38) observed that many skeletons were ‘carefully laid out’, but ‘with no uniformity of posture’, and that children and adolescents were frequently buried in a crouched position. He also reports that some individuals ‘had perhaps been buried in the posture in which they died’ (*ibid*), although what is meant by this is not clear and the statement should be regarded with caution. Notably, at Driffield Terrace some burials were interred in a flexed position on their sides and there were three prone burials. The most notable of these was the single female individual whose arm was bent upwards, as if the hand was raised above the head.

Double and multiple burials were relatively common, with four double burials at 3 Driffield Terrace, and a double, a triple and a quadruple burial at 6 Driffield Terrace. A triple grave containing three adults was also found at Moss Street Depot (Holst 2003) and two double graves were excavated at Mill Mount (Holst 2005, Holst 2006).

Grave goods were relatively scarce, though the artefactual and animal bone assemblages are still being examined, and this process needs to be completed before it can be decided which items were grave goods and which were residual inclusions in the grave backfills. Pottery sherds occurred in some inhumation burials, as did chicken or horse bones. Hob nails were found with 12.2% of skeletons and are indicative of footwear. The most unusual grave inclusions were two iron bands which were located around the ankles of Skeleton 3DT37. Interestingly, no grave goods were recovered from 89 The Mount or Mill Mount, with the exception of two coins from the sarcophagus burial at Mill Mount (Holst 2008), while grave goods have been found in a number of burials at Trentholme Drive.

Coffins were noted in 19.7% of burials, but were much more common at 6 Driffield Terrace, where they occurred in almost half of the burials, in comparison to 3 Driffield Terrace, where only 11.1% of the skeletons were buried in wooden coffins. Coffins were also common at Mill Mount, where the majority of individuals were interred in wooden coffins (Holst 2005, Holst 2006), and probably at Trentholme Drive (Wenham 1968, 39), but were uncommon at 89 The Mount (Holst 2007).

When analysing the contextual evidence for decapitations of the inhumations, it was found that the majority of skulls were found in the leg region, followed by skulls being placed in the correct anatomical position. This corresponds with evidence from the surrounding cemeteries, where the skulls of three apparently decapitated males in a triple grave at the Moss Street Depot were placed in anatomical position (Tucker *pers. comm.* 2007) and the skull of a mature adult female from 89 The Mount had been placed beside her left leg (Holst 2007).

The cremation burials were all unurned, although the single cremation burial recovered from 6 Driffield Terrace (Context 1022) was buried in a wooden box. At Trentholme Drive, both urned and unurned cremation burials were observed (Wenham 1968), whereas at Mill Mount, both cremation burials were interred in urns (Holst 2005). Grave goods were not uncommon in the cremation burials, with approximately a quarter of burials containing pottery sherds or complete vessels, while one burial contained a horse phalanx and another contained a Trajan coin and a plated buckle. The fact that cremation burials took place in the later phases at Driffield Terrace is contrary to the general finding that inhumation replaced cremation as the dominant burial rite by the third/ fourth centuries AD. However, late cremation burials are known to occur in the far north of England, particularly at sites associated with Roman forts.

6.0 DISCUSSION AND SUMMARY

The excavations at Driffield Terrace recovered the remains of 82 skeletons, as well as fourteen cremation burials and a quantity of disarticulated human remains, which probably derived from disturbed inhumation burials. Most of the human remains came from excavations at 3 Driffield Terrace, with the remainder excavated at 6 Driffield Terrace. Much of the osteological analysis has displayed similarities in the demographic profile, burial archaeology and patterns of dental disease and pathology, suggesting these two sites do indeed represent part of the same burial population. The excavated skeletons therefore represent just a sample of the original cemetery: presumably burials continue across the unexcavated area between 3 Driffield Terrace and 6 Driffield Terrace. It would be interesting to know whether burials do actually occupy the area between the two plots, and if so whether they are consistent in demographic profile, funerary rituals and pathological conditions with the skeletons already excavated. Burials certainly continued beyond the edges of the trench on all sides at 6 Driffield Terrace. At 3 Driffield Terrace the north-eastern part of the excavated area had been disturbed by post-medieval features, which have probably removed all trace of burials in the area. Burials extended beyond the southern/ south-western edge of the trench and possibly beyond the south-eastern edge of the trench. Although burials were less frequent in the north-western area of the site, they do continue up to the limit of the trench. Since the extent of the cemetery is unknown, there is no indication at present what proportion of the cemetery the excavated Driffield Terrace skeletons represent. Incomplete excavation of cemetery populations was one of the limitations Waldron (1994, 15-16) discussed when analysing skeletal populations.

The date of the cemetery spanned the first four centuries AD, from the late first/early second century to the late fourth century AD. There was therefore a degree of continuity in burial practice over three hundred years. The possibility that the burials were interred after a single cataclysmic event can therefore be discounted.

During the Roman period York developed into an important military and civilian centre, with numerous cemeteries lining the main roads outside the settled area (Ottaway 1993). This location of burial grounds outside settlements was in accordance with Roman law (Hope 1999, 57), and the location of the Driffield Terrace cemetery was therefore in keeping with the customs of the period. It formed part of a much larger cemetery lining the road that now forms the modern A1036. Unfortunately, despite the large number of known Roman cemeteries surrounding York, the available information on these is scarce. Many were discovered during the nineteenth century and so understanding of the burial practices is limited and little is known of the skeletons themselves (Ottaway 1993, 91). The large cemetery at Trentholme Drive was discovered and excavated in the 1950s (Wenham 1968, 6), but even so the osteological data leaves much to be desired by modern standards. New methods of osteological analysis have been developed and existing ones improved upon in the intervening half-century, and there has been both an increase in the possible information that can be gained from studying human remains as well as an improved understanding of the limitations of such studies. More recently there have been smaller groups of skeletons excavated around York, for example those at Mill Mount (Holst 2005, 2006) and 89 The Mount (Holst 2007). Although benefitting from modern excavation practices and osteological analysis, these samples of skeletons are small and it is therefore difficult to assess how representative they are of the population. Driffield Terrace therefore provides an opportunity to examine the burial practices, demography and health status of a moderately-sized skeletal sample from Roman York.

Ironically, the best way to understand the Driffield Terrace population and to place them into context would be by comparison with other contemporary York populations. However, the lack of ideal comparative material has been highlighted above. Comparisons with Trentholme Drive are hindered by the differences in methods and ways of presenting data, while comparisons with Mill Mount and 89 The Mount and limited by the small size of the samples. Comparisons were also made further afield, with the Lincolnshire Roman cemeteries at Ancaster (Cox 1989), and Horncastle (Caffell and Holst, 2008). Again methods have developed since the study of the Ancaster population in the 1980s, and although Horncastle benefits from being analysed recently by the same authors, which reduces the possibility of inter-observer error, the data is limited by the relatively small size of the sample. An overview of health during the Roman period in Britain provided a useful point of reference (Roberts and Cox 2003, 107-163), but some of the average frequencies provided for different pathological conditions are based on a relatively small number of sites (on occasion), and in many cases only a crude prevalence could be calculated. A crude prevalence is often lower than the true prevalence, since the former does not take account of missing bone elements. Roberts and Cox (2003, 29) themselves describe the crude prevalence rate as “a gross under-estimation of the true or corrected prevalence rate”, and discuss their frustrations with the limitations this places on the understanding of pathological conditions. Bearing this in mind, it would be hoped that the recently excavated Roman skeletal remains from Hungate in York might provide useful comparative data once they are analysed.

Considering previous suggestions that the Driffield Terrace skeletons may have been gladiators (Saržinski 2009; Wysocki pers. comm. 2010), the supposed gladiator skeletons from Ephesus in Turkey were also used as a comparison (Kanz and Grossschmidt 2006). There are many issues with this, not least the fact that the two populations derive from completely different countries, and no doubt differ in genetic background and environmental surroundings (e.g. climate, food sources, living conditions etc.). Furthermore, the data available for Ephesus was limited to cranial trauma, for which true prevalence rates were not provided, and even the data on demography was limited. Little information on the funerary context was provided, from which it appeared that the remains were disarticulated (at least to an extent). It would be useful to compare the two populations in other respects.

A somewhat minimal analysis of funerary practices at Driffield Terrace has been carried out in this report, and obviously further research into the different aspects observed should be undertaken, with more detailed comparisons with other sites. A brief discussion of some of the main points is provided here.

In the early Roman period cremation burial was practiced as the favoured method of disposal of the dead, and the uptake of cremation as the dominant funerary rite is more likely to have occurred quickly in larger urban and military centres (Philpott 1991). York surely fell into this category, and so it would be expected that cremation burial was practiced in the earliest phases of burial at Driffield Terrace, as it was at Trentholme Drive (Wenham 1968). Inhumation began to replace cremation burials during the second century AD across much of Britain (Hope 1999, 55), and evidence for this process was observed at Trentholme Drive with cremation burials cutting into earlier inhumation burials on occasion. However, the majority of cremation burials at Driffield Terrace dated to the later phases of the site, which is unusual.

However, cremation did persist as a burial rite in the third and fourth centuries AD, particularly in the northern frontier region in cemeteries potentially associated with Roman forts. For example, a large cremation burial cemetery at Brougham, Cumbria dated to the third or very early fourth century AD was associated with the nearby *vicus* and fort (Cool 2004; McKinley 2004c, 283). Cool (2004, 463-467) postulates that this cemetery may have served a particular ethnic group, probably soldiers from elsewhere in Europe stationed at the fort. One of the facts used in support of this argument was the presence of large quantities of cremated horse bones. Cremation burial was also practiced at Petty Knowes, Northumberland between the second and fourth centuries AD (Charlton and Mitcheson 1984), and at Lanchester, County Durham between the mid second and late third century AD (Turner 1990). An isolated third or fourth century AD cremation burial was discovered at Chester-le-Street, County Durham (Caffell 2010). All these cemeteries were located near Roman forts.

Grave location at Driffield Terrace was not particularly orderly, and the graves were not tidily arranged in rows as frequently seen in large urban cemeteries (such as Cannington, Rahtz *et al.* 2000). There was also a contrast with the burials just across the road, at Mill Mount, which were much more organised with minimal intercutting. Parallels could be drawn between Trentholme Drive or 89 The Mount and Driffield Terrace in the more random pattern of burial location.

Some have suggested that existing Iron Age burial practices may have persisted into the Roman period in some areas, so if the usual Iron Age funerary practice included inhumation burial, then this may have continued into the early Roman period (Philpott 1991; Hope 1999, 50). It is also worth bearing in mind that much of what is regarded as 'typical' for Roman burial practices has been influenced by a small number of large organised cemeteries, such as Cannington, Somerset (Rahtz *et al.* 2000), and Cirencester, Gloucestershire (McWhirr *et al.* 1982), a point noted by O'Brien (1999, 5). For example, the predominant burial orientation observed among Roman burials (west-east) is due to the bias for west-east burials at a small number of large sites. If these large sites are removed, then over half the burials in the remaining cemeteries were aligned on a north-south or inverted orientation (*ibid*). This is more in keeping with the prevailing burial orientations at Driffield Terrace, where the majority of burials were buried with heads to the northeast, northwest, southeast or southwest. A consistent northwest-southeast orientation was also favoured across the road at Mill Mount. The burial positions of the majority of the Driffield Terrace skeletons (mostly extended and supine with ordered arm positions, a small percentage flexed on left or right sides) were consistent with expected burial positions for the Roman period. Extended inhumation gradually replaced crouched inhumation from the mid second century, with the former becoming the predominant position by the fourth century (O'Brien 1999, 5; Hope 1999, 55).

A small percentage of the Driffield Terrace burials had been buried prone, a burial rite more frequently observed in small rural cemeteries, particularly in the fourth century AD, and often located at the margins of the cemetery (Philpott 1991). At the Romano-British cemetery at Cirencester, 33 individuals of all ages and sexes were buried prone, and while some appeared carefully laid out, others gave the impression of hasty burial (McWhirr *et al* 1982). Philpott (1991) has considered reasons for prone burial, including the desirability of prone burial for ritual reasons, accidental prone burial due to hasty burial or a lack of concern for the body position, prone burial with the deliberate intent of dishonouring the dead and prone burial for practical reasons, if something prevented the body from being laid out in the normal position. O'Brien (1999, 5-6) describes prone burials as 'an expression of censure, or punishment, or a means to prevent a person who was feared in life, or who suffered an unnatural death, from returning to haunt the living'. Essentially, these ideas are connected to the idea that burial face-down may prevent the soul of the dead person from rising from the grave, and so prevent the entry of the person to the afterworld (punishment of the dead) or prevent their soul from haunting the living (protection of the living; Philpott 1991; Harman *et al.* 1981). Philpott (1991) even suggested that prone burial may have been used for individuals who had suffered a violent death, to spare the mourners the sight of the disfigured face. Considering the number of decapitated burials at Driffield Terrace it seems unlikely that sparing the sensibilities of the mourners was a reason for prone burial here. Notably, the prone burials at Driffield Terrace included the single female located towards the margins of the group, whose arm positions were more disorderly, possibly indicating a lack of care taken in her burial. These features could be consistent with outcast status, or punishment meted out in death. The presence of a single female in an otherwise almost all male adult cemetery could also indicate she was forbidden burial in the normal location for adult females. However, one of the two remaining prone burials was located in a triple grave, and the other was in an area of dense burial.

The majority of the individuals were in single graves, but five double burials were present, as well as one triple burial and a quadruple burial. Multiple burials occurred relatively frequently in the Roman period in Britain (O'Brien 1999, 9) and double burials were also observed on the opposite side of the Roman road at Mill Mount (Holst 2005, Holst 2006) and a triple burial was excavated around 150m to the northeast of Driffield Terrace, at the Moss Street Depot (Holst 2003).

Although many aspects of burial at Driffield Terrace were relatively normal for the period, or consistent with practices observed elsewhere, the number of decapitated burials was striking. Decapitation as a burial rite is not unknown in Roman Britain. Roberts and Cox (2003, 153) report 58 known decapitated individuals in Roman Britain at the time they conducted their survey. They observed that the crude prevalence of decapitation was 5.5%, although the proportion of decapitated burials ranged from 0.3% to 19.7% in the cemeteries they surveyed. The number of decapitated individuals identified at Driffield Terrace (minimum of 46) goes a long way to doubling the number of previously reported decapitation burials, and the prevalence (70.8% of those individuals where either osteological or contextual evidence for decapitation could be observed) was markedly higher than previously observed. Even the crude prevalence (56.1%) was high. Philpott (1991) has observed that, like prone burial, decapitation is observed far more frequently in rural cemeteries, which makes the occurrence of such a high prevalence of decapitations at Driffield Terrace even more unusual.

The location of the Driffield Terrace decapitated skulls is fairly consistent with that reported elsewhere in Roman Britain. Philpott (1991) observes that the head may be placed in the correct anatomical position, or elsewhere in the grave, and when the latter occurs the head is frequently placed between the legs or feet. The majority of decapitated heads at Driffield Terrace were placed with the legs, followed by those located in the correct anatomical location. One instance of heads being 'switched' between two individuals in a double burial was also observed. One head was placed in the correct anatomical position for the incorrect body, while the second head was placed at the feet of the first individual. The meaning of this is at present unknown.

Where osteological evidence for decapitation could be observed in the skeletons from Driffield Terrace, the majority of individuals had been decapitated with a single cut, although a small number of individuals had multiple cuts. Cuts were seen in all neck vertebrae as well at the first thoracic vertebra, but were most frequent around the level of the fourth cervical vertebra, which is located around the middle of the neck. Cuts directed to the upper part of the neck had in some instances also penetrated the lower jaw and parts of the skull around the base of the ears, whereas cuts to the lower part of the neck had occasionally penetrated the collar bones, shoulder blade and first ribs. Two individuals had cuts down the back of the neck which might be associated with decapitation. Some decapitations appear to have been incomplete, possibly failing in the complete removal of the head from the body. Where direction could be determined, many of the cuts seem to have been delivered from behind, although some cuts were delivered from the sides and front, and some individuals had cuts delivered from multiple directions. Some of the multiple cuts were nearly parallel to each other and had evidently been delivered from the same direction with little change in the relative positions of the victim/body and the person delivering the blows. In a brief review of evidence for decapitation burial in Roman Britain, O'Brien (1999, 7) observed that some decapitations had been carried out carefully from the front, which suggested the decapitation may have been carried out as part of a funerary ritual.

Similar reasons to those cited above for prone burial have been proposed to explain decapitation. These include decapitation for individuals who suffered an unnatural or premature death, where an individual had died in unusual circumstances, and where there was considered a risk that the dead person might return to haunt the living (Philpott 1991). However, there may have been positive associations with decapitation, which Philpott argues may have been used as a healing ritual for the soul of the dead person (particularly when associated with wells), allowing them entry into the afterlife. This obviously contrasts with the idea of punishment preventing the dead from entering the afterlife. Of course, decapitation may also be used as a form of execution, and decapitation has often been interpreted as such in the early medieval period. Features commonly observed in these early medieval execution cemeteries, aside from decapitation, include shallow and undersized graves, intercutting graves, random grave orientation, unusual burial positions, and few grave goods (Reynolds 1997; Buckberry 2008; Buckberry and Hadley 2007). Furthermore, the burials are usually predominantly adult males (Buckberry 2008). Further research is required into decapitation in Roman Britain, as well as into the detail of the decapitations carried out at Driffield Terrace.

Finally, another aspect to consider when evaluating the funerary archaeology is who was responsible for carrying out the burials. Komar (2008) has pointed out that the meaning and expression of burial rituals can change depending on whether the burial is carried out by relatives or friends, strangers, or those holding an official position.

The demographic composition of the Driffield Terrace population was definitely not representative of a normal cross-section of the population, being composed almost exclusively of young to middle aged males. Older adults were notable by their absence, and only one adult female was present. Three of the seven non-adults who were buried at Driffield Terrace were adolescents aged around sixteen to nineteen years old at the time of death, and these could conceivably have been socially regarded as adults. From a cultural perspective, their separation from the 'young adult' group is an artificial one, created by the fact their skeletons were not quite fully mature in modern eyes. The remaining four non-adults comprised a foetus (around 30-32 weeks *in utero*), a newborn baby, and two children aged one to two years and six to seven years respectively. Evidence from the disarticulated remains largely supported the conclusions drawn from the articulated burials, although possibly indicated an infant of aged between birth to three months had also been buried there.

In many Roman cemeteries males are found to outnumber females, particularly in the larger urban cemeteries, and it has been suggested that men and women may have been buried in separate areas for cultural reasons (Davison 2000). A high frequency of males was certainly observed at most of the comparative sites (Ancaster, Horncastle and the Mill Mount/ 89 The Mount combined) where around 58-60% of the adults were males. However, the proportion of adult males at Driffield Terrace far exceeded this, being 98.5%. In this respect it was identical to the population from Ephesus (Kanz and Grossschmidt 2006). Trentholme Drive potentially had a higher proportion of adult males than might be expected, even for the Roman period, but it must be borne in mind that the data on sex distribution include sex estimates made for non-adults, including apparently some quite young children (Warwick 1968, 163). It is currently accepted that sex estimation in non-adults is unreliable (Scheuer and Black 2000, 15-16). Davison (2000) commented on hints that there may have been spatial patterning of male and female graves in the larger urban cemeteries. Driffield Terrace may represent an extreme example of spatial patterning. The extent of the cemetery is not known, so it is entirely possible that this is just a small part of a much larger cemetery and there was an area devoted to the burial of females that has not yet been excavated.

In a normal cross-section of the population it would be expected that many adults would survive into old age, and this was the case for most of the comparative populations (most notably Horncastle, Caffell and Holst 2008). The complete lack of mature adults at Driffield Terrace was therefore most unusual, and again this age structure most closely resembled that seen at Ephesus (Kanz and Grossschmidt 2006), although Ancaster also had a high proportion of younger adults (Cox 1989).

Another group that was substantially under-represented at Driffield Terrace were children. The adolescents were probably socially regarded as adults, even if not biologically so. In the past, neonatal and infant mortality must have been high, and Scott (1999, 90) suggests that infants should make up around 15-30% of the burial population (although they rarely do, one exception being the early and late Roman burials at Wattle Syke, Caffell and Holst 2010). Children under the age of two often seen to have been excluded from burial in formal cemeteries during the Roman period, and Watts (1989) has suggested that infant and neonatal burials are infrequent prior to the fourth century AD. Those that are discovered tend to be found in unusual places, such as in agricultural contexts (Scott 1999, 120) or in ditches, pits or wells (Watts 1989). The presence of the foetus, neonate and one to two year old child at Driffield Terrace (and potentially a 0-3 month old infant) is therefore counter to the normal exclusion of children of this age from formal cemeteries. However, since Driffield Terrace could be argued not to be a normal cemetery, it is possible that this rule did not apply. The almost complete lack of older children, who would normally have been afforded burial with the adults of the population, is further evidence for the distinctive demographic profile of the Driffield Terrace population and supports the argument that this cemetery served a particular purpose. Indeed, if the cemetery is an area dedicated to the burial of young to middle aged men, then why are children buried there at all?

The adult population structure of Driffield Terrace therefore most closely resembles Ephesus, as both sites contained a high proportion of young adult males. Even the presence of a single female was common to both sites. Ephesus did lack child burials completely though, which were present (in small numbers) at Driffield Terrace. Montgomery *et al.* (2011, 153) have noted that such an age and sex distribution is most likely to indicate a military context, and suggest that this may have been the case at Driffield Terrace. This conclusion was also proposed by Müldner *et al.* (2011). At Ephesus, the age and sex profile was taken to be consistent with the interpretation of the cemetery as a gladiator burial ground (Kanz and Grossschmidt 2006), and the theory that Driffield Terrace was a gladiator cemetery has also been proposed (Saržinski 2009; Wysocki *pers comm*. 2010). Early medieval execution cemeteries have also been noted to contain predominantly male adults (Reynolds 1997; Buckberry 2008). Certainly, the demographic profile suggests deliberate cultural selection of who was to be buried at this location according to specific criteria, and so the individuals from Driffield Terrace comprise a specific group of individuals, rather than a more random cross-section of the population.

The Driffield Terrace population was probably genetically diverse, with some indication that individuals from different ancestral groups were buried there. However, estimating ancestry from skeletal remains is subjective. Other sources have also suggested the Driffield Terrace population had a variety of geographical origins. Müldner *et al.* (2011) carried out a study of the strontium and oxygen isotope signatures of eighteen individuals from 6 Driffield Terrace, coupled with the carbon and nitrogen isotope ratios of 52 adults from 3 Driffield Terrace and 23 adults from 6 Driffield Terrace. Their findings indicated that the Driffield Terrace individuals were particularly diverse compared to other cemeteries from Roman York. Furthermore, they proposed that two individuals had consumed large quantities of millet, which they suggest was further evidence for a non-British origin for these two skeletons. Studies of the lead isotopes conducted by Montgomery *et al.* (2010, 2011) provided unequivocal proof that some individuals from 3 Driffield Terrace were not of British origin. Of course isotope studies do not pick up ‘second generation’ migrants, people whose parents migrated and stayed to raise a family, and the findings of Leach *et al.* (2009) should be considered in that respect.

The fact that a wide range of stature estimates was obtained for the Driffield Terrace adults (compared to that reported for Roman Britain by Roberts and Cox 2003, 142) could be related to the suspected diversity of the population. If these individuals had a variety of genetic backgrounds, and had grown up in diverse environments, then both factors may have influenced their final adult stature. The average stature at Driffield Terrace was comparable with the average for Roman Britain, if not slightly higher. It was certainly similar to that at Trentholme Drive (Warwick 1968, 149), and higher than observed at the nearby cemetery of Mill Mount (Holst 2005, 2006). The average/ above average stature might also suggest an average or relatively favourable childhood free from severe episodes of malnutrition and disease that might lead to stunted growth and a reduced adult stature. However, other evidence from the skeletal remains suggested otherwise. The presence of *cribra orbitalia* (porosity in the orbit roofs) and dental enamel hypoplasia (defective enamel formation) in this population implied episodes of childhood stress, potentially involving poor diet, infectious disease, and/or parasite loads, with *cribra orbitalia* indicating that some individuals may have suffered from infection or other forms of stress as children. The prevalence of both conditions was high compared to the Roman British average (Roberts and Cox 2003), but not necessarily in comparison with other populations. For example, the prevalence of *cribra orbitalia* at Driffield Terrace was half that seen at Horncastle and more equivalent to the prevalence at the nearby Mill Mount population. Likewise, the prevalence of enamel hypoplasia at Driffield Terrace was similar to that seen at Mill Mount 05 (Holst 2006), but lower than that at Mill Mount 04 (Holst 2005). Of course, if these individuals were of diverse origins, their childhood experiences are likely to have been different, which makes it difficult to interpret the pattern of lesions seen. Furthermore, the phenomenon of ‘catch up growth' means that adult stature may not be impaired in children who experience slowed or stunted growth for a period of their childhood (Bogin 1988).

The demographic structure of the Driffield Terrace population has influenced the frequency of certain pathological conditions. For example, all forms of joint disease were relatively infrequent, as would be expected in a group composed largely of younger adults. The frequency of joint disease was certainly far lower than that observed at Horncastle, where the bulk of the population were probably quite elderly (Caffell and Holst 2008). Unsurprisingly, joint disease became more prevalent with age reflecting the normal degeneration of joints that occurs with general wear-and-tear. Degenerative disc disease and osteoarthritis of the spine were particularly uncommon, and the proportion of most extra-spinal joints affected with osteoarthritis was also low. Those joints that were more frequently affected were the ones that most typically develop osteoarthritis in modern populations, and included those most frequently involved at Horncastle. These included the hip, which is a major weight-bearing joint in the lower limb, and joints at either end of the clavicle. Involvement of the joint between the base of the cranium and the lower jaw was probably caused by changes to the stresses placed on the joint due to loss of teeth during life and consequent alteration in chewing patterns. However, in one man it may have been secondary to a congenital underdevelopment of one half of the mandible. Some individuals had developed osteoarthritis as a result of trauma that had disrupted the normal articulation patterns of a joint. Two 35-45 year old men with wrist fractures had developed subsequent osteoarthritis of the joint, and one unsexed adult had developed osteoarthritis of the ankle following trauma. Another 35-45 year old man had secondary complications (spondylolisthesis) related to a particular kind of spinal fracture (spondylolysis), where the lower part of his spine was effectively dislocated. Not surprisingly, he had also developed osteoarthritis as a secondary complication.

The young age distribution of the population probably also explains the low frequency of most dental diseases observed. Mineralised plaque deposits (calculus) were an exception, being relatively frequent (although most deposits were rather mild). Calculus deposits were particularly common amongst the adults, but were also observed to a lesser extent on the teeth of the children and adolescents. These deposits may indicate poor or inadequate oral hygiene, and had probably encouraged the development of inflammation of the gums leading to periodontal disease (where the bone structures surrounding the teeth are lost). Certainly, more extensive periodontal disease was common among the older-middle aged men. The frequency of tooth decay was below average for the period (Roberts and Cox 2003, 132), and the frequency of tooth decay generally increased with age, although the young adults had a higher than expected prevalence compared to the frequency observed in other age groups. An increase with age is expected as the enamel of teeth cannot repair, so once a cavity has developed it is there for life. The pattern of cavities was fairly typical for the period (Moore and Corbett 1973), and suggestive of food particles trapped between teeth or in the pits and fissures of the crowns of slightly worn teeth. Like tooth decay, abscesses and loss of teeth during life also became more prevalent with age. The frequency of both conditions was very low overall, no doubt connected to the low prevalence of tooth decay (as this is one of the major causes of abscesses and loss of teeth) and the young age bias of the population. Around half the abscesses had developed as a result of cavities in the teeth, but another frequent cause of abscesses in this population was fractured teeth.

Nearly a third of the adults had fractured one or more teeth, most frequently the upper front incisors and upper second molars, although fractures were observed in most tooth types. The distribution of fractures suggested these individuals had experienced both direct injuries to the upper front teeth (leading to fractured incisors and canines), and indirect injuries to the back teeth (leading to fractured molars and premolars). Injuries to the teeth can result from both accidental causes (such as falls where the teeth are banged against an object), and intentional causes (deliberate blows to the teeth or lower jaw); the back teeth can also be fractured when the teeth are tightly clenched together (Glendor *et al.* 2007). At Driffield Terrace, the majority of fractures to the upper front teeth occurred on the left side, which might suggest these individuals were engaged in combat with a right-handed opponent. These included root fractures to the incisors, a type of fracture often caused in modern populations during fights or when the teeth are struck by an object (Andreasen *et al.* 2007b, 337). The fractures to the lower teeth were more evenly distributed by side and could have resulted from blows delivered underneath the chin, or forceful tooth clenching. Further study into the types of dental fractures would shed more light on the likely causes.

Other kinds of trauma were also prevalent among the Driffield Terrace population. Three of the individuals with dental fractures also had probable healed cranial trauma, and an additional ten individuals had healed cranial trauma with no dental fractures. Taken together, these suggest a comparatively high occurrence of trauma directed to the head and face. Injuries to the latter have in particular been associated with inter-personal violence (Jurmain 1999, 192). Most of the cranial trauma was present in the form of small depressed lesions, probably the result of blunt-force trauma, located primarily on the left side of the forehead and the left side of the head. Walker (1989) ascribed a similar distribution pattern of such lesions to interpersonal violence, albeit ritualised fights where the intention was not to kill the opponent.

Although the overall prevalence of healed cranial trauma at Driffield Terrace was higher than that seen at Ephesus, the types of lesions sustained were different. The only two lesions at Ephesus similar to those seen at Driffield Terrace were suggested to have occurred prior to gladiator training (Kanz and Grossschmidt 2006). Furthermore, no healed blade injuries to the cranium and no definite unhealed peri-mortem blunt force trauma to the cranium were observed in the Driffield Terrace population, which contrasts with the findings at Ephesus (*ibid*). However, a couple of potential peri-mortem blunt force injuries to the cranium were observed at Driffield Terrace, and these should be re-evaluated. Unfortunately, there was no information on the presence (or absence) of dental trauma at Ephesus.

Some of the healed injuries in the post-cranial skeleton observed at Driffield Terrace could also have been sustained as a result of interpersonal violence, including a fractured scapula blade (in the early stages of healing at the time the individual died), a number of fractured spinous and transverse processes of vertebrae, and a healed blade injury to the left thigh. Most of the spinal transverse process fractures occurred on the left side of the third lumbar vertebra, and could indicate direct blows to the lower back (Denis 1983, 818). Two fractures to the proximal fibula shaft could have resulted from direct blows to the side of the leg (Dandy and Edwards 2003, 255-256; Galloway 1999d, 203). Notably, fractures to the first metacarpal (thumb part of the palm of the hand) were the most frequent healed limb bone fracture in the Driffield Terrace population. These fractures occur most commonly during fights or sporting activities, and are caused by punching with a closed fist (Galloway 1999c; Dandy and Edwards 2003, 222). Four men and an unsexed individual had broken their first metacarpals, all in the right hand, which is consistent with modern observations that these types of fractures occur most frequently in the dominant hand.

Identifying whether or not fractures were caused by interpersonal violence can be difficult, as the same type of fracture could be due to a deliberate blow or an accidental one. Rib fractures can be caused by blows to the chest, or falls. A high proportion of Driffield Terrace individuals had fractured ribs compared to the Horncastle population, although the true prevalence was more similar. Some fractures were likely to have been caused by falls, for example fractures to the clavicles and wrists which are commonly sustained through a fall onto an outstretched hand. Two of the ulna fractures may also have resulted from falls onto the elbow, and one man had a crush fracture to the spine that was possibly caused by a fall from a height. Twisted ankles were probably the cause of fractures and soft tissue injuries seen in the ankles and feet.

Two men had distinctive fractures to their first thoracic vertebrae (central spine) known as clay shoveler's fractures. In modern populations these tend to occur in untrained inexperienced labourers, often in poor physical condition, who were shovelling heavy soils (McKellar 1940). The mechanism of the fracture was associated with the particular movement of the muscles attached to that part of the spine when throwing the contents of the shovel upwards (*ibid*). In another man, excessive force applied to the muscle attachment site for the *quadriceps* muscle of the thigh had resulted in avulsion fractures of the tibiae just below the knees, a condition known as Osgood-Schlatter's disease. These injuries are frequently observed in athletes (Dandy and Edwards 2003, 317-318; Aufderheide and Rodríguez-Martín 1998, 85). He had probably sustained these fractures during adolescence. Although not a fracture, a high frequency of *os acromiale* was observed. This failure of part of the scapula to fuse together during late adolescence might be associated with increased stress placed on the shoulder during development, although the condition may also have an inherited component (Mann and Hunt 2005, 140).

Other injuries seen at Driffield Terrace included anterior disc herniation, or damage to the front of the vertebral bodies during development as a result of too much stress placed on the spine (Mays 2007). Schmorl's nodes also result from herniation of the vertebral discs (Roberts and Manchester 2005), and these were common in the Driffield Terrace individuals. The prevalence of Schmorl's nodes was much higher than that observed on average in Roman Britain (Roberts and Cox 2003, 147) and higher than the prevalence at Horncastle (Caffell and Holst 2008, 37). Fractures through the neural arch of the vertebrae (*spondylolysis*) also occurred, although the prevalence was comparable with that seen in other populations. These fractures have been associated with stress placed on the lower spine during sporting activities, although a congenital weakness in the spine has also been implicated (Roberts and Manchester 2005, 106). One man had developed a complication of *spondylolysis* known as *spondylolisthesis*, a condition rarely diagnosed in archaeological populations, where the body of the fractured vertebra slips forward.

Soft tissue injuries were also implicated, with evidence for damage to soft tissues in the shoulders, hands, legs, ankles and feet. Soft tissue injuries had occurred together with fractures on occasion. A small number of partial joint dislocations were observed, predominantly in the feet and associated with soft tissue trauma. Trauma may also have led to the development of localised periosteal reactions (superficial inflammation) or ossified haematomas (blood clots that become bone) on the legs of thirteen adults. These swollen lumps occurred primarily on the front and inside of the shin, which is a location prone to injury, although other lesions were found on the back and outside of the tibia, and on the femur, locations that are better protected by layers of muscle.

Almost all the peri-mortem trauma took the form of blade injuries associated with decapitation (discussed above). Aside from these cuts, shallow unhealed blade injuries were seen on the sides and backs of the hands of two individuals, and in the femur just above the right knee in a third male. The latter injury may have been sustained if the individual was standing with his right leg forward and bent slightly at the knee. Three individuals had cuts to the neck that may indicate a stabbing injury, although since two of these were decapitated it cannot be ruled out that the cuts were associated with decapitation. One man had possibly sustained a peri-mortem blunt force fracture to his forearm, which could have been received when protecting himself from a blow. The presence of potential carnivore bite marks in the pelvis of one individual requires further investigation.

Aside from trauma, evidence for infection was also relatively common. Inflammation of the leg bones, particularly the shins, was the most frequently observed lesions. Although many of these lesions were subtle, a small number of individuals had more pronounced deposits, including the man buried with iron bands around his shins. It is possible that these lesions were associated with the presence of the bands, although the severity of the lesions was worse on the left side. Inflammation was also observed in the bones of the pelvis, arms and jaw bones. The latter may have been due to an infection resulting from tooth decay and an associated abscess in one adult. Potential osteitis (infection of the bone cortex) or osteomyelitis (severe infection of the inside of the bone) was also observed in three individuals and a disarticulated bone. A proportion of the population had evidently suffered from respiratory tract infections. These included lung infections (which occurred with a similar frequency to that seen among the Horncastle population, Caffell and Holst 2008) and maxillary sinusitis. The prevalence of the chronic sinusitis was high, and although it was associated with dental abscesses draining into the sinus cavity in two individuals, the frequency of dental disease in general was low. It is therefore likely that inhaling dusty, smoky, or polluted air on a regular basis may have contributed to the development of these lesions (Roberts and Manchester 2005, 174-176).

The presence of small chips in the biting surfaces of the teeth (most frequently in the upper anterior teeth) were probably related to the use of teeth as a tool, as were the shallow grooves seen exclusively in the first incisors (primarily affecting the upper left teeth). The condition of *hallux valgus*, where the big toe deviates towards the rest of the toes, was present in a small percentage of individuals, and might suggest the wearing of ill-fitting shoes.

Various skeletal and dental developmental anomalies were observed, some of which may have a genetic component, although environmental influences can also play a part in their development. Most of the anomalies observed were focussed on the spine, including variation in the number of vertebrae present (both increased and decreased in number), and minor issues relating to correct development. Developmental anomalies affecting the feet were also observed. One individual had a developmental growth defect in his right shoulder that could have led to pain and restricted movement of his arm. Dental anomalies included congenitally absent or impacted teeth (most frequently the third molars), and three individuals had impacted permanent upper canines associated with retained deciduous canines, and one had retained deciduous molars associated with either congenitally absent or impacted premolars. Two individuals had additional teeth, one of which was erupting in a relatively normal position in the jaw. The other tooth was located in the wall of the maxillary sinus. Crowding and rotation of teeth were also observed.

In conclusion, the Driffield Terrace population is unusual in many respects, including the demography, burial practices with the particularly high frequency of decapitations, and the pattern of pathology observed, notably the quantity and type of trauma. These individuals must represent a specific group of people, but who they were is open to debate. Some form of military or fighting context does seem likely, given the bias towards young men and the high frequency of ante-mortem trauma and potential evidence for inter-personal violence. However, it would be prudent to consider the options carefully, evaluating all aspects of the archaeological and skeletal evidence before reaching any final conclusion. Some of the diagnoses of pathological conditions and interpretations made in this report are of necessity tentative at present, and further research is essential in order to understand the burials better. It is vital that future work on the skeletal remains be carried out in consultation with York Osteoarchaeology Ltd in order to maintain the consistency of the study and it is also vital that the specialists involved in further research discuss their findings with each other.

7.0 FUTURE RECOMMENDATIONS

Considering the highly unusual nature of Driffield Terrace, a range of future recommendations have been made based on the osteological and palaeopathological analysis of the human remains. The skeletal analysis presented here should be regarded as a base-line, and further work on particular aspects may refine the conclusions drawn. The recommendations made here are offered as suggestions for further work; it is recognised that it may not be feasible to carry them all out.

7.1 FUTURE RECOMMENDATIONS RELATING TO THE SKELETAL REMAINS

- A review of the small number of potential cranial blunt force trauma lesions should be carried out, in consultation with other experts in the field. These lesions need to be discussed between York Osteoarchaeology Ltd and others in order to verify that the exact features are being observed, and that all can reach an agreement on the likely nature of the lesions.
- Likewise, a review of the potential peri-mortem butterfly fracture in the arm of 6DT2 should also be carried out, as above.
- The potential carnivore bite marks need to be examined through specialist study, to confirm whether they are indeed a peri-mortem injury caused by an animal, to attempt to identify the animal involved (if possible), and to offer any other insights into animal behaviour. Detailed drawings and descriptions of these lesions have been made by York Osteoarchaeology Ltd, and these should be provided to the specialist when they examine the bones.
- The high frequency of dental trauma was most unusual and the dental fractures need to be examined in more detail. The exact type of fracture and tooth affected will have a bearing on the likely way in which it was sustained. This should be carried out by an appropriate specialist, but in close association with York Osteoarchaeology Ltd.
- More detailed study of the decapitation cuts should be carried out to provide prevalence rates for cut directions and angles.
- Radiographs should be taken of the fractures and potential fractures, and these should be used to refine the diagnosis. Further research should be undertaken into the clinical literature on the types of fractures observed, in order to better understand their causes.
- The evidence for soft tissue trauma should be reviewed and prevalence rates calculated. Other aspects of soft tissues, such as muscle attachment sites, and variation in bone morphology (cross-sectional morphology,

pilasterism, torsion of bone shafts) should also be conducted, and it is recommended that both aspects be carried out by the appropriate specialist.

- Better prevalence rates need to be calculated for the data on joint disease to gain a fuller picture of the pattern observed at Driffield Terrace.
- Further consideration needs to be given to the undiagnosed pathological lesions, potentially including radiographs where relevant.
- A future research project (potentially part of a student dissertation) could examine the prevalence of maxillary sinusitis in the individuals with intact sinuses. This would entail drilling a small hole into the sinus to enable the insertion of an endoscope, and it should be evaluated whether this is appropriate for this population.

7.2 FUTURE RECOMMENDATIONS RELATING TO COMPARATIVE SAMPLES

- More detailed data on the possible gladiator cemetery at Ephesus in Turkey should be sought in order that a fuller comparison can be made between the two sites.
- Data from Driffield Terrace should be compared to that from Hungate, once the skeletal population there has been analysed.

7.3 FUTURE RECOMMENDATIONS RELATING TO SCIENTIFIC STUDY

- The data compiled by existing isotope studies (Müldner *et al.* 2011; Montgomery *et al.* (2010; 2011) should be fully integrated with the skeletal data and publication report, and both ought to be used to inform the overall conclusions drawn.
- Montgomery *et al.* (2010; 2011) have proved conclusively that four of the Driffield Terrace individuals could not have originated in Britain, and lead isotopes are proving to be an exciting new method for examining origin. Should a funding opportunity arise, it would be a valuable opportunity to pursue the geographic origins of this population further.
- Again, this suggestion is limited by the available funds, but further AMS dating of burials may help to refine the phasing of the burials.
- The Department of Archaeology at Durham (Charlotte Roberts) and Manchester Universities (Terry Brown) have applied for a Wellcome Grant to undertake a project concerned with the development of urbanism and infectious disease in England from the Roman to post-medieval periods, with the aim of understanding what factors were important. This will involve a combination of DNA, isotope and palaeopathological analysis. Driffield Terrace could be part of this research project, should the grant application be successful.

7.4 FUTURE RECOMMENDATIONS RELATING TO FUNERARY ARCHAEOLOGY

- The section on funerary archaeology written for this report was fairly minimal. This should be expanded, with more research carried out into all aspects of burial, particularly decapitation. Data from the skeletal remains should be integrated with other archaeological data from the site and both should be used to inform the conclusions drawn.
- Any spatial analysis of graves ought to be carried out using geographical information systems (GIS).

- If a spatial analysis of non-metric traits is attempted, then it is important to include the data on which traits were not present, as well as which traits were present in each skeleton.
- An attempt should be made to identify which artefacts in the graves were residual and which were deliberate grave goods, so that comparisons with other cemeteries can be drawn.

7.5 FUTURE RECOMMENDATIONS RELATING TO THE PRESENTATION OF DATA IN THE PUBLICATION

- It is suggested that compilation-diagrams illustrating the location of injuries are created to show the patterning of lesions, for example the location of cranial trauma, or the location and angle of cuts to the spine for the publication of the cemetery.
- Drawings may convey certain aspects of the peri-mortem cuts better than photographs, and both should be considered as suitable means to illustrate the peri-mortem trauma in a publication.
- For the publication on the mass grave at Towton (1461), a detailed catalogue of the injuries suffered by each skeleton was provided, with drawings and photographs of each skeleton combined with short descriptions of the lesions and an interpretation of how they were sustained. It should be considered whether something similar should be attempted for presenting the data from Driffield Terrace.

References

Al-Nimri, K. and Gharaibeh, T. 2005. ‘Space conditions and dental and occlusal features in patients with palatally impacted maxillary canines: and aetiological study’, *The European Journal of Orthodontics* 27(5): 461-465

Andreasen, F. M., Andreasen, J. O. and Tsukiboshi, M. 2007a. ‘Examination and diagnosis of dental injuries’, in J. O. Andreasen, F. M. Andreasen and L. Andersson (eds) *Textbook and Color Atlas of Traumatic Injuries to the Teeth (4th edition)* (Oxford): 255-279

Andreasen, F. M., Andreasen, J. O. and Cvek, M. 2007b. ‘Root fractures’, in J. O. Andreasen, F. M. Andreasen and L. Andersson (eds) *Textbook and Color Atlas of Traumatic Injuries to the Teeth (4th edition)* (Oxford): 337-371

Andreasen, J. O., Andreasen, F. M. and Tsukiboshi, M. 2007. ‘Crown-root fractures’, in J. O. Andreasen, F. M. Andreasen and L. Andersson (eds) *Textbook and Color Atlas of Traumatic Injuries to the Teeth (4th edition)* (Oxford): 314-336

Aufderheide, A. C. and Rodríguez-Martín, C. 1998. *The Cambridge Encyclopedia of Human Paleopathology* (Cambridge)

Barnes, E. 1994. *Developmental Defects of the Axial Skeleton in Paleopathology* (Niwot, Colorado)

Bass, W. M. 1987. *Human Osteology: A Laboratory and Field Manual* (Columbia)

Baud, C-A. and Kramar, C. 1991. ‘Soft tissue calcifications in paleopathology’, in D. J. Ortner and A. C. Aufderheide (eds) *Human Paleopathology: Current Syntheses and Future Options* (Washington and London): 87-89

Baykul, T., Doğru, H., Yasan, H. and Aksoy, M. Ç. 2006. ‘Clinical impact of ectopic teeth in the maxillary sinus’, *Auris Nasus Larynx* 33: 277-281

Berry, A. C. and Berry, R. J. 1967. ‘Epigenetic variation in the human cranium’ *Journal of Anatomy* 101: 361-379

Bond, J. M. and Worley, F. L. 2004. ‘The animal bone’, in H. E. M. Cool, *The Roman Cemetery at Brougham, Cumbria: Excavations 1966-67*, Britannia Monograph Series No. 21 (London): 311- 331

Brooks, S. T. and Suchey, J. M. 1990. ‘Skeletal age determination based on the os pubis: a comparison of the Acsádi-Nemeskéri and Suchey-Brooks methods’ *Human Evolution* 5: 227-238

Brothwell, D. R. 1981. *Digging Up Bones* (New York)

Buckberry, J. L. 2008. ‘Off with their heads: The Anglo-Saxon execution cemetery at Walkington Wold, East Yorkshire’, in E. Murphy (ed) *Deviant Burial in the Archaeological Record* (Oxford): 148-168

Buckberry, J. L. and Hadley, D. M. 2007. ‘An Anglo-Saxon execution cemetery at Walkington Wold, Yorkshire’, *Oxford Journal of Archaeology* 26: 309-329Buikstra, J. E. And Ubelaker, D. H. (eds) 1994. *Standards for Data Collection from Human Skeletal Remains* (Fayetteville)

Byers, S. N. 2010 *Introduction to Forensic Anthropology (International Edition)*, 3rd edition, (Boston)

Caffell, A. 2010. ‘Report on cremated remains from Chester-le-Street, County Durham (TWCMS 2008.1967) (commissioned by Tyne and Wear Museums)

Caffell, A. and Holst, M. 2010. ‘Osteological Analysis, Wattle Syke, West Yorkshire, York Osteoarchaeology, No. 0310, Unpublished Osteological Report

Caffell, A. and Holst, M. 2008. ‘Osteological Analysis, Horncastle, East Lincolnshire’, York Osteoarchaeology, No. 1607, Unpublished Osteological Report

Cancelmo, J. J. 1972. ‘Clay-shoveler’s fracture: a helpful diagnostic sign’ *The American Journal of Roentgenology, Radium Therapy and Nuclear Medicine* 115: 540-543

Cannon, S. R., Dowd, G. S. E., Williams, D. H. and Scott, J. M. 1986. 'A long-term study following Bennett's Fracture', *Journal of Hand Surgery* 11: 426-431

Capasso, L., Kennedy, K. A. R. and Wilczak, C. A. 1999. *Atlas of Occupational Markers on Human Remains. Journal of Paleontology: Monographic Publication* 3 (Teramo)

Ceroni, D., de Coulon, G., Spadola, L., de Rosa, V. and Kaelin, A. 2006. 'Calcaneus secundarius presenting as calcaneonavicular coalition: A case report', *Journal of Foot and Ankle Surgery* 45: 25-27

Charlton, B. and Mitcheson, M. 1984. 'The Roman cemetery at Petty Knowes, Rochester, Northumberland', *Archaeology Aeliana* (5)12: 1-31

Cho, K-H., Lee, S. M., Lee, Y. H., Suh, K. J., Kim, S. M., Shin, M. J. and Jang, H. W. 2004. 'Non-infectious ischiogluteal bursitis: MRI findings', *Korean Journal of Radiology* 5: 280-286

Chow, C. Y., Weiss, M. A. and Gu, Y. 2005. 'Anatomic variations of the hook of hamate and the relationship to carpal tunnel syndrome', *Journal of Hand Surgery* 30: 1242-1247

Clarke, G. 1979. *The Roman Cemetery at Lankhills* (Oxford)

Cooke, C. and Rowbotham, T. C. 1968. 'Dental report', in L. P. Wenham, *The Romano-British Cemetery at Trentholme Drive, York*, Ministry of Public Building and Works Archaeological Reports No. 5 (London): 179-210

Cool, H. E. M. 2004. *The Roman Cemetery at Brougham, Cumbria: Excavations 1966-67*, Britannia Monograph Series 21 (London)

Cox, M. 2000. 'Ageing adults from the skeleton', in M. Cox and S. Mays (eds), *Human Osteology in Archaeology and Forensic Science* (London): 61-82

Cox, M. 1989. *The Human Bones from Ancaster*. Ancient Monuments Laboratory Report 93/89, English Heritage: Unpublished

Dandy, D. J. and Edwards, D. J. 2003. *Essential Orthopaedics and Trauma* (Edinburgh)

Davison, C. 2000. 'Gender imbalances in Romano-British cemetery populations: a re-evaluation of the evidence', in J. Pearce, M. Millett and M. Struck (eds) *Burial, Society and Context in the Roman World* (Oxford): 231-237

Denis, F. 1983. 'The three column spine and its significance in the classification of acute thoracolumbar spinal injuries', *Spine* 8: 817-831

Finnegan, M. 1978. 'Non-metric variation of the infracranial skeleton' *Journal of Anatomy* 125: 23-37

Ferreira-Junior, O., de Ávila, L. D., da Silva Sampieri, M. B., Dias-Ribeiro, E., Chen, W-L. and Fan, S. 2009. 'Impacted lower third molar fused with a supernumerary tooth – Diagnosis and treatment planning using cone-beam computed tomography', *International Journal of Oral Science* 1(4): 224-228

Galloway, A. 1999a. 'Fracture patterns and skeletal morphology: Introduction and the skull', in A. Galloway (ed) *Broken Bones: Anthropological Analysis of Blunt Force Trauma* (Springfield, Illinois): 63-80

Galloway, A. 1999b. 'Fracture patterns and skeletal morphology: The axial skeleton', in A. Galloway (ed) *Broken Bones: Anthropological Analysis of Blunt Force Trauma* (Springfield, Illinois): 81-112

Galloway, A. 1999c. 'Fracture patterns and skeletal morphology: The upper extremity', in A. Galloway (ed) *Broken Bones: Anthropological Analysis of Blunt Force Trauma* (Springfield, Illinois): 113-159

Galloway, A. 1999d. 'Fracture patterns and skeletal morphology: The lower extremity', in A. Galloway (ed) *Broken Bones: Anthropological Analysis of Blunt Force Trauma* (Springfield, Illinois): 160-223

Galloway, A. 1999e. 'The biomechanics of fracture production', in A. Galloway (ed) *Broken Bones: Anthropological Analysis of Blunt Force Trauma* (Springfield, Illinois): 35-62

Garland, A. N. and Janaway, R. C. 1989. 'The taphonomy of inhumation burials', in C. A. Roberts, F. Lee and J. Bintliff (eds) *Burial Archaeology: Current Research, Methods and Developments. British Archaeological Reports British Series* 211 (Oxford): 15-37

Giachelli, C. M. 1999. 'Ectopic calcification: gathering hard facts about soft tissue mineralization' *American Journal of Pathology* 154: 671-675

Giles, E. and Eliott, O. 1962. 'Race identification from cranial measurements', *Journal of Forensic Sciences* 7: 147-157

Glendor, U., Marcenes, W. and Andreasen, J. O. 2007. 'Classification, epidemiology and etiology', in J. O. Andreasen, F. M. Andreasen and L. Andersson (eds) *Textbook and Color Atlas of Traumatic Injuries to the Teeth (4th edition)* (Oxford): 217-254

Harman, M., Molleson, T. I., and Price, J. L. 1981. 'Burials, bodies, and beheadings in Romano-British and Anglo-Saxon cemeteries', *Bulletin of the British Museum (Natural History) Geology Series* 35: 145-188

Henderson, J. 1987. 'Factors determining the state of preservation of human remains', in A. Boddington, A. N. Garland and R. C. Janaway (eds) *Death, Decay and Reconstruction: Approaches to Archaeology and Forensic Science* (Manchester): 43-54

Hershkovitz, I., Bedford, L. Jellema, L. M. and Latimer, B. 1996. 'Injuries to the skeleton due to prolonged activity in hand-to-hand combat' *International Journal of Osteoarchaeology* 6: 167-178

Hillson, S. 1996. *Dental Anthropology* (Cambridge)

Hilton, R.C., Ball, J. and Benn R.T. 1976. 'Vertebral end-plate lesions (Schmorl's nodes) in the dorsolumbar spine', *Ann Rheum. Dis.* 35: 127-132

Hodge, J. C. 1999. 'Anterior process fracture or calcaneus secundarius: A case report', *Journal of Emergency Medicine* 17: 305-309

Holst, M. 2008. 'Osteological Analysis, Mill Mount, York', York Osteoarchaeology, No. 0808, Unpublished Osteological Report

Holst, M. 2007. 'Osteological Assessment, 90 The Mount, York, York Osteoarchaeology, Unpublished Osteological Report

Holst, M. 2006. 'Osteological Analysis, Mill Mount, York' York Osteoarchaeology, No. 0306, Unpublished Osteological Report

Holst, M. 2005. 'Osteological Analysis, Mill Mount, York', York Osteoarchaeology, No. 1005, Unpublished Osteological Report

Holst, M. 2003. 'Osteological Assessment, Moss Street Depot, York', Field Archaeology Specialists, Unpublished Osteological Report

Hope, V. M. 1999. 'The Iron and Roman ages: c. 600 BC to AD 400', in P. C. Jupp and C. Gittings (eds) *Death in England: An Illustrated History* (Manchester): 40-64

Hunter-Mann, K. 2005. *6 Driffield Terrace, York: Assessment Report on an Archaeological Excavation*, York Archaeological Trust Unpublished Report 2005/55

İşcan, M. Y. and Loth, S. R. 1986. 'Determination of age from the sternal rib in white females: a test of the phase method' *Journal of Forensic Sciences* 31: 990-999

İşcan, M. Y., Loth, S. R. and Wright, R. K. 1984. 'Age estimation from the rib by phase analysis: white males' *Journal of Forensic Sciences* 29: 1094-1104

İşcan, M. Y., Loth, S. R. and Wright, R. K. 1985. 'Age estimation from the rib by phase analysis: white females' *Journal of Forensic Sciences* 30: 853-863

Janaway, R. C. 1996. 'The decay of buried human remains and their associated materials', in J. Hunter, C. A. Roberts and A. Martin (eds) *Studies in Crime: An Introduction to Forensic Archaeology* (London): 58-85

Jones, R.F.J. 1984. 'The Cemeteries of Roman York', in Addyman, P.V. and Black, V.E., *Archaeological Papers from York,* York, 34-42

Jurmain, R. 1999. *Stories from the Skeleton* (London and New York)

Kanz, F. and Grossschmidt, K. 2006. 'Head injuries of Roman gladiators' *Forensic Science International* 160: 207-216

Kennedy, K. A. R. 1989. 'Skeletal markers of occupational stress', in M. Y. İşcan and K. A. R. Kennedy (eds) *Reconstruction of Life from the Skeleton* (New York): 129-160

Knüsel, C. 2000 'Activity-related change', in V. Fiorato, A. Boylston and C. Knüsel (eds) *Blood Red Roses: The Archaeology of a Mass Grave from the Battle of Towton AD 1461* (Oxford): 103-118

Komar, D. 2008. 'Patterns of mortuary practice associated with genocide: Implications for archaeological research', *Current Anthropology* 49: 123-133

Larsen, C. S. 1997. *Bioarchaeology: Interpreting Behaviour from the Human Skeleton. Cambridge Studies in Biological and Evolutionary Anthropology* (Cambridge)

Leach, S., Lewis, M., Chenery, C., Müldner, G. and Eckhardt, H. 2009. 'Migration and diversity in Roman Britain: A multidisciplinary approach to the identification of immigrants in Roman York, England', *American Journal of Physical Anthropology* 140: 546-561

Lewis, M. E. 2007. *The Bioarchaeology of Children: Perspectives from Biological and Forensic Anthropology* (Cambridge)

Lewis, M. E. 2004. 'Endocranial lesions in non-adult skeletons: understanding their aetiology' *International Journal of Osteoarchaeology* 14: 82-97

Lewis, M. E. 2000. 'Non-adult palaeopathology: current status and future potential', in M. Cox and S. Mays (eds) *Human Osteology in Archaeology and Forensic Science* (London): 39-57

Lovejoy, C. O., Meindl, R. S., Pryzbeck, T. R. and Mensforth, R. P. 1985. 'Chronological metamorphosis of the auricular surface of the ilium: a new method for the determination of adult skeletal age at death' *American Journal of Physical Anthropology* 68: 15-28

Lovell, N. C. 1997. 'Trauma analysis in paleopathology', *Yearbook of Physical Anthropology* 40: 139-170

Mann, R. W. and Hunt, D. R. 2005. *Photographic Regional Atlas of Bone Disease: A Guide to Pathologic and Normal Variation in the Human Skeleton* (Springfield, Illinois)

Marzke, M. W. and Marzke, R. F. 1987. 'The third metacarpal styloid process in humans: Origin and functions', *American Journal of Physical Anthropology* 73: 415-431

Matos, V. and Santos, A. L. 2006. 'On the trail of pulmonary tuberculosis based on rib lesions: results from the human identified skeletal collection from the Museu Bocage (Lisbon, Portugal)' *American Journal of Physical Anthropology* 130: 190-200

Mays, S. A. 2009. 'A scapula deformity in two burials from Medieval England', *International Journal of Osteoarchaeology* 19: 642-651

Mays, S. A. 2007. 'Lysis at the anterior vertebral body margin: Evidence for brucellar spondylitis?', *International Journal of Osteoarchaeology* 17: 107-118

Mays, S. A. 2005. 'Paleopathological study of hallux valgus' *American Journal of Physical Anthropology* 130: 190-200

Mays, S. and Cox, M. 2000. 'Sex determination in skeletal remains', in M. Cox and S. Mays (eds) *Human Osteology in Archaeology and Forensic Science* (London): 117-130

Mays, S. A., Fysh, E. and Taylor, G. M. 2002. 'Investigation of the link between visceral surface rib lesions and tuberculosis in a medieval skeletal series from England using ancient DNA' *American Journal of Physical Anthropology* 119: 27-36

McKellar, R. D. 1940. 'Clay-shoveler's fracture' *Journal of Bone and Joint Surgery* 22: 63-75

McKinley, J. I. 2004a. 'Compiling a skeletal inventory: disarticulated and co-mingled remains', in M. Brickley and J. I. McKinley (eds) *Guidelines to the Standards for Recording Human Remains. IFA Paper No. 7* (Southampton and Reading): 14-17

McKinley, J. I. 2004b. 'Compiling a skeletal inventory: cremated human bone', in M. Brickley and J. I. McKinley (eds) *Guidelines to the Standards for Recording Human Remains. IFA Paper No. 7* (Southampton and Reading): 9-13

McKinley, J. I. 2004c. 'The human remains and aspects of pyre technology and cremation rituals', in H. E. M. Cool, *The Roman Cemetery at Brougham, Cumbria: Excavations 1966-67,* Britannia Monograph Series No. 21 (London): 283-309

McKinley, J. I. 2004d. 'Aspects of cremation ritual as evidenced by the animal bones', in H. E. M. Cool, *The Roman Cemetery at Brougham, Cumbria: Excavations 1966-67,* Britannia Monograph Series No. 21 (London): 331-332

McKinley, J. I. 1993. 'Bone fragment size and weights of bone from modern British cremations and the implications for the interpretation of archaeological cremations' *International Journal of Osteoarchaeology* 3: 283-287

McSherry, P. F. 1998. 'The ectopic maxillary canine: a review', *British Journal of Orthodontics* 25: 209-216

McSherry, P. and Richardson, A. 1999. 'Ectopic eruption of the maxillary canine quantified in three dimension on cephalometric radiographs between the ages of 5 and 15 years', *European Journal of Orthodontics* 21: 41-48

Meza, R. S. 2003. 'Radiographic assessment of congenitally missing teeth in orthodontic patients', *International Journal of Paediatric Dentistry* 13: 112-116

Miles, A. E. W. 1962. 'Assessment of the ages of a population of Anglo-Saxons from their dentitions' *Proceedings of the Royal Society of Medicine* 55: 881-886

Miles, A., Powers, N., Wroe-Brown, R. and Walker, D. 2008. *St Marylebone Church and Burial Ground in the 18th to 19th Centuries: Excavations at St Marylebone School, 1992 and 2004-6* (London)

Molleson, T. 1995. 'Rates of ageing in the eighteenth century', in S. R. Saunders and A. Herring (eds) *Grave Reflections: Portraying the Past Through Cemetery Studies* (Toronto): 199-222

Molleson, T. and Cox, M. 1993. *The Spitalfields Project. Vol 2. The Anthropology: The Middling Sort*, CBA Research Report 86 (York)

Montgomery, J., Evans, J., Chenery, S., Pashley, V. and Killgrove, K. 2010. '"Gleaming white and deadly": using lead to track human exposure and geographic origins in the Roman period in Britain', *Journal of Roman Archaeology Supplement* 78: 199-226

Montgomery, J., Knüsel, C. and Tucker, K. 2011. 'Identifying the Origins of Decapitated Male Skeletons from 3 Driffield Terrace, York Through Isotope Aanalysis: Reflections on the Cosmopolitan Nature of Roman York in the Time of Caracalla', in M. Bonogofsky (ed) *The Bioarchaeology of the Human Head: Decapitation, Deformation, and Decoration* (Florida)

Moore, W. J. and Corbett, E. 1973. 'Distribution of dental caries in ancient British populations: Iron Age, Romano-British and medieval periods' *Caries Research* 7: 139-153

Moorrees, C. F. A., Fanning, E. A. and Hunt, E. E. 1963a 'Formation and resorption of three deciduous teeth in children' *American Journal of Physical Anthropology* 21: 205-213

Moorrees, C. F. A., Fanning, E. A. and Hunt, E. E. 1963b 'Age variation of formation stages for ten permanent teeth' *Journal of Dental Research* 42: 1490-1502

Morgan, D.A.F. and Walters, J.W. 1984. 'A prospective study of 100 consecutive carpal scaphoid fractures', *Aust. N. Z. J. Surg.* 54: 233-241

Moynihan, P. 2003. 'Diet and dental caries', in J. J. Murray, J. H. Nunn and J. G. Steele (eds) *The Prevention of Oral Disease* (Oxford): 9-34

Müldner, G., Chenery, C. and Eckardt, H. 2011. 'The 'headless Romans': multi-isotope investigations of an unusual burial ground from Roman Britain', *Journal of Archaeological Science* 38: 280-290

O'Brien, E. 1999. *Post-Roman Britain to Anglo-Saxon England: Burial Practices Reviewed. British Archaeological Reports British Series* 289 (Oxford)

Ortner, D. J. 2003. *Identification of Pathological Conditions in Human Skeletal Remains* (Amsterdam)

Ottaway, P. 2005. *1-3 Driffield Terrace, York: Assessment Report on an Archaeological Excavation*, York Archaeological Trust Report 2005/27

Ottoway, P. 1993. *Roman York* (Stroud)

Perry, M., Newnam, J. and Gilland, M. 2008. 'Differential diagnosis of a calcified object from a 4th-5th century AD burial in Aqaba, Jordan' *International Journal of Osteoarchaeology* 18: 507-522

Philpott, R. 1991. *Burial Practices in Roman Britain: A Survey of Grave Treatment and Furnishing. A.D. 43-410. British Archaeological Reports British Series* 219 (Oxford)

Quensel-von-Kalben, L. 2000. 'Putting the late Roman burial practice in Britain in context', in J. Pearce, M. Millett and M. Struck (eds), *Burial, Society and Context in the Roman World* (Oxford), 218-228

Rahtz, P., Hirst, S. and Wright, S. M. 2000. *Cannington Cemetery Excavations 1962-3 of Prehistoric, Roman, Post-Roman, and Later Features at Cannington Park Quarry, Near Bridgewater, Somerset* (London)

Rajab, L. D. and Hamdan, M. A. M. 2002. 'Supernumerary teeth: review of the literature and a survey of 152 cases', *Internationa Journal of Paediatric Dentistry* 12: 244-254

Regan, M. H., Case, D. T., and Brundige, J. C. 1999. 'Articular surface defects in the third metatarsal and third cuneiform: Nonosseous tarsal coalition', *American Journal of Physical Anthropology* 109: 53-65

Reynolds, A. 1997. 'The definition and ideology of Anglo-Saxon execution sites and cemeteries', in G. de Boe and F. Verhaeghe (eds) *Death and Burial in Medieval Europe* (Zellick): 33-41

Roberts, C. A. and Cox, M. 2003. *Health and Disease in Britain* (Stroud)

Roberts, C. A. and Manchester, K. 2005. *The Archaeology of Disease (third edition)* (Stroud)

Rogers, J. 2000. 'The palaeopathology of joint disease', in M. Cox and S. Mays (eds) *Human Osteology in Archaeology and Forensic Science* (London): 163-182

Salter, R. B. 1999. *Textbook of Disorders and Injuries of the Musculoskeletal System*

Sanchez-Lara, P. A., Graham, J. M. J., Hing, A. V., Lee, J. and Cunningham, M. 2007. 'The morphogenesis of wormian bones: A study of craniosynostosis and purposeful cranial deformation' *American Journal of Medical Genetics. Part A* 143: 3243-3251

Santos, A. L. and Roberts, C. A. 2001. 'A picture of tuberculosis in young Portugese people in the early 20th century: a multidisciplinary study of the skeletal and historical evidence' *American Journal of Physical Anthropology* 115: 38-49

Santos, A. L. and Roberts, C. A. 2006. 'Anatomy of a serial killer: differential diagnosis of tuberculosis based on rib lesions of adult individuals from the Coimbra Identified Skeletal Collection, Portugal' *American Journal of Physical Anthropology* 130: 38-49

Saržinski, D. 2009. *Forensic Analysis of Skeletal Trauma and Bilateral Asymmetry in a Romano-British Cemetery at Driffield Terrace, York.* University of Central Lancashire, Unpublished MSc Dissertation

Sauer, N. J. 1998. 'The timing of injuries and manner of death: distinguishing among antemortem, perimortem and postmortem trauma', in K. Reichs (ed) *Forensic Osteology: Advances in the Identification of Human Remains* (Springfield): 321-332

Saunders, S. R. 1989. 'Non-metric variation', in M. Y. İşcan and K. A. R. Kennedy (eds) *Reconstruction of Life from the Skeleton* (New York): 95-108

Scheuer, L. and Black, S. 2000a. 'Development and ageing of the juvenile skeleton', in M. Cox and S. Mays (eds) *Human Osteology in Archaeology and Forensic Science* (London): 9-22

Scheuer, L. and Black, S. 2000b. *Developmental Juvenile Osteology* (San Diego)

Scott, E. 1999. *The Archaeology of Infancy and Infant Death. British Archaeological Reports International Series* 819 (Oxford)

Sletten, D. W., Smith, B. M., Southard, K. A., Casko, J. S. and Southard, T. E. 2003. 'Retained deciduous mandibular molars in adults: a radiographic study of long-term changes', *American Journal of Orthodontics and Dentofacial Orthopedics* 124: 625-630

Spriggs, J. A. 1989. 'On and off-site conservation of bone', in C. A. Roberts, F. Lee and J. Bintliff (eds) *Burial Archaeology: Current Research, Methods and Developments. British Archaeological Reports British Series* 211 (Oxford): 39-45

Stirland, A. 2005. 'Human remains', in J. Gardiner and M. J. Allen (eds) *Before the Mast: Life and Death Aboard the Mary Rose. The Archaeology of the Mary Rose* 4 (Portsmouth): 516-544

Stuart-Macadam, P. 1992. 'Anemia in past populations', in P. Stuart-Macadam and S. Kent (eds) *Diet, Demography and Disease: Changing Perspectives of Anemia* (New York): 151-170

Sture, J. F. 2001. *Biocultural Perspectives on Birth Defects in Medieval Urban and Rural English Populations*, Unpublished PhD Thesis (Durham)

Trinkhaus, E. 1978. 'Bilateral asymmetry of human skeletal non-metric traits' *American Journal of Physical Anthropology* 49: 315-318

Trotter, M. 1970. 'Estimation of stature from intact long limb bones', in T. D. Stewart (ed) *Personal Identification in Mass Disasters* (Washington DC): 71-83

Trotter, M. and Gleser, G. C. 1952. 'Estimation of stature from long bones of American Whites and Negroes', *American Journal of Physical Anthropology* 10: 463-514

Tucker, K. 2006. 'The inhumations from 1-3 and 6 Driffield Terrace', Unpublished Preliminary Assessment Report, York Archaeological Trust

Turner, R. 1990. 'A Romano British cemetery at Lanchester, County Durham', *Archaeology Aeliana* (5)18: 63-77

Ubelaker, D. H. 1989. *Human Skeletal Remains; Excavation, Analysis, Interpretation* (Washington)

Waldron, T. 1994. *Counting the Dead: The Epidemiology of Skeletal Populations* (Chichester)

Walker, P. L. 1989. 'Cranial injuries as evidence of violence in prehistoric Southern California', *American Journal of Physical Anthropology* 80: 313-323

Walker, P. L. 1995. 'Problems of preservation and sexism in sexing: some lessons from historical collections for palaeodemographers', in S. R. Saunders and A. Herring (eds) *Grave Reflections: Portraying the Past Through Cemetery Studies* (Toronto): 31-47

Walker, P. L., Bathurst, P. R., Richman, R., Gjerdrum, T. and Andrushko, V. A. 2009. 'The causes of porotic hyperostosis and cribra orbitalia: a reappraisal of the iron-deficiency-anemia hypothesis' *American Journal of Physical Anthropology* 139: 109-125

Warford Jr, J. H., Grandhi, R. K. and Tira, D. E. 2003. 'Prediction of maxillary canine impaction using sectors and angular measurement', *American Journal of Orthodontics and Dentofacial Orthopedics* 124: 651-655

Warwick, R. 1968. 'The skeletal remains', in L.P. Wenham (ed.), *The Romano-British Cemetery At Trentholme Drive*, York Ministry of Public Buildings and Works: Archaeological Reports, no 5 :113-76

Watts, D. J. 1989. 'Infant burials and Romano-British Christianity' *Archaeological Journal* 146: 372-383

Wenham, L.P. 1968. 'The Romano-British Cemetery at Trentholme Drive, York', *Ministry of Building and Works Archaeological Reports, No.5*, London, 158-162

Zero, D. T. 1999. 'Dental caries process' *Dental Clinics of North America* 43: 635-664

APPENDICES

Appendix A: Osteological and Palaeopathological Catalogue – Articulated Skeletons

Full descriptions of pathological lesions can be found in the skeletal recording forms.

Skeleton Number	**3DT 1**
Phase	32
Radiocarbon date	-
Preservation	Very good (Grade 1), severe fragmentation
Completeness	40-50% Partial cranium, mandible; C1 & 1 cervical vertebra, T11-12 & 3 thoracic vertebrae, L1-5, S1-4; 6 right & 3 left ribs; partial sternum & manubrium; right & left arms; partial right hand (4 carpals, 5 metacarpals, 5 proximal & 3 intermediate phalanges) & left hand (1 carpal, MC1, 3 & 5, 1 proximal & 2 intermediate phalanges); partial os coxae; proximal halves both femora; partial right foot (MT1-2) & left foot (1 tarsal, MT1-2, 4, 2 proximal, 1intermediate & 1 distal phalanx)
Age	26-35 years (young middle adult)
Sex	Male?
Ancestry	Unknown
Stature	-
Non-Metric Traits	Parietal foramen (R); sutural mastoid foramen (R); accessory supraorbital foramen (R) Acetabular crease (R); plaque (bilateral)
Pathology	Schmorl's node (1 unidentified thoracic vertebra) DJD (OP + PO) inferior right facet L2 Cribra orbitalia right orbit (left lost post-mortem) Small developmental anomaly of T11 – inferior part of spinous process deviated slightly to the right and superior part deviated slightly to the left Possible hallux valgus of left MT1 – hollow lesion on medial surface of the head (6 x 3.8mm); right MT1 has a slight groove on the medial surface Decapitation - apart from part of the right side of the atlas, only one cervical vertebra is present, probably C4. This vertebra has a roughly horizontal linear cut through the arch and body angled superior left to inferior right. The cut has passed just superior to the inferior left apophyseal facet & removed part of the inferior surface of the left pedicle, the inferior surface of the body, the inferior laminae & the inferior half of the inferior right apophyseal facet. A fragment of the inferior left lamina & part of the inferior left apophyseal facet is present. The cut surfaces are the same colour as the surrounding bone. The cut surface on the body is smooth, but that on the laminae is rougher, and it is possible the inferior left lamina & pedicle have fractured rather than being cut though. Cut possibly delivered from the anterior right.
Dental Health	16 tooth positions, 11 teeth present 4 teeth lost post-mortem, 1 tooth not present/ unerupted Calculus (flecks to slight); slight crowding of anterior right mandible; possible cyst at socket RM_1

	Right Dentition								Left Dentition							
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	NP/U	P	PM	P	P	P	P	P	PM	PM	PM	P	P	P	P	P
Calculus	-	S lm	-	F bm	F bd	F m	S lmd	S lmdb	-	-	-	F ld	S lmd	S md	F ld	F mdb
DEH	-	-	-	L	L	L	L	-	-	-	-	L	-	-	-	-

Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	3	-	2	2	3	3	4	-	-	-	2	2	3	2	2

Skeleton Number	**3DT 2**
Phase	34
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	60-70% Cranium, mandible, maxilla, hyoid, ossified thyroid cartilage; sternum & manubrium; C1-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm (proximal humerus, lateral clavicle & lateral scapula lost post-mortem); right hand (7 carpals, MC1-5, 5 proximal & 2 intermediate phalanges), left hand (2 carpals, MC1-5); os coxae; proximal femora
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	Mixed, possibly black?
Stature	161.9cm ±4.30cm (radius, black formula)
Non-Metric Traits	Parietal foramen (R); sutural mastoid foramina (bilateral); absent zygomaticofacial foramen (L) Double atlas facets (bilateral); transverse foramina bipartite (2/3 R, 2/3 L); circumflex sulcus (R); plaque (L)
Pathology	Schmorl's nodes T6-12 DJD (OA + PO) costal facets T10-12, medial clavicles Developmental anomaly of sphenoid – bridge of bone between the anterior and middle right clinoid processes forming clinocarotid canal; partial bridge between right middle & posterior clinoid processes Transitional vertebra at thoraco-lumbar border – lumbar morphology of right apophyseal joint between T11-12; slight cranial border shift Maxillary sinusitis (bilateral) – lamellar bone & porosity, more pronounced & extensive on left side (probably associated with dental disease) Healing fracture of right scapula blade – fracture running from the inferior border of the medial end of the spine, along the inferior margin of the area where the spine rises from the blade, staying roughly parallel with the spine for 56mm. At this point the break extends through the spine, completely separating the medial half of the spine & surrounding bone from the rest of the scapula – this part of the break appears to be post-mortem. Three fragments of scapula blade interior to the break are present – one at the medial margin forming part of the medial border of the scapula, an adjoining fragment, and another occupying the area just before the break though the spine (so more central to the blade). Fragile deposits of woven bone are present along both sides of the fracture on both anterior and posterior surfaces, thickest at the fracture line; these woven bone deposits on the superior and inferior fragments interlock at the medial end of the break. The surfaces of the break appear slightly remodelled under magnification & the surfaces are the same colour as the surrounding bone Soft-tissue trauma to right humerus (medial head of triceps brachii) – thickened crest of bone running proximo-distally on postero-medial side of proximal shaft, with inferior part projecting inferiorly as a thick bony spur tapering to a blunt point Small fracture to the anterior olecranon process/ superior proximal joint of the right ulna Clay shoveler's fracture of T1 – spinous process short, with flattened tip, surface of flattened area irregular; ununited Ossified costal cartilage at articular surface for the left first rib on the manubrium Ossified thyroid cartilage Two unidentified ossified fragments – 1) crescent shaped, smooth convex surface & rougher concave surface, 17.5 x 14.5 x 10.0mm, 2) crescent shaped, concave surface rough & slightly porous, convex surface smooth, 11.4 x 8.0 x 5.0mm Soft tissue trauma to right pubis – cluster of sharp bone spicules on the anterior margin of the obturator foramen, projecting postero-laterally Pilasterism of left femur; right femur too incomplete to observe Partial decapitation(?) C6 – diagonal linear cut through the vertebra that has removed the superior right apophyseal facet, a sliver from the superior right pedicle & the right uncinate process. The left superior apophyseal facet & uncinate process are also missing, but although fairly linear the surfaces are pale and slightly irregular, indicating post-mortem damage. The cut is angled superior

	left to inferior right. The cut surfaces are smooth, the same colour as the surrounding bone & polished along the posterior margins. Some peeling of the superior right pedicle & the anterior right side of the body is angled infero-laterally, suggesting this part possibly fractured. The severed uncinate process is present. Cut probably delivered from behind. No evidence for any cuts to the inferior of C5, so cut possible confined to the right side?
Dental Health	32 tooth positions, 26 teeth present 2 teeth lost post-mortem, 4 teeth lost ante-mortem Calculus, caries (4 teeth), abscesses x2 (RP^1 & LM^1), slight periodontal disease, slight rotation LP_1 &RC_1, slight crowding right mandible; both lower second molars tilted mesially; wear on buccal side RC_1 due to occlusion patterns with upper teeth Ante-mortem fractures of buccal sides both lower third molars; small chips to the enamel of the incisive surface of RI^2

	Right Dentition								Left Dentition							
Present	P	P	P	P	AM	P	P	P	PM	PM	P	P	P	P	P	P
Calculus	F db	F mdl	F b	F md	-	M bm	F b	F b	-	-	-	S b	S bm	-	F bdl	S bdl
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	La	Sm	-	La	Mm	-
Wear	2	3	3	2	-	3	3	4	-	-	-	2	2	-	3	3
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	AM	AM	P	P	P	P	P	P	P	P	P	AM	P	P
Calculus	-	F m	-	-	S mb	S ldm	S ldmb	S ldmb	S ldmb	S ldmb	S lmb	F md	S bdlm	-	S ml	S mld
DEH	-	-	-	-	L	L	-	L	-	-	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	3	3	-	-	2	3	3	3	3	3	3	2	2	-	3	3

Skeleton Number	**3DT 3**
Phase	34
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	50-60% Cranium, maxilla, part mandible, hyoid; C1-2, C7? & part 1 cervical vertebra, T9-10? & 1 thoracic vertebra, L4?-5 & part 1 lumbar vertebra; S1-5; 2 right & 9 left ribs; right shoulder; part left arm (scapula, midshaft humerus, proximal & distal ulna, midshaft radius); right hand (2 carpals), left hand (MC5, 2 proximal, 2 intermediate & 1 distal phalanx); os coxae; right & left legs; right foot (7 tarsals, MT1-5, 3 proximal, 2 intermediate & 1 distal phalanx, 2 sesamoid bones), left foot (5 tarsals, MT1-3, 3 proximal phalanges, 1 sesamoid bone)
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	Indeterminate
Stature	178.5cm ±2.99cm (femur & tibia, white formula) 172.9cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Sutural mastoid foramen (R); open posterior condylar canals (bilateral); open foramina spinosum (bilateral); maxillary torus (L); mandibular torus (L), bridging of supraorbital notch (bilateral) Transverse foramen bipartite (1/1 R, 0/1 L); acetabular creases (bilateral); Poirier's facet (L); plaque (bilateral); exostosis in trochanteric fossae (bilateral); vastus notches (bilateral); vastus fossae (bilateral); peroneal tubercle (R); double anterior calcaneal facet (R); double inferior talar facet (bilateral); lateral talar extension (L)
Pathology	Schmorl's node (T9?) Ossified ligamentum flavum (T10?) to such an extent that it impinges on the vertebral foramen on the right side

	OA lateral right clavicle (OP, PO & C); DJD (OP & PO) both acetabuli Maxillary sinusitis (bilateral) – porosity right side, strands of lamellar bone on left side Small nodules of lamellar bone on the endocranial surface of the frontal, on either side of the frontal crest – early HFI? or healed infection? Small (11 x 9mm) shallow depression in the ectocranial surface of the left occipital, immediately adjacent to the lambdoid suture, c a third of the way along from asterion. Margins indistinct, floor of lesion slightly porous. Endocranial surface unaffected. Left MT1 has a deep hollow in the head at the medial margin of the joint surface, 6.7 x 3.2mm. Margins sharp. Cyst. Soft tissue trauma to right scapula joint capsule – flat sheet of lamellar bone on the posterior surface bordering the glenoid fossa, terminating in line with the surface of the glenoid fossa creating a thickened ring around the margin. Left tibia – has an oval swelling (42 x 33mm) on the medial shaft at the junction of the mid & distal thirds, projecting c. 10mm. Margins indistinct, surface mostly smooth lamellar bone but some striations along posterior side. Pronounced striations surrounding swelling. Second, less pronounced, swelling on lateral shaft of tibia just inferior to the first swelling; again mostly smooth lamellar bone. Further lamellar bone deposits on mid third close to interosseous crest. Possible ossified haematoma/ periosteal reaction Right fibula – thickened area of lamellar bone on antero-medial surface of shaft at the junction of the mid & distal thirds. Bone is smooth on the lateral surface, more roughened on medial surface. Margins indistinct, but c. 40 x 15mm in size. Oval depression (8 x 5mm) located just inferior to the centre of the lesion, margins moderately clear & slightly rounded, floor & walls solid & covered in a rust-coloured deposit. Lamellar bone deposits extend inferiorly from the inferior margin along the anterior distal third of the fibula shaft. Possibly traumatic in origin?
Dental Health	17 tooth positions, 13 teeth present 2 teeth lost post-mortem, 2 teeth lost ante-mortem Calculus (flecks to medium, on occlusal surfaces LM^1, LM^2 & LP^2) caries (2 teeth), DEH (pits); uneven wear – left maxillary teeth much less worn than right teeth; periodontal disease (maxilla) Enamel chips – small chips to buccal side incisive surface of LI^1, LI^2, RI^2, RC^1

	Right Dentition								Left Dentition							
Present	P	AM	AM	P	P	P	P	P	P	P	P	P	P	P	P	PM
Calculus	S dl	-	-	F m	F md	F bmd	F b	F b	S b	F bd	S b	F b	S bol	M bodlm	M bolm	-
DEH	-	-	-	-	P	P	-	-	-	-	P	P	P	-	-	-
Caries	Mm	-	-	Sd	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	-	-	6	5	5	5	5	5	4	4	2	2	2	2	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	PM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**3DT 4**
Phase	32
Radiocarbon date	-
Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	80-90% Cranium, mandible, partial maxilla; part sternum; C1-7, T1-2, T10-12 + minimum of 6 thoracic vertebrae; L1-5, S1, S3-5, Cx1; 12 right & 12 left ribs; right arm; left arm; right hand (7 carpals, MC1-5, 4 proximal, 3 intermediate & 1 distal phalanx), left hand (4 carpals, MC1-5, 5 proximal, 4 intermediate & 3 distal phalanges); os coxae (pubic bones lost post-mortem); right & left legs; partial left foot (2 tarsals, MT4-5, 1 distal phalanx)
Age	18-25 years (young adult)

Sex	Male
Ancestry	White?
Stature	-
Non-Metric Traits	Ossicles in lambdoid sutures (bilateral); parietal foramen (L); metopic suture; extrasutural mastoid foramina (bilateral); posterior condylar canal open (L); open foramen spinosum (R) Circumflex sulcus (L); accessory sacral facets (bilateral); acetabular creases (bilateral); hypotrochanteric fossae (bilateral); vastus notch (L); vastus fossa (R); lateral tibial squatting facet (L); os trigonum (L)
Pathology	Os acromiale, bilateral Right MC1 - healed fracture of proximal end, proximal end displaced and proximal joint surface angled to face more towards palmar; saddle joint of right trapezium flattened & broader than that of the left trapezium Spondylolysis L4, detached part of neural arch present; L5 present & arch intact Developmental anomaly (cortical defect) of left tibia distal joint surface – linear groove with smooth rounded margins Both tibiae are broken post-mortem though the midshaft at almost identical locations. Both have a deposit of bone in the medullary cavity on the posterior side, clearly separate from the cortical bone, appearing as several layers wrapped around each other, also slightly porous. Decapitation C2 – linear cut through arch & body, angled diagonally from superior left to inferior right. Cut passes through the superior left apophyseal facet, left pedicle & body, superior margin of right lamina, and just superior to the inferior right apophyseal facet; the anterior part of the body has probably fractured. Cut delivered from behind. The cut to C2 also penetrated the mandible – there is a small shallow (2-3mm deep) linear cut into the posterior left ramus c. 20mm superior to the inferior border. There is a crack running from the anterior margin of the cut antero-inferiorly. The cut is angled superior left to inferior right. There is a probable cut to the posterior of the right ramus, located c. 16mm superior to the inferior margin of the mandible, but the inferior part is lost post-mortem. This probable cut does line up with that on the left ramus.
Dental Health	32 tooth positions, 30 teeth present 1 tooth lost post-mortem, 1 tooth not present/ unerupted Calculus (flecks to slight), LM^3 super-erupted, slight crowding anterior mandible, RI_1 slightly rotated, RI_2 rotated Small enamel chips – RC^1, LI^1, LC^1, LP^2

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	PM	P	P	P	P	P	P	P	P	P
Calculus	F d	F bml	S bmdl	F dl	-	-	-	S b	F b	F b	S bm	-	F l	F md	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	2	2	2	-	2	2	2	2	2	2	3	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	NP/U
Calculus	-	-	S lb	-	S d	S bm	S blmd	S md	S md	S b	-	F d	F ld	F l	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	2	2	2	2	2	2	2	2	2	2	3	2	-

Skeleton Number	**3DT 5**
Phase	32
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	50-60%

	Partial cranium (right side face), right maxilla, mandible, hyoid; manubrium & sternum; C5-7, T1-12, L1-5, S1-3; 12 right & 12 left ribs; right arm; left arm; right hand (MC2-5, 4 proximal & 1 intermediate phalanx), left hand (MC2-4); ox coxae; proximal left femur
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	White??
Stature	169.9cm ±4.05cm (humerus, white formula)
Non-Metric Traits	Accessory supraorbital foramen (R) Allen's fossa (L)
Pathology	DJD (OA + PO) apophyseal joints between T4-5, costal facets T12 Ossified ligamentum flavum T3-T12 Cribra orbitalia right orbit (very little of left orbit present) Decapitation C5 – near horizontal linear cut through the superior part, angled slightly superior right to inferior left. Cut has removed the superior right apophyseal facet, lateral superior margin of the right lamina, superior margin of the left lamina, left superior apophyseal facet, posterior body surface & right uncinate process. The superior half of the left side of the body is not present, surfaces rough & uneven. Cut surfaces smooth & polished; small area of peeled bone on the superior surface of the right pedicle. Cut probably delivered from the posterior right. Superior part of C5 not present, & C1-4 also lost post-mortem.
Dental Health	19 tooth positions, 22 teeth (3 of which loose) Calculus (flecks to slight); crowding of anterior mandible

	Right Dentition								Left Dentition							
Present	-	-	P(l)	P	P	P	P	P	P(l)	P(l)	-	-	-	-	-	-
Calculus	-	-	S ml	-	F d	F b	F md	F md	F mdb	F m	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	2	1	1	2	2	2	2	2	-	-	-	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	-	-
Calculus	S ld	S l	S ldm	F md	F md	S md	S ml	S mld	S mld	S mld	F mld	S mld	S mld	S ldm	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	1	2	1	1	2	2	3	3	2	2	1	1	2	-	-

Skeleton Number	**3DT 6**
Phase	33
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	90%+ Cranium, mandible; sternum & manubrium; C1-7, T1-12, L1-5, S1-5, Cx1; 12 right & 7 left ribs; right arm; left arm; right hand (2 carpals, MC1-4, 4 proximal, 4 intermediate & 2 distal phalanges), left hand (7 carpals, MC1-5, 5 proximal, 4 intermediate & 2 distal phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 5 proximal, 3 intermediate & 3 distal phalanges), left foot (6 tarsals, MT1-5, 5 proximal, 2 intermediate & 3 distal phalanges), 1 sesamoid bone
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	White
Stature	167.6cm ±2.99cm (femur & tibia, white formula)

Non-Metric Traits	Ossicle in lambdoid (R); ossicles at asterion (bilateral); auditory torus (L); extrasutural mastoid foramina (bilateral); open posterior condylar canals (bilateral) Transverse foramina bipartite (3/5 R, 3/5 L); circumflex sulcus (R); Allen's fossae (bilateral); Poirier's facets (bilateral); plaque (L); hypotrochanteric fossae (bilateral); vastus notch (L); vastus fossa (L); lateral tibia squatting facet (R); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral); medial talar facets (bilateral)
Pathology	Schmorl's nodes T7-L2 DJD (OP + PO) costal facets T1, T5, T9 Cribra orbitalia right orbit Cleft neural arch S1 - right lamina extends to midline, left lamina stops c. 5mm short of midline Transitional vertebrae – sacrum has 5 segments. Sacral promontory located at the upper margin of the second segment and alae slope inferiorly. Fifth segment is partially fused to segment beneath – fused at the left arch (since broken post-mortem), creating another anterior foramen, but not fused at body or right side (no contact at right side). Possible sacralisation of an additional lumbar vertebra; not clear whether lowest partially fused segment was originally S5 or Cx1. Right foot sesamoid bone probably bipartite - diagonal line through the joint surface with small notches at margins Healed fracture to nasal bones – diagonal line extending from inferior lateral corner of left nasal bone towards lateral border of right nasal about a third of the way from the superior corner. Minimal displacement on right side. R maxilla – large hollow depressed area inferior to infraorbital foramen. Healed fracture of one right rib (possibly rib 5), close to sternal end. Distal end slightly displaced inferiorly & laterally Os acromiale right scapula; left scapula – acromion fused but a small rounded dent in the postero-lateral margin of the acromion & subtle line on the superior surface passing from the dent to the anterior margin just medial to the clavicular facet Possible Osgood-Schlatter's disease of both tibiae – tibial tuberosities concave in superior half with sharp delimitation at the inferior margin of the concave area where the inferior part of the tuberosities protrude anteriorly Avulsion fracture of the styloid process of R MT5 Area of woven bone along the dorsal surface of the shaft of R MT5 Woven bone in transition to lamellar along the posterior border of the interosseous crest of the left tibia, extending posteriorly. Similar bone on the corresponding area of the distal left fibula (medial surface) just superior to the fibrous joint with the tibia. Striated lamellar bone on the left tibia shaft medial surface, with more focal area on the medial proximal end. Striated lamellar bone also on the medial shaft of the right tibia Both zygomas have porous woven bone in transition to lamellar occupying the centre of the external surface Soft tissue trauma to left calcaneus – large projecting nodule of bone at the superior margin of the anterior (cuboid) facet, lateral to the anterior talar facet Cortical defects: 1) Right calcaneus has a cortical defect in joint surface of the main articular surface for the talus – small (5mm diameter) roughly circular lytic lesion close to the medial border, edges smooth & rounded, well-defined, floor of lesion solid bone. 2) Right MT1 has a similar sized lytic lesion in the proximal joint, central-superior half; edges sharp, floor more porous. 3) small depression in the distal joint surface of the left humerus, inferior surface of trochlea, margins rounded & smooth, floor & walls smooth, texture same as rest of joint surface Possible hallux valgus L MT1 – lytic lesions on medial surface of head Decapitation C3 & C4. C3 has linear cut to the anterior part of the inferior body that has removed a sliver from the inferior surface. Cut surface polished. C4 has a linear cut angled superior left to inferior right that has removed a sliver from the superior left apophyseal facet & the entire right apophyseal facet (fragment present). Cut surfaces smooth & polished. Single blow, possibly delivered from behind.
Dental Health	32 tooth positions, 30 teeth present 1 tooth lost post-mortem, 1 tooth lost ante-mortem Calculus (flecks to medium), caries (1 tooth), partial impaction RM_3 (erupting mesially at 45º angle) Ante-mortem fractures of both upper central incisors & LI^2 – RI^1 tip of root broken diagonally from close to the apex on the mesial side to midpoint of root on distal side, LI^1 also broken through root a quarter to half way from the CEJ, root apex present, LI2 root only present, broken diagonally from mid part on the labial side to close to the CEJ on the lingual side; fracture of distal RP_1 which has removed enamel from distal surface, sockets shallow and remodelled; fracture to mesial surface LP^2, removed sliver of enamel 2mm wide from the occlusal surface to

	just above the CEJ from the lingual half of the mesial surface; small chips to enamel – all canines

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	S dm	F dm	F ml	S mbd	F md	F b	S b	S b	F d	-	S b	S md	F b	F lbmd	F m	F db
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	3	3	2	3	3	3	4	4	-	3	3	3	4	3	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	AM	P	P	P	P	PM	P	P	P	P	P	P	P
Calculus	F mb	-	M lmb	-	S bm	S ldbm	S b	S bm	-	S bmd	S bdm	S bdm	F md	S dlm	S ml	F d
DEH	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-
Caries	-	La	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	-	3	-	3	3	3	4	-	3	3	3	2	4	3	2

Skeleton Number	**3DT 7**
Phase	34
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	50-60% Manubrium, sternum, xiphoid; T3-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm (medial clavicle, scapula, distal humerus, ulna, radius); right hand (7 carpals, MC1-5, 5 proximal, 4 intermediate & 1 distal phalanx), left hand (4 carpals, MC1-5, 5 proximal, 4 intermediate & 1 distal phalanx) + 4 unsided distal phalanges; os coxae; left leg
Age	26-35 years (young middle adult) – probably 30+
Sex	Male
Ancestry	Unknown
Stature	169.2cm ±3.27cm (femur, white formula) 165.9cm ±3.94cm (femur, black formula)
Non-Metric Traits	Circumflex sulcus (R); septal apertures (bilateral); acetabular crease (L); plaque (L); hypotrochanteric fossa (L); third trochanter (L); lateral tibial squatting facet (L)
Pathology	Schmorl's nodes T5-11 Cleft neural arches S1-S5 – small area in contact, either S2 or S3 Cranial border shift at thoraco-lumbar border – apophyseal joints between T11-12 slightly lumbar in shape, both have large costal facets on the pedicles. Both 12th ribs are short and stumpy (R = 59mm long, L = 57mm long) Excavated muscle attachment site right humerus, pectoralis major Spondylolysis L5 Left tibia – striated lamellar bone on mid third of medial shaft, with subtle lump of lamellar bone with indistinct margins located close to the posterior margin. Possible ossified haematoma/ periosteal reaction Peri-mortem cuts to the right scapula and right clavicle. There are two cuts to the right clavicle: 1) a fine linear cut 32mm long into the superior and posterior surface of the sternal end, running from the superior margin of the sternal end inferiorly & laterally to a point c. 5.7mm inferior to the superior margin. No evidence for a cut to the right clavicular facet on the manubrium indicating the cut passed just superior to the manubrium; the cut must have passed through C7 or T1 in order to penetrate the clavicle in this location (cut would have to be delivered from behind) so decapitation can be inferred; 2) second cut 41mm long to the posterior-inferior surface of the lateral third of the shaft. The conoid tubercle is detached from the rest of the clavicle as a result (2 fragments of this detached part present). The superior part of the cut surface is smooth and polished (indicating a peri-mortem cut); the inferior part is more irregular, angled more anteriorly & with a peeled appearance to the surface (suggesting a peri-mortem fracture). The cut was

	delivered from the superior-posterior & medial, directed towards the inferior-anterior & lateral. This cut also penetrated the acromion process of the scapula. There is a short linear cut c. 3mm deep into the antero-superior margin of the acromion of the right scapula at the postero-superior-medial margin of the clavicular facet. Cut is angled superior-medial to inferior-lateral. Both the clavicle and the acromion indicate a relatively shallow cut that did not penetrate completely through either bone, but the posterior-inferior fragment of clavicle fractured away from the rest of the bone
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**3DT 8**
Phase	32
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	80-90% Cranium, mandible, hyoid; manubrium & sternum; C1-3, C5?-7?, T1-4?, T6?-12, L1-6, S1-5; 6 right & 12 left ribs; right arm; left arm; right hand (6 carpals, MC1-5, 4 proximal, 4 intermediate & 3 distal phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 3 proximal & 1 distal phalanx), left foot (7 tarsals, MT1-5, 3 proximal & 1 distal phalanx)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	Mixed?
Stature	176.2cm ±2.99cm (femur & tibia, white formula) 170.9cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Parietal foramen (L); ossicle at asterion (L); sutural mastoid foramina (bilateral); open posterior condylar canals (bilateral); double anterior condylar canal (R); accessory supraorbital foramina (bilateral) Vastus notch (R); vastus fossae (bilateral); lateral tibial squatting facets (bilateral); medial talar facets (bilateral)
Pathology	Schmorl's nodes T6-L4 DJD (OP + PO) costal facets T12 Probable sacralisation of an additional lumbar vertebra – 5 lumbar vertebrae present, left half & centre of sacrum fairly intact. There is a gap between the first segment (L6?) and second segment at the anterior body, laminae & apophyseal facets, but both segments are fused at the left ala and posterior body. The sacral promontory is located at the superior margin of the second segment. The ala on the left side slopes steeply towards inferior. Lowermost segment in the sacrum looks typical for S5. Coxa valga both femora – necks angled steeply towards superior; femora also have a lot of torsion. Tibiae also have a lot of torsion Avulsion fracture/ developmental anomaly of right navicular tuberosity – tuberosity is curtailed and terminates in a flattened area with a rough porous surface. Non-osseous tarsal coalition right lateral cuneiform & MT3 – inferior quarter of joint surface between the two bones angled anteriorly and this part of the joint surfaces occupied by lytic lesions Probable cyst right proximal 1st foot phalanx – small oval lytic lesion on the plantar surface adjacent to the joint margin on the medial side Possible decapitation C5 – possible cut through superior margin of right superior apophyseal facet, but area partially obscured by post-mortem damage. If a cut is present it is angled postero-inferior to antero-superior.
Dental Health	32 permanent tooth positions, 32 permanent teeth present; 1 deciduous tooth position present, 1 deciduous tooth lost post-mortem Calculus (flecks to medium) Enamel chips to buccal side occlusal surface – RI^1, RI^2, RP^1, RM^1, LI^1, LI^2, LC^1 Small empty socket between RC^1 and RP^1 indicating presence of retained deciduous canine (since lost post-mortem). RC^1 has been displaced lingually and has erupted into the palate Unusual occlusion with several teeth displaced lingually or buccally leading to unusual patterns of wear. RM^2 displaced buccally & tilted so occlusal surface angled buccally, lingual surface of lingual cusp in occlusion with the buccal surface of the distobuccal cusp of RM_2. RM2 displaced lingually & occlusal surface of crown tilted lingually. LP_1 & LP^2 both displaced lingually. LM^3 tilted slightly, occlusal surface towards buccal side. All mandibular anterior teeth are tilted to the left (LI_1-P_1 tilted distally, RP_1-I_1 tilted mesially)

	Right Dentition									Left Dentition							
Present	P	P	P	P	P	PM	P	P	P	P	P	P	P	P	P	P	P
Calculus	S db	S dlo	F bml	F b	F b	-	S m	F ld	F l	F l	F l	F b	S b	M b	S mb	S bml	S mdbo
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	1/3	4	2	2	-	2	5	6	6	5	4	3	2	3	3	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**c**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**		**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P
Calculus	S ld	M lmo	S ld	S lmb	S mdl	S ldbm		S blmd	S lbm	S blmd	S bmld	S blmd	S ml	S lmb	S lm	S l	F ldb
DEH	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
Wear	2	1/3	4	2	2	2		4	4	5	4	4	2	3	4	3	1

Skeleton Number	**3DT 9**
Phase	33
Radiocarbon date	-
Preservation	Good (Grade 2), severe fragmentation
Completeness	10-20% Thoracic vertebrae x2 (T9-10?); 3 lower right ribs + unsided fragments; left hand (MC2 & 3?, 1 proximal phalanx); right leg (distal tibia & fibula); left leg (distal tibia & fibula); right foot (7 tarsals, MT1-5, 5 proximal, 1 intermediate & 1 distal phalanx), left foot (7 tarsals, MT1-5, 5 proximal, 2 intermediate & 1 distal phalanx)
Age	18+ years (adult)
Sex	Unsexed
Ancestry	Unknown
Stature	-
Non-Metric Traits	Double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral)
Pathology	DJD (OP + PO) left talus, probably associated with trauma Flattened right fibula shaft, ridges extremely pronounced; the left fibula shaft is more rounded with less pronounced ridges Probable trauma to the left foot resulting in collapsed arches and subluxation of talus-calcaneus, calcaneus-cuboid, talus-navicular, navicular-intermediate cuneiform: L talus – thick pronounced ridge of bone (extending 9-10mm superiorly) along the distal margin of the dorsal neck/ superior margin of the head with a flattened distal surface acting to extend the articular surface of the head. Large spicules of irregular lamellar bone in the inferior surface of the neck. Extension of the posterior-inferior joint surface onto the anterior-lateral surface. L calcaneus – posterior margin of posterior talar joint surface enlarged and large facet occupying the area anterior to the posterior talar joint surface & lateral to the medial talar joint surfaces. The dorsal margin & dorsal half of the lateral margin of the anterior cuboid facet has an overhanging area of bone extending c. 10mm in an anterior & superior direction L navicular – thick pronounced ridge of bone extending 7mm superiorly along the dorsal margin, with a flattened proximal side acting as an extension to the proximal articular facet. Similar extensions (10mm to superior) to the superior margin of the facet for the intermediate cuneiform L intermediate cuneiform – dorsal margin of proximal joint convex & extending onto dorsal surface L cuboid – dorsal part of proximal joint surface curved (convex) & extending onto dorsal surface (in contact with overhanging area of bone on the anterior calcaneus)
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**3DT 10**

Phase	32
Radiocarbon date	-
Preservation	Poor (Grade 4), slight fragmentation
Completeness	50-60% Cranium, mandible; sternum; C1-7, T1-12, L1-5, S1; 12 right & 12 left ribs; right arm; left arm; right hand (5 carpals, MC1, 3 & 5, 3intermediate & 1 distal phalanx), left hand (5 carpals, MC1 + 5?, 1 proximal phalanx); partial left os coxa (pubis & part ilium)
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	Black
Stature	161.8cm ±4.30cm (radius, black formula)
Non-Metric Traits	Ossicle in lambdoid (bilateral); extrasutural mastoid foramina (bilateral); sutural mastoid foramen (R); open posterior condylar canals (bilateral); precondylar tubercle; absent zygomaticofacial foramen (R); bridging of supraorbital notch (R)
Pathology	Degeneration superior body S1 (OP + PO) DJD (OP + PO) left acetabulum Excavated muscle attachment site proximal right humerus (pectoralis major)
Dental Health	32 tooth positions, 19 teeth fully erupted + 1 tooth impacted 7 teeth lost post-mortem, 3 teeth lost ante-mortem, 2 teeth not present/ unerupted Calculus (flecks); caries (3 teeth); abscess (buccal roots LM^3); AMTL; DEH Diastema between RC_1 & RP_1, also gap of 1mm between crowns RM_1 & RM_2 LM^3 super-erupted The crown of LC^1 is partially visible through post-mortem damage in the palate & through a hole in the posterior wall of the socket for LI^2. LC^1 crown probably close to horizontal/ angled with tip of crown towards a point between LI^1 and LI^2, root lying distally. Small bulge in palate surface on anterior left side. Cannot assess whether a deciduous canine had been retained due to post-mortem damage to the alveolar bone. Enamel chips – RI^1, RI^2, LP^2

	Right Dentition								Left Dentition							
Present	P	AM	AM	P	PM	PM	P	P	P	PM	U	PM	P	P	P	P
Calculus	F d	-	-	-	-	-	-	-	-	-	-	-	F bm	F bd	F m	-
DEH	-	-	-	L	-	-	-	L	L	-	-	-	-	L	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Md	Mm
Wear	2	-	-	3	-	-	5	5	5	-	-	-	3	5	4	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	NP/U	P	P	PM	P	P	P	P	P	PM	PM	P	P	AM	P	NP/U
Calculus	-	F lb	F d	-	F d	F m	F l	F md	F m	-	-	F md	F m	-	F dl	-
DEH	-	-	-	-	-	L	L	-	-	-	-	-	-	-		-
Caries	-	-	Lm/o	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	3	3	-	3	3	4	6	5	-	-	3	2	-	4	-

Skeleton Number	**3DT 11**
Phase	34
Radiocarbon date	-
Preservation	Very good (Grade 1), minimal fragmentation
Completeness	20-30% Right arm (radius & ulna); right hand (6 carpals, MC1-5, 3 proximal, 1 intermediate & 2 distal phalanges); right leg; left leg (patella, tibia & fibula); right foot (7 tarsals, MT1-5, 5 proximal

	phalanges), left foot (7 tarsals, MT1-5, 5 proximal & 1 intermediate phalanx, 1 sesamoid bone)
Age	18+ years (adult)
Sex	Unsexed
Ancestry	Unknown
Stature	-
Non-Metric Traits	Plaque (R); vastus notch (R); vastus fossae (bilateral): peroneal tubercle (R); absent anterior calcaneal facet (L)
Pathology	Healed fracture right MC1 – fracture to lateral palmar extension of distal joint surface, with fragment displaced proximally Cyst in the lateral head of R MC2 – oval hollow at the margin of the joint surface, sharp margins, floor & walls smooth & rounded Subtle striated lamellar bone on the medial midshafts of both tibiae, most pronounced along the posterior half. Lateral surfaces of midshafts undulate slightly, as if small flattened nodules of lamellar bone had been deposited Deposit of thickly striated lamellar bone on the antero-medial shaft of the right fibula, at the junction of the proximal & mid thirds. Also undulating, gently rounded lamellar bone deposits along the mid third of the lateral shaft, extending onto the proximal third. The left fibula has much more subtle lamellar bone deposits on the lateral shaft (mid & proximal thirds) Possible trauma to both feet, changes similar on both sides but most pronounced on the right: Calcanei – both have a large facet occupying the area anterior to the posterior talar facet, and lateral to the medial talar facets. Rugged projections of bone present around the margins of this facet (projecting 9mm superiorly) Tali – both have a large extension of the posterior inferior facet onto the anterior surface of the body, again with large osteophytes around the margins. This surface is in articulation with the calcaneus. There is a large, thick ridge of bone occupying much of the dorsal surface of the necks of both tali Naviculars – both have a projection of bone along the dorsal surface, most pronounced at the proximal end RMT1 – has osteophytes around the dorsal & medial margin of the head. Corresponding osteophytes on the proximal joint surface of the proximal first foot phalanx creating a flattened extension to the joint surface
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**3DT 12**
Phase	32
Radiocarbon date	-
Preservation	Moderate (Grade 3), slight fragmentation
Completeness	90%+ Cranium, mandible; manubrium, sternum; C1-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (3 carpals, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges), left hand (7 carpals, MC1-5, 3 proximal & 2 intermediate phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 3 proximal phalanges), left foot (7 tarsals, MT1-5, 1 proximal phalanx)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	White
Stature	177.6cm ±2.99cm (femur & tibia, white formula)
Non-Metric Traits	Highest nuchal lines (bilateral); ossicles in lambdoid (bilateral); extrasutural mastoid foramen (L); maxillary torus (R); accessory supraorbital foramen (L) Poirier's facets (bilateral); hypotrochanteric fossae (bilateral); exostosis in the trochanteric fossa (bilateral); vastus fossae (bilateral); lateral tibial squatting facets (bilateral); peroneal tubercles (bilateral); double anterior calcaneal facets (bilateral); medial talar facet (R)
Pathology	Schmorl's nodes T6-12, L3 Probable crush fracture of T11 – body wedge shaped, most compressed at anterior right. Thick crescent of lytic activity on inferior body surface along anterior margin with slight osteophyte formation at the edges. T12 – small shallow lytic area along right margin of inferior body surface

Trauma to anterior body L4 – anterior margin of superior body angled & surface rough with irregular nodules & scattered porosity. Traumatic anterior disc herniation.

Cortical defects in the proximal ends of both humeri, located at margin of head & lesser tubercle

Well healed fracture of left rib (possibly rib 6) halfway between the tubercle & angle, minimal displacement

Possible dislocation/ subluxation of left hip joint with damage to superior margin of acetabulum – large notch in superior-posterior margin of the left acetabulum, surface uneven and slightly rugged; left femur head enlarged with ring of osteophytes around the superior margin

Avulsion fracture of medial malleolus of left tibia. Probable associated trauma to the left talus - large nodules of bone inferior to the medial joint surface, osteophytes along medial and posterior margins of tibial joint surface, lytic activity on medial joint surface

Entheseal changes present at the anterior border of the distal joints of both fibulae, most pronounced on right side

Maxillary sinusitis, bilateral; on right side thick lamellar bone covering anterior wall, spicules & web-like deposits covering all observable surfaces – connected to dental abscess

Striated lamellar bone covering medial midshafts of both tibiae, extending onto distal thirds. Deposits thicker on left side. Well remodelled lamellar bone also present on midshafts of both fibulae.

Various enthesophytes in both feet – bar of bone on dorsal right talar neck, peroneal large tubercles, small spicules on dorsal medial corner right cuboid, small spur of bone on dorsal distal right medial cuneiform, pronounced ridges of bone on both 5th metatarsals on dorsal surface.

Ivory osteoma on frontal bone, located in the midline superior to glabella

Multiple peri-mortem sharp force injuries:

3 cuts to the atlas:

1) small fine shallow cut into the posterior margin of the right inferior apophyseal facet

2) small shallow cut in inferior surface of right transverse process, lateral to the transverse foramen

3) small cut 2-3mm long into the lateral margin of the inferior left apophyseal facet; cut delivered from behind, aligned with cut 9 on the axis

9 cuts to the axis:

1) roughly horizontal cut to left side, posterior to the transverse foramen, cut slightly angled from left inferior to right superior & penetrating c. 12 mm into the axis; cut delivered from the left side

2) cut on same angle and alignment to cut 1 located 2mm inferior to cut 1, penetrating c. 2mm into the bone

3) fine, shallow cut on similar angle and alignment as cuts 1 & 2, located 3mm inferior to cut 2 at the anterior end and 2mm inferior to cut 2 at the posterior end

4) short, shallow cut into the lateral margin of the left inferior facet

5) short, shallow cut into the lateral margin of the left inferior facet located c. 3mm inferior to cut 4 and on a similar angle

6) deeper cut penetrating c. 4mm into the lateral margin of the left inferior facet located just inferior to cut 5 & on a similar angle; aligned with the cut to C3

7) sliver of bone removed from the superior right neural arch posterior to the superior apophyseal facet, anterior end of cut continuing slightly beneath the superior facet; angled from posterior right to anterior left; probably delivered from behind and to the right

8) deep roughly horizontal cut through the superior right facet & body, terminating to the left of the body; angled slightly from superior right to inferior left; probably delivered from the right side; although penetrated two-thirds of the axis it did not completely sever the dens from the rest of the axis

9) Possible cut on the posterior left side of the dens, angled from superior left to inferior right, penetrating 1-2mm into the bone. Probable same cut as cut 3 on the atlas

C3 – linear roughly horizontal cut into the lateral margin of the left superior apophyseal facet roughly halfway along the lateral margin, penetrating c. 3.5mm into the bone. Aligned with cut 6 on the axis

3 cuts to the mandible:

1) short shallow cut into the posterior lateral margin of the left gonial angle, c. 3mm long & penetrating less than 1mm into the bone

2) shallow cut into the posterior margin of the lateral surface of the left ramus located 9-10mm superior to cut 1, 8mm long & no more than 1mm deep. Angle similar to cut 1

3) possible horizontal cut to the lateral left ramus, just superior to the extramolar sulcus, c. 5mm long

Dental Health	32 tooth positions, 27 teeth 3 teeth lost post-mortem, 1 tooth lost ante-mortem, 1 tooth not present/ unerupted Calculus (flecks to medium); DEH; caries (4 teeth); AMTL; abscesses (x2) – RM^2 (penetrating maxillary sinus), LP^2 Slight crowding of anterior mandible; RI^2 not present, small gap between RI^1 & RC^1, alveolar bone normal – possible congenital absence or impaction; LI^2 small; LM^3 crown enlarged, especially along length of buccal side, possible germination?; LM^3 also partially impacted, erupted at an angle with crown tilted mesially Fractures to three teeth: LM^2 – entire mesial half of occlusal surface missing, fracture angled diagonally to mesial CEJ; LP^2 – shallow sliver from distobuccal surface missing, angled from central occlusal surface towards distobuccal side; LM$_3$ – distbuccal third of crown missing, steep angle from occlusal surface to below CEJ of distal root Enamel chips – RC^1, RI^1, LI^1, RI$_2$

	Right Dentition								Left Dentition							
Present	P	PM	AM	P	P	P	NP/U	P	P	P	P	P	P	PM	P	P
Calculus	F bdm	-	-	S b	S bdm	F b	-	F b	F b	F bd	F bdm	F l	-	-	S bd	F mb
DEH	-	-	-	L	L	L	-	L	L	L	L	L	-	-	L	-
Caries	-	-	-	Sd	-	-	-	-	-	-	-	-	La	-	Sd	-
Wear	2	-	-	3	3	4	-	4	4	4	4	4	-	-	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	PM	P	P	P	P	P	P	P	P	P	P	P
Calculus	S lbd	S l	M blmd	S mld	-	S bl	S bdl	F blm	F mdl	F md	S bdml	F blmd	F blm	S blmd	F mbd	F m
DEH	-	L	-	L	-	L	-	-	-	-	L	L	L	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	Sd	-	-
Wear	2	2	4	2	-	4	3	4	4	3	3	3	2	3	2	1

Skeleton Number	**3DT 13**
Phase	33
Radiocarbon date	-
Preservation	Poor (Grade 4), slight fragmentation
Completeness	90%+ Cranium, mandible; manubrium & sternum; C1-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (7 carpals, MC1-5, 3 proximal phalanges), left hand (2 carpals, MC1-5, 5 proximal, 3 intermediate & 1 distal phalanx); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 5 proximal, 1 intermediate & 1 distal phalanx, 1 sesamoid bone); left foot (7 tarsals, MT1-4, 2 proximal & 1 intermediate phalanx, 1 sesamoid bone)
Age	16-19 years (adolescent)
Sex	(Male?)
Ancestry	White?
Stature	(173.6cm ±3.37cm (tibia, white formula))
Non-Metric Traits	Parietal foramina (bilateral); sutural mastoid foramen (R); open posterior condylar canals (bilateral); open foramen spinosum (L); bridging of supraorbital notch (R) Double atlas facet (L); posterior atlas bridge (L); acetabular creases (bilateral); vastus fossa (R); lateral tibial squatting facets (bilateral); os trigonum (L); lateral talar extensions (bilateral)
Pathology	Schmorl's nodes T7-11 Developmental anomalies – C5-6 fused together at posterior body surface, since broken post-mortem; T1-2 similar appearance to C5-6 but apparently bodies were not fused. T5 – slight butterfly vertebra, with body underdeveloped at the midline Cleft neural arches S1 (arches meet but are not fused), S4-5 Small cortical defect in the proximal joint surface of the right proximal first foot phalanx

	Congenital fusion of the styloid process of R MC3 and the capitate, with avulsion fracture of the styloid process. Possibly bilateral – avulsion fracture of the styloid process of L MC3 suspected, capitate lost post-mortem Cribra orbitalia, bilateral Healed fracture of proximal end right MC1 – proximal joint surface displaced to face towards palmar surface Subtle woven bone deposits on the internal surfaces of the mandibular rami superior to the mandibular foramen & lingula, blending into lamellar bone as it approaches the neck of the condyle. The left side also has a roughly oval deposit of transitional woven-lamellar bone on the internal body, inferior to the third molar. Striated lamellar bone on the medial proximal-mid thirds of the shafts of both femora Lamellar bone in feet – both first metatarsals have subtle deposits on the lateral shafts just proximal to the heads & RMT5 has a deposit on the proximal half of the dorsal shaft Rib lesions – two right ribs (probably 8 & 9) have woven bone deposits on the visceral surfaces of the necks, merging into lamellar bone at the distal end; right rib 4(?) also has a small deposit of woven bone on the visceral neck. Two right ribs (probably 6 & 7) have lamellar bone deposits on the visceral necks. Two left ribs (probably 6 & 7) have subtle deposits of transitions woven-lamellar bone on the visceral necks
Dental Health	32 tooth positions, 31 teeth present (2 in process of eruption) 1 tooth lost post-mortem/ sampled Calculus (flecks); DEH; slight crowding anterior left mandible; narrow palate

	Right Dentition								Left Dentition							
Present	P(E)	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P(E)
Calculus	-	-	F b	F b	-	-	F b	-	-	-	-	-	F md	F mb	-	-
DEH	-	-	-	-	L	L	-	-	-	-	-	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	1	3	2	2	2	2	2	3	2	2	2	2	3	1	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	(PM)	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	-	F d	F l	-	-	-	F bm	F bd	F bm	S l	F ld	-	F m	F lm	F l	-
DEH	-	-	-	-	L	L	-	-	-	-	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	1	3	-	2	3	3	3	3	2	2	1	2	3	1	1

Skeleton Number	**3DT 14**
Phase	34
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	30-40% Cranium (2 small vault fragments); 2x thoracic arches, 1x lumbar arch; 5 right & 6 left ribs; right arm (humerus, radius, ulna); left arm (clavicle, scapula, radius, ulna); hands (2 metacarpals); os coxae (both iliae); right leg (femur, tibia); left leg; left(?) foot (MT1)
Age	30-32 weeks in utero (foetus)
Sex	-
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**3DT 15**
Phase	33
Radiocarbon date	-
Preservation	Very good (Grade 1), minimal fragmentation
Completeness	90%+ Cranium, mandible, hyoid, incus x1; sternum, xiphoid; C1-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (8 carpals, MC1-5, 5 proximal, 3 intermediate & 5 distal phalanges), left hand (5 carpals, MC1-5, 3 proximal & 1 intermediate phalanx); os coxae; right leg; left leg; right foot (6 tarsals, MT1-5, 5 proximal, 2 intermediate & 4 distal phalanges, 1 sesamoid), left foot (6 tarsals, MT1-5, 5 proximal, 2 intermediate & 4 distal phalanges)
Age	18-25 years (young adult); probably 20-30 years but classified as young adult
Sex	Male
Ancestry	White?
Stature	169.5cm ±3.27cm (femur, white formula)
Non-Metric Traits	Parietal foramina (bilateral); extrasutural mastoid foramina (bilateral); sutural mastoid foramina (bilateral); open posterior condylar canal (L); bridging of supraorbital notch (L); extrasutural anterior ethmoid foramen (R) Poirier's facets (bilateral); third trochanter (L); vastus fossae (bilateral); lateral tibial squatting facet (L); peroneal tubercle (L); lateral talar extensions (R)
Pathology	Schmorl's nodes T7, T9, T11 T5 has a groove running across the superior body surface from the anterior left margin to the posterior right margin; T6 has a shallow depression in the anterior superior body surface with an indistinct shallow groove running diagonally along the posterior margin of the depression Probable developmental anomalies of T10-11 – T10 superior body surface slightly depressed, more pronounced on right side (does not affect annular ring); T11 superior body surface depressed, more pronounced on right side, and annular ring involved Slight cranial border shift at thoraco-lumbar border – apophyseal joints between T11 and T12 lumbar in shape, particularly on right side Rib lesions – 2 left ribs (probably 7 & 8) have subtle thin deposits of pale lamellar bone on the visceral surfaces of the necks Both naviculars have a crest of bone along the dorsal margin of the distal joint surface for the intermediate cuneiform, more pronounced on the left side Decapitation C3-4: C3 has a linear cut angled from posterior-inferior-right to anterior-superior-left has removed the inferior half of the left apophyseal facet & the inferior quarter of the inferior body. The angle is such that the inferior right apophyseal facet is unaffected C4 – a linear cut angled steeply from the posterior-inferior-right to the superior-anterior-left has removed the superior right apophyseal facet (the cut is roughly parallel with the joint surface of the facet), the superior margin of the right lamina, and part of the superior margin of the left lamina. The angle is such that the left apophyseal facet & the body are unaffected. The cuts to C3 & C4 align, provided the neck was slightly extended. There is no indication as to the cut direction.
Dental Health	32 tooth positions, 31 teeth present 1 tooth possibly not present/ unerupted? Calculus (flecks to slight); DEH; Both upper third molars have additional cusps (parastyles) on the buccal side of the crown LI^2 is not present, instead there is a very shallow socket located slightly buccal to the dental arcade. Does not seem deep enough for a permanent tooth unless the root was very short, but potentially too large for a retained deciduous tooth. Possibly a cyst? Enamel chips RP_2, RM_1, RI^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	NP/U	P	P	P	P	P	P
Calculus	F bd	F lm	S md	S md	S b	F ml	S bm	-	F b	-	F m	-	F md	F m	-	F l
DEH	-	-	-	-	-	L	-	P	-	-	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Wear	1	2	3	2	2	2	2	3	3	-	2	2	2	3	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F bm	S lmd	S lmd	F d	-	S lm	S lmd	S lmb	S lbmd	S lbmd	S lbmd	S md	F d	S mdl	S mdl	S mdl
DEH	-	-	-	-	L	L	L	-	-	L	L	L	-	-	L	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	2	3	2	1	2	2	3	3	2	2	1	2	4	2	2

Skeleton Number	**3DT 16**
Phase	33
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	95%+ Cranium, mandible, hyoid, ossified thyroid; manubrium, sternum, xiphoid; C1-7, T1-12, L1-6, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (6 carpals, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges), left hand (7 carpals, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges); os coxae; right leg; left leg; right foot (6 tarsals, MT1-5, 2 proximal phalanges), left foot (6 tarsals, MT1-5, 3 proximal, 1 intermediate & 1 distal phalanx)
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	Unknown
Stature	171.8cm ±2.99cm (femur & tibia, white formula) 167.1cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Parietal foramen (R); extrasutural mastoid foramina (bilateral); absent zygomaticofacial foramina (bilateral) Double atlas facet (R); transverse foramen bipartite (1/2 R, 1/2 L); circumflex sulcus (L); plaque (L); exostosis in the trochanteric fossae (bilateral); third trochanter (R); vastus notch (L); vastus fossa (L); lateral tibial squatting facets (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facet (L); os trigonum (bilateral)
Pathology	Schmorl's nodes T5-L4 DJD (OP + PO) right apophyseal facets between L5 & L6 (sacralised); OA (OP, PO + E) left apophyseal facets between L5 & L6 DJD (OP + PO) lateral clavicles, medial left clavicle, left lunate OA (OP, PO & E) distal left radius & scaphoid (associated with fracture) Additional vertebral segment present – L6 sacralised. Uppermost sacral segment fused to second segment at alae, but gap at anterior body & between laminae, R apophyseal facets possibly unfused; sacral promontory located at upper border of second segment Apophyseal joints between T12 & L1 thoracic in shape – slight caudal border shift at thoraco-lumbar border Osteochondritis dissecans of distal joint of left tibia – roughly circular lytic lesion, porous floor, sharp margins Maxillary sinusitis, bilateral – spicules of lamellar bone & porosity Developmental anomaly/ trauma to right MT5 & right 5th proximal foot phalanx. R MT5 has a 'V' shaped notch in the dorsal surface of the head, dividing the joint surface. The surface of the 'V' shaped area is rough & irregular. The distal end of the proximal 5th foot phalanx appears underdeveloped, as if the distal 3mm is absent, and the distal surface is flattened and faces disto-laterally (none of the surface curves around onto the plantar surface) Healed fracture to the spinous process of T4 – fracture located half way along the spinous process, distal end displaced inferiorly. Healed comminuted fracture to the distal joint surface of the left radius, dividing the joint surface into three sections, with slight posterior & proximal displacement of the styloid process. Associated osteoarthritis. Decapitation C6 – linear cut through both laminae, angled slightly superior left to inferior right, and

	passing just superior to the superior margins of the inferior apophyseal facets & just inferior to the inferior margins of the pedicles. The only part surviving is the inferior fragment (spinous process & inferior laminae). Probably delivered from behind.
Dental Health	32 tooth positions, 31 teeth present 1 tooth lost post-mortem/ sampled Calculus (flecks to slight); caries (2 teeth); DEH; periodontal disease Both upper third molars smaller than average; LP^2, RI^2 & LI^2 slightly rotated Fracture of LC_1, section of enamel missing from the bucco-distal corner from the occlusal surface to the CEJ; enamel chips – RC_1, LI^1, LI^2, LC^1, LP^1, RI^2, LC^1

	Right Dentition								Left Dentition							
Present	P	P	P	(PM)	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F m	F d	-	-	S bd	F b	F m	F md	-	S bmd	S bmd	S bmd	S md	S b	S b	F d
DEH	-	-	-	-	L	-	-	-	-	-	-	L	-	-	-	-
Caries	-	-	La	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	5	5	-	-	4	5	5	5	5	5	5	3	3	5	5	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	S bdm	-	-	-	S md	S ldb	S lmdb	S lmdb	S ldb	S lmdb	S lmdb	S lmd	S lmd	S md	S md	S lmd
DEH	-	-	-	-	-	L	-	-	-	-	-	-	-	-	-	-
Caries	-	-	La	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	4	-	3	3	5	6	7	7	6	4	4	3	5	4	2

Skeleton Number	**3DT 17**
Phase	33
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	80-90% Cranium, mandible; partial sternum; C1-7, T1-12, L1-5, S1-5; 10 right & 12 left ribs; right arm (distal humerus, radius, ulna); left arm; right hand (6 carpals, MT1-5, 5 proximal, 4 intermediate & 4 distal phalanges), left hand (7 carpals, MC1-5, 5 proximal 3 intermediate & 2 distal phalanges); os coxae; right leg; left leg; right foot (4 tarsals, MT1-5, 5 proximal, 4 intermediate & 5 distal phalanges), left foot (5 tarsals, MT1-5, 2 proximal, 1 intermediate & 1 distal phalanx)
Age	18-25 years (young adult)
Sex	Male
Ancestry	White?
Stature	177.8cm ±3.27cm (femur, white formula)
Non-Metric Traits	Extrasutural mastoid foramen (R); sutural mastoid foramen (L); open posterior condylar canal (L); double anterior condylar canal (R) Transverse foramen bipartite (0/1 R, 1/3 L); sternal foramen; septal aperture (L); Allen's fossa (bilateral); hypotrochanteric fossa (bilateral); lateral tibial squatting facet (bilateral); double anterior calcaneal facet (L); absent anterior calcaneal facet (R); double inferior talar facet (L); lateral talar extensions (bilateral)
Pathology	Schmorl's nodes T8-9, T11 Small, shallow, indistinct depression (13 x 8.7mm) on the external surface of the left parietal, c. 30mm posterior to the coronal suture & half way between the sagittal and squamous borders. Internal surface unaffected Lamellar bone on the external surface of the occipital bone, on the external occipital protuberance and following the superior nuchal lines Maxillary sinusitis, right side Subtle striated lamellar bone on mid third of lateral shaft of the right tibia

	Lamellar & transitional woven-lamellar bone on the mid third of the right fibula shaft; small area of transitional woven-lamellar bone at the junction of the proximal & mid thirds of the left fibula shaft Os acromiale of left scapula Left humerus shaft gently bowed medio-laterally across the entire length, concave on medial side Developmental anomaly of both humeri – small circular depression at the medial margin of the coronoid fossae, c 5mm in diameter Cortical defects – right lunate: small depression in centre of capitate facet; left scaphoid: depression in radial facet Probable cyst – circular lytic lesion on the medial surface of the distal left fibula immediately adjacent to the joint surface (posterior-superior corner) Excavated muscle attachment site on the left fibula proximal end – soleus/ peroneus longus Decapitation C2-4, single cut angled steeply from superior-posterior-left to inferior-anterior-right passing through all three vertebrae: C2 – linear cut through the neural arch passing through the middle of the inferior left apophyseal facet, left & right laminae. The angle of the cut has not involved the body C3 – linear cut diagonally through C3, passing through the superior left apophyseal facet, left pedicle, body and right lamina (just inferior to the right superior apophyseal facet) C4 – linear cut through the superior right apophyseal facet that has removed a sliver of bone from the superior margin
Dental Health	32 tooth positions, 30 teeth present 2 teeth lost post-mortem Calculus (flecks to slight); caries (1 tooth) RM^3 crown tilted distally & buccally; both lower third molars super-erupted Enamel chips – RC^1, RP^2, RM^1, LP^1, LP^2

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	PM
Calculus	F d	-	F m	F md	F md	F bd	-	F bm	F bml	F b	F b	F l	F ld	F md	F m	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	4	2	2	2	2	3	3	2	2	2	2	4	2	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	PM	P	P	P	P	P	P	P
Calculus	S d	S lb	S ldbm	S md	S md	S blmd	S blmd	S blmd	-	S blmd	S blmd	S d	F d	S lbm	S lb	S ldm
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	So	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	4	2	2	2	2	2	-	2	2	2	2	4	2	1

Skeleton Number	**3DT 18**
Phase	33
Radiocarbon date	-
Preservation	Poor (Grade 4), moderate fragmentation - upper body Very good (Grade 1), slight fragmentation - lower body
Completeness	50-60% Cranium, mandible, hyoid; manubrium, sternum; C1-7, T1-2, T12? + minimum of 8 thoracic vertebrae; L1?; 8 right & 6 left ribs; right arm; left arm (clavicle, scapula, distal radius); right hand (1 carpal, MC1-5, 5 proximal, 3 intermediate phalanges), left hand (7 carpals, MC1-5, 4 proximal, 2 intermediate & 3 distal phalanges); right leg (distal femur, patella, tibia, fibula); left leg (distal femur, patella, tibia, fibula), right foot (7 tarsals, MT1-5, 1 proximal & 1 distal phalanx), left foot (7 tarsals, MT1-5, 5 proximal, 1 intermediate & 1 distal phalanx, 1 sesamoid bone)

Age	15-19 years (adolescent)
Sex	(Indeterminate)
Ancestry	Unknown
Stature	-
Non-Metric Traits	Ossicles in lambdoid (bilateral); parietal foramen (L); metopic suture; extrasutural mastoid foramen (L); sutural mastoid foramen (R); open posterior condylar canal (L); mandibular torus (R) Double atlas facet (R); transverse foramen bipartite (1/3 R, 0/3 L); lateral tibial squatting facet (R); peroneal tubercles (bilateral); double anterior calcaneal facet (L); double inferior talar facet (L); lateral talar extension (R)
Pathology	Soft tissue trauma to the medial proximal shafts of both fibulae – small sharp enthesophytes Developmental anomaly of both calcanei & cuboids – systentaculum tali is underdeveloped in the anterior half and the proximal-medial corner of the cuboids are enlarged; effectively the medial part of the cuboid bones acts as part of the anterior talar facets Cribra orbitalia, right side
Dental Health	30 tooth positions, 32 teeth present (2 of which loose) Calculus (flecks to slight); caries (2 teeth); DEH; slight periodontal disease Cyst at apex LC^{1} Enamel chips – RI^{1}, RC^{1}, LC^{1}

	Right Dentition								Left Dentition							
Present	P(l)	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P(l)
Calculus	F m	S b	F bl	F b	F b	S b	F b	-	-	S b	F b	S bd	F bmd	S bl	F l	-
DEH	-	-	-	-	L	-	-	-	-	-	L	L	-	-	-	-
Caries	-	-	Mm	Sd	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	3	4	2	2	2	3	4	4	2	2	2	3	4	3	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	S d	S l	S ldm	F m	F b	F b	F b	F b	-	F l	F b	F md	F md	S lmd	S lm	F d
DEH	-	-	-	-	L	-	-	-	-	-	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	3	4	2	2	3	4	5	5	4	3	2	3	4	3	2

Skeleton Number	**3DT 19**
Phase	31
Radiocarbon date	-
Preservation	Very good (Grade 1); slight fragmentation
Completeness	90%+ Cranium, mandible; manubrium, sternum; C1-7, T1-11, L1-5, S1-5; 11 right & 11 left ribs; right arm; left arm; right hand (1 carpal, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges), left hand (1 carpal, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges); os coxae; right leg; left leg; right foot (5 tarsals, MT2-3 & 5, 1 proximal phalanx), left foot (7 tarsals, MT1-5, 2 proximal phalanges)
Age	16½-20 years (adolescent)
Sex	(Male?)
Ancestry	Unknown
Stature	(165.0cm ±2.99cm (femur & tibia, white formula))
Non-Metric Traits	Open foramen spinosum (L); accessory lesser palatine foramen (R) Transverse foramen bipartite (1/5 R, 1/4 L); circumflex sulcus (R); plaque (L); hypotrochanteric fossae (bilateral); lateral tibial squatting facet (R); double anterior calcaneal facet (L); medial

	talar facets (bilateral)
Pathology	Manubrium elongated superior-inferior (67mm) – developmental Reduction in the number of vertebral segments with multiple border shifts, confusion at the atlanto-occipital, thoraco-lumbar, lumbo-sacral and sacro-coccygeal borders: 7 cervical vertebrae present – superior atlas facets and occipital condyles are flattened and more circular than usual; possible slight border shift at the atlanto-occipital border. 11 full thoracic vertebrae present, T11 morphologically typical for T12, and 11 pairs of ribs present. 'T12'/'L1' has small superior apophyseal facets that are slightly curved & face posterior-medially (but not full lumbar shape), and lacks costal facets. The transverse processes are short & stubby, angled postero-laterally. Four true lumbar vertebrae are present. L4 shares features more typical of L5 (lack of pedicles). There are five segments in the sacrum. First segment not fused to the second at the body, alae angle steeply inferiorly & are fully fused on the right but partially fused on the left, full apophyseal joints are present between the first & second segments. The inferior-most segment has incomplete sacral foramina at the inferior border & the sacral hiatus is level with the fourth segment. Small nodule of lamellar bone on the endocranial surface of the frontal close to the frontal crest Shallow circular depression (8mm in diameter) in the external surface of the left parietal 13mm lateral to the midpoint of the sagittal suture. Margins indistinct, surface smooth. Excavated muscle attachment in the proximal shaft of the right humerus, latissimus dorsi Hypervascularity of both tibiae medial midshafts, multiple small nutrient foramina; also present on lateral midshaft of right tibia Hallux valgus of L MT1 – deep sharp-edged lytic lesion in the medial head, floor & walls smooth
Dental Health	32 tooth positions, 26 fully erupted permanent teeth, 2 erupting permanent teeth; 1 retained deciduous tooth 1 erupted tooth + 1 erupting tooth lost post-mortem; 1 tooth not present/ unerupted, 1 tooth impacted Calculus (flecks to slight); DEH The upper right deciduous canine has been retained, position in the dental arcade maintained. There is a bulge in the anterior right palate lingual to the deciduous canine, and white enamel can be observed through a small hole lingual to the deciduous canine Enamel chips – RM_1, RM^1, RI^2

	Right Dentition									Left Dentition							
Present	NP/U	P	P	P	P	U	P	P	P	P	P	P	P	PM	P	P	P(E)
Calculus	-	F d	F bm	F md	F m	-	S b	F bmd	-	-	S blmd	S bmd	S bmd	-	S bmd	F m	-
DEH	-	-	-	-	-	-	-	-	-	-	L	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	3	1	2	-	6	2	3	3	1	1	1	-	3	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**c**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**		**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	PM(E)	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P(E)
Calculus	-	F m	S ld	F m	-	F bl		S blm	S blmd	S lmd	S blmd	S blm	S blmd	S mb	S lbmd	S lb	-
DEH	-	-	-	-	-	L		-	-	-	-	L	-	-	-	-	-
Caries	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-
Wear	-	2	3	2	2	1		2	3	3	2	2	1	2	3	2	1

Skeleton Number	**3DT 20**
Phase	32
Radiocarbon date	-
Preservation	Poor (Grade 4), extreme fragmentation
Completeness	5-10% Cranium (left frontal, right parietal, occipital, temporals) + 165 cranial fragments; 3 long bone fragments, unidentified; c. 30 unidentifiable post-cranial fragments

Age	1-2 years (younger juvenile)
Sex	-
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions, 8 erupted deciduous teeth present, 4 unerupted permanent teeth (first molars) present Calculus (flecks to slight)

	Right Dentition					Left Dentition				
Present	P(l)	-	-	-	-	-	P(l)	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	1	-	-	-	-	-	2	-	-	-
Maxilla	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Mandible	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Present	-	P(l)	-	P(l)	-	-	P(l)	P(l)	P(l)	P(l)
Calculus	-	-	-	F d	-	-	-	-	-	S o
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	-	2	-	2	-	-	3	2	2	1

Skeleton Number	**3DT 21**
Phase	31
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	90%+ Cranium, mandible, hyoid; manubrium & sternum; C1-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (3 carpals, MC1-5, 5 proximal, 3 intermediate & 1 distal phalanx), left hand (7 carpals, MC2-5, 5 proximal, 4 intermediate phalanges); os coxae; right leg; left leg; right foot (5 tarsals, MT1-5), left foot (6 tarsals, MT1-2, 4-5)
Age	36-45 years? (old middle adult?)
Sex	Male?
Ancestry	White?
Stature	174.3cm ±2.99cm (femur & tibia, white formula)
Non-Metric Traits	Ossicles in lambdoid (bilateral); extrasutural mastoid foramen (R); open posterior condylar canals (bilateral); open foramina spinosum (bilateral); accessory lesser palatine foramen (R); palatine torus; mandibular torus (R) Circumflex sulcus (R); Poirier's facets (bilateral); exostosis in the trochanteric fossa (R); emarginate patella (L); vastus fossa (R); lateral tibial squatting facets (bilateral); peroneal tubercle (R); medial talar facet (R); lateral talar extensions (bilateral)
Pathology	Schmorl's nodes T7-10, L1 DJD (OP + PO) apophyseal facets of T4-7 & T12, and costal facets T12 General asymmetry in the skeleton: Cranium is low and broad, and noticeably asymmetric – posterior bulge on the left side of the occipital, mid third of cranium shorter on left side compared to right, left mastoid smaller and more pointed than right side, right orbit rim sharp & thin but left rounded and thicker. Asymmetry of mandible and maxilla described below. Postcranial bones also asymmetric – right humerus is longer & head is larger than the left, but the left distal end is larger and muscle attachments are more pronounced; left radius head is larger than the right; the right os coxa is a slightly different shape to the left; the right femur is longer than the

	left, but the left tibia is longer than the right The sternal body & manubrium are fused – developmental C7 – stenosis of left transverse foramen T2 has a small notch in the superior body at the midline of the anterior border – developmental First ribs – do not appear to articulate with the transverse processes of T1 – lack of costal facets on the transverse processes and no facets on the rib tubercles Slight cranial border shift at the thoraco-lumbar border – apophyseal joints between T11-12 are lumbar in shape Maxillary sinusitis, bilateral – slight porosity in sinus floors. Mix of striated and porous lamellar bone in the medial shaft of the left tibia at the junction of the medial and mid thirds. Lamellar bone also present on the medial and lateral mid third of the right tibia shaft, with a raised area of striated lamellar bone on the lateral mid third. Trauma to the anterior body of L4 – anterior margin of superior body angled inferiorly, and surface of lesion rough. Traumatic anterior disc herniation. Healed fracture to the head of right rib 10 – small flake of bone on the anterior (internal) border of the joint surface displaced anteriorly Large bar on the dorsal neck of the right talus, along the superior margin of the head; spicule of bone on the anterior margin of the right calcaneus Decapitation C5-6 – cut removing superior half of both superior apophyseal facets of C6. Angled slightly from superior right to inferior left. C5 - inferior margin of the spinous process & laminae of C5 removed, surfaces irregular and peeled, same colour as the surrounding bone.
Dental Health	32 tooth positions, 29 teeth present 1 tooth lost post-mortem, 2 teeth lost ante-mortem Calculus (flecks to heavy – very heavy deposits on right teeth); caries (2 teeth); DEH; slight periodontal disease Slight crowding anterior mandible, more pronounced on right side; RP$_1$ & RC$_1$ rotated slightly Enamel chips: RI^2, LI^2 Upper and lower dental arcades asymmetric: right half of the upper dental arcade is concave on the buccal side between P^1-M^3 (the anterior part, RI^1-C^1 is normal). The right side of the lower dental arcade is straighter than normal (more parallel to the midline than the left side) and the anterior teeth (RI$_1$-C$_1$) are crowded and rotated. The buccal cusps of the right premolars & molars occlude with the lingual cusps of the lower premolars and molars

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	AM	AM	P
Calculus	H a	H a	H a	H a	H a	H blmd	H bm	F b	-	F b	F b	F b	F d	-	-	F md
DEH	-	-	-	-	-	-	-	-	L	L	-	-	L	-	-	L
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	1	1	1	1	1	2	2	2	3	2	2	2	-	-	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	PM	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	-	H a	H a	H a	H a	H a	H mdlb	M lbdm	M lmdb	M ldm	F md	S md	F md	S bdl	S lm	S dlb
DEH	-	-	-	-	-	-	-	-	-	L	L	L	L	-	L	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	Sm	So	-
Wear	-	1	1	2	1	2	2	3	3	2	3	2	2	4	2	1

Skeleton Number	**3DT 22**
Phase	33
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	90%+ Cranium, mandible, ossified thyroid cartilage; manubrium & partial sternum; C1-7, T1-12, L1-5,

	S1-5; 11 right & 12 left ribs; right arm; left arm; right hand (5 carpals, MC1-5, 5 proximal, 4 intermediate & 3 distal phalanges), left hand (8 carpals, MC1-5, 5 proximal, 4 intermediate & 5 distal phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 3 proximal, 1 intermediate & 2 distal phalanges, 2 sesamoid bones); left foot (7 tarsals, MT1-5, 2 proximal, 1 intermediate & 1 distal phalanx, 1 sesamoid bone)
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	Unknown
Stature	174.8cm ±2.99cm (femur & tibia, white formula) 169.7cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Highest nuchal lines (bilateral); ossicle in lambdoid (R); parietal foramina (bilateral); ossicle at asterion (R); extrasutural mastoid foramen (R); open posterior condylar canals (bilateral); double anterior condylar canal (R); bridging of supraorbital notches (bilateral); accessory supraorbital foramen (R) Circumflex sulci (bilateral); Allen's fossae (bilateral); plaque (bilateral); exostosis in the trochanteric fossae (bilateral); third trochanter (R); vastus fossae (bilateral); lateral tibial squatting facets (bilateral); peroneal tubercles (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral); medial talar facets (bilateral); lateral talar extensions (bilateral)
Pathology	Schmorl's nodes T5, T6-9, T11-L3 Degeneration vertebral bodies T7, T9, L3-S1 DJD (OP + PO) apophyseal facets C2-4, L5; costal facets T9-11; TMJ (bilateral); medial clavicles & lateral left clavicle OA apophyseal facets C7-T1, T4-5, T7-8; costal facets T12 Possible healed fracture of sternal end of right clavicle, or soft tissue trauma? Both fifth metatarsals have a small nodule of bone on the lateral midshaft, less pronounced on the left side – possibly related to soft tissue? Slight cranial border shift at thoraco-lumbar border – apophyseal joints between T11-12 lumbar in shape; twelfth ribs short and stubby with broad, rounded ends (66mm long on left side, right side broken but apparently equivalent length) Superior halves of both ischial tuberosities covered in irregular nodules of bone and porous lamellar bone – Weaver's bottom? Lamellar bone deposit on lateral midshaft of right tibia, thickened raised lump (indistinct margins) focussed along centre of midshaft (35 x 9mm); small deposits of woven bone on lateral surface of distal thirds of right tibia Striated lamellar bone on antero-lateral surface of proximal third of left fibula Maxillary sinusitis, bilateral – thin layer of lamellar bone; probably associated with dental caries on left side Cribra orbitalia Cortical defect, right calcaneus – elongated depression, rounded margins, in posterior talar facet
Dental Health	32 tooth positions, 21 teeth present 1 lost post-mortem, 6 lost ante-mortem, 4 not present/ unerupted Calculus (flecks to medium); caries (3 teeth; LM^2 has two small carious lesions on the mesial surface); medium periodontal disease; abscesses – LM^1 (opening into sinus), LP^1, LC^1 – both latter associated with fractures?; RM$_1$ (woven bone surrounding margins) LM^1 – mesio-buccal root separated from the rest of the tooth due to heavy wear and carious lesions. Possible that this root had tilted distally so it was wedged into the carious lesion Fractures: LC^1 – two fractures through root, crown lost; LP^1 – distal part crown from occlusal surface to alveolar bone lost, pulp cavity almost exposed; RM$_2$ – medial half crown from occlusal surface to just below CEJ lost; LM$_2$ – distal two-thirds of crown from occlusal surface to below CEJ lost

	Right Dentition								Left Dentition							
Present	NP/U	AM	P	P	P	AM	AM	PM	AM	AM	P	P	P	P	P	NP/U
Calculus	-	-	M bmld	S blmd	S bld	-	-	-	-	-	-	F b	F mb	F l	M ldb	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	So	-	Lo	Sm x2	-

Wear	-	-	4	5	7	-	-	-	-	-	8	7	6	8	6	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	NP/U	P	AM	P	P	P	P	P	P	P	P	P	P	P	P	NP/U
Calculus	-	M ld	-	S mlb	S lmd	S lmdb	S lmdb	S lmdb	S lmdb	S mdlb	S mdlb	M lmd	M ldmb	S lb	S lb	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	8	-	6	5	5	5	6	6	5	5	5	6	7	8	-

Skeleton Number	**3DT 23**
Phase	32
Radiocarbon date	-
Preservation	Moderate (Grade 3), slight fragmentation
Completeness	90%+ Cranium, mandible, hyoid; manubrium & part sternum; C1-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (2 carpals, MC1-5, 5 proximal, 4 intermediate & 2 distal phalanges); left hand (2 carpals, MC1-4, 4 proximal, 4 intermediate & 1 distal phalanx); os coxae; right leg; left leg; right foot (5 tarsals, MT2-5, 2 proximal phalanges); left foot (7 tarsals, MT1-5, 3 proximal & 2 intermediate phalanges)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	White?
Stature	178.2cm ±3.37cm (tibia, white formula)
Non-Metric Traits	Ossicle in lambdoid (R); parietal foramina (bilateral); sutural mastoid foramen (R); open posterior condylar canal (R); double anterior condylar canal (L); open foramen spinosum (R); bridging of supraorbital notch (L) Acetabular crease (L); vastus fossae (bilateral); medial talar facets (bilateral)
Pathology	Schmorl's nodes T7-8 DJD (OP + PO) apophyseal facets T3-5 OA apophyseal facets T6, T8 Shallow oval depression (14 x 9.5mm) in the external surface of the right parietal, located just superior to the parietal boss Cortical defect in right mandibular condyle – oval hollow with rounded margins, floor of lesion slightly porous Excavated muscle attachment sites on right humerus – teres major & pectoralis major Possible soft tissue injury to the styloid process of LMC3 & left capitate Small flattened lump of lamellar bone on the medial surface of the proximal left tibia shaft; indistinct lump of lamellar bone on the anterior half of the medial midshaft of the left tibia Striated lamellar bone along the antero-lateral margin of the proximal-mid third of the left fibula shaft Soft tissue trauma to the feet – Both naviculars have a bar of bone along the dorsal surface, focussed along the superior margin of the intermediate cuneiform facet, particularly pronounced on the right side. Both lateral cuneiforms have a ridge of bone on the proximal end of the dorsal surface. The left calcaneus has a thick projection of bone at the lateral anterior margin. Four or five peri-mortem cuts to the neck (C3-5) delivered from behind & lower right, complete decapitation though C5, plus additional cut to the mandible: C3 – 1) linear cut angled steeply from inferior-posterior-right to superior-anterior-left running diagonally through the left lamina, from just anterior to the spinous process on the inferior margin to a point roughly half-way through the superior left apophyseal facet (the cut runs parallel to the joint surface, but c. 1mm beneath it). The inferior part of the facet has fractured away. The cut has entered the posterior body, running diagonally from a point just superior to the left pedicle to a point just inferior to the right pedicle. The cut penetrates shallowly at the left superior end, with fracture of the left uncinate process and posterior-superior body surface. On the right side the cut extends deeper, with resulting fracture through to the superior body surface, passing diagonally

	from the anterior end of the right uncinate process to the posterior surface of the left side of the body. 2) linear cut though the neural arch, also angled posterior-inferior to anterior-superior & penetrating deeper on the right side. Cut penetrates c. 10mm into the posterior left lamina (does not detach inferior apophyseal facet), and has removed the inferior margin of the right lamina and the inferior right apophyseal facet; it has also penetrated slightly into the posterior surface of the body (at the inferior margin of the pedicle) on the right side. This cut is parallel to cut 2 on C4 C4 – 1) the lateral-posterior third of the right neural arch (bearing the right superior apophyseal facet and posterior part of the right inferior apophyseal process) has been detached as a single fragment; the superior margin of the right lamina and spinous process has also been detached as a second fragment. Difficult to interpret how this occurred – both appear to be largely fractured rather than cut, but possible evidence for a cut to the lateral part of the superior right lamina, slightly penetrating the superior apophyseal facet. Potential stab wound 2) linear cut into the posterior surface of the left apophyseal process (penetrating 3-6mm into the bone) and the right half of the posterior body close to the inferior surface (penetrating deeper on the right side). The cut is angled diagonally from superior left to inferior right (viewed from posterior) and postero-inferior to antero-superior (viewed laterally). Corresponds to cut 1 on C5 C5 – 1) linear cut passing through the superior part of the spinous process, removing a sliver from the superior margin of the medial left lamina & dividing the right lamina in half, removing the superior right apophyseal facet and passing through the right pedicle. Corresponds to cut 2 on C4 2) almost horizontal linear cut that has removed the inferior margin of both laminae, the inferior half of both inferior apophyseal facets and the inferior quarter of the body (fragment present). The cut is angled slightly from posterior-inferior to anterior-superior. Complete decapitation Mandible – has a cut to the inferior body of the left ramus, entering at a point inferior to LP$_1$ and continuing at an angle posteriorly and superiorly to a point 15mm inferior to the mesial root of LM$_2$. The cut is 35mm long and cuts across the entire width of the corpus; the inferior fragment has been detached. A small fragment is present and probably derives from this injury, although it is smaller than the missing area of bone
Dental Health	32 tooth positions, 31 teeth present 1 tooth lost post-mortem Calculus (flecks to slight); DEH Slight crowding anterior mandible Grooves worn into the incisive surface of RI^1 Enamel chip – LI^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	-	-	-	-	F b	F l	-	-	F d	F mbd	S b	S b	F md	S mb	F ld	-
DEH	-	-	-	-	-	L	L	-	-	L	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	2	1	3	3	3	3	2	2	2	2	4	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	PM	P	P	P	P	P	P	P	P	P
Calculus	F m	-	-	F d	-	S m	-	S blmd	S blmd	S bmd	F mb	F d	F md	-	-	-
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	4	2	1	3	-	4	4	2	3	2	2	4	2	1

Skeleton Number	**3DT 24**
Phase	33
Radiocarbon date	-
Preservation	Poor (Grade 4), minimal fragmentation
Completeness	5-10%

	Right femur; left leg
Age	0-1 month (neonate)
Sex	-
Stature	-
Non-Metric Traits	-
Pathology	-
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**3DT 25**
Phase	34
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	90%+ Cranium, mandible; manubrium, sternum; C1-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (MC2-5), left hand (MC1?-5), hand (5 proximal? & 2 intermediate? phalanges); os coxae; right leg; left leg; right foot (4 tarsals, MT1-5, 1 proximal phalanx); left foot (3 tarsals, MT1-5, 1 proximal phalanx)
Age	6-7 years (older juvenile)
Sex	-
Ancestry	-
Stature	-
Non-Metric Traits	Parietal foramina (bilateral); ossicle at parietal notch (R); sutural mastoid foramina (bilateral); open posterior condylar canal (R); anterior ethmoid foramen extrasutural (bilateral); posterior ethmoid foramen extrasutural (bilateral) Hypotrochanteric fossae (bilateral); absent anterior calcaneal facets (bilateral)
Pathology	Cleft neural arches S1,2, 4 & 5 (S3 damaged post-mortem) Porous woven bone on the internal surface of the left ramus of the mandible; possible well-remodelled lamellar bone in the same location on the right ramus Transitional woven-lamellar bone on the medial side of the proximal right femur, extending along the linea aspera & spiral line; lamellar bone in the same area of the left femur, extending further onto the mid third of the shaft Transitional woven-lamellar bone on the right tibia shaft occupying almost the entire medial surface, the mid third of the lateral shaft, and the medial half of the posterior surface mid & distal thirds. Lamellar bone on the left tibia mid third of the medial shaft, extending onto proximal and distal thirds, and on medial part of the posterior shaft mid third (less pronounced) Excavated muscle attachment sites on both tibiae – soleus
Dental Health	28 tooth positions; 15 fully erupted deciduous teeth; 4 fully erupted permanent teeth; 2 erupting permanent teeth; 7 permanent teeth visible unerupted in the jaw (RM^2, RI^1, LI^1, LM^2, RM_2, RI_2, LM_2) Calculus (deciduous teeth flecks to medium; permanent teeth flecks) Enamel chip – Rdi^1

	Right Dentition								Left Dentition							
Present		P(U)	P	P	P	PM	P	P	P	P	PM	P	P	P	P(U)	
Calculus		-	-	S bdm	S bd	-	S md	F b	F m	F mb	-	F b	S bm	-	-	
DEH		-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Caries		-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Wear		-	1	3	3	-	2	4	3	3	-	4	3	1	-	
Maxilla		**7**	**6**	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**	**6**	**7**	
Mandible		**7**	**6**	**e**	**d**	**c**	**b**	**1**	**1**	**b**	**c**	**d**	**e**	**6**	**7**	
Present		P(U)	P	P	P	P	P	P(E)	P(E)	PM	P	P	P	P	P(U)	
Calculus		-	F	F	F	-	-	-	-	-	M	S	S	-	-	

			d	d	m						bml	l	ldb			
DEH		-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Caries		-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Wear		-	1	3	3	3	3	1	1	-	3	3	3	1	-	

Skeleton Number	**3DT 26**
Phase	33
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	90%+ Cranium, mandible; manubrium, sternum, xiphoid; C1-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (2 carpals, MC1-4, 5 proximal, 2 intermediate & 2 distal phalanges); left hand (2 carpals, MC1-5, 4 proximal, 1 intermediate & 1 distal phalanx); os coxae; right leg; left leg; right foot (6 tarsals, MT1-5, 4 proximal & 1 intermediate phalanx); left foot (6 tarsals, MT1-5, 4 proximal phalanges)
Age	36-45 years (old middle adult)
Sex	Male?
Ancestry	White?
Stature	179.3cm ±2.99cm (femur & tibia, white formula)
Non-Metric Traits	Parietal foramina (bilateral); ossicles at asterion (bilateral); accessory lesser palatine foramina (bilateral) Transverse foramen bipartite (1/3 R, 1/3 L); circumflex sulci (bilateral); septal aperture (L); acetabular creases (bilateral); Poirier's facets (bilateral); exostosis in the trochanteric fossa (R); lateral tibial squatting facets (bilateral); medial talar facets (bilateral); lateral talar extensions (bilateral)
Pathology	Schmorl's node T8 Degeneration bodies L5-S1; OA bodies C6-7 (eburnation on the L lateral side of body) DJD (OP + PO) apophyseal facets T7-9, L3-4; costal facets T1, T3-7, T9-10, T12; right TMJ; medial clavicles, lateral right clavicle; right wrist; both hips; both proximal tibio-fibular joints OA apophyseal facets T12-L1, L4-S1 (associated with spondylolisthesis); costal facets T11; lateral left clavicle; left wrist (associated with unhealed scaphoid fracture) Cleft neural arches S1-5 Probable border shift at thoraco-lumbar border – superior left apophyseal facet of L1 has a flattened area angled postero-laterally at the lateral margin of the joint surface. The inferior left apophyseal facet of T12 has a flattened area on the postero-lateral margin that lines up with the facet on L1. Possible lumber rib, since lost post-mortem? The inferior right apophyseal facet of T8 is broad and almost bipartite; shape mirrored in the superior right apophyseal facet of T9 Probable trauma to the left shoulder joint capsule – 'V' shaped lytic area in the posterior head of the left humerus , dividing the posterior half of the greater tubercle from the articular surface of the head, floor & walls porous, clusters of osteophytes on the greater tubercle & flatter osteophyte on the surface of the head. Bone formation around the anterior and inferior glenoid fossa of the left scapula. The left scaphoid has an ununited fracture diagonally through the capitate facet; the proximo-dorsal part (bearing the radial facet) is not present. The break surface has a slightly irregular texture & slight porosity; some areas appear very flat and smooth and eburnation is suspected, but since the entire surface is covered in clear varnish this is difficult to verify The left arm is slightly more gracile than the right arm; the left radius shaft is quite round in cross section as the interosseous crest is not pronounced; the left metacarpal shafts are thinner than the right Well healed fracture of right rib 10 – fracture through the shaft c. half to a third of the way from the sternal end since broken post-mortem; sternal shaft displaced inferiorly Right rib 11 – has a possible woven bone deposit on the superior margin of the shaft centre Healed fracture of the left transverse process of L2, tip displaced posteriorly Healed fracture of the right transverse process of L3, tip displaced posteriorly & slightly inferiorly Spondylolysis of L5 – neural arch detached at pars interarticularis on both sides. The neural arch is in two pieces, possibly originally unfused as all sacral arches are cleft.

	Spondylolisthesis – the body of L5 has slipped forwards on the body of S1; the posterior half of the body of S1 was no longer in contact with L5 and is covered in osteophytes; the anterior body has a large osteophyte enlarging the joint surface and clearly acting to support L5. The inferior part of the right pars interarticularis on L5 was in contact with the posterior surface of the body of S1. Dislocation of the left apophyseal joint between L5 & S1. The inferior left apophyseal facet of L4 was probably in contact with the superior surface of the left neural arch of L5. The left ulna has a gentle swelling in the shaft at the join between the mid & distal thirds, most pronounced on the lateral & posterior aspects. Margins indistinct, surface smooth apart from two sharp-edged lytic lesions on the posterior surface. These are c. 2mm deep and do not seem to penetrate right through the cortex. Probable infection. Cribra orbitalia, right orbit Ossified cartilage – costal cartilage of both first ribs & corresponding facets on manubrium Both femora have a cluster of vertical striations divided by deep grooves on the anterior surface of the proximal end, at the medial-inferior end of the intertrochanteric line – iliofemoral ligament? Pilasterism of femoral shafts Well remodelled striated lamellar bone on both tibia medial midshafts Bar of bone & thin sharp bone projections on the dorsal surface of the left navicular, most pronounced along the dorsal margin of the intermediate cuneiform facet Enlarged nutrient foramen in the shaft of L MT1 Plaque of smooth lamellar bone on the shaft of both fourth metatarsals Decapitation C6-7: C7 – broadly horizontal cut through the superior part of C7, angled slightly superior left to inferior right, & from posterior-inferior to superior-anterior. The cut has passed through the superior laminae, removing the superior apophyseal facets (right fragment present), both uncinate processes & a small part of the posterior margin of the superior body surface C6 – the cut through C7 has removed a sliver of bone from the anterior margin of the inferior body surface
Dental Health	32 tooth positions, 30 teeth present 2 teeth lost ante-mortem Calculus (flecks to medium, occlusal calculus on LM^1 & LM^2); DEH; slight periodontal disease LM^1 super-erupted; RM^3 slightly smaller & crown rounder in occlusal outline than LM^3; shallow semi-circular notch worn into centre of incisive surface LI^1 Enamel chips – RI_1, LI_1, LI_2, LC_1, RI^1, RI^2, RC^1, LI^2, LC^1, LP^1, LP^2

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	S dbm	F bl	S blmd	F mdl	F mdl	S bm	S bm	S b	F md	S bmd	S bmd	M db	M bmd	M a	M a	M mdlb
DEH	-	-	-	-	L	-	-	L	L	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	6	6	6	4	4	4	4	4	4	4	4	4	4	3	4	6
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	AM	AM	P
Calculus	S mld	F blmd	F blmd	S lmd	S lmd	M lbmd	M lbmd	M bmld	M bmld	M bmld	S blmd	S lmd	S lm	-	-	S lm
DEH	-	-	-	L	L	L	L	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	5	6	7	4	3	4	4	5	5	5	5	4	4	-	-	5

Skeleton Number	**3DT 27**
Phase	32
Radiocarbon date	-
Preservation	Moderate (Grade 3), severe fragmentation
Completeness	20-30%

	Cranium, mandible; C1-7, T1-3 + fragments from minimum of 4 thoracic; 8 right & 7 left ribs; right shoulder (clavicle & scapula); left shoulder (clavicle & partial scapula)
Age	25+ years (adult)
Sex	Male
Ancestry	Unknown
Stature	-
Non-Metric Traits	Ossicle in lambdoid (L); double anterior condylar canal (L); mandibular tori (bilateral) Circumflex sulcus (R)
Pathology	Cribra orbitalia, right orbit Maxillary sinusitis, bilateral – thick remodelled lamellar bone; probably associated with dental disease Healed fracture of an unsided upper rib shaft fragment Decapitation C4 – diagonal linear cut through the superior arch that has removed the superior left apophyseal facet (right side lost post-mortem), a sliver from the superior margins of the laminae, the superior half of the left pedicle & the superior quarter of the body. The cut is angled superior left to inferior right, and posterior-superior to anterior-inferior. The anterior pedicle is peeled & the anterior part of the cut through the body is rougher and angled inferiorly. Possibly delivered from behind.
Dental Health	23 tooth positions, 26 permanent teeth (+ 1 unidentified permanent tooth root; 3 of which loose) Calculus (flecks to medium; on occlusal surfaces RM$_2$, M$_3$ & lower premolars); caries (5 teeth); slight periodontal disease; abscesses – RM$_1$, LP^1 Crowding of anterior mandible; LI^1 has short root; shallow groove worn into the incisive surface of LI^1 Fractures – RM$_1$ buccal side; LC^1 lingual side Enamel chips – RI^1, RI^2

	Right Dentition								Left Dentition							
Present	-	-	-	-	P(l)	P	P	P	P(l)	P	P	P	P	-	P(l)	-
Calculus	-	-	-	-	F m	F db	S lbdm	S bdlm	S bmd	S bml	S b	-	-	-	S b	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	La	La	-	-	-	-
Wear	-	-	-	-	2	3	3	4	4	3	-	-	8	-	4	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	M a	M a	S b	S lmo	S lobm	M blm	S mdl	S lbmd	M lmdb	M mldb	S mldb	S mldb	S ml	S lb	S lm	F mb
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	La	-	-	-	-	-	-	-	-	-	Sd	Sm	-	-
Wear	2	2	-	2	2	3	3	4	4	3	3	3	3	3	3	2

Skeleton Number	**3DT 28**
Phase	33
Radiocarbon date	-
Preservation	Moderate (Grade 3), slight fragmentation
Completeness	95%+ Cranium, mandible; manubrium, sternum; C1-7, T1-12-, L1-5, S1-5, Cx1-3; 12 right & 12 left ribs; right arm; left arm; right hand (7 carpals, MC1-5, 4 proximal, 3 intermediate & 1 distal phalanx); left hand (7 carpals, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges); os coxae; right leg; left leg; right foot (6 tarsals, MT1-5, 3 proximal phalanges); left foot (7 tarsals, MT1-5)
Age	26-35 years (young middle adult)
Sex	Male

Ancestry	White?
Stature	179.3cm ±2.99cm (femur & tibia, white formula)
Non-Metric Traits	Parietal foramen (L); double anterior condylar canal (R); bridging of supraorbital notch (L) Double atlas facet (R); plaque (bilateral); vastus notch (R); vastus fossae (bilateral); double anterior calcaneal facets (bilateral(; double inferior talar facets (bilateral)
Pathology	Schmorl's nodes T6-L1, L3 Small shallow oval depression (16 x 9mm) in the external surface of the frontal bone, located in the midline c. 10mm anterior to the coronal suture. Margins indistinct, floor smooth. Small shallow oval depression (16 x 8mm) in the external surface of the left parietal, located in the area of the parietal boss. Margins indistinct, floor solid. Cranial border shift at thoraco-lumbar border – apophyseal joints between T11-12 are lumbar in shape. Costal facets on T12 low & right costal facet poorly defined. Left rib 12 is short (56m long) and stubby, with a rounded end. Right rib 12 longer (c. 90mm). Sacrum slightly asymmetric – slight curve to the right & right ala angled slightly to superior (left ala angled inferiorly). Developmental. Cortical defect in right radial head Possible neoplasm/ osteomyelitis of left ulna: the mid third of the shaft is greatly expanded – at the largest point the diameter is 26.04mm compared to 18.49 at the equivalent point of the right ulna. The area of expansion develops gradually, emerging smoothly from the normal bone; the length of the lesion is c. 80mm. The surface of the lesion predominantly consists of fairly smooth lamellar bone with patches of woven bone (mostly on the lateral and posterior surfaces). The bone has broken post-mortem through the centre of the lesion. The cortical bone is very thin along the anterior, medial and posterior sides (0.83mm at the thinnest point. The thicker cortex is porous in cross section, and there are shallow scalloped depressions on the internal surface of the shaft. Subtle striated lamellar bone in the medial mid third of the tibia shafts Hallux valgus L MT1 – hollow on the medial surface of the head, sharp margins Decapitation C4-5 (single cut angled superior left to inferior right): C4 – linear cut through the arch and body which has removed the left inferior apophyseal facet, the inferior surface of the left transverse process, inferior left lamina and medial half of the inferior right lamina, spinous process (fragment present) and most of the inferior body surface. C5 – linear cut has removed the superior right apophyseal facet & a sliver of bone from the medial superior margin of the left superior apophyseal facet.
Dental Health	32 tooth positions, 32 teeth present Calculus (flecks to slight) Slight rotation LI^2 & LP^1 Enamel chips – RI^1, RC^1, LI^1, RP_1, RI_2, LI_1, LI_2

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F db	S l	F b	F m	-	F b	F b	F b	F b	F b	F m	-	-	F bmd	-	F d
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	2	2	2	2	3	3	2	2	2	2	3	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F d	F l	S l	F b	F l	S lmb	S bm	S bmld	S blm	S bdl	F m	F b	F d	F bdl	F d	F d
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	2	4	2	2	3	3	4	4	3	3	2	2	4	2	1

Skeleton Number	**3DT 29**

Phase	32
Radiocarbon date	-
Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	70-80% C6?-7?; T1-12, L1-5; S1-5, Cx1-2; 8 right & 8 left ribs; right arm; left arm; right hand (6 carpals, MC1-5, 5 proximal, 4 intermediate & 1 distal phalanx); left hand (8 carpals, MC1-5, 5 proximal, 3 intermediate & 2 distal phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 5 proximal & 1 distal phalanx); left foot (7 tarsals, MT1-5, 4 proximal, 2 intermediate phalanges)
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	Unknown
Stature	179.9cm ±3.27cm (femur, white formula) 173.5cm ±3.78cm (tibia, black formula)
Non-Metric Traits	Circumflex sulcus (L); acetabular creases (bilateral); Poirier's facets (bilateral); hypotrochanteric fossae (bilateral); third trochanter (L); peroneal tubercle (L); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral); medial talar facets (bilateral)
Pathology	DJD (OP + PO) both hips Cranial border shift at thoraco-lumbar border – apophyseal joints between T11-12 lumbar in shape Cleft neural arches S1, S4-5 Cortical defect in right triquetral (hamate joint surface) Pilasterism of both femora; tibiae midshafts slightly bowed medio-laterally Subtle striated lamellar bone on the medial midshaft of the right tibia, extending onto the distal third Deposit of lamellar bone on the antero-medial surface of the right fibula shaft at the junction of the mid & distal third
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**3DT 30**
Phase	32
Radiocarbon date	-
Preservation	Good (Grade 2), slight fragmentation
Completeness	60-70% Mandible, hyoid, ossified thyroid cartilage; manubrium, sternum; C1-7, T1-12, L1-5, S1-5, Cx1; 12 right & 12 left ribs; right arm (clavicle, scapula, humerus; distal half ulna); left arm (clavicle, scapula, radius, ulna); right hand (1 carpal, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges); left hand (1 carpal, MC1-5, 5 proximal, 4 intermediate & 2 distal phalanges); os coxae; right leg, left leg; right foot (2 tarsals); left foot (1 tarsal)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	Unknown
Stature	171.1cm ±2.99cm (femur & tibia, white formula) 166.4cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Accessory sacral facet (R); plaque (bilateral); vastus fossae (bilateral); peroneal tubercle (R); double anterior calcaneal facet (R); double inferior talar facets (bilateral); medial talar facet (R)
Pathology	Schmorl's nodes T6-7, T10-11 DJD (OP+PO) apophyseal facets T3-4, T6; costal facets T1, T12; medial left clavicle Ossified cartilage – thyroid, facet for first ribs on the manubrium Excavated muscle attachment proximal right humerus – teres major Healed fracture to proximal end R MC1, proximal joint surface tilted towards palmar Damage to joint capsule/ joint disease of distal joints LMC1 & LMC4. LMC1 – osteophytes along the palmar & dorsal margins of the distal joint, U shaped ridge of bone on the lateral surface of the head surrounding rough & porous surface. LMC4 – deep sharp-edged lytic lesion on the lateral side of the head, surrounding area irregular

	Caudal border shift at sacro-coccygeal border – partial fusion of fist coccygeal vertebra with S5. Large vertical crest of bone tapering to a point located on the posterior surface of the left ilium close to the midpoint of the iliac crest. Occupies the area of origin for gluteus medius – possible soft tissue trauma Subtle striated lamellar bone on the posterior midshaft of the left tibia, extending onto the medial midshaft; subtle striated lamellar bone on the medial midshaft of the right tibia Soft tissue trauma to the left talus – large rounded nodule of bone on the lateral-dorsal side of the neck just proximal to the head, extending 9mm laterally, then angled 90º and extending 14mm anteriorly Stab wound to C3-4, delivered from the anterior-superior-left: C3 – linear cut that has removed a sliver of bone from the anterior margin of the inferior body surface C4 – linear cut to the anterior left side of the left neural arch, passing through the area between the superior and inferior apophyseal facets. The superior fragment (bearing the superior left apophyseal facet, the superior left pedicle and a sliver of bone from the superior margin of the left lamina) has fractured away from the rest of the vertebra (this fragment is present). C4 – second small shallow cut into the posterior & lateral margin of the left inferior apophyseal facet, penetrating 1-3mm into the bone. The cut is angled from the posterior-inferior-left to the superior-anterior-right. Partial decapitation C7-T1, cut also penetrates right first rib; cut angled gently from superior-left to inferior right: C7 – the inferior part of the spinous process & inferior laminae has fractured with the inferior fragment detached and lost post-mortem. The inferior surface of the fracture is concave, and slightly irregular; the colour is consistent with the surrounding bone T1 – has a linear cut into the posterior of the neural arch, removing the superior third of the left transverse process entirely, both superior apophyseal facets, the superior three-quarters of the right transverse process & the lateral superior margin of the lamina. A fracture has continued through the superior margin of both pedicles and the posterior-left and posterior-right corners of the superior body. There is no sign of a cut to the left first rib, consistent with the fact that the cut passed through the left transverse process of T1 just superior to the costal facet The cut to T1 penetrated the posterior of the right first rib at the tubercle, just inferior to the articular facet. This cut penetrates c. 13.5mm into the rib, extending from the lateral margin c. 15mm towards medial. Inferior to the cut a fracture extends anteriorly c. 26mm along the length of the shaft, passing from the inferior medial surface to the superior lateral surface. At the anterior end of the fracture, the bone surface is very pale & changes angle (medially & superiorly) indicating a small post-mortem break. It is this post-mortem break that has completely detached the superior-medial fragment (head & neck) from the rest of the shaft.
Dental Health	16 tooth positions, 15 teeth present 1 tooth not present/ unerupted Calculus (slight to medium); caries (1 tooth); DEH; slight periodontal disease Fractures – LP$_1$ mesio-buccal surface & disto-lingual corner, LP$_2$ distal margin, RP$_1$ mesial & distal margins, RP$_2$ mesial margin Enamel chips – LP$_2$, RC$_1$, RP$_2$, LI$_2$, LC$_1$, RM$_3$

	Right Dentition								Left Dentition							
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	NP/U
Calculus	S ldb	S lb	S b	S lb	S lb	S b	S bmd	S bmdl	M blmd	M blmd	S bmld	S lmb	S ldm	S bl	S bdl	-
DEH	-	-	-	-	-	G	G	G	G	G	G	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	So	-	-

Wear	2	2	4	2	3	4	3	3	4	3	4	4	2	4	2	-

Skeleton Number	**3DT 31**
Phase	32
Radiocarbon date	-
Preservation	Very good (Grade 1), minimal fragmentation
Completeness	80-90% Cranium, mandible, hyoid; sternum, manubrium; C1-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (7 carpals, MC1-5, 5 proximal, 4 intermediate & 1 distal phalanx); left hand (3 carpals, MC1-5, 5 proximal, 4 intermediate & 2 distal phalanges); os coxae; right femur; left femur
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	Mixed (Black?)
Stature	170.8cm ±3.94cm (femur, black formula)
Non-Metric Traits	Ossicle in lambdoid (L); ossicle at pterion (R); extrasutural mastoid foramina (bilateral); open posterior condylar canals (bilateral); double condylar facet (L); precondylar tubercle; double anterior condylar canal (R); accessory lesser palatine foramen (R); palatine torus; maxillary torus (L); anterior ethmoid foramen extrasutural (L) Transverse foramen bipartite (2/5 R, 0/5 L); circumflex sulcus (R); supracondyloid process (R); Poirier's facet (L); plaque (bilateral); hypotrochanteric fossae (bilateral); exostosis in trochanteric fossa (L)
Pathology	Schmorl's nodes T4-11, L3-4 Cranium asymmetric, bulging to posterior on the left side of the occipital. Large ossicle (52 x 28mm) occupying left lambdoid suture Shallow indistinct depression (15 x 6mm), slightly crescent shaped, in the external surface of the left frontal squama, c. 25mm superior to the frontal boss & 10mm lateral to the midline. Second shallow depression (9mm diameter) at the lateral end of the first depression. Pale well remodelled lamellar bone surrounds the depressions on the lateral, inferior and superior margins Decapitation C6 – linear cut has removed the superior half of the left superior apophyseal facet, left uncinate process, superior right apophyseal facet, superior margin of the right lamina, superior half of the right pedicle & superior part of the body. The cut is angled superior-left to inferior right, superior-posterior to inferior-anterior. Possible fracture through the anterior body.
Dental Health	32 tooth positions, 31 teeth present 1 tooth lost ante-mortem Calculus (slight); DEH Slight crowding anterior mandible, RC_1 slightly rotated Shallow groove across incisive surface LI^1 Enamel chips – RI^1, LI^1, LI^2, LC^1, RI_2, LP_1, LM_1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	AM	P	P
Calculus	S ldb	S ld	S bl	S bm	S bd	S b	S b	S b	S b	S bm	S b	S b	S bd	-	S mdl	S ld
DEH	-	-	-	-	-	-	-	L	L	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	3	4	2	2	2	2	3	3	2	3	2	2	-	3	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	S ldm	S ld	S blm	S lm	S bml	S bmld	S bmld	S blmd	S blmd	S blmd	S blmd	S blmd	S blmd	S blmd	S blmd	S blmd
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Wear	2	3	4	2	2	2	2	3	3	3	3	2	2	4	3	2

Skeleton Number	**3DT 32**
Phase	32
Radiocarbon date	-
Preservation	Very Good (Grade 1), slight fragmentation
Completeness	95%+ Cranium, mandible, hyoid; manubrium, sternum; C1-7, T1-12, L1-6, S1-5, Cx1; 12 right & 13 left ribs; right arm; left arm; right hand (7 carpals, MC1-5, 5 proximal, 4 intermediate & 1 distal phalanx); left hand (8 carpals, MC1-5, 4 proximal, 2 intermediate & 1 distal phalanx); os coxa; right leg; left leg; right foot (6 tarsals, MT1-5, 4 proximal & 1 distal phalanx); left foot (6 tarsals, MT1-5, 4 proximal phalanges)
Age	17-23 years (young adult)
Sex	Male
Ancestry	Black?
Stature	154.7cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Ossicles in lambdoid (bilateral); ossicle at pterion (L); sutural mastoid foramina (bilateral); absent zygomaticofacial foramina (bilateral); accessory infraorbital foramen (L); anterior ethmoid foramina extrasutural (bilateral) Transverse foramen bipartite (1/4 R, 0/5 L); circumflex sulcus (L); septal aperture (L); plaque (bilateral); hypotrochanteric fossae (bilateral); exostosis in trochanteric fossa (R); vastus fossa (L); lateral tibial squatting facets (bilateral); peroneal tubercle (L); double anterior calcaneal facet (L); double inferior talar facet (L); medial talar facets (bilateral)
Pathology	Lamellar bone on internal surface of both mandibular rami, superior to lingula and extending towards the coronoid process; lamellar bone on the external surface of the right maxilla in a band from RC^1 to RM^1; porosity on the lateral margins of the nasal aperture extending onto the frontal process of both maxillae; woven bone surrounding abscess in mandible (see below) Schmorl's nodes T5, T7-L1 Several thoracic vertebrae have a small lytic crescent of roughened porous bone along the anterior margin of the superior & or inferior body surfaces – T3, T5, T6, T7, T8, T9, T10, T13/L1 Cribra orbitalia, right orbit Additional vertebral segment at the thoraco-lumbar border – either an additional thoracic with a caudal shift, or an additional lumbar with a cranial shift. T12 is morphologically typical for T12. The vertebra beneath has superior apophyseal facets of lumbar shape, and a small raised costal facet on the left side of the body. In addition there are five full lumbar vertebrae present. There are 12 right ribs & 13 left ribs present. The 13^{th} rib is small (34mm long) The sternum is broad at the inferior end – developmental Developmental anomaly of the sphenoid – bridges of bone between the anterior & mid clinoid processes forming clinocarotid canals, with additional bridge between the mid & posterior clinoid processes on the right side Oval depression with porous & uneven floor on the internal surface of the left greater wing of the sphenoid. Equivalent area of right greater wing slightly porous & uneven, with a small smooth oval depression posterior to this Small circular nodule of bone (4mm diameter) on the right maxilla, located 14mm superior to RP^2; post-mortem damage reveals trabecular bone inside the nodule Excavated muscle attachments on both proximal humeri – teres major All six intermediate phalanges have a longitudinal bar of bone running the length of the palmar surface of the shaft, most pronounced in the mid third Left femur - roughly oval swelling on the medial surface of the midshaft, just proximal to the junction of the mid & distal thirds. Margins indistinct, c. 52mm long, 20mm wide, projecting 5-6mm. Surface covered in slightly striated lamellar bone with scattered fine porosity. Lamellar bone continues onto to the medial & lateral mid-proximal shaft. Possible osteitis/ ossified haematoma Three small gentle swellings on the posterior surface of the left tibia shaft. Lamellar bone with diffuse fine porosity. Small swelling on the posterior shaft of the right tibia. Posterior mid third of both tibiae covered in striated lamellar bone & fine foramina. Possible traumatic cause Left fibula has a small deposit of lamellar bone on the lateral shaft at the junction of the proximal & mid thirds

	Hypervascularity of the medial surface of the midshafts of both tibiae Calcaneus secundarius/ avulsion fracture to anterior right calcaneus – crescent of bone missing from the anterior margin of the superior surface, surface of crescent porous & irregular Cyst/ developmental anomaly of L MT3 – deep hollow on the lateral side of the proximal end, inferior to the lateral facet for L MT4 Calcanei – plantar surfaces quite porous
Dental Health	32 tooth positions, 31 teeth present (1 of which partially erupted) 1 tooth lost post-mortem Calculus (flecks to medium; occlusal calculus right side); caries (8 teeth, 10 lesions); DEH; abscess LM_1 surrounded by woven bone, woven bone also on internal surface mandible; slight periodontal disease RM_3 super-erupted Enamel chips – LI_2, LI^2, RI^1, LC^1, LP^2, LM^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	PM	P	P	P	P	P	P	P(E)
Calculus	M obdm	M ldob	S bol	S bmd	S bdo	S bl	S bl	F l	-	F lb	F bl	F mbd	F b	F bl	F bdm	-
DEH	-	-	L	L	-	L	-	L	-	L	L	-	-	L	-	-
Caries	-	Sm So	Md Sm	Md	-	-	-	-	-	-	-	-	Sd	Sm	-	-
Wear	1	2	4	3	2	2	3	4	-	3	3	3	3	4	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	M olmb	M a	M blmd	S blmd	S bmd	S lb	S lb	S lbm	S lbmd	S lbm	S lb	S dm	S m	-	S lmd	S lm
DEH	-	-	-	-	-	L	L	L	L	L	L	L	-	-	-	-
Caries	-	-	Md	-	-	-	-	-	-	-	-	-	Sd	La	-	-
Wear	1	3	4	2	2	3	3	4	4	3	3	2	2	-	2	1

Skeleton Number	**3DT 33**
Phase	32
Radiocarbon date	-
Preservation	Good (Grade 2), slight fragmentation
Completeness	90%+ Cranium, partial mandible; manubrium, sternum; C1-2, C4-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (2 carpals, MC1-5, 5 proximal, 2 intermediate & 3 distal phalanges); left hand (3 carpals, MC1-3 & 5, 3 proximal & 1 distal phalanx); os coxae; right leg; left leg; right foot (5 tarsals, MT1-5); left foot (7 tarsals, MT1-5, 4 proximal phalanges)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	Mixed (Black?)
Stature	167.5cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Ossicles in lambdoid (bilateral); extrasutural mastoid foramen (R); sutural mastoid foramen (L); open posterior condylar canal (L); open foramina spinosum (bilateral); accessory lesser palatine foramina (bilateral); palatine torus; accessory supraorbital foramina (bilateral) Transverse foramen bipartite (0/3 R, 2/4 L); acetabular creases (bilateral); Allen's fossae (bilateral); plaque (bilateral); vastus fossa (R); peroneal tubercles (bilateral); os trigonum (R)
Pathology	Schmorl's nodes T6-L1, L3-4 DJD (OP + PO) apophyseal facets T4-5, T7; lateral right clavicle OA apophyseal facets T5, T7-8 Shallow lytic crescents in the anterior superior bodies T7-9

T10-11 – ossified ligament R body margin, osteophytes probably touched but were not fused

Stenosis of right transverse foramen of C7

Healed fracture c. 20mm lateral to the sternal end of the right clavicle. The sternal end is angled inferiorly and displaced slightly anteriorly. Partial dislocation of the right acromio-clavicular joint, with lamellar bone on the superior surface of the acromion

Healed fracture close to the sternal end of the left 12^{th} rib

Healed blade injury to the right femur at the junction of the mid & distal thirds, medial to the medial supracondylar ridge. Delivered from posterior right

Striated lamellar bone on the medial and lateral midshafts of both tibiae, extending onto the proximal thirds. Deposits thickest along the medial side of the anterior crest. Deposits thicker & more evident on the left side.

Small area of lamellar bone on the lateral anterior midshaft of the right fibula

Cribra orbitalia, left orbit

Maxillary sinusitis, bilateral – lamellar bone on floor & walls

Oral surface of the palate covered with irregular spicules & nodules of lamellar bone, possibly associated with dental disease

Hallux valgus L MT1 – small lytic lesion on the medial head

Soft tissue trauma to right foot – nodules of bone along the anterior superior margin of the cuboid facet of the right calcaneus

Possible soft tissue trauma to left shoulder – shallow lytic area on lesser tubercle of left humerus – subscapularis

Multiple peri-mortem sharp force injuries. Decapitation C2. At least two cuts delivered vertically down the back of the neck, removing the tip of the spinous process of C2 & C4 (C3 lost post-mortem):

Left temporal – cut through mastoid process which removed the tip; cut angled from superior left to inferior right. Probably same cut as mandible cut (1), & cuts on atlas and axis

Mandible–

1) cut on posterior left ramus c. 30mm inferior to the tip of the condyle, on internal surface the cut extends c. 4mm into the bone (from posterior to anterior)

2) cut on external surface of left corpus at point where anterior part of ramus starts to ascend, anterior end of cut located at anterior end of extramolar sulcus (inferior to LM_3), posterior end of cut extends beyond broken edge of fragment, penetrates external cortex only, on similar angle to cut (1)

3) cut spanning inferior left corpus of mandible angled from inferior-posterior to superior-anterior, terminating c. 10mm below M_1

4) shallow cut on internal surface of right corpus running from the base of the corpus c. 20mm anterior to the gonial angle superiorly and anteriorly to a point c. 15mm inferior to the mesial surface of M_3, length 22mm, deeper at inferior half, at inferior termination of cut a fracture line extends posteriorly along the inferior border of the corpus, delivered from anterior left

5) cut on similar angle and orientation to (4) located 15mm anteriorly to (4), cut is deeper, penetrating through internal cortex to the lingual surface of the distal root of RM_1 (visible as a thin straight line)

6) cut through inferior surface of right ramus c. 15mm anterior to cut (4), polished surface of cut visible on external cortex, angled from inferior-anterior to superior-posterior, possibly same as cut (3) but seems to be on slightly different angle

7) cut on external right corpus inferior to P_2 & terminating 13mm inferior to the mesial surface of M_1, angled inferior-anterior to superior-posterior, only 5mm of cut surface survives, the rest extending beyond the edge of the broken fragment; c. 7mm anterior & superior to (7) there is a parallel straight break which may be a radiating fracture line

Atlas – cut to the inferior surface of left transverse process & left inferior facet, angled from superior left to inferior right, probably same cut as that on temporal, mandible cut (1), axis cut (1)

Axis –

1) straight shallow cut on posterior surface of body running from medial border of left superior facet across the posterior surface inferior to the dens to the posterior lateral edge of the right superior facet, on the right side the cut has removed a sliver from the superior border of the neural arch, broadly horizontal but slight angle from superior left to inferior right, same as cut on temporal, mandible cut (1), and atlas

2) cut on similar angle to (1) has removed slivers of bone from the inferior surface of the left lamina, most of the inferior left facet, the posterior corner of the right inferior facet and the

	anterior third of the inferior body surface (decapitation) 3) vertical cut has removed the tip of the spinous process, angled slightly from superior-posterior to inferior-anterior C3 has been lost post-mortem; C4 – 1) thin shallow cut in the superior spinous process c. 5mm long & delivered from above 2) cut on similar angle to (1) has removed the tip of the spinous process & has terminated in the spinous process of C5 C5 – thin shallow cut to the superior surface of the spinous process c. 9mm long, delivered from above (termination of C4 cut (2)) T9 – straight & very thin possible cut c. 9mm long on the inferior surface of the right transverse process (could be pm damage)
Dental Health	23 tooth positions, 17 teeth present 3 teeth lost post-mortem, 2 teeth lost ante-mortem, 1 tooth not present/ unerupted Calculus (flecks); caries (6 teeth); DEH; abscesses RM^1 & RP^1; slight to medium periodontal disease Possible fusion of RM^2 & RM^3 – RM^2 has a large irregularly shaped crown and a large fourth root extending distally Rotation RP^2 Fractures - RI^1 through root, crown lost; LI^1 lingual surface, crown lost; LI^2 lingual surface, crown lost; LM^2 crown lost Enamel chips – RM_3, LM_1, RP^2, RC^1, RI^2, LP^2

	Right Dentition								Left Dentition							
Present	NP/U?	P	P	P	P	P	P	P	P	P	PM	PM	P	AM	P	AM
Calculus	-	-	-	F M	-	-	-	-	-	-	-	-	F l	-	-	-
DEH	-	-	-	-	-	L	L	-	-	-	-	-	-	-	-	-
Caries	-	Mm	La	Sd	La	-	-	-	-	-	-	-	Sd	-	-	-
Wear	-	4	-	3	-	4	3	-	-	-	-	-	3	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	-	-	-	-	-	-	-	-	-	PM	P	P	P
Calculus	-	-	F lm	-	-	-	-	-	-	-	-	-	-	F lb	F lb	F lbd
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	So	-	-
Wear	3	2	4	-	-	-	-	-	-	-	-	-	-	4	2	2

Skeleton Number	**3DT 34**
Phase	33
Radiocarbon date	-
Preservation	Very good (Grade 1), moderate fragmentation
Completeness	95%+ Cranium, mandible, hyoid; manubrium, part sternum; C1-7, T1-11, L1-5, S1-5, Cx1; 12 right & 11 left ribs; right arm; left arm; right hand (7 carpals, MC1-5, 5 proximal, 3 intermediate & 4 distal phalanges); left hand (8 carpals, MC1-5, 5 proximal, 3 intermediate & 3 distal phalanges); os coxae; right leg; left leg; right foot (6 tarsals, MT1-5, 5 proximal, 1 intermediate & 1 distal phalanx); left foot (6 tarsals, MT1-5, 5 proximal, 1 intermediate & 1 distal phalanx)
Age	17-23 years (young adult)
Sex	Male
Ancestry	White?

Stature	156.2cm ±3.37cm (tibia, white formula)
Non-Metric Traits	Parietal foramen (R); extrasutural mastoid foramen (R); sutural mastoid foramen (L); open foramen spinosum (R); absent zygomaticofacial foramina (bilateral); anterior ethmoid foramen extrasutural (L): posterior ethmoid foramen extrasutural (bilateral) Transverse foramen bipartite (1/4 R, 1/4 L), acetabular crease (L); Poirier's facets (bilateral); plaque (R); hypotrochanteric fossae (bilateral); peroneal tubercles (bilateral); medial talar facets (bilateral)
Pathology	Schmorl's node T9 DJD (OP + PO) costal facets T1 Congenital absence of one vertebra with border shifts at the thoraco-lumbar, lumbo-sacral and sacro-coccygeal borders. Eleven full thoracic vertebrae present, T10 morphologically like T11; T11 morphologically like T12. T12/L1 (transitional vertebra) has lumbar shaped superior & inferior apophyseal facets and a small slightly raised costal facet on the right pedicle. Eleven pairs of normal ribs (ribs 10 & 11 lack tubercles) plus a short thin twelfth right rib (46 mm long) with a squared end. Sacrum contains six segments. S1 is not fused to S2 (possibly due to young age) & there are vestigial apophyseal joints between S1-2; the sacral promontory is at the superior margin of S1 – suggests caudal border shift at lumbo-sacral border. Sixth segment fused to sacrum at an angle and inferior pair of sacral foramina lack inferior margins; the sacral hiatus is level with the superior margin of S5 – suggests caudal border shift at sacro-coccygeal border T8 – body slightly compressed on the right side, wall slightly more concave than left side Excavated muscle attachments both proximal humeri – pectoralis major & teres major Developmental fusion of the right 5th intermediate & distal foot phalanges Subtle lamellar bone and multiple small nutrient foramina on the medial shafts of both tibiae, around the junction of the proximal and mid thirds. Hypervascularity.
Dental Health	32 tooth positions, 31 teeth present 1 tooth lost post-mortem/ sampled Calculus (flecks to heavy); caries (2 teeth); DEH; abscess RM$_2$; slight periodontal disease Crowding anterior mandible Fractures – buccal sides RM$_2$ & LM$_2$ Enamel chip – RC^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	(PM)	P	P	P	P	P	P	P	P
Calculus	M o	H a	M blmd	M blmd	M bmd	S bdm	S bm	-	S bml	F b	F b	F l	-	F l	-	-
DEH	-	-	-	-	-	L	-	-	L	-	L	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	1	3	2	1	3	1	-	3	1	3	2	2	3	1	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	M lobd	M lbmd	M lbmd	M lbmd	M lbmd	M lbmd	S lbmd	S lbmd	H lbmd	S lbmd	S lbmd	S lmd	S md	F md	S l	F d
DEH	-	-	-	-	-	G	L	L	L	L	L	-	-	-	-	-
Caries	-	Lob	-	-	-	-	-	-	-	-	-	-	-	-	Lob	-
Wear	1	1	3	2	2	3	2	3	3	2	2	2	1	3	1	1

Skeleton Number	**3DT 35**
Phase	31
Radiocarbon date	-
Preservation	Moderate (Grade 3), slight fragmentation
Completeness	80-90% Cranium, mandible; manubrium, sternum; C1-5, C7, T1-11, L1-5, S1-5, Cx1-2; 11 right & 12 left ribs; right arm; left arm; right hand (5 carpals, MC1-5, 5 proximal, 3 intermediate & 3 distal phalanges); left hand (5 carpals, MC1-5, 4 proximal, 4 intermediate phalanges); ox coxae; right

	leg; left leg (patella, distal tibia & fibula lost post-mortem); right foot (7 tarsals, MT1-5, 5 proximal, 2 intermediate & 4 distal phalanges)
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	Unknown
Stature	170.7cm ±2.99cm (femur & tibia, white formula) 166.1cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Ossicle at lambda; ossicle in lambdoid (R); accessory lesser palatine foramina (bilateral); palatine torus; bridging of supraorbital notches (bilateral) Posterior atlas bridge (L); Poirier's facet (L); plaque (L); third trochanters (bilateral); vastus fossae (bilateral); peroneal tubercle (R); lateral talar extension (R)
Pathology	Schmorl's nodes T8-10 Shallow depressed crescents along the anterior margins of the inferior bodies of T4, 5, & possibly 6 Congenital absence of a thoracic vertebra with border shifts at the thoraco-lumbar border & sacro-coccygeal vertebra: Eleven full thoracic vertebrae: T10 is morphologically typical for T11 & T11 is morphologically typical for T12. T12/L1 is transitional – superior apophyseal facets of lumbar shape, with a raised costal facet on the left pedicle. Eleven right ribs and 12 left ribs are present. The 12th left rib is short (41mm long) and looks similar in shape to a lumbar transverse process. The sacrum has six segments – sacral promontory at the superior margin of S1 (which is morphologically typical for S1), sacral hiatus level with the superior margin of S5; sixth segment small & probably the first coccygeal vertebra. Congenital fusion of the manubrium & sternum Congenital fusion of the right 5th intermediate & distal foot phalanges Pilasterism both femora Slight bar of bone on the proximal dorsal surface of the right navicular
Dental Health	32 tooth positions, 31 teeth present Calculus (flecks to slight); slight periodontal disease Unusual wear of anterior teeth – inverted 'U' shape to wear of incisors Small fracture RM$_1$ mesio-lingual corner; fracture LM^1 mesial half Enamel chips – RI^2, LI^2, LC^1, LP^1

	Right Dentition								Left Dentition							
Present	PM	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	-	-	-	M b	M b	M b	S b	-	-	-	-	S b	S b	-	S b	S l
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	Lo/m	-	-
Wear	-	5	6	3	2	2	4	6	6	5	3	4	5	6	5	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	-	F l	F dm	S l	F md	S lmd	S lmdb	S lmd	S lmd	S lmdb	S lmd	S lmd	S md	F lb	F l	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	3	4	5	2	2	2	4	4	5	4	4	3	3	5	4	3

Skeleton Number	**3DT 36**
Phase	32
Radiocarbon date	-
Preservation	Good (Grade 2), slight fragmentation
Completeness	50-60%

	Part sternum; T1?-12, L1-5, S1-5; 10 right & 11 left ribs; right arm (distal radius & ulna lost post-mortem); left arm; left hand (7 carpals, MC1-4, 2 proximal, 1 intermediate & 1 distal phalanx); os coxae; proximal left femur
Age	18-25 years (young adult)
Sex	Male
Ancestry	Unknown
Stature	171.8cm ±4.32cm (radius, white formula) 165.5cm ±4.30cm (radius, black formula)
Non-Metric Traits	Poirier’s facet (L)
Pathology	Schmorl’s node T11 Ossification of ligamentum flavum T3-12 Excavated muscle attachment proximal right humerus – latissimus dorsi Cortical defect of left radial tuberosity – deep oval hollow in centre of tuberosity Developmental anomaly of L1 superior apophyseal facets – flattened area on lateral margins facing postero-laterally. Possible border shift? Cyst at the border of the right auricular surface of the ilium – circular lytic lesion next to the posterior margin, floor & walls smooth
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**3DT 37**
Phase	32
Radiocarbon date	-
Preservation	Good (Grade 2), slight fragmentation
Completeness	90%+ Cranium, mandible; manubrium, sternum; C1-2, C5?-7, T1-12, L1-6, S1-5; 12 right & 12 left ribs; right arm; left arm (clavicle, humerus, radius, ulna); right hand (8 carpals, MC1-5, 4 proximal, 3 intermediate & 1 distal phalanx); left hand (4 carpals, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges); os coxae; right leg; left leg; right foot (1 tarsal, MT4-5); left foot (4 tarsals, MT1-5, 2 proximal phalanges)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	Mixed
Stature	166.3cm ±2.99cm (femur & tibia, white formula) 162.1cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Parietal foramen (L); ossicle in coronal (R); accessory lesser palatine foramen (R); accessory supraorbital foramen (R) Circumflex sulcus (R); accessory sacral facet (R); acetabular crease (L); Poirier’s facet (R); plaque (R); vastus fossa (L); peroneal tubercles (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facet (L)
Pathology	Schmorl’s nodes T7-S1 DJD (OP + PO) apophyseal facets T10, L1-4; costal facets T1, T10; lateral clavicles; both acetabuli Caudal border shift at thoraco-lumbar border – apophyseal joints between T12 & L1 thoracic in shape Additional lumbar vertebra at lumbo-sacral border that has become sacralised (cranial border shift) – sacrum has six segments, with sacral promontory located at the superior margin of the second segment Shallow oval indistinct depression (13 x 6mm) in the frontal squama just to the left of the midline, superior & medial to the frontal boss. Second even shallower circular depression (4mm diameter) just lateral to the first Primary dysplasia of the right scapula neck/ birth injury to brachial plexus – the glenoid fossa is retroverted (facing postero-laterally) with a shallow horizontal groove through the centre. The posterior margin is enlarged by osteophyte formation, most pronounced along the inferior half. The inferior part of the scapular neck is underdeveloped. The humeral head is normal Left clavicle – acromial end is broad and thick, with plaques and irregular bone formation on the inferior surface; the lateral part at 90º to the midshaft. Possible soft tissue trauma

	Excavated muscle attachment proximal humeri – pectoralis major Soft tissue trauma to a right proximal hand phalanx (probably 2nd digit) – thickened area along margin of palmar side of shaft Subtle deposits of woven bone on the visceral surfaces of seven left ribs Pilasterism of both femora Subtle woven bone deposits on the postero-lateral shafts of both femora, at the junction of the proximal & mid thirds Healed fracture of the left fibula shaft at the junction between the proximal and mid thirds. Distal shaft displaced slightly posteriorly. Deposits of woven bone on the lateral midshaft & the anterior-lateral third of the shaft. The left tibia has a thick spicule of bone projecting laterally & inferiorly from the proximal end of the interosseous crest at a point level with the fibula fracture. Probably soft tissue damage associated with the fracture The left tibia has woven bone (transitional to lamellar bone in places) occupying the entire mid third of the medial and posterior shaft, extending onto the distal third of the posterior shaft. Also patches on the lateral surface at the junction of the mid & distal thirds. The rest of the lateral mid third is covered in thick deposits of lamellar bone. There is an oval swollen area of smooth lamellar bone on the anterior shaft at the junction of the mid and distal thirds of the shaft; surrounded by a mix of porous and striated transitional woven-lamellar bone. The right tibia has striated lamellar bone occupying the medial mid third of the shaft, extending onto the proximal and distal thirds, and the posterior mid third. Also deposits of transitional woven-lamellar bone on the medial surface of the distal end, superior to the medial malleolus The sacrum has a thick band of lamellar bone on the anterior surface of the body of S3, extending into the sacral foramina on either side. Possible decapitation C2 – linear cut to the posterior arch, posterior to the superior apophyseal facets. Cut angled superior-posterior to inferior-anterior. The posterior margin of the inferior surface body has fractured (surface rough and slightly irregular). C3 has been lost post-mortem
Dental Health	32 tooth positions, 28 teeth present 2 teeth lost post-mortem (1 of which possibly sampled), 2 teeth not present/ unerupted Calculus (flecks to slight); caries (4 teeth); abscess LM^1; slight periodontal disease Slight crowding of anterior mandible Both upper second molars have small crowns that look more typical for third molars Fractures – LM^2, entire buccal half of crown lost; RI^1, fracture to buccal side distal crown Enamel chips – RI^1, RC^1, RI$_1$

	Right Dentition								Left Dentition							
Present	NP/U	P	PM	(PM)	P	P	P	P	P	P	P	P	P	P	P	NP/U
Calculus	-	-	-	-	S bm	F b	F bd	-	-	F b	S bl	F m	F m	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	Sd	Sm	La	Mo	-
Wear	-	1	-	-	2	3	3	5	4	2	3	2	3	-	1	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus																
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	4	2	2	3	3	5	4	3	3	2	2	4	3	1

Skeleton Number	**3DT 38**
Phase	31
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	95%+ Cranium, mandible, hyoid; manubrium, sternum; C1-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs;

	right arm; left arm; right hand (8 carpals, MC1-5, 4 proximal, 3 intermediate & 2 distal phalanges); left hand (8 carpals, MC1-5, 5 proximal, 4 intermediate & 2 distal phalanges); os coxae; right leg; left leg; right foot (6 tarsals, MT1-5, 5 proximal & 1 distal phalanx); left foot (6 tarsals, MT1-5, 5 proximal, 1 intermediate & 2 distal phalanges)
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	White?
Stature	173.6cm ±3.27cm (femur, white formula)
Non-Metric Traits	Parietal foramen (L); ossicles at pterion (bilateral); extrasutural mastoid foramina (bilateral); open posterior condylar canals (bilateral); double anterior condylar canal (R); open foramen spinosum (bilateral); bridging of supraorbital notch (R); accessory supraorbital foramen (bilateral) Double atlas facet (L); posterior atlas bridging (bilateral); bipartite transverse foramina (1/4 R, 2/4 L); circumflex sulci (bilateral); acetabular crease (L); Poirier's facets (bilateral); plaque (bilateral); vastus notches (bilateral); vastus fossae (bilateral); peroneal tubercles (bilateral); medial talar facets (bilateral)
Pathology	Ossified ligamentum flavum T2-L2 DJD (OP + PO) medial clavicles Maxillary sinusitis, bilateral – cobweb of lamellar bone strands Possible agenesis/ hypoplasia of nasal bones; nasal aperture asymmetric Ossified costal cartilage on the manubrium, facet for right first rib Possible cervical rib – the left first rib has a raised slightly flattened area of bone (15 x 10mm, projecting 5mm) on the medial part of the superior surface, c. 5mm from the sternal end – possible that a cervical rib was in contact with this nodule. Right first rib sternal end damaged. Both sides of C7 damaged post-mortem, complete loss of transverse processes; no cervical ribs identified among the ribs (mostly fairly complete though fragmented) Possible slight caudal border shift at lumbo-sacral border, with slight lumbarisation S1. Well healed fracture of left rib 7(?) at the junction between the mid & sternal thirds of the shaft. Minimal displacement or change in alignment Possible fracture/ soft tissue trauma to right rib 9 – sheet of bone along the inferior margin between the angle and mid shaft, projecting inferiorly by 10mm; slight bugle on internal surface just distal to the angle. Right rib 10 has a flattened area on the superior margin of the shaft corresponding to the area affected on rib 9; no evidence the ribs were actually in contact Pilasterism of both femora The left tibia has smooth lamellar bone deposits on the posterior midshaft – gently rounded shallow nodules Soft tissue trauma to the proximal left tibia – distinct sharp spicule of bone at the inferior margin of the fibular facet, angled inferiorly The left fibula has a sharp spicule of lamellar bone on the medial side of the anterior surface of the distal end – soft tissue trauma to the tibio-fibular joint Both tali have a bar of bone along the dorsal surface of the neck, just proximal to the head Congenital fusion of the left intermediate & distal 5^{th} foot phalanges Soft tissue trauma to the left intermediate & proximal 5^{th} foot phalanges – nodules of bone on the plantar-lateral surfaces around the joint between the two bones Decapitation C6-7 – single cut angled slightly superior left to inferior right, and posterior-superior to anterior-inferior: C6 – has a broadly horizontal linear cut through the posterior arch that has removed the inferior half of the inferior left apophyseal facet, inferior margin of the left lamina, and a sliver from the inferior margin of the right inferior apophyseal facet. Probable peri-mortem fracturing of the spinous process. C7 – linear cut through the arch that has removed the superior margin of the superior left apophyseal facet & the superior half of the superior right apophyseal facet, and the posterior part of the right uncinate process
Dental Health	32 tooth positions, 32 teeth present Calculus (flecks to slight) Enamel chips – RI^1, LP^1, LM^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F	F	F	S	F	S	S	S	S	S	S	S	S	S	S	S

	bm	md	mdl	md	d	b	bl	b	b	bl	bmdl	b	bmd	bmd	bmd	bm
DEH	-	-	-	-	L	L	-	-	-	-	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	2	4	3	2	3	2	3	2	2	3	2	3	4	3	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F ld	F lmd	F lmd	S lmdb	S lmdb	S mdl	S lmdb	S lmdb	S lmdb	S lmdb	S lmd	S lmd	S mdl	S mdl	S md	-
DEH	-	-	-	-	L	L	-	-	-	-	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	3	5	3	3	3	3	3	3	3	3	3	3	5	3	3

Skeleton Number	**3DT 39**
Phase	32
Radiocarbon date	-
Preservation	Good (grade 2), moderate fragmentation
Completeness	10-20% Right leg (distal femur, patella, tibia, midshaft fibula); left leg (distal 2/3 femur, patella, proximal tibia, proximal fibula shaft)
Age	18+ years (adult)
Sex	Unknown
Ancestry	Unknown
Stature	-
Non-Metric Traits	Vastus fossae (bilateral)
Pathology	Excavated muscle attachment right tibia – soleus Cortical defect in lateral condyle of left femur – oval depression, floor smooth and same as rest of joint surface
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**3DT 40**
Phase	33
Radiocarbon date	-
Preservation	Good (grade 2), slight fragmentation
Completeness	60-70% Sternum; T6-12, L1-5, S1-5; 2 right & 12 left ribs; right arm (distal third humerus, radius, ulna); left arm; right hand (6 carpals, MC1-5, 5 proximal, 4 intermediate & 1 distal phalanx); left hand (3 carpals, MC1-5, 4 proximal & 1 intermediate phalanx); os coxae; right leg (proximal quarter femur, tibia, fibula); left leg; right foot (7 tarsals, MT1-5, 5 proximal phalanges); left foot (7 tarsals, MT1-5, 3 proximal phalanges)
Age	16-22 years (young adult)
Sex	Male
Ancestry	Unknown
Stature	166.9cm ±2.99cm (femur & tibia, white formula) 162.7cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Acetabular crease (R); Poirier's facets (bilateral); hypotrochanteric fossae (bilateral); lateral tibial squatting facets (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral); medial talar facets (bilateral)
Pathology	Cranial border shift at thoraco-lumbar border – apophyseal joints between T11-12 lumbar in shape

	Cranial border shift at lumbo-sacral border – partial unilateral sacralisation of L5. L5 right transverse process enlarged and pseudoarthrosis between it and the right ala of the sacrum; the transverse process also in articulation with the ilium – extension of the auricular facet. The right apophyseal joint between L5-S1 is under-developed Possible greenstick fracture of the distal end of the right ulna – distal third angled laterally Both tibiae have small subtle lumps of lamellar bone on the shafts (medial side of anterior crest of right tibia, posterior midshaft of left tibia) – possible infection/ trauma Fracture of right proximal foot phalanx (possibly 2nd digit) – diagonal fracture through the proximal joint surface
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**3DT 41**
Phase	32
Radiocarbon date	-
Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	80-90% Partial cranium, mandible, hyoid; manubrium, sternum, xiphoid; C1-3, C7, T1-12, L1-5, S1-4; 12 right & 12 left ribs; right arm (distal ulna lost post-mortem); left arm (midshaft humerus lost post-mortem); right hand (4 carpals, MC1-5, 5 proximal, 1 intermediate & 1 distal phalanx); left hand (7 carpals, MC1-5, 2 proximal & 1 intermediate phalanx); os coxae; right leg; left leg; right foot (2 tarsals)
Age	18-25 years (young adult)
Sex	Male
Ancestry	Unknown
Stature	171.0cm ±4.32cm (ulna, white formula) 164.7cm ±4.42cm (ulna, black formula)
Non-Metric Traits	Highest nuchal line (L); extrasutural mastoid foramen (L); double anterior condylar canal (R); open foramen spinosum (R) Septal apertures (bilateral); acetabular crease (L); Poirier's facets (bilateral)
Pathology	Cranial border shift at thoraco-lumbar border – apophyseal joints between T11-12 lumbar in shape Possible slight caudal border shift at lumbo-sacral border – S1 titled slightly posteriorly and slight promontory at junction between S1-2 Very slight scoliosis: T5 – body wedged slightly to the left & left body wall more concave than right, left pedicle marginally thinner than right. T6 – body slightly wedged to left, left pedicle slightly thinner than right T4 – small V shaped notch in the superior body margin on the left side, margins smooth and rounded. Developmental Sternum – body very broad & large xiphoid process Striated lamellar bone on the medial mid thirds of both tibia shafts Soft tissue trauma to the left pubic bone – nodule of lamellar bone on the posterior margin of the pubic symphysis at the inferior end and deposit of smooth well remodelled lamellar bone on the dorsal surface of the pubic body Probable decapitation C7 – linear cut through the superior arch & part of the body, angled superior left to inferior right & posterior-inferior to anterior-superior. The cut has removed a sliver from the superior margin of both laminae, both superior apophyseal facets, the posterior part of the right pedicle & the right uncinate process. The left uncinate process is still present, but has some post-mortem damage – casts doubt on this being a full decapitation. Cut delivered from behind & possibly from the right Vertical cut through the posterior neural arches of C2-3 that has removed the tips of the spinous processes. The cut is angled steeply from the superior-posterior-left to the inferior-anterior-right. The superior parts of the cut on both vertebrae are smooth, but the inferior part is more irregular and angled anteriorly suggesting was probably delivered from above
Dental Health	27 tooth positions, 27 teeth present (3 of which loose) 3 teeth lost post-mortem Calculus (flecks to medium); caries (3 teeth); abscess RM_1 Porous lamellar bone on external body of left mandible, most pronounced beneath LM_1, extending anteriorly beneath LP_1 & P_2, posteriorly beneath LM_2 & inferiorly to mental foramen – possibly associated with carious lesion

				Enamel chip – RI^2													
	Right Dentition								Left Dentition								
Present	-	P(l)	P	P	P	P	P	P	PM	PM	P	P	P	P(l)	P(l)	-
Calculus	-	F m	S md	S md	S md	S md	F md	S b	-	-	M bm	M b	M bd	M bdml	M bd	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	3	2	2	2	2	3	-	-	2	2	2	2	2	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	PM	P	P	P	P	P	P
Calculus	-	S ml	S ld	S m	S dlm	S blmd	M blmd	M blmd	M blmd	-	M blmd	S lmdb	S lm	S ld	S lm	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	Mm	-	-	-	-	-	-	-	-	-	-	Lm	So	-
Wear	1	2	3	2	2	2	2	3	3	-	2	2	2	3	2	1

Skeleton Number	**3DT 42**
Phase	32
Radiocarbon date	-
Preservation	Good (Grade 2), slight fragmentation
Completeness	90%+ Cranium, mandible; C1-7, T1-12, L1-5, S1-5; 12 right & 11 left ribs; right arm; left arm; right hand (MC1-5, 4 proximal phalanges); left hand (MC1-5, 5 proximal & 3 intermediate phalanges); os coxae; right leg; left leg; right foot (6 tarsals, MT1-3); left foot (MT1-2 & 5?)
Age	26-35 years
Sex	Female
Ancestry	White?
Stature	160.9cm ±3.66cm (tibia, white formula)
Non-Metric Traits	Ossicles in lambdoid (bilateral); ossicles at parietal notches (bilateral); ossicle at asterion (R); sutural mastoid foramen (bilateral); open foramen spinosum (L) Bipartite transverse foramina (1/2 R, 1/3 L); accessory sacral facet (L); lateral tibial squatting facets (bilateral); absent anterior calcaneal facet (R); lateral talar extensions (bilateral)
Pathology	Schmorl's nodes T6-L1 T11 – has a shallow lytic lesion at the anterior-right margin of the superior body surface Cortical defect in the distal joints of both humeri Maxillary sinusitis, left sinus – lamellar bone Possible greenstick fracture or soft tissue trauma to the left femur – the shaft is twisted along the length with linea aspera pronounced (similar to pilasterism) and on the medial margin of the posterior midshaft. The proximal third of the shaft is angled posteriorly and is rotated medially, and the femoral head is retroverted. Calcaneus secundarius/ avulsion fracture of right calcaneus – anterior medial margin pitted and irregular, very slightly concave
Dental Health	30 tooth positions; 29 teeth present (2 of which loose) 3 teeth lost post-mortem Calculus (flecks to slight); caries (2 teeth) The maxilla is narrow anteriorly so the palate and dental arcade seem almost triangular; the mandible is broken post-mortem & part of the anterior left area is incomplete LP^1 & LP^2 have short stubby roots Fracture of RM^2 disto-lingual corner Enamel chips – RI$_1$, RC^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P(l)	P(l)	P	P	P
Calculus	-	F d	F md	S b	S bl	F lm	F bd	F d	F d	F bmd	F mbd	F mdbl	S bd	S b	F m	F ld
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	2	3	2	1	2	1	2	2	1	2	1	2	3	2	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	PM	PM	PM	P	P	P	P	P
Calculus	S dlm	F m	-	S lmd	S lmd	S l	S md	S blm	-	-	-	S ld	S lmd	F m	F lm	S bdl
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	So	-	-	-	-	-	-	-	-	-	-	-	-	So
Wear	2	2	3	2	2	1	1	2	-	-	-	2	2	3	2	2

Skeleton Number	**3DT 43**
Phase	33
Radiocarbon date	-
Preservation	Good (Grade 2), slight fragmentation
Completeness	40-50% Cranium, mandible; C1-2; left arm (distal radius, distal ulna); right hand (2 carpals, MC1-4, 1 proximal phalanx); left hand (6 carpals, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges); os coxae (pubic areas & part ischia only); right leg; left leg; right foot (5 tarsals, MT1-5, 5 proximal phalanges); left foot (7 tarsals, MT4-5)
Age	18-25 years (young adult)
Sex	Male
Ancestry	White
Stature	175.5cm ±2.99cm (femur & tibia, white formula)
Non-Metric Traits	Extrasutural mastoid foramen (R); open posterior condylar canal (R); accessory lesser palatine foramen (R) Allen's fossa (L); hypotrochanteric fossae (bilateral); exostosis in the trochanteric fossa (L); vastus notch (L); vastus fossae (bilateral); lateral tibial squatting facets (bilateral); peroneal tubercle (R)
Pathology	Possible healed fracture of the right maxilla frontal process – superior half of nasal margin angled medially The nasal spine & base of the nasal septum deviate markedly towards the right Congenital absence of the right hook of hamate; left hamate too damaged post-mortem to observe Cyst in left hamate – circular aperture on the palmar side at the proximal end of the bone, sharp edges, floor & walls smooth & solid Cyst in left MT5 – hollow on the lateral surface of the head close to the margin of the joint surface, margins sharp, floor & walls smooth Femoral necks long, thick vertically, and flattened antero-posteriorly. Torsion of both tibiae. Both fibulae curved medio-laterally, and thickened medio-laterally at the distal ends
Dental Health	32 tooth positions, 30 teeth present 2 teeth lost post-mortem Calculus (flecks to medium); caries (1 tooth); DEH; slight periodontal disease Slight crowding anterior mandible; slight rotation both lower canines & LM$_3$ Enamel chips – RC^1, RM^1, LI^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	PM	P	PM	P	P	P	P	P	P
Calculus	F	-	F	F	F	S	S	-	S	-	S	S	S	-	F	F

	d		bm	mb	bd	b	b		b		bmd	bdl	bmd		b	dm
DEH	-	-	L	-	-	L	-	-	L	-	L	-	-	L	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	La	-	-
Wear	2	4	5	2	2	2	2	-	4	-	3	2	2	-	3	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F md	F l	S l	S mld	S mod	M lbdm	S md	S bmd	S bmd	S blmd	S lmbd	M lmd	M lmbd	S lmb	F l	F dl
DEH	-	-	-	L	L	L	L	L	L	L	L	L	L	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	5	6	3	2	3	3	4	4	3	3	2	2	4	3	2

Skeleton Number	**3DT 44**
Phase	32
Radiocarbon date	-
Preservation	Moderate (Grade 3), slight fragmentation
Completeness	90%+ Cranium, mandible, hyoid; manubrium, sternum; C1-7, T1-12, L1-5, S1-5, Cx1; 12 right & 12 left ribs; right arm; left arm; right hand (5 carpals, MC1-5, 5 proximal, 4 intermediate & 5 distal phalanges); left hand (8 carpals, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges); os coxae; right leg; left leg; right foot (3 tarsals); left foot (7 tarsals, MT1-5, 5 proximal, 2 intermediate & 2 distal phalanges)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	Unknown
Stature	170.3cm ±2.99cm (femur & tibia, white formula) 165.7cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Extrasutural mastoid foramen (L); sutural mastoid foramen (R); open posterior condylar canal (L); double anterior condylar canal (L); open foramina spinosum (bilateral); accessory lesser palatine foramen (R) Plaque (bilateral); peroneal tubercle (L); double anterior calcaneal facet (L); absent anterior calcaneal facet (R); double inferior talar facet (L)
Pathology	Cribra orbitalia, bilateral Excavated muscle attachment right humerus – teres major Small area of lamellar bone on the antero-medial surface of the right fibula midshaft Trauma/ infection to the distal end of the left 5th proximal foot phalanx – the distal joint surface is rugged, appears eroded; no trace remains of the normal joint morphology Possible cyst in proximal joint surface of distal left foot phalanx – deep oval lytic lesion, sharp margins, floor & walls smooth, occupying half the proximal joint surface Possible soft tissue trauma to the sternal end of the left clavicle Partial decapitation C6 – linear cut angled from superior left to inferior right that has removed the superior-medial part of the superior left apophyseal facet, a sliver from the superior border of the left lamina, the superior part of the right lamina and passed through the right side of the arch inferior to the right superior apophyseal facet. It has passed diagonally through the body, removing a small part of the left uncinate process and passing through the right pedicle into the right side of the body. The anterior-left part of the body and the left pedicle have fractured. Cut delivered from posterior-right.
Dental Health	32 tooth positions, 31 teeth present 1 tooth lost post-mortem Calculus (flecks to slight) Slight crowding of anterior mandible; RP_1 slightly rotated Small ectopic supernumerary tooth in the wall of the left maxillary sinus

				Fractures - LM_1 distal margin occlusal surface; LP_2, LM_2 Enamel chips – LI^1, LC^1, RI^1												
	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	PM
Calculus	-	F md	F d	-	-	F bl	F l	-	-	F bd	F m	F md	F m	F d	F m	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	2	4	2	3	3	3	4	4	3	4	3	2	4	3	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F l	F l	-	F md	S md	F d	S md	S lmd	S lmdb	S mdb	S bmd	S md	S md	F m	F ld	S bdl
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	3	3	2	3	3	3	3	4	3	4	3	2	4	3	2

Skeleton Number	**3DT 45**
Phase	31
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	95%+ Cranium, mandible, hyoid; sternum, manubrium; C1-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (7 carpals, MC1-5, 5 proximal, 4 intermediate & 2 distal phalanges); left hand (6 carpals, MC1-5, 5 proximal, 4 intermediate & 2 distal phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 5 proximal & 2 intermediate phalanges); left foot (7 tarsals, MT1-5, 5 proximal, 3 intermediate & 1 distal phalanx, 2 sesamoid bones)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	White
Stature	168.7cm ±2.99cm (femur & tibia, white formula)
Non-Metric Traits	Ossicle in lambdoid (L); parietal foramen (R); extrasutural mastoid foramen (L); sutural mastoid foramen (R); open posterior condylar canal (R); accessory lesser palatine foramen (L); absent zygomaticofacial foramen (L); bridging of supraorbital notch (L) Transverse foramen bipartite (1/4 R, 0/5 L); accessory acromial facet (R); sternal foramen; acetabular creases (bilateral); Poirier's facets (bilateral); hypotrochanteric fossae (bilateral); vastus fossa (L); peroneal tubercle (L); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral); os trigonum (bilateral)
Pathology	Schmorl's node T8 DJD (OP + PO) apophyseal facets T6 & L1 Eight thoracic vertebrae have lytic lesions at the anterior margins of the bodies (superior surface/ inferior surface/ both surfaces) including T3-9 & T11 Cranial border shift at cervico-thoracic border – the right uncinate process of C7 is flattened (corresponding flattened area on the inferior body of C6), small demi costal facets on the lateral margins of the inferior body (rib 1 partially in contact with C7). Left transverse process thickened at the posterior end, extending 20mm laterally. Probable cervical rib (Type I) Slight unilateral cranial shift at thoraco-lumbar border – right apophyseal joints between T11-12 lumbar in shape (left facets thoracic in shape) Possible healed fractures to the left transverse processes of T4, T5, T6, and L3 Small shallow circular depression (c. 7mm diameter) in the left frontal squama just superior to the frontal boss, margins indistinct, floor of lesion smooth Soft tissue trauma to the lesser tubercle of the right humerus – spicule of bone projecting laterally

	from the lateral margin (over the bicipital groove) Soft tissue trauma to two proximal hand phalanges from the left hand. One (4th digit?) has a roughened nodule of bone on the medial side of the proximal shaft; the second (2nd digit?) has an elongated nodule of bone on the lateral surface of the distal end Deposit of woven bone on the left os coxa, on the anterior surface of the ilium. Focussed just medial to the AIIS, and extending towards the auricular surface superior to the arcurate line. Patchy distribution. Both femora have flattened midshafts with development of the medial midshafts Soft tissue trauma to the right distal tibio-fibular joint – nodule of bone on the medial side of the right fibula at the proximal end of the fibrous joint surface; corresponding area on the tibia more concave than usual Lamellar bone on the lateral surface of the proximal-mid third junction of the left fibula shaft. Further deposits of transitional woven-lamellar bone on the medial-posterior surface of the mid third of the shaft Bar of bone along the dorsal surface of the right navicular (along the superior margin of the facet for the intermediate cuneiform). The intermediate cuneiform has a nodule of bone on the dorsal surface at the superior margin of the proximal joint, and the lateral cuneiform has a bar of bone along the superior margin of the proximal joint Decapitation C5-6; single cut angled superior left to inferior right: C5 – has a linear cut through the neural arch and body, running from just inferior to the superior left apophyseal facet to the middle of the inferior right apophyseal facet; probable fracture of the anterior margin of the body C6 –cut has removed the superior half of the superior right apophyseal facet Shallow peri-mortem cut (29.5mm long) into the anterior-medial surface of the distal right femur. The lateral end of the cut is located 9mm superior to the patellar surface, and the cut extends medially just superior to the medial epicondyle
Dental Health	32 tooth positions, 32 teeth present Calculus (flecks to slight); DEH Super-eruption both lower third molars Upper third molars angled so crowns tilted posteriorly Enamel chips – RI^2, RC^1, LI^1, LC^1, LP^1, LM^1, LM^2, LI_2, LC_1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	-	F m	F mdl	F d	F bd	F m	S b	-	F m	F l	F bl	F d	-	F md	F bl	F ml
DEH	-	-	-	-	-	L	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	2	2	2	2	2	3	2	3	2	2	3	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F d	F mbd	F lbmd	-	F b	S lm	S m	S mdbl	S md	S mdb	F md	F md	F md	F mb	S lmd	S dl
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	2	2	3	2	3	3	2	3	2	2	3	2	1

Skeleton Number	**3DT 46**
Phase	32
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	95%+ Cranium, mandible; manubrium, sternum; C1-7, T1-12, L1-5, S1-5, Cx1; 12 right & 12 left ribs; right arm; left arm; right hand (3 carpals, MC1-5, 5 proximal & 4 intermediate phalanges); left

	hand (6 carpals, MC1-5, 5 proximal & 4 intermediate phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 5 proximal, 3 intermediate & 2 distal phalanges); left foot (7 tarsals, MT1-5, 4 proximal & 1 distal phalanx)
Age	26-35 years (young middle adult) (likely to be 30+ years)
Sex	Male
Ancestry	Mixed
Stature	173.9cm ±2.99cm (femur & tibia, white formula) 168.8cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Highest nuchal lines (bilateral); ossicles in lambdoid (bilateral); parietal foramina (bilateral); ossicles at parietal notches (bilateral); ossicle at asterion (R); sutural mastoid foramina (bilateral); double anterior condylar canals (bilateral); ossicles in squamous sutures (bilateral – not scored systematically) Bipartite transverse foramina (2/3 R, 2/5 L); acetabular crease (R); exostosis in the trochanteric fossa (L); vastus fossae (bilateral); lateral tibial squatting facets (bilateral); peroneal tubercles (bilateral); medial talar facets (bilateral); os trigonum (R)
Pathology	Schmorl's nodes T4-L4 Ossification of ligamentum flavum T3-L1 DJD (OP + PO) medial clavicles Nasal septum angled slightly to the right RMT1 has a slightly raised flattened area on the dorsal surface of the shaft 4mm proximal to the head. LMT1 has a raised nodule of bone in the equivalent location. Changes associated with the joint capsule? Soft tissue trauma to the lateral surface of LMT1 – smooth projection of bone on the lateral surface of the midshaft Possible trauma to the right proximal first foot phalanx – proximal half large and robust (especially on medial side), seems expanded compared to the size of the distal half. Cribra orbitalia, bilateral Small deposit of woven bone on the internal surface of the frontal process of the right maxilla, occupying the posterior half of the part adjacent to the fronto-maxillary suture Ossified cartilage – both first ribs Developmental anomaly of C3 – round hole (3mm diameter) with smooth rounded margins penetrating completely through the left lamina Decapitation C1-2; cut also penetrated posterior mandible & right mastoid process; cut angled superior right to inferior left, & posterior-inferior to superior-anterior: C1 – linear cut that has removed the inferior surface of the posterior arch, the left inferior apophyseal facet, the posterior half (& part of the lateral margin) of the right superior apophyseal facet C2 – linear peri-mortem cut has removed the posterior-superior surface of the spinous process and the tip of the dens. This cut is angled inferior-posterior-left to superior-anterior-right; aligns with the cut through C1. There are two (potentially three) short, shallow parallel linear cuts into the posterior left side of the dens close to the base Mandible – cut into the posterior margin of both ascending rami, aligned with the cut through C1-2. Penetrating the posterior right ramus at the base of the neck, and the posterior left ramus level with the lingula; both cuts have severed the mandibular condyles. On the left side the cut extends into the posterior margin of the coronoid process Right temporal – the inferior part of the mastoid process has been removed by a linear cut. This cut is aligned with the cut through C1-2
Dental Health	32 tooth positions, 31 teeth present 1 tooth not present/ unerupted Calculus (flecks to slight); DEH LM_3 partially erupted into the ramus due to limited space LP^1 rotated, LP^2 slightly rotated Small crescent worn into the distal half of the occlusal surface of RC_1; both lower right premolars have flattened wear facets on the medial half of the buccal cusp

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	NP/U
Calculus	-	F b	S bm	S b	F b	-	F b	F bm	F m	F b	F m	S b	F bd	F m	-	-

DEH	-	-	L	-	L	L	-	-	-	-	L	L	-	L	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	2	2	3	2	3	3	2	3	1	2	3	2	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F b	F m	F l	F l	S lbdm	S lm	S lmd	S lmdb	S mldb	S mldb	S lmb	S lmb	F db	F m	F d	-
DEH	-	-	-	L	-	L	L	L	L	L	L	-	L	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	2	2	3	2	3	3	2	3	2	2	4	3	1

Skeleton Number	**3DT 47**
Phase	31
Radiocarbon date	-
Preservation	Moderate (Grade 3), slight fragmentation
Completeness	95%+ Cranium, mandible, hyoid; manubrium, sternum; C1-7, T1-12, L1-5, S1-5; 11 right & 12 left ribs; right arm; left arm; right hand (8 carpals, MC1-5, 5 proximal, 3 intermediate & 3 distal phalanges); left hand (6 carpals, MC1-5, 4 proximal, 4 intermediate & 1 distal phalanx); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 5 proximal, 3 intermediate & 3 distal phalanges, sesamoid bone); left foot (7 tarsals, 5 proximal & 1 distal phalanx, sesamoid bone)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	White
Stature	171.4cm ±3.37cm (tibia, white formula)
Non-Metric Traits	Ossicles in lambdoid (bilateral); parietal foramen (L); ossicle at parietal notch (R); ossicle at asterion (L); extrasutural mastoid foramen (R); sutural mastoid foramen (L); open posterior condylar canal (R); incomplete foramen ovale (R); open foramen spinosum (R); absent zygomaticofacial foramen (L); bridging of supraorbital notch (L); accessory supraorbital foramen (R) Bipartite transverse foramina (1/3 R, 2/3 L); acetabular crease (L); Poirier's facets (bilateral); hypotrochanteric fossae (bilateral); exostosis in the trochanteric fossa (R); third trochanters (bilateral); vastus notches (bilateral); vastus fossae (bilateral); lateral tibial squatting facets (bilateral); peroneal tubercles (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral); medial talar facets (bilateral); lateral talar extension (R)
Pathology	Schmorl's nodes T6-7, T9, T11-L5 Developmental anomaly of right apophyseal joint between T9-10 – joint surfaces partially divided Cranial border shift at thoraco-lumbar border – apophyseal joints between T11-12 lumbar in shape. Small, underdeveloped costal facets on the pedicles of T12. Eleven normal rib pairs, plus one small vestigial left rib Small unidentified ossified object, roughly triangular in shape (25.9 x 11.2mm), gently curved along its length, convex on one side (surface smooth) & concave on the other (small ridge along length) Os acromiale of left scapula (tip present); right side normal Subtle lamellar bone on the medial midshafts of both femora, extending onto the proximal third of the medial shafts Slightly swollen area (c. 40 x 18mm) on the popliteal surface of the left femur, margins indistinct, gently rounded profile, surface predominantly smooth lamellar bone. Possible ossified haematoma/ periosteal reaction Striated lamellar bone on the lateral & medial midshafts of both tibiae. Also on the antero-lateral surface of both fibula shafts at the junction of the mid & proximal thirds The right tibia has a small prominent nodule of lamellar bone on the medial midshaft, close to the posterior border.

	Congenital fusion of the right intermediate & distal 5th foot phalanges Around 17-18 peri-mortem cuts to the neck and mandible, delivered from the anterior, posterior and right sides. Several are difficult to interpret. No single cut passes completely through the spine; possible that combination of cuts resulted in decapitation: C1 – tiny V shaped notch in the posterior margin of the inferior left apophyseal facet. Aligned with cut 1 on C2 C2 – 1) diagonal linear cut angled superior left to inferior right that has passed through the right neural arch just superior to the inferior apophyseal facet and passed into the posterior right pedicle (anterior part fractured. The cut has penetrated the superior left apophyseal facet half way along the posterior margin to a depth of 1-2mm, and the posterior left & central body (very shallow at this point). Cut delivered from the posterior right; would have severed the spinal cord but not decapitated the individual completely 2) linear cut roughly parallel with, and c. 4mm inferior to, cut 1. This has removed part of the superior margin of the spinous process and penetrated slightly into the right lamina & lateral margin of the right inferior apophyseal facet. Cut delivered from posterior-right 3) possible almost vertical cut to the spinous process that has removed the left tip C3 – 1) linear cut that has removed the superior margin of the superior right apophyseal facet and possibly penetrated the lateral surface of the right uncinate process (shallow cut). Difficult to interpret how this cut occurred – either a stab from the right side, or sustained when C2 was no longer in normal articulation with C3 2) shallow fine linear cut on the lateral surface of the right inter-articular area 3) fine linear cut parallel with, and located 1mm inferior to, cut 2 on C3 4) linear cut that has removed the inferior margin of the inferior right apophyseal facet, inferior right lamina with fracture through the spinous process. Probably delivered from the posterior-superior-right angled towards the anterior-inferior-left. No corresponding cut visible in C4 5) sliver of bone removed from the anterior margin of the inferior body surface. Cut angled slightly from superior right to inferior left. Possibly the same cut as cut 1 on C4 C4 – 1) sliver of bone removed from the superior margin of the superior right apophyseal facet. Cut angled steeply from inferior-posterior to superior-anterior. Possibly the same cut as cut 5 on C3 2) diagonal linear cut into the anterior surface, running from the left inter-articular area through the anterior part of the left pedicle and the anterior surface of the body close to the superior margin terminating medial to the right uncinate process. Cut delivered from the anterior left, angled superior left to inferior right 3) diagonal linear cut into the inferior part of the anterior body surface, running from the centre of the right body margin to the inferior left corner of the anterior body. Cut delivered from the anterior, angled superior right to inferior left 4) short, shallow fine linear cut into the left side of the anterior body c. 3mm superior to the inferior margin 5) linear diagonal cut to the left inferior apophyseal facet that has removed the lateral-inferior margin. Cut delivered from the posterior left, angled superior-lateral-left to inferior-medial-right. No evidence for corresponding cut on C5 C5 – 1) almost horizontal linear cut into the anterior & superior body, angled slightly inferior right to superior left, that has penetrated the anterior surfaces of the uncinate processes and the anterior part of the superior surface of the body. Delivered from anterior 2) short shallow linear cut into the centre of the anterior body, c. 4mm inferior to the superior margin. Angled slightly superior right to inferior left, delivered from anterior 3) shallow short linear cut into the anterior surface of the body c. 1.5mm inferior to (and parallel with) cut 2. Delivered from anterior C6 – potential cut through the anterior margin of the inferior body; potentially the same as the cut to C7 C7 shallow fine linear cut into the anterior right of the superior body surface, running from the anterior right corner posteriorly towards the left side. Cut delivered from the anterior and superior. Mandible – 1) short shallow linear cut into the inferior margin of the right corpus c. 27mm anterior to the gonial angle, angled posterior-inferior to anterior-superior. Potentially the same cut as C4 cut 1 2) sliver of bone removed from the inferior surface of the right mental tubercle, probably delivered from the anterior left and slightly superior. Potentially the same cut as C5 cut 1. Peri-mortem cuts to the right 4th and 5th metacarpals, presumably the result of a stabbing injury to the back of the hand: RMC 5 – two shallow fine parallel linear cuts to the dorsal half of the lateral surface of the

	midshaft perpendicular to the long axis RMC4 – two shallow fine linear cuts to the medial surface
Dental Health	32 tooth positions, 30 teeth present 2 teeth not present/ unerupted Calculus (flecks to slight) LI^1 and LI$_1$ both have a small groove across the incisive surface Enamel chips – RI^1, RI^2, LI^1, LI^2, LC^1, LP^1, LP^2, LI$_1$, LI$_2$, LC$_1$

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F m	F mdb	S mbd	F d	F dm	F b	-	-	-	-	F b	-	-	F b	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	4	2	2	3	3	3	4	3	3	3	2	4	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	NP/U	P	P	P	P	P	P	P	P	P	P	P	P	P	P	NP/U
Calculus	-	S ldb	S ld	S md	S dm	S mdlb	S lmd	S ld	S lmd	S lmd	F md	F md	F md	F lm	S ld	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	3	4	2	2	3	3	3	4	3	3	2	2	5	3	-

Skeleton Number	**3DT 48**
Phase	31
Radiocarbon date	-
Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	90%+ Cranium, mandible, hyoid; manubrium, sternum, xiphoid; C1-7, T1-12, L1-5, S1-5; 12 right & 11 left ribs; right arm; left arm; right hand (1 carpal, MC1-5, 4 proximal, 3 intermediate & 1 distal phalanx); left hand (MC1-5, 5 proximal phalanges); os coxae; right leg; left leg; right foot (4 tarsals, MT1-5); left foot (4 tarsals, MT1-5, 2 proximal phalanges)
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	Unknown
Stature	160.7cm ±3.27cm (femur, white formula) 158.3cm ±3.94cm (femur, black formula)
Non-Metric Traits	Ossicle at lambda; ossicles in lambdoid (bilateral); parietal foramen (L); ossicle at parietal notches (bilateral); ossicle at asterion (bilateral); extrasutural mastoid foramen (R); sutural mastoid foramen (L); open posterior condylar canals (bilateral); mandibular tori (bilateral); bridging of supraorbital notch (R); accessory supraorbital foramen (L) Circumflex sulci (bilateral); plaque (L); hypotrochanteric fossae (bilateral); exostosis in trochanteric fossae (bilateral); third trochanter (L); lateral tibial squatting facets (bilateral); double anterior calcaneal facet (L); absent anterior calcaneal facet (R); medial talar facets (bilateral)
Pathology	Schmorl's nodes T7, T9-10 Degeneration vertebral bodies (OP + PO) C3-T1, T6 DJD (OP + PO) apophyseal facets T2-8, T10-12, L3; costal facets T2-4, T7-12; medial right clavicle OA apophyseal facets C2-3, L5-S1; costal facets T1 Possible cyst/ developmental anomaly in T4 – triangular hollow in the anterior-inferior left wall of the body Os acromiale of right scapula; left side unobservable

	Retroversion of both femora Anomalies of both feet, bilateral but most pronounced on the right side – possible partial dislocation of tali, with bone spicules on both calcanei from the posterior-medial margin of the main talar facet inferiorly and anteriorly inferior to the systentaculum tali. Thick osteophytes along the medial margin of the talar heads; both fibulae partially articulate with the calcanei Decapitation C5 – broadly horizontal linear cut passing through the spinous process, both laminae just superior to the inferior right apophyseal facet and the middle of the inferior left apophyseal facet, and through the body. Cut angled slightly inferior left to superior right, and from inferior-posterior to superior-anterior; fracture to the anterior left part of the body
Dental Health	32 tooth positions, 29 teeth present 1 tooth lost ante-mortem, 2 teeth not present/ unerupted Calculus (flecks to medium); caries (3 teeth); DEH; medium periodontal disease Parastyle on RM^2; RP^2 slightly rotated; LC^1 has small crescent of wear in the buccal side of the occlusal surface Fracture – LM^2 lingual half of distal surface Enamel chips – RI^1, RI^2, RC^1, LI^1, LI^2, LC^1, LP_2, LI_2, LI_1, RC_1, RI_2

	Right Dentition								Left Dentition							
Present	P	P	AM	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F l	F dl	-	F m	F d	S b	S bm	S b	S b	S bm	S b	S bml	S bmd	S ml	S bdml	M a
DEH	LP	-	-	-	-	L	L	-	-	L	L	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	Md	Mm	So
Wear	1	5	-	6	6	5	5	5	5	4	4	5	5	5	4	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	NP/U	P	P	P	P	P	P	P	P	P	P	P	P	P	P	NP/U
Calculus	-	F bld	F l	F mb	S mldb	S bld	S blm	M lmbd	M lmbd	M lmbd	S lmb	F md	S bmd	S bld	M bld	-
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	5	4	4	4	4	4	4	4	4	4	3	4	5	4	-

Skeleton Number	**3DT 49**
Phase	33
Radiocarbon date	-
Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	5-10% Right leg (distal ¾ tibia, midshaft fibula); left leg (distal ¾ tibia, fibula)
Age	18+ years (adult)
Sex	Unsexed
Ancestry	Unknown
Stature	-
Non-Metric Traits	Lateral tibial squatting facets (bilateral)
Pathology	Swollen area of smooth lamellar bone along the anterior border of the medial midshaft of the right tibia; striated lamellar bone along the posterior half of the medial midshaft; porous lamellar bone on the lateral surface of the midshaft. Possible osteitis/ ossified haematoma Subtle striated lamellar bone along the medial midshaft of the left tibia Lamellar bone on the midshaft of the right fibula
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**3DT 50**

Phase	32
Radiocarbon date	-
Preservation	Good (Grade 2), slight fragmentation
Completeness	10-20% Right leg (distal ¾ tibia, distal ¾ fibula); left leg (distal ½ tibia, distal ½ fibula); right foot (6 tarsals, MT1-5, 3 proximal phalanges); left foot (7 tarsals, MT1-5, 5 proximal phalanges)
Age	18+ years (adult)
Sex	Unsexed
Ancestry	Unknown
Stature	-
Non-Metric Traits	Lateral tibial squatting facets (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral); medial talar facet (R); lateral talar extension (R)
Pathology	Healed fracture of left first proximal foot phalanx - crack through medial part of distal joint surface running from dorsal to plantar, medial part displaced proximally
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**3DT 51**
Phase	32
Radiocarbon date	-
Preservation	Very good (Grade 1), moderate fragmentation
Completeness	90%+ Cranium, mandible, hyoid; manubrium, sternum; C1-7, T1-12, L1-6, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (4 carpals, MC1-5, 5 proximal, 3 intermediate & 3 distal phalanges); left hand (4 carpals, MC1-5, 5 proximal & 1 distal phalanx); os coxae; right leg; left leg; right foot (5 tarsals, MT1-5, 4 proximal & 1 distal phalanx); left foot (5 tarsals, MT1-5, 2 proximal phalanges)
Age	18-25 years (young adult)
Sex	Male
Ancestry	Unknown
Stature	165.5cm ±2.99cm (femur & tibia, white formula) 161.4cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Highest nuchal line (L); ossicle at lambda; ossicle at asterion (L); auditory torus (L); extrasutural mastoid foramina (bilateral); open posterior condylar canal (L); accessory lesser palatine foramen (L); palatine torus; absent zygomaticofacial foramen (L) Allen's fossa (R); Poirier's facet (L); plaque (L); vastus fossae (bilateral); lateral tibial squatting facet (R); double anterior calcaneal facet (R); double inferior talar facet (R)
Pathology	Schmorl's nodes T7-10, L3-4 Cribra orbitalia, bilateral Additional lumbar vertebra; L6 has typical morphology for L5; sacrum has normal morphology Slight caudal border shift at thoraco-lumbar border – left apophyseal joint between T12-L1 thoracic in shape, right apophyseal joint between T12-L1 lumbar in shape. Left transverse process of L1 shorter than right, and terminates in flattened oval (right terminates in rounded point) Os acromiale of both scapulae (tip present on left side) Smooth rounded nodule of lamellar bone on the anterior wall of the left frontal sinus – possible osteoma / infection Subtle lamellar bone on the medial midshafts of both tibiae, and medial & lateral midshafts of both femora Cortical defect in right 1st proximal foot phalanx – small circular hollow in the proximal joint surface
Dental Health	30 permanent tooth positions, 30 permanent teeth present (1 of which loose); 1 deciduous tooth position 1 permanent tooth unerupted (impacted); 1 deciduous tooth lost post-mortem Calculus (flecks to slight); caries (4 teeth); DEH; slight periodontal disease Slight crowding anterior mandible; slight rotation LI_1 & RC_1

	Retained Rdc^{1} – small round socket between RI^{2} & RP^{1}, tooth itself lost post-mortem; RC^{1} impacted – bulge in anterior right palate, and small part of crown visible though hole in posterior wall of the socket for RI^{1}, radiograph shows impacted canine Enamel chips – LI^{2}, LI^{1}, RI^{2}																
	Right Dentition								Left Dentition								
Present	P(l)	-	P	P	P	U	PM	P	P	P	P	P	P	P	P	P	P
Calculus	F l	-	S b	S bl	S bdm	-	-	F md	-	-	-	-	F m	-	F md	-	F m
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	La	-	-	-	-	-	-	-	-	-	-	-	-	So	-
Wear	2	-	-	2	2	-	-	3	4	4	3	2	2	3	4	2	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**c**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**		**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P	P
Calculus	S lbd	S ml	F mld	F mbl	S ldb	F mdb		S mldb	S mldb	S mldb	S mldb	F blmd	F md	F b	-	F d	F l
DEH	-	-	-	-	-	L		-	-	-	-	L	-	-	-	-	-
Caries	-	So	-	-	-	-		-	-	-	-	-	-	-	-	So	-
Wear	2	2	4	2	2	2		3	3	3	3	2	2	2	4	3	2

Skeleton Number	**3DT 52**
Phase	31
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	20-30% Right hand (2 carpals, MC1-5, 5 proximal, 2 intermediate & 3 distal phalanges); right os coxa (pubis & ischium); left os coxa (pubis); right leg; left leg; right foot (1 tarsal)
Age	18-25 years (young adult)
Sex	Male
Ancestry	Unknown
Stature	179.3cm ±2.99cm (femur & tibia, white formula) 173.6cm ±3.53cm (femur & tibia, black formula)
Non-Metric Traits	Hypotrochanteric fossa (R); vastus notch (L); vastus fossa (L); lateral tibial squatting facets (bilateral); double inferior talar facet (R); medial talar facet (R); lateral talar extension (R)
Pathology	-
Dental Health	0 tooth positions; 0 teeth present

Skeleton Number	**3DT 53**
Phase	31
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	60-70% Cranium, mandible, hyoid; manubrium, sternum; C1-4, C6-7, T1-12, L1-6, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (3 carpals, 1 proximal & 1 intermediate phalanx); left hand (3 carpals, MC2-4, 3 proximal & 1 distal phalanx); os coxae; right leg (proximal ¼ femur); left leg (proximal ½ femur)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	White?

Stature	180.9cm ±4.05cm (humerus, white formula)
Non-Metric Traits	Ossicle at lambdoid; extrasutural mastoid foramina (bilateral); open posterior condylar canals (bilateral); accessory lesser palatine foramina (bilateral); palatine torus; accessory infraorbital foramen (R) Bipartite transverse foramen (0/3 R, 1/3 L); circumflex sulcus (R); Poirier's facet (L); hypotrochanteric fossae (bilateral)
Pathology	Schmorl's nodes T6, T8-L5 Developmental asymmetry of spinous processes of upper-mid thoracic vertebrae – spinous processes of T3, T6, T7 all deviated to the right; spinous process of T4, T5 & T8 all deviated to the left Stenosis of transverse foramina of C7 Developmental asymmetry of manubrium – superior part off-set to the right, clavicular facet slightly more superior than the left with possible developmental anomaly affecting the epiphyseal flake that fuses to the clavicular facet Asymmetry of clavicles – enlargement of posterior part of sternal end of right clavicle, enlarged sternal facet. Possibly developmental and related to asymmetry of manubrium/ possibly traumatic Excavated muscle attachments both humeri – latissimus dorsi Small short ridges of lamellar bone on the visceral surfaces of right ribs 6 & 7 and left ribs 6 & 7, with small well defined single nodules of lamellar bone on all but left rib 7 Additional vertebra present, probably sacralised lumbar vertebra – sacrum contains six segments, inferior-most segment fused at lateral margins but not at body or cornua, sight sacral promontory at superior margin of second segment, alae of first segment angled inferiorly. Cervical spine incomplete – C5 lost post-mortem (C4 & C6 do not articulate) Cortical defect in right hamate – oval depression in centre of proximal end Decapitation C4 & C6-C7; two cuts – impossible to be certain whether either of them passed completely through the neck: C4 – linear cut through neural arch that has removed the inferior laminae and inferior apophyseal facets, probably the inferior tip of the right transverse process and a sliver of bone from the posterior margin of the inferior body surface. Cut angled slightly superior-posterior to inferior-anterior C5 – lost post-mortem C6 – horizontal linear cut located c. 5mm superior to the inferior border of the lamina that has passed through the superior part of the right inferior apophyseal facet (left side lost post-mortem). Corresponds to the cut to C7 C 7 – linear cut that has removed a sliver of bone from the superior-lateral margin of the right superior apophyseal facet. Cut possibly angled superior-left to inferior-right. Corresponds to the cut to C6
Dental Health	32 tooth positions, 32 teeth present Calculus (flecks to slight); caries (1 tooth); DEH Enamel chips – RI_1, RI_2, RP_1, RP_2, LI_1, RI^1, RI^2, RC^1, LI^1, RP^1, RP^2, RM^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F m	-	F m	F d	-	F b	S b	-	F b	S b	S b	S d	S m	-	F m	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	3	4	3	3	3	3	4	4	2	2	2	2	4	2	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F ld	F d	F d	F md	F md	F md	F blm	F l	S lb	S lbm	F bm	S d	S d	F l	-	S dl
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	So	-
Wear	2	3	5	3	3	3	3	4	4	3	3	3	2	4	3	2

Skeleton Number	**3DT 54**
Phase	31
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	90%+ Cranium, mandible; manubrium, sternum; C1-3, C5-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (6 carpals, MC2-5, 4 proximal phalanges); left hand (3 carpals, MC1-5, 3 proximal, 1 intermediate & 1 distal phalanx); os coxae; right leg; left leg; right foot (6 tarsals, MT1-5, 5 proximal phalanges, sesamoid bone); left foot (6 tarsals, MT1-5, 1 proximal & 1 distal phalanx, sesamoid bone)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	White?
Stature	162.9cm ±4.05cm (humerus, white formula)
Non-Metric Traits	Highest nuchal lines (bilateral); ossicles in lambdoid (bilateral); parietal foramen (R); ossicle at pterion (R); ossicle at asterion (R); extrasutural mastoid foramen (R); open posterior condylar canals (bilateral); double anterior condylar canal (R); accessory lesser palatine foramina (bilateral); maxillary torus (R) Lateral atlas bridging (L); posterior atlas bridging (bilateral); hypotrochanteric fossae (bilateral); lateral tibial squatting facets (bilateral); os trigonum (R); lateral talar extensions (bilateral)
Pathology	Schmorl's nodes T7, T9-11, L1-3 Developmental fusion of sternum and manubrium, sternum also broad Slight caudal border shift at lumbo-sacral border, with partial lumbarisation of S1 – slight promontory at the superior body of S2, narrow fissure between laminae of S1-2 Cleft neural arch – S1 Excavated muscle attachment proximal left humerus – teres major Small thin deposit of transitional woven to lamellar bone on the distal end of the right radius, on the medial part of the posterior surface New bone formation (woven and lamellar) on the visceral surfaces of 5 right ribs (ribs 4-8) Subtle lamellar bone on lateral shafts of both femora, and lateral & medial midshafts of both tibiae Two lumps of lamellar bone on the left tibia shaft – one on the anterior crest at the junction between the proximal and mid thirds of the shaft; the second on the medial surface at the junction of the mid & distal thirds of the shaft. Possible trauma/ ossified haematoma/ periosteal reaction Cyst in right femur – hollow on the posterior surface of the distal end at the posterior margin of the medial condyle Possible healed fracture of the left transverse process of L3 – thickened on posterior surface with subtle, irregular ridge on anterior surface
Dental Health	32 tooth positions, 26 teeth present 2 teeth lost post-mortem (one of which possibly sampled), 1 tooth lost ante-mortem, 3 teeth not present/ unerupted Calculus (flecks to heavy; asymmetric deposits – heavy on left side); caries (1 tooth); DEH; slight periodontal disease Crowding of anterior mandible; slight rotation RC_1; rotation LP^2, RP^2 Enamel chips – RI^1, RI^2, RC^1, LI^1, LI^2, LC^1, LM^1

	Right Dentition								Left Dentition							
Present	NP	P	P	P	(PM)	P	P	P	P	P	P	P	P	P	P	PM
Calculus	-	H a	H a	H a	-	M b	S b	S b	S b	S b	F b	F bd	S bd	S blm	S mb	-
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	1	3	2	-	3	3	3	3	3	4	3	2	3	2	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**

Present	NP/U	P	P	P	P	P	P	P	P	P	P	P	P	AM	P	NP/U
Calculus	-	H lbdo	H blm	H a	H a	M blmd	S blmd	S blmd	S blmd	S mb	S blm	S l	F ld	-	F l	-
DEH	-	-	-	-	-	L	L	L	L	L	L	L	-	-	-	-
Caries	-	-	Md	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	3	2	2	3	3	4	4	3	3	2	2	-	3	-

Skeleton Number	**3DT 55**
Phase	31
Radiocarbon date	-
Preservation	Very good (Grade 1), slight fragmentation
Completeness	60-70% Cranium, mandible; manubrium, sternum, xiphoid; C1-3, C6-7, T1-12, L1-5, S1-5; 12 right & 12 left ribs; right arm; left arm; right hand (4 carpals, MC1-5, 2 proximal phalanges); left hand (2 carpals, MC1-4, 3 proximal, 1 intermediate & 1 distal phalanx); os coxae
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	White?
Stature	171.5cm ±4.05cm (humerus, white formula)
Non-Metric Traits	Ossicle at pterion (R); ossicle at parietal notch (R); extrasutural mastoid foramen (R); open foramen spinosum (L); accessory lesser palatine foramen (R); palatine torus; maxillary tori (bilateral); absent zygomaticofacial foramen (L) Circumflex sulcus (R)
Pathology	Schmorl's nodes T11, L1 Osteochondritis dissecans of superior left apophyseal facet of C2 – oval lytic lesions (7.8 x 4.3mm), clear margins, floor porous Ossified ligamentum flavum T1-L2 Maxillary sinusitis, bilateral – slight porosity (both sides), small deposits of woven bone (left side) Developmental asymmetry of C2 & C3 –right halves of neural arches thicker and chunkier than left sides; spinous process of C2 deviates to the right; left half of spinous process of C3 underdeveloped Healed fractures of two right and one left rib: Right rib 7 – healed fracture in shaft c. 30mm distal to the angle, very little displacement or angulation Right rib 8 – healed fracture in shaft c. 50mm distal to the angle, very little displacement or angulation Left rib 7(?) – healed fracture in shaft just distal to the tubercle, very little displacement or angulation Healed fracture in the spinous process of T4 – tip displaced and angled to the left C6 – horizontal linear cut that has removed the superior parts of both laminae, superior apophyseal facets, superior parts of pedicles & the superior half of the body (anterior part of body fractured). Superior part of C6 lost post-mortem, also C4 & C5
Dental Health	32 tooth positions, 30 teeth present 1 tooth lost post-mortem; 1 tooth lost ante-mortem Calculus (flecks to slight); slight periodontal disease Slight crowding anterior mandible; RC$_1$ slightly rotated; slight crowding anterior maxilla; RI^1 & LI^2 rotated Two grooves in the incisive surface LI^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F m	F dm	S mb	F mb	F bd	F d	-	F b	F md	F b	F b	-	F m	-	F m	-

DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	2	4	3	2	2	2	4	4	2	2	2	3	5	3	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	AM	P	P	P	P	PM	P	P	P	P	P	P	P	P
Calculus	F ld	-	-	F b	S d	F ldm	F ld	-	S ldm	S ldm	S ld	F bmd	F lmd	F md	F md	F ld
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	3	-	2	2	2	2	-	3	2	2	2	2	5	4	2

Skeleton Number	**3DT 56**
Phase	31
Radiocarbon date	-
Preservation	Good (Grade 2), slight fragmentation
Completeness	20-30% Right leg; left leg; right foot (5 tarsals, MT1-5, 4 proximal & 1 distal phalanx, sesamoid bone); left foot (6 tarsals, MT1-5, 1 proximal phalanx)
Age	18+ years (adult)
Sex	Unknown
Ancestry	Unknown
Stature	-
Non-Metric Traits	Poirier's facets (bilateral); hypotrochanteric fossa (R); exostosis in trochanteric fossa (R); vastus notch (R); vastus fossa (R); lateral tibial squatting facets (bilateral); medial talar facet (R); lateral talar extension (L)
Pathology	Right femur has a small teardrop shaped shallow depression in the head extending from the inferior border of the fovea capitis; lesion surrounded by a slight ridge & floor of lesion porous Infection of right femur – shaft swollen at the junction between the mid & distal thirds (c. 70-80mm long), most pronounced on the medial side, surface composed of lamellar bone. Deep oval lytic lesion (3 x 2.3mm) on the medial side, margins slightly rounded, porosity surrounding lesion. Second deep lytic lesion (2.4 x 1.5mm) on the lateral-anterior surface, sharp margins, surrounding bone porous Soft tissue trauma to the distal right tibia & fibula – tibia has bone projection along anterior margin of fibular notch; woven bone deposits along the groove for tibialis posterior. Fibula has a thin flange of bone at the anterior border of the distal shaft (proximal end of the tibio-fibular joint) Both tibiae – slightly bowed in antero-posterior direction. Deposits of lamellar bone on medial shaft of both tibiae, especially along the anterior crest, most pronounced on right side Lamellar bone deposits on the lateral midshaft of the right fibula Calcaneus secundarius/ avulsion fracture of right calcaneus Probable trauma to right foot – proximal & distal first foot phalanges fused together. The joint space is visible on the lateral half; the medial half of the joint is bridged by roughened osteophytes
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**3DT 57**
Phase	33
Radiocarbon date	-
Preservation	Moderate (Grade 3), severe fragmentation
Completeness	30-40% Cranium (partial), mandible; C1-7 (partial), T1-2 + minimum of 4 thoracic vertebrae, 2 sacrum

	fragments; 2 right & 7 left ribs; right arm (ulna midshaft); left arm (lateral clavicle, scapula, proximal ¾ humerus, distal 1/3 ulna, distal ½ radius); right hand (MC1, 1 intermediate phalanx); left hand (MC1 & 4, 4 proximal & 1 intermediate phalanx); hand (2 MC shafts); os coxae (right ischium, left ischium & part ilium); right leg (distal femur shaft, patella, tibia shaft + distal end); left leg (proximal ¾ femur)
Age	18+ years (adult)
Sex	Male?
Ancestry	Unknown
Stature	-
Non-Metric Traits	Parietal foramen (L); double anterior condylar canal (L); absent zygomaticofacial foramen (L); bridging of supraorbital notch (L) Bipartite transverse foramen (1/2); acetabular crease (L)
Pathology	Possible healed fracture of left clavicle acromial end Probable healed fracture to RMC1 proximal end – proximal and thickened and proximal joint surface angled towards palmar Possible soft tissue trauma to the left femur – ridge of bone on medial side of the superior end of the medial supracondylar line; lateral supracondylar line thickened and enlarged at the superior end Coxa vara of left femur
Dental Health	28 tooth positions, 21 permanent teeth present; 1 deciduous tooth present 5 permanent teeth not present/ unerupted; 2 permanent teeth lost post-mortem; 1 deciduous tooth lost post-mortem Calculus (flecks to slight) Both lower second premolars not present or unerupted; both lower first premolars tilted distally; both second deciduous molars retained & probably partially submerged – Ldm$_2$ present on left side (stubs of roots fit into shallow sockets), presence inferred on right side from shallow sockets (tooth itself presumed lost post-mortem) Both upper second premolars also not present/ unerupted; LM$_3$ unerupted/ not present; super-eruption LM^3 Rotation LP^1 & RP^1 RM$_3$ – has an additional cusp and four roots Enamel chips – RI^1, RI^2, LI^1, LM^1

	Right Dentition								Left Dentition								
Present	P	P	P	NP/U	P	P	P	P	P	-	PM	P	NP/U		P	P	P
Calculus	-	F l	F lm	-	S bdl	F b	-	-	-	-	-	F d	-		F bd	F b	F dm
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
Wear	1	2	3	-	3	3	3	4	4	-	-	3	-		3	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**		**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**e**	**6**	**7**	**8**
Present	P	P	P	NP/U	P	-	-	-	P	P	PM	P	NP/U	P	P	P	NP/U
Calculus	F d	S lm	S ldb	-	S bld	-	-	-	-	-	-	-	-	S md	S lbm	S l	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	-	2	-	-	-	4	3	-	2	-	4	3	2	-

Skeleton Number	**3DT 58**
Phase	33
Radiocarbon date	-
Preservation	Good (Grade 2), severe fragmentation
Completeness	30-40%

	Cranium (partial), mandible (left side); partial manubrium & sternum; C1-3 + minimum 3 cervical vertebrae, T11-2 + minimum 9 thoracic vertebrae, L1-5, S1; 2 right & 7 left ribs, unsided shaft fragments; left arm (clavicle, part scapula, distal 1/3 ulna, distal 1/3 radius); left hand (2 carpals, MC1-5, 3 proximal, 3 intermediate phalanges); right os coxa (partial ilium)
Age	36-45 years (old middle adult)
Sex	Male?
Ancestry	Unknown
Stature	-
Non-Metric Traits	Highest nuchal lines (bilateral); ossicle at bregma; open posterior condylar canal (R) Accessory sacral facet (R); acetabular crease (R)
Pathology	Schmorl's nodes T11-L4 + 2 unidentified thoracic bodies Cranial border shift at thoraco-lumbar border – apophyseal joints between T11-12 lumbar in shape
Dental Health	9 tooth positions, 7 teeth present (3 of which loose) 5 teeth lost post-mortem Calculus (flecks to slight); DEH Enamel chips – LI_2

	Right Dentition								Left Dentition							
Present	P	-	-	P(l)	-	-	-	-	-	P(l)	-	-	-	-	-	PM
Calculus	F l	-	-	-	-	-	-	-	-	F l	-	-	-	-	-	-
DEH	L	-	-	L	-	-	-	-	-	L	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	-	-	2	-	-	-	-	-	2	-	-	-	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	-	P(l)	-	-	-	-	-	PM	PM	P	P	P	PM	-	-	PM
Calculus	-	F dml	-	-	-	-	-	-	-	S lmd	S lmd	S lmd	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	-	-	-	-	-	-	-	2	3	2	-	-	-	-

Skeleton Number	**3DT 59**
Phase	Unphased
Radiocarbon date	-
Preservation	Moderate (Grade 3), severe fragmentation
Completeness	40-50% Cranium (partial); 1 thoracic vertebra (T9/10?); 11 right & 10 left ribs; right arm; left arm (clavicle, head & distal ½ humerus, midshaft ulna); os coxae; right leg (proximal 2/3 femur); left leg (proximal 1/3 femur)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	Unknown
Stature	-
Non-Metric Traits	Ossicle at asterion (L); extrasutural mastoid foramen (L); open posterior condylar canal (L); double anterior condylar facet (R); bridging of supraorbital notch (R) Circumflex sulcus (R); acetabular crease (R); third trochanter (R)
Pathology	Schmorl's node T10(?)
Dental Health	8 tooth positions, 8 teeth present

				Calculus (flecks)													
	Right Dentition								Left Dentition								
Present	P	P	P	P	P	P	P	P	-	-	-	-	-	-	-	-
Calculus	F m	F m	F d	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	3	4	3	3	3	3	4	-	-	-	-	-	-	-	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**6DT 2**
Phase	24
Radiocarbon date	-
Preservation	Very good (Grade 1), moderate fragmentation
Completeness	70-80% Cranium, mandible; C1-4, T3-12, L1-5, S1-5, Cx1; 11 right & 9 left ribs; right arm; right hand (6 carpals, MC1-5, 5 proximal, 4 intermediate & 3 distal phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 2 proximal phalanges); left foot (6 tarsals, MT1-5, 5 proximal, 3 intermediate & 2 distal phalanges), 2 sesamoid bones
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	White
Stature	167.3cm ±3.27cm (femur, white formula)
Non-Metric Traits	Highest nuchal lines (bilateral); ossicle in lambdoid (L); extrasutural mastoid foramina (bilateral); accessory lesser palatine foramen (R) Poirier's facets (bilateral); plaque (L); hypotrochanteric fossae (bilateral); emarginate patella (R); vastus notches (bilateral); vastus fossa (L); lateral tibial squatting facets (bilateral); peroneal tubercles (bilateral); lateral talar extensions (bilateral)
Pathology	Schmorl's nodes T7-10 , T12 OA superior left apophyseal facet T8 Ivory osteoma on left parietal (anterior-medial corner) Pinprick porosity on anterior right mandible, focussed around canine Cortical defects in centre of glenoid fossa of right scapula, superior facet of right talus, proximal joint surface of right intermediate cuneiform Large rounded nodule of bone (25.9 x 19.3mm, projecting 13mm) on the posterior surface of the proximal shaft of the right humerus, located inferior to the surgical neck. Post-mortem damage to the posterior surface shows the nodule has a thin outer cortex (<0.5mm) & internally it is occupied by trabecular bone. Possibly neoplastic/ trauma to triceps brachii? Possible caudal border shift at sacro-coccygeal border – Cx1 sacralised Well healed fracture to left rib 9(?) between the tubercle and angle, possible slight inferior displacement of the shaft Probable well healed fracture to left rib 11, just proximal to the angle, minimal displacement or angulation Well healed fracture to right rib 11 c. 30mm distal to the angle Pilasterism of both femora Subtle striated lamellar bone on the medial & posterior thirds of both tibia shafts; also on lateral

	midshaft of left tibia Calcaneus secundarius / avulsion fracture of right calcaneus Non-osseous tarsal coalition right & left MT3 & lateral cuneiforms Possible trauma to the ligaments on the medial left talus – rugged spicules of bone inferior to the facet for the medial malleolus
Dental Health	32 tooth positions, 29 teeth present 1 tooth sampled; 2 teeth lost ante-mortem Calculus (flecks to slight); caries (4 teeth); DEH; abscesses – RM_3, LM_2; slight periodontal disease Crowding of anterior mandible; slight rotation RC_1 & LC_1 Curve of upper dental arcade slightly concave on left side Fractures – LM_2 crown, RM_1 mesio-lingual corner, LM^2 buccal side Enamel chips – RP_2, LM_1, RC^1, RI^2, RI^1, LI^1, LI^2, LC^1, LP^1

	Right Dentition								Left Dentition							
Present	P	P	P	S	P	P	P	P	P	P	P	P	P	P	P	AM
Calculus	S l	F B	-	-	F bl	S bl	-	S bl	F mb	F d	S ldb	F bl	F ld	F md	S mdb	-
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-
Caries	Mo	-	La	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	2	-	-	3	2	3	4	4	4	3	3	3	6	4	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	AM	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	-	-	F ld	S m	S mld	S mld	S mld	S lmdb	F dlb	S lmd	S ldb	S lmo	S l	S lb	-	S ld
DEH	-	-	-	-	-	L	-	-	-	L	L	-	L	-	-	-
Caries	La	-	-	-	-	-	-	-	-	-	-	-	-	-	-	So
Wear	-	-	6	4	3	3	3	5	5	5	3	3	4	7	-	2

Skeleton Number	**6DT 3**
Phase	24
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	90%+ Cranium, mandible; C1-2, C4-5, C7, T1-12, L1-5, S1-5; 7 right & 12 left ribs; right arm; left arm; right hand (3 carpals, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges); left hand (8 carpals, MC1-5, 4 proximal, 3 intermediate & 3 distal phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 5 proximal phalanges); left foot (7 tarsals, MT1-5, 5 proximal & 1 distal phalanx)
Age	18-25 years (young adult)
Sex	Male
Ancestry	White?
Stature	182.7cm ±3.37cm (tibia, white formula)
Non-Metric Traits	Highest nuchal line (bilateral); ossicles in lambdoid (bilateral); ossicle at asterion (L); extrasutural mastoid foramina (bilateral); open posterior condylar canal (R); precondylar tubercle; palatine torus Acetabular crease (R); Allen's fossa (L); hypotrochanteric fossa (L); lateral tibial squatting facets (bilateral); medial talar facets (bilateral)
Pathology	Schmorl's nodes T4, T6-12 Cleft in the superior left apophyseal facet of S1, dividing the posterior inferior corner from the rest of the surface. Possibly traumatic/ developmental Cribra orbitalia, bilateral Slight cranial border shift at thoraco-lumbar border – right apophyseal joint between T11-12

	tending towards a lumbar shape; left side thoracic in shape Elongated deposit of lamellar bone along the superior half of the gluteal lines of both femora, occupying the area of the hypotrochanteric fossa; possibly related to muscle attachment Excavated muscle attachments both tibia – soleus Avulsion fracture of the styloid process of R MC3 Possible avulsion fracture/ developmental anomaly of right navicular – tuberosity flattened and surface rough & porous Possible decapitation C4-5; possibly two separate cuts C4 – linear cut that has removed a sliver of bone from the anterior half of the inferior body surface, angled slightly superior left to inferior right C5 – 1) linear cut that has penetrated the lamina inferior to the superior right apophyseal facet; the superior fragment is detached and present, apparently fractured at the anterior margin rather than cut; left half of neural arch lost post-mortem. Cut angled from posterior-inferior to anterior-superior (broadly parallel with the inferior right apophyseal facet), & possibly delivered from behind 2) possible second cut just superior & parallel to cut 1 that has removed the superior margin of the right lamina, terminating posterior to the superior apophyseal facet Right ulna – possible peri-mortem butterfly fracture through the midpoint of the shaft. The proximal and distal halves each have a curved break through the shaft with the posterior side projecting further (i.e. both halves nearly meet at the posterior margin); the gap between the two break surfaces on the anterior margin is roughly 30mm. The V shaped segment of bone that would have occupied the gap has been lost post-mortem. The break surfaces are slightly roughened & the same colour as the rest of the bone cortex.
Dental Health	33 tooth positions, 32 teeth present 1 tooth sampled Calculus (flecks to heavy); DEH Slight crowding of anterior mandible Small supernumerary tooth distal to LM^3, possibly beginning to erupt, crown shape circular with two equal cusps Shallow notch in incisive surface RI^1 and RI$_1$

	Right Dentition								Left Dentition								
Present	P	P	P	P	P	P	P	P	P	P	P	P	S	P	P	P	P(E)
Calculus	F db	-	F lbm	S blm	F bd	S bd	F l	F lmb	F ldb	F lm	S bl	S db	-	F lb	S lb	F l	-
DEH	-	-	-	-	-	L	L	L	L	L	L	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	2	3	2	2	3	2	3	3	2	2	2	-	3	2	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
Calculus	S dl	S l	S l	S lmd	S lmd	M lmd	H lmd	F l	F m	H lmd	H lmd	S lmd	S lmd	S lm	S l	S d	
DEH	-	-	-	-	L	L	L	L	L	L	L	L	-	-	-	-	
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Wear	2	3	3	2	2	3	3	4	4	3	3	2	2	3	3	2	

Skeleton Number	**6DT 4**
Phase	24
Radiocarbon date	-
Preservation	Good (Grade 2), slight fragmentation
Completeness	60-70% Cranium, mandible; C1-5, L5, S1-3, Cx1; right arm (distal humerus, ulna, radius); left arm (ulna, radius); right hand (2 carpals, MC1-2 & 5, 3 proximal, 3 intermediate & 1 distal phalanx); left hand (1 carpal, MC1-5, 5 proximal, 2 intermediate & 1 distal phalanx); os coxae; right leg; left

	leg; right foot (4 tarsals, MC1 & 5); left foot (2 tarsals)
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	White
Stature	178.7cm ±3.37cm (tibia, white formula)
Non-Metric Traits	Ossicle in lambdoid (R); ossicle at pterion (R); ossicle at parietal notch (R); ossicle at asterion (R); extrasutural mastoid foramen (R); open posterior condylar canal (R); accessory lesser palatine foramina (bilateral); absent zygomaticofacial foramen (R) Bipartite transverse foramen (0/2 R, 1/3 L); accessory lesser sacral facets (bilateral); acetabular creases (bilateral); vastus notches (bilateral); vastus fossae (bilateral); lateral tibial squatting facets (bilateral); peroneal tubercles (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facet (R)
Pathology	OA of proximal inter-phalangeal joint of the 5th digit of the left hand; potential dislocation? Cribra orbitalia, bilateral Striated lamellar bone on the medial midshafts of both tibiae, more subtle lamellar bone on the lateral mid thirds of the tibiae & the lateral-anterior midshafts of the fibulae Both ischia have rounded nodules & porosity on the superior parts of the ischial tuberosities, with a diamond-shaped depression in the centre. Weaver's bottom RMC1 – osteophytes on palmar side of head + 2 small lytic lesions (sharp margins) at the joint margins Small shallow oval depression (17 x 9mm) in the anterior-medial corner of the right parietal, margins indistinct Decapitation C4-5: C4 – horizontal peri-mortem cut through the inferior part of the spinous process & both laminae C5 – 1) linear cut that has removed the inferior halves of both inferior apophyseal facets, with peeling of the inferior surfaces of the pedicles. Cut angled superior left to inferior right & delivered from posterior-superior, corresponds to cut on C4 2) sliver of bone removed from the anterior margin of the inferior body surface. Cut angled slightly superior right to inferior left
Dental Health	32 tooth positions, 27 teeth present 1 tooth sampled; 1 tooth lost post-mortem; 4 teeth not present/ unerupted Calculus (flecks to medium); DEH; slight periodontal disease Slight rotation LP_2 Enamel chips – LI^1, LI^2, RI^1, RI^2, RC^1, RP^1, LI_1, LI_2, RI_1

	Right Dentition								Left Dentition							
Present	NP/U	P	P	P	P	P	P	P	P	P	P	P	P	P	P	NP/U
Calculus	-	S dlbm	S md	S bm	M bm	M b	S bmd	S bm	S bd	S bm	S db	F d	S md	S md	S dbl	-
DEH	-	-	-	-	-	L	-	L	L	-	L	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	3	5	4	3	4	4	4	4	4	4	4	4	5	3	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	NP/U	P	P	S	P	P	P	P	P	P	P	P	P	P	P	NP/U
Calculus	-	S bld	S lbm	-	S lbmd	S bl	S bl	S bl	S bl	S bl	S lmd	F mldb	S lm	S lbd	S bmdl	-
DEH	-	-	-	-	L	-	L	L	L	L	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	3	4	-	3	3	3	4	4	3	4	3	3	4	3	-

Skeleton Number	**6DT 5**
Phase	24

Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	40-50% Manubrium, sternum; C6-7, T1-12, L1-5, S1; 12 right & 9 left ribs; right arm; left arm; right os coxa; right leg (proximal 2/3 femur)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	Unknown
Stature	167.2cm ±4.05cm (humerus, white formula) 164.5cm ±4.43cm (humerus, black formula)
Non-Metric Traits	Circumflex sulci (bilateral); accessory sacral facet (R); hypotrochanteric fossa (R); third trochanter (R)
Pathology	Schmorl's nodes T6-10 Os acromiale of left scapula; right scapula unobservable as damaged post-mortem Excavated muscle attachments both humeri – teres major (bilateral), pectoralis major (right humerus) 5 right & 3 left ribs have subtle irregularities & undulations on the internal surfaces of the ribs near the angles – gently rounded slightly raised areas, or multiple parallel short ridges Subtle well remodelled lamellar bone on the lateral & medial mid third of the right femur shaft Decapitation C6-7: C6 – linear cut through the spinous process, angled superior-posterior to inferior-anterior; corresponds to cut 1 on C7 C7 – 1) linear cut through the neural arch just inferior to the superior apophyseal facets, terminating in the pedicles; a small crack runs from the anterior end of the cut in the right pedicle medially across the posterior surface of the body. Cut angled slightly superior-posterior to inferior-anterior, delivered from behind; corresponds to cut through C6 2) linear cut superior to, and parallel to, cut 1 that has cut through the superior left apophyseal facet and left uncinate process (passing superior to the left pedicle); probably also delivered from behind Left clavicle – has a small (5.7mm long), shallow (penetrates c. 4mm into the bone) linear cut into the superior-posterior surface of the sternal third c. 24mm lateral to the sternal end. Cut angled from superior right (medial) to inferior left (lateral); possibly sustained during decapitation
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**6DT 6**
Phase	24
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	90%+ Cranium, mandible; manubrium (partial); C1-3, C5?, C6-7, T1-12, L1-5, S1-3; 8 right & 10 left ribs; right arm; left arm; right hand (6 carpals, MC1-5, 5 proximal, 4 intermediate & 3 distal phalanges); left hand (4 carpals, MC1-5, 5 proximal, 4 intermediate & 2 distal phalanges); os coxae; right leg; left leg; right foot (6 tarsals, MT1-2 & 5); left foot (7 tarsals, MT1-5)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	Mixed?
Stature	171.2cm ±4.32cm (radius, white formula) 164.9cm ±4.30cm (radius, black formula)
Non-Metric Traits	Ossicle in lambdoid (L); metopic suture; ossicle at pterion (R); ossicle at parietal notches (bilateral); extrasutural mastoid foramen (R); sutural mastoid foramen (L); open posterior condylar canals (bilateral); open foramina spinosum (bilateral); mandibular tori (bilateral); absent zygomaticofacial foramen (L) Acetabular creases (bilateral); hypotrochanteric fossae (bilateral); vastus notch (R); lateral tibial squatting facets (bilateral); peroneal tubercle (R)

Pathology	Schmorl's nodes T5-L4 The mid third of the sagittal & metopic sutures are raised on a rounded ridge – developmental Small shallow circular depression (4.2mm diameter) on the centre of the left parietal bone just superior to the temporal line. Cranial border shift at thoraco-lumbar border – apophyseal joints between T11-12 lumbar in shape Excavated muscle attachments in both humeri (latissimus dorsi); both tibiae (soleus); both ulnar tuberosities (brachialis) Subtle pale lamellar bone on the medial & distal thirds of both femora Slightly raised deposit of lamellar bone on the medial mid third of the tibiae Both tibiae slightly bowed antero-posteriorly in the mid third of the shaft Cortical defect/ osteochondritis dissecans in the medial condyle of the right tibia – deep triangular lytic lesion, clear margins, floor rough & slightly porous Cortical defects in both superior apophyseal facets of C3 Bar of bone along dorsal surface of right navicular, adjacent to proximal joint surface
Dental Health	31 tooth positions, 24 teeth present 1 tooth sampled; 3 teeth lost post-mortem; 2 teeth lost ante-mortem; 1 tooth not present/ unerupted Calculus (flecks to medium); slight periodontal disease Diastema between LP^1 & LP^2 Enamel chips – RI^1, LI^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	S	AM	P	P	NP/U
Calculus	M bdlm	M blmd	M bmd	M bmld	M bmld	M bmd	S bm	S bmd	F mb	F m	M bmd	-	-	S bmd	S blmd	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	4	5	3	3	5	5	5	5	5	5	-	-	5	4	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	AM	P	PM	PM	PM	P	P	P	-	P	P	P	P
Calculus	M lbd	M lbm	M lbd	-	S lbmd	-	-	-	S bld	S blm	S blmd	-	M lbmd	M bld	M blmd	M bdlm
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	4	5	-	3	-	-	-	4	4	4	-	3	4	4	2

Skeleton Number	**6DT 7**
Phase	24
Radiocarbon date	-
Preservation	Good (grade 2), moderate fragmentation
Completeness	60-70% Cranium, mandible; C1-3, L4?-5, S1 + fragments sacrum; right arm (ulna, radius); left arm (ulna, radius); right hand (1 carpal, MC1-5, 4 proximal & 2 intermediate phalanges); left hand (7 carpals, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 4 proximal, 1 intermediate & 1 distal phalanx); left foot (7 tarsals, MT1-5, 4 proximal & 1 distal phalanx, 1 sesamoid)
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	White?
Stature	-
Non-Metric Traits	Ossicle in lambdoid (L); parietal foramen (R); metopic suture; ossicle in coronal (L); extrasutural mastoid foramen (L); sutural mastoid foramina (bilateral); palatine torus; absent zygomaticofacial

	foramen (L); accessory supraorbital foramen (R) Acetabular creases (bilateral); hypotrochanteric fossae (bilateral); exostosis in trochanteric fossa (R); vastus notch (R); lateral tibial squatting facet (L); lateral talar extension (L)
Pathology	DJD (OP + PO) both TMJs, distal left ulna, both acetabuli Maxillary sinusitis, bilateral – lamellar bone & scattered fine porosity Cobweb of fine lamellar bone strands on central external surface of both zygomatic bones Soft tissue trauma to the left radius – broad flat enthesophyte on the postero-lateral side of the distal third (brachioradialis insertion) Striated lamellar bone on the medial midshafts of both tibiae Well healed fracture of distal third of right fibula, just superior to the distal joint surface Soft tissue trauma to the distal right tibia – rough bone spicules along the posterior margin of the fibrous fibular joint surface; probably associated with fracture to fibula Developmental anomaly of both medial cuneiforms – partial horizontal cleft dividing superior and inferior halves C3 - possible peri-mortem cut in the left neural arch (just posterior to the pedicle); rest of area obscured by post-mortem damage
Dental Health	32 tooth positions, 28 teeth present 1 tooth sampled; 1 tooth lost ante-mortem, 2 teeth not present/ unerupted Calculus (flecks to heavy); caries (2 teeth); slight periodontal disease LM^3 – probably partially impacted; LM_1 supererupted Fracture – LM^1 crown Enamel chips – RI^1, RI^2, LI^1, LI^2

	Right Dentition								Left Dentition							
Present	P	AM	P	P	P	P	P	P	P	P	P	P	P	P	P	P(E)
Calculus	F d	-	-	-	-	F b	F b	F b	S b	F bl	S bl	S bd	-	-	S dbml	F o
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	Sd	-	-	-	-	-	-	-	-	-	La	-	-	-
Wear	1	-	3	2	2	3	3	4	4	3	3	2	-	8	1	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	NP/U	P	P	S	P	P	P	P	P	P	P	P	P	P	P	NP/U
Calculus	-	S dl	S l	-	S ldb	S lbdm	S lmbd	S lmbd	S lmbd	S lmd	S lmbd	M a	M a	M lmdb	H ldbm	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	4	-	2	3	3	4	3	3	3	2	2	3	2	-

Skeleton Number	**6DT 8**
Phase	24
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	90%+ Cranium, mandible; manubrium, sternum (partial); C1-7, T1-12, L1-5, S1; 11 right & 11 left ribs; right arm; left arm; right hand (5 carpals, MC1-5, 5 proximal, 4 intermediate & 1 distal phalanx); left hand (6 carpals, MC1-5, 5 proximal, 3 intermediate & 5 distal phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 5 proximal & 1 distal phalanx); left hand (7 tarsals, MT1-5, 3 proximal & 1 intermediate phalanx)
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	White?
Stature	177.3cm ±4.32cm (radius, white formula)

Non-Metric Traits	Highest nuchal line (R); parietal foramen (R); ossicle at parietal notch (R); ossicle at asterion (L); sutural mastoid foramina (bilateral); open posterior condylar canal (R); absent zygomaticofacial foramina (bilateral) Acetabular crease (L); Poirier's facet (L); plaque (bilateral); third trochanters (bilateral); vastus fossa (R); peroneal tubercle (L)
Pathology	Schmorl's nodes T6, L1 DJD (OP + PO) apophyseal facets T4, T10; costal facets T1; acetabuli; distal left femur & patella Trauma to L2 – small depression on centre of anterior border of inferior surface of body. Traumatic anterior disc herniation. Soft tissue trauma to proximal(?) hand phalanx (possibly right side) – rounded nodule of lamellar bone on the edge of the palmar side just proximal to the head Probable fracture to the proximal joint surface of a distal hand phalanx (possibly right side) Fracture through the dorsal half of the proximal joint surface of the distal right first foot phalanx Rib lesions – 8 right & 6 left ribs have subtle plaques of lamellar bone on the visceral necks Cortical defect of left navicular proximal joint surface Well remodelled lamellar bone on the lateral midshaft of the right fibula, & on the mid-distal third of the left fibula (less pronounced) Striated lamellar bone on the medial, lateral & posterior midshafts of both tibiae; transitional woven-lamellar bone on the medial side of the anterior crest of the left femur Decapitation C3-4 , single cut angled posterior-superior to anterior-inferior, probably delivered from behind: C3 – horizontal linear cut through both inferior apophyseal facets & laminae; corresponds to cut on C4 C4 – horizontal linear cut that has removed the superior halves of both superior apophyseal facets & the posterior half of the body (anterior part fractured); corresponds to cut on C3
Dental Health	32 tooth positions, 30 teeth present 1 tooth sampled, 1 tooth lost ante-mortem Calculus (flecks to medium); caries (5 teeth); DEH; abscesses – RM^1, LM^1-M^2; slight periodontal disease AM loss RI^1 - RI$_2$ & distal half RI$_1$ have noticeably less wear than surrounding teeth Enamel chips – LI^1, RP^1, RP^2, LP^1, LP^2, RI$_1$, RI$_2$, RP$_1$, LP$_1$

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	AM	P	P	P	P	P	P	P	P
Calculus	S ml	S md	F ld	S bm	S bmdl	S bdm	F md	-	F bdl	S mdb	S bmld	S bmld	M bmld	S bm	-	M bdlm
DEH	L	-	-	-	-	-	-	-	L	-	-	L	-	-	-	-
Caries	So	-	La	Md	-	-	-	-	-	-	-	-	-	Lm	La	-
Wear	2	4	-	3	2	4	5	-	5	5	5	3	3	4	-	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	S	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	S lmd	S ldm	S lbmd	-	M lmdb	M lbmd	M ldmb	S lbmd	S lbmd	S lmdb	S lbmd	S lbmd	S lbmd	S bmdl	S bdml	S bdml
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	4	5	-	4	4	2	4	5	4	5	3	3	5	4	2

Skeleton Number	**6DT 9**
Phase	24
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation

Completeness	30-40% Cranium, mandible, hyoid; C1-4; right hand (3 carpals, MC1-4, 5 proximal, 2 intermediate & 3 distal phalanges); right os coxa (ilio-pubic ramus); right leg; left leg; right foot (2 tarsals); left foot (3 tarsals)
Age	18+ years (adult)
Sex	Male?
Ancestry	Mixed?
Stature	-
Non-Metric Traits	Highest nuchal lines (bilateral); ossicle in lambdoid (L); parietal foramen (L); extrasutural mastoid foramen (L); sutural mastoid foramen (R); open foramen spinosum (R); absent zygomaticofacial foramen (L); accessory supraorbital foramina (bilateral) Plaque (bilateral); hypotrochanteric fossae (bilateral); vastus fossa (L); lateral tibial squatting facet (R)
Pathology	DJD (OP + PO) both TMJs Asymmetry of mandible – left ramus 10mm shorter than right, left corpus shorter than the right, left mandibular condyle rotated c. 45º. Rotation of condyles mirrored in the location and orientation of the glenoid fossae of the temporal bones Porosity on the external surfaces of both sphenoid greater wings Both tibia shafts slightly swollen with deposits of striated lamellar bone on the medial mid third of the shaft, extending onto the distal third & posterior midshaft. Lightly raised area of lamellar bone on the right tibia at the junction of the mid & distal thirds just medial to the anterior crest Possible lamellar bone deposits on the lateral side of the proximal shaft of the left fibula, & lamellar bone on the lateral mid third of the right fibula Both femora have well remodelled lamellar bone on the postero-medial mid third of the shaft, extending onto the proximal thirds Decapitation C3-4: C3 – two shallow fine parallel linear cuts into the lateral side of the posterior surface of the right inferior apophyseal facet: 1) cut 6.9mm long c. mid-way along the lateral margin & 2) 3.5mm inferior to cut 1, 6.4mm long & close to the inferior margin. Slivers of bone have been removed from the inferior surfaces of the tips of the spinous process; this cut is aligned with cut 1. Both cuts delivered from the posterior right C4 – diagonal cut through the superior right apophyseal facet, pedicle & posterior right corner of the inferior body surface. Cut angled from posterior superior right to anterior inferior left
Dental Health	31 tooth positions, 29 teeth present (1 of which loose) 1 tooth sampled; 2 teeth not present/ unerupted Calculus (flecks to medium); DEH Diastema between LC^1 & LP^1, RC^1 & RP^1; RP^1 slightly rotated Super-eruption LM^3 Fracture – RC^1 buccal surface, RP^1, buccal surface, LP^1 buccal surface Enamel chips – RI^1, RI^2, LI^1, LI^2, LC^1, RI_1, RI_2, LI_2

	Right Dentition								Left Dentition							
Present	P(l)	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	S dlmb	S bld	S blm	S bdm	M bmd	S mbd	F bmd	F bmd	F bmd	F bm	F bmd	F bmd	S md	S bmld	F bdml	F dbm
DEH	-	L	L	L	G+L	G+L	L	L	L	L	G+L	L	L	L	L	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	4	3	3	2	3	2	4	4	3	3	3	4	4	4	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	NP/U	P	P	P	P	P	P	P	P	P	P	P	S	P	P	NP/U
Calculus																
DEH	-	L	L	L	G+L	G+L	L	-	L	L	G+L	G+L	-	L	L	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	4	3	2	3	3	4	4	4	4	2	-	4	3	-

Skeleton Number	**6DT 10**
Phase	23
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	10-20% C5-7, T1-2; 9 left ribs; right arm (medial 2/3 clavicle; scapula, humerus)
Age	18-25 years (young adult)
Sex	Unsexed
Ancestry	Unknown
Stature	-
Non-Metric Traits	Bipartite transverse foramen (1/1 R); circumflex sulcus (L)
Pathology	Os acromiale of left scapula (right scapula lost post-mortem) Excavated muscle attachment left humerus – teres major Lamellar bone + pinprick porosity on the anterior surface of the distal left humerus, just proximal to the coronoid fossa C5 – possible peri-mortem cut to the superior part of the superior right apophyseal facet, but area eroded post-mortem
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**6DT 11**
Phase	23
Radiocarbon date	-
Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	5-10% Right leg (fibula); right foot (6 tarsals, MT1-5)
Age	18+ years (adult)
Sex	Unsexed
Ancestry	Unknown
Stature	-
Non-Metric Traits	Double anterior calcaneal facet (R); double inferior talar facet (R)
Pathology	Lamellar bone on the lateral right fibula shaft, most pronounced in the mid third Oval deposit of lamellar bone on the proximal half of the medial shaft of RMT3 & RMT4
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**6DT 12**
Phase	22
Radiocarbon date	-
Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	40-50% Cranium, mandible; manubrium, sternum; C1-7, T1-10; 10 right & 10 left ribs; right arm (clavicle, scapula, humerus); left arm (clavicle, scapula, humerus)
Age	18+ years (adult)
Sex	Male?
Ancestry	Mixed
Stature	-
Non-Metric Traits	Highest nuchal lines (bilateral); ossicle at lambda; ossicles in lambdoid (bilateral); parietal foramen (R); extrasutural mastoid foramina (bilateral); open posterior condylar canals (bilateral); double condylar facets (bilateral); precondylar tubercle; double anterior condylar canals

	(bilateral); open foramen spinosum (L); mandibular torus (L) Bipartite transverse foramina (2/3 R, 2/4 L); septal apertures (bilateral)
Pathology	Schmorl's nodes T4-9 DJD (OP + PO) costal facet left transverse process of T4; medial right clavicle Excavated muscle attachment left humerus – teres major Decapitation C3-4, single cut angled slightly superior left to inferior right, and inferior-posterior to superior-anterior: C3 – linear cur that has removed the inferior margins of both inferior apophyseal facets; corresponds to cut on C4 C4 – linear cut that removed the superior half of the left apophyseal facet, left uncinate process, the superior margin of the right lamina, most of the superior right apophyseal facet; right side of body damaged post-mortem; corresponds to cut on C3
Dental Health	32 tooth positions, 29 teeth present 1 tooth sampled, 2 teeth lost ante-mortem Calculus (flecks to slight); caries (1 tooth); DEH; slight periodontal disease Crowding of mandible; LC_1 & RC_1 rotated Enamel chips – LI^1, RI^1, RI^2, RC^1, LI_1

	Right Dentition								Left Dentition							
Present	P	P	P	S	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F bm	F bl	S bl	-	F bl	S bl	F bl	F bm	F b	S bm	S b	S bl	S bl	S bl	F blm	F d
DEH	-	-	-	-	-	-	-	L	L	L	-	L	-	-	-	-
Caries	So	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	-	2	2	2	3	4	2	2	2	2	3	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	AM	P	P	P	P	P	P	P	P	AM	P	P	P
Calculus	F ldb	S l	S lmb	-	S ldbo	S lbm	S m	S bl	S l	F lmb	S blmd	S a	-	S lmb	S lb	F b
DEH	-	-	-	-	L	-	-	-	-	-	-	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	4	-	2	2	4	4	4	4	2	2	-	5	2	1

Skeleton Number	**6DT 13**
Phase	23
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	20-30% Sternum (small fragment); C3-6, T11?-12?, L1-5; 1 left rib, unsided rib fragments; left arm (distal ¾ humerus, radius, ulna); right hand (1 carpal, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges); left hand (8 carpals, MC1-5, 5 proximal, 3 intermediate & 3 distal phalanges); left os coxa; left leg (femur)
Age	36-45 years (old middle adult)
Sex	Male?
Ancestry	Unknown
Stature	-
Non-Metric Traits	Bipartite transverse foramina (2/2 R); hypotrochanteric fossa (L)
Pathology	Schmorl's nodes T11-12 DJD (OP + PO) apophyseal facet L5 Soft tissue trauma to the right proximal first hand phalanx – small nodule of bone on the dorso-medial corner adjacent to the proximal joint surface

	Cyst in LMC3 – sharp-edged hollow in the lateral shaft close to the distal end, smooth walls & floor Decapitation C6 – cut that removed the entire inferior surface of the body, inferior margin of the right lamina & the right inferior apophyseal facet; left half of neural arch lost post-mortem, peeling of inferior surface of left pedicle. Cut angled slightly superior left to inferior right, possibly delivered from behind
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**6DT 14**
Phase	22
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	60-70% Cranium, mandible; sternum (small fragment); C1-7, T1-12, L1-5, S1; 8 right & 3 left ribs; right arm (clavicle, scapula, humerus, proximal 1/3 radius; proximal third ulna shaft); left arm; hands (comingled with 6DT17, 6DT18 & 6DT20); os coxae (incomplete); right leg; left leg; right foot (3 tarsals, 4 proximal & 1 distal phalanx); left foot (5 tarsals, MT1-5, 5 proximal & 1 distal phalanx)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	Unknown
Stature	-
Non-Metric Traits	Parietal foramina (bilateral); extrasutural mastoid foramen (R); sutural mastoid foramen (L); open posterior condylar canal (R); double condylar facet (R); double anterior condylar canals (bilateral) Bipartite transverse foramen (0/2 R, 1/3 L); circumflex sulcus (R); Poirier's facet (L); hypotrochanteric fossae (bilateral); third trochanters (bilateral); vastus fossa (L); lateral tibial squatting facets (bilateral); peroneal tubercles (bilateral); double anterior calcaneal facet (L); double inferior talar facet (L)
Pathology	Schmorl's nodes T10-L2 Degeneration of vertebral body (OP + PO) L4 DJD (OP + PO) apophyseal facets T4-6; costal facets T1; right scapula glenoid fossa; both acetabuli & proximal left femur; left patella OA – inferior left apophyseal facet of L2, associated with possible trauma Possible fracture of inferior left apophyseal facet of L2 – crescent of bone removed from the anterior margin of the inferior half, area porous & irregular with small area of eburnation; possibly cyst in the posterior surface of the apophyseal process L4 – probable trauma to anterior margin of superior body surface. Traumatic anterior disc herniation. Slight cranial border shift at thoraco-lumbar border – right apophyseal joint between T11-12 lumbar in shape; left joint thoracic in shape Cribra orbitalia, left side Ivory osteoma on left parietal, half way between the parietal boss and the sagittal suture Porosity on the internal occipital bone, on the superior branch of the cruciform eminence (possible well remodelled lamellar bone). Irregular lytic area in the sulcus just superior to the cruciform eminence, floor irregular & containing smaller lytic areas. Cluster of deep lytic lesions and an isolated circular lytic lesion inferior to the right transverse sulcus, some of which merged together. Two smaller lytic lesions inferior to the left transverse sulcus. Possible arachnoid granulations? Soft tissue trauma to right shoulder – sharp edged lytic lesions in the anterior of the greater tubercle of the right humerus, floor & walls irregular & porous; smaller lesions of similar character on the lesser tubercle Calcaneus secundarius/ avulsion fracture of left calcaneus – small crescent of bone missing from the anterior talar facet/ superior-medial corner of the cuboid facet. Anterior surface irregular & porous. Both tibiae flattened medio-laterally and bowed antero-posteriorly in the mid third of the shaft. Distal thirds of both fibulae flattened medio-laterally Striated lamellar bone present on the medial & lateral surfaces of the mid third of the tibia shafts, and on the lateral mid third of the right fibula Rib lesions – two unsided rib shafts have subtle well-remodelled lamellar bone on the visceral surfaces

	Stabbing injury to the right (& potentially left) side of the neck: C6 – 1) linear cut that has removed the superior right apophyseal facet just inferior to the facet itself (left half of neural arch lost post-mortem). Cut angled from inferior-posterior to superior-anterior. 2) Possible second cut to the inferior left pedicle, angled steeply from inferior to superior, terminating half-way through the pedicle. No cut visible on C7, so not delivered from below; only possibility would be stab from left side. Potentially associated with cut to left mandible C5 – no evidence for any cut marks, none in the body/ posterior body, which would be expected given the angle of the cut in C6. Possible that the inferior part of the right transverse process had fractured peri-mortem & this may be associated with the cut to the right side of C6 Possible cut to the mandible – small shallow cut into the inferior margin of the left gonial angle. Cut angled steeply from inferior to superior, and more visible on the external surface than the internal surface. Area of post-mortem damage to the equivalent part of the right gonial angle. Potentially associated with cut 2 on C6
Dental Health	25 tooth sockets, 24 teeth present 1 (loose) tooth sampled; 1 tooth lost AM Calculus (flecks to medium) Slight crowding of anterior mandible Enamel chips – RI_1, RI_2, LI_1, LP^2

	Right Dentition								Left Dentition							
Present	P	P	P	P	S(l)	-	-	-	-	-	-	P	P	P	P	P
Calculus	S dbm	M bldm	M bdlm	S b	-	-	-	-	-	-	-	S bd	F bm	S bm	S bml	S db
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	3	4	2	-	-	-	-	-	-	-	3	4	5	4	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	AM	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	S mlb	S blmd	M ldmb	-	M lbdo	M lbd	S lb	S lb	S lb	S lb	S lb	S lob	S lb	S blmd	S lbm	S lbd
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	3	3	-	2	4	2	5	4	3	3	3	3	4	4	3

Skeleton Number	**6DT 15**
Phase	23
Radiocarbon date	-
Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	90%+ Cranium, mandible, hyoid; partial manubrium & sternum; C1-7, T1-12, L1-5, S1; 12 right & 11 left ribs; right arm; left arm; right hand (8 carpals, MC1-5, 5 proximal, 4 intermediate & 4 distal phalanges); left hand (6 carpals, MC1-5, 5 proximal, 3 intermediate & 3 distal phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 5 proximal, 1 intermediate & 1 distal phalanx, sesamoid bone); left foot (6 tarsals, MT1-5, 5 proximal, 3 intermediate & 2 distal phalanges)
Age	18-25 years (young adult)
Sex	Male
Ancestry	White
Stature	168.6cm ±4.32cm (radius, white formula)
Non-Metric Traits	Ossicle in lambdoid (R); parietal foramen (L); sutural mastoid foramen (R); open posterior condylar canals (bilateral); precondylar tubercle; accessory lesser palatine foramen (L); bridging of supraorbital notch (R)

	Bipartite transverse foramina (1/5 R, 2/5 L); Allen's fossa (R); Poirier's facet (R); hypotrochanteric fossae (bilateral); exostosis in trochanteric fossae (bilateral); vastus fossa (L)
Pathology	Schmorl's node L2 Cranium slightly asymmetric – left side of the occipital bulges posteriorly Small roughly circular shallow depression (7mm diameter) in the left parietal, adjacent to the lambdoid suture (c. a third of the way along from lambda). Depression surrounded by a slightly raised, wide ridge of bone Pale lamellar bone on the antero-medial surface of the distal humerus shafts; deposits thickest around the nutrient foramen & are full of very fine porosity. Deposits extend onto the posterior shafts Rib lesions – lamellar bone on the visceral surfaces of the necks of four left & 2 right ribs (including left ribs 10 & 11) Striated lamellar bone on femoral midshafts, most pronounced on lateral surfaces; also tibia midshafts, most pronounced on medial surfaces; also medial surface of right talus Fracture of the tip of the spinous process of T8 – horizontal groove through the tip, distal part of tip angled slightly to the left Peri-mortem cuts to the left hand: Fifth proximal phalanx – two cuts into the medial side of the central shaft; proximal cut penetrating 4mm into the bone; second cut located c. 3.5mm distal to the first, penetrating c. 2mm into the bone. Cuts correspond to those on the fourth proximal phalanx Fourth proximal phalanx – two parallel shallow cuts running from the medial margin over the dorsal surface to the midline, located at the midpoint of the shaft c. 2.5 mm apart. Cuts are thickest and deepest at the medial edges, aligned with cuts to fifth proximal phalanx LMC5 – shallow cut into the dorsal surface c. 9mm proximal to the head RMC5 – possible shallow linear cut on the dorso-lateral midshaft perpendicular to the long axis, corresponding with possible cut to RMC4 RMC4 – possible shallow linear cut on the medial midshaft, perpendicular to the long axis, corresponding with possible cut the RMC5
Dental Health	32 tooth positions, 28 teeth present 1 tooth sampled; 3 teeth lost ante-mortem Calculus (flecks to medium); caries (3 teeth); DEH; abscess – LM$_3$; slight periodontal disease LM$_2$ tilted mesially Possible fractures of LM^3 & LM$_3$ Enamel chips – RP^1, LI^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F d	F m	S bld	F l	F d	F bd	F d	-	-	-	-	F mb	-	S l	S lb	-
DEH	-	-	-	-	L	L	L	L	L	L	L	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	La
Wear	1	2	3	3	3	3	3	4	4	3	3	3	2	2	2	-
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	AM	AM	P	P	P	P	P	P	P	P	P	S	AM	P	P
Calculus	F m	-	-	F ld	F d	F d	-	-	-	-	-	S d	-	-	M l	-
DEH	-	-	-	L	L	L	L	L	L	L	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Lo	La
Wear	1	-	-	3	3	3	3	4	4	3	3	3	-	-	2	-

Skeleton Number	**6DT 16**
Phase	22
Radiocarbon date	-

Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	20-30% T2-12, L1-5, S1; 5 right & 8 left ribs; left arm (scapula, humerus, ulna, radius); left hand (MC2-4); left os coxa (partial ilium); left leg (proximal 2/3 femur)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	Unknown
Stature	-
Non-Metric Traits	Circumflex sulcus (L); Poirier's facet (L); plaque (L)
Pathology	Schmorl's nodes T4-L3 T9 – body slightly compressed vertically, right body wall slightly more concave. Well defined crescent-shaped lytic area occupying the anterior superior body surface Excavated muscle attachment left humerus – teres major Os acromiale of left scapula (right scapula lost post-mortem)
Dental Health	0 tooth positions, 0 teeth present

Skeleton Number	**6DT 17**
Phase	22
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	50-60% Cranium, mandible, hyoid; partial sternum; C1-2, T1 + minimum 4 thoracic vertebrae, minimum 3 lumbar vertebrae; 3 right ribs; right arm; left arm; hands comingled with 6DT14, 6DT18 & 6DT20; right os coxa (partial ilium); right leg; left leg; right foot (7 tarsals, MT1-5, 5 proximal phalanges); left foot (7 tarsals, MT1-3 & 5)
Age	36-45 years? (old middle adult?)
Sex	Male?
Ancestry	Mixed
Stature	165.1cm ±3.37cm (tibia, white formula) 161.1cm ±3.78cm (tibia, black formula)
Non-Metric Traits	Ossicle in lambdoid (R); extrasutural mastoid foramen (L); open precondylar canal (R); open foramina spinosum (bilateral) Circumflex sulcus (R); acetabular crease (R); hypotrochanteric fossae (bilateral); lateral tibial squatting facets (bilateral); medial talar facets (bilateral)
Pathology	Schmorl's nodes 1 unidentified thoracic vertebra DJD (OP + PO) costal facets T1; right acetabulum Possible OA – distal joint of right fifth proximal phalanx Osteochondritis dissecans of superior right apophyseal facet of C2 – oval lytic lesions (7.8 x 4.7mm, 2.9mm deep), sharp margins, floor porous & slightly irregular Two small depressed areas on the frontal bone: 1) indistinct shallow linear depression (19 x 6.6mm) running parallel to the coronal suture just to the right of the midline; 2) shallow semi-circular depression (c. 20mm long) immediately anterior to the left coronal suture (c. 25mm lateral to bregma) Woven bone deposit on the superior surface of the acromial end of the right clavicle Excavated muscle attachment left humerus – pectoralis major
Dental Health	32 tooth positions, 30 teeth present 1 tooth sampled; 1 tooth not present/ unerupted Calculus (slight to medium); caries (1 tooth); DEH; slight periodontal disease Super-eruption RM^{3} Enamel chips – RI^{2}, RP^{1}, LI^{2}, LC^{1}, LP^{1}, LP^{2}, RI$_{1}$, LC$_{1}$, LP$_{2}$, LM^{2}

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Calculus	M bdl	S blm	S blmd	S blmd	S bl	S blm	S bl	S blm	S lbmd	S lb	S lb	S lb	S lbd	S lbm	S lb	S ldb
DEH	-	-	-	-	-	L	L	L	L	L	L	L	-	-	-	-
Caries	Mm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	4	5	3	4	4	4	5	5	5	4	4	3	5	4	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	NP/U	P	P	S	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	-	M lbdm	S lbmd	-	S blmd	S lbmd	S blmd	S blmd	S blmd	S blmd	S blmd	S blmd	S blmd	S blmd	S blmd	S blmd
DEH	-	-	-	-	L	L	-	-	-	-	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	3	4	-	3	4	4	5	5	5	4	3	3	4	3	3

Skeleton Number	**6DT 18**
Phase	22
Radiocarbon date	-
Preservation	Good (Grade 2), severe fragmentation
Completeness	80-90% Cranium, mandible; partial manubrium; C1-7, T1-12, L1-5, S1-4; 7 right & 10 left ribs; right arm; left arm; hands comingled with 6DT14, 6DT17 & 6DT20; os coxae; right leg; left leg; left foot (4 tarsals, MT1-5, 1 proximal phalanx)
Age	17-21 years (young adult)
Sex	Male
Ancestry	Unknown
Stature	-
Non-Metric Traits	Ossicles in lambdoid (bilateral); ossicle at asterion (L); extrasutural mastoid foramina (bilateral); double anterior condylar canals (bilateral) Bipartite transverse foramen (0/2 R, 1/2 L); circumflex sulcus (L); hypotrochanteric fossae (bilateral); lateral tibial squatting facet (R)
Pathology	Schmorl's nodes T6, T8-11, L2-3 Cribra orbitalia, bilateral Caudal shift at thoraco-lumbar border – apophyseal joints between T12-L1 thoracic in shape. L1 has a raised flattened joint surface on the posterior surface of the left pedicle, possibly a costal facet Clay shoveller's fracture of T1 – tip of spinous process missing, and surface irregular and slightly porous Excavated muscle attachments on both humeri – latissimus dorsi, pectoralis major & teres major; also left clavicle – anterior fibres of deltoid
Dental Health	30 tooth positions, 29 teeth present 1 tooth sampled Calculus (flecks to slight); DEH Enamel chips – RI^1, LI^2

	Right Dentition								Left Dentition							
Present	P(E)	P	P	P	P	P	P	P	P	P	P	P	S	P	P	P(E)
Calculus	-	S md	S blmd	F bm	F d	F b	F b	-	F b	S b	F b	S bd	-	S bmd	S mld	-

DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	2	2	2	2	3	3	2	2	2	-	3	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	-	-	P	P	P	P	P	P
Calculus	-	F ldb	S dbl	F ld	S l	S ld	S blmd	S blmd	-	-	S lm	S ldm	S lm	S lbd	S lmbd	F l
DEH	-	-	-	-	L	L	-	-	-	-	L	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	2	2	2	2	3	-	-	2	2	2	3	2	1

Skeleton Number	**6DT 19**
Phase	23
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	70-80% Cranium, mandible; manubrium; C1-7, T1-8, T10-12, L1-5, S1-5; 11 right & 10 left ribs; right arm; left shoulder (clavicle & scapula); right hand (7 carpals, MC1-5, 5 proximal, 3 intermediate & 3 distal phalanges); os coxae; right leg (femur, tibia); left leg (femur, tibia, fibula)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	White
Stature	171.9cm ±3.37cm (tibia, white formula)
Non-Metric Traits	Highest nuchal lines (bilateral); ossicle in lambdoid (L); parietal foramina (bilateral); ossicles at pterion (bilateral); sutural mastoid foramina (bilateral); extrasutural anterior ethmoid foramina (bilateral); N.B. right mastoid foramen 7mm in diameter Bipartite transverse foramina (1/3 R, 2/4L); circumflex sulcus (L); acetabular crease (L); plaque (bilateral)
Pathology	Schmorl's nodes T5-8, T11-L3 DJD (OP + PO) costal facets T12 L2 – the anterior half of the inferior body surface is occupied by a deep lytic lesion (annular ring unaffected); floor rough spicules. Very similar to lesions in lumbar spine of 6DT21 L4 – the anterior half of the superior body surface is occupied by a deep lytic lesion (annular ring unaffected); floor rough spicules. Very similar to lesions in lumbar spine of 6DT21 Cortical defect – superior right apophyseal facet of C2. Lytic lesion occupying posterior half of joint surface, margins clear, floor smooth Possible caudal border shift at lumbo-sacral border – promontory at superior margin S2; S2 had a superior left apophyseal facet (right side lost post-mortem) Transitional woven-lamellar bone on the visceral surface of the neck of right rib 12 Os acromiale of left scapula (right acromion process damaged post-mortem) Right os coxa – the auricular surface is covered in irregular rough spicules of lamellar bone, with areas of dense fine porosity. Only part of the right sacral auricular surface survives – also with porous irregular appearance at the apex; lamellar bone on the superior surface of the right ala & multiple nutrient foramina. Possible infection Cyst in right ischium, on lateral surface of inferior margin – oval, margins slightly raised, floor smooth Both femora have well remodelled lamellar bone on the medial proximal & mid thirds of the shaft, & lateral midshaft Both tibiae have woven bone on the lateral mid third of shaft & lamellar bone on the medial mid third of the shaft Left fibula has striated lamellar bone at the junction of the proximal & mid thirds of the shaft & a small deposit of woven bone on the lateral surface of the central third Developmental anomaly/ fracture of L5 superior right apophyseal facet – diagonal groove through

	facet Decapitation – single cut through C2-3, terminating in posterior mandible; cut angled slightly posterior-inferior to anterior-superior & delivered from behind C2 – sliver of bone probably removed from the anterior margin of the inferior body surface (partially obscured by post-mortem damage) C3 – linear cut that has removed the superior margins of both laminae, both superior apophyseal facets & the posterior parts of both uncinate processes. Mandible – linear horizontal cut into the posterior margin of both gonial angles, penetrating c. 17mm on the left and c. 5-6mm on the right. Potential peri-mortem bite marks on the left and right os coxae; all depressions and indentations have small flakes of bone pushed into the lesion: Right ilium – anterior medial surface of the ASIS has a row of two depressions & a smaller indentation: 1) small, triangular (4 x 4mm, 1.5mm deep) located c. 4mm posterior to the ASIS; 2) circular depression (5.2 x 7.3mm, 2.7mm deep) located 1.5mm posterior to depression (9.5mm posterior to the ASIS & 9mm inferior to the iliac crest); 3) shallow indistinct roughly circular lesion (c. 3mm diameter) posterior to depression 2. On the posterior-lateral surface of the ASIS there are two shallow linear crushed areas close to the iliac crest – one c. 22mm posterior to the ASIS (13mm long, 1.3mm wide) & the second c. 30mm posterior to the ASIS (7mm long, 1.5mm wide); both are perpendicular to the iliac crest Left ilium – three depressions on the anterior-medial surface of the iliac crest: 1) small shallow indentation (2.8mm diameter) located c. 20mm posterior to the ASIS & 6mm inferior to the iliac crest; 2) deep depression (c. 6mm diameter, 4mm deep) located c. 33mm posterior to the ASIS (& 8mm posterior to depression 1), 6mm inferior to the iliac crest; 3) shallow indistinct indentation (2mm diameter) just anterior to the midpoint of the crest (c. 77mm posterior to the ASIS & 10mm inferior to the iliac crest). On the posterior-lateral surface there is a deep roughly circular depression (6.5mm diameter & 5mm deep) located c. 25mm posterior to the ASIS & 2.5mm inferior to the iliac crest. There is a second slight indentation (3mm diameter, 0.8mm deep) located c. 9.5mm posterior to the ASIS
Dental Health	32 tooth positions, 30 teeth present 1 tooth sampled; 1 tooth possibly sampled? Calculus (flecks to heavy); caries (1 tooth); DEH; abscesses – RP^2, RM^1, surrounded by lamellar bone; slight periodontal disease Enamel chips – LI^1, LI^2, RI^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	M b	H lbmo	M lbdo	M bmdl	M blmd	S bmd	S bmd	S bmd	F bm	F b	S bd	M b	S b	S b	S bm	S dbl
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	Mm	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	2	2	2	2	2	3	3	2	2	2	2	2	2	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	PM	P	P	P	P	P	P	P	P	S	P	P	P
Calculus	H a	H a	M lbmd	-	M lbdm	H lbmd	H lbmd	H lbmd	M lbmd	M lbmd	M blmd	S ldmb	-	S lmd	S mdb	F d
DEH	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	-	2	2	3	3	3	3	2	2	-	3	2	2

Skeleton Number	**6DT 20**
Phase	22
Radiocarbon date	-
Preservation	Good (Grade 2), moderate fragmentation
Completeness	90%+ Cranium, mandible, hyoid; C1-5, T1-12, L1-5, S1; 11 right & 13 left ribs (probably includes some of ribs from 6DT14 & 6DT17); right arm; left arm; hands comingled with 6DT14, 6DT17 &

	6DT18); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 3 proximal phalanges); left foot (7 tarsals, MT1-5, 2 proximal phalanges)
Age	26-35 years (young middle adult)
Sex	Male?
Ancestry	Mixed
Stature	-
Non-Metric Traits	Parietal foramina (bilateral); extrasutural mastoid foramen (R); sutural mastoid foramina (bilateral); open posterior condylar canals (bilateral); double anterior condylar canal (R); accessory lesser palatine foramina (bilateral); maxillary torus (R); mandibular tori (bilateral); extrasutural anterior ethmoid foramina (bilateral) Circumflex sulcus (R); acetabular creases (bilateral); hypotrochanteric fossa (R); vastus fossae (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facet (L); medial talar facets (bilateral)
Pathology	Schmorl's nodes T6-12 DJD (OP + PO) apophyseal facets C3; costal facets T1, T6 Ossified ligamentum flavum T2-8, T10 Os acromiale of right scapula (left acromion damaged post-mortem) Cyst in right os coxa – small circular depression (5mm diameter) immediately adjacent to the posterior margin of the auricular surface, margins sharp Cyst in left os coxa – oval hollow (5.5 x 5.0mm, 4mm deep) in the anterior margin of the ilium, just superior to the AIIS Lamellar bone on the visceral neck of one left rib (bear in mind that the ribs of 6DT14 & 6DT17 could be co-mingled) Developmental anomaly of left calcaneus – crescent shaped hollow (13 x 5mm, 6.5mm deep) in the superior third of the posterior surface Potential decapitation T1 – linear cut that has removed the superior-posterior part of the right transverse process & a sliver from the superior margin of the superior right apophyseal facet; possible also part of the superior left transverse process and the superior margin of the tip of the spinous process. Cut angled from posterior-inferior to superior-anterior. Unfortunately C7 & right rib 1 are lost post-mortem, as this cut would have no doubt affected both
Dental Health	32 tooth positions, 30 teeth present 1 tooth sampled; 1 tooth lost post-mortem Calculus (flecks to heavy); caries (1 tooth); DEH Slight rotation LC_1 Shallow grooves in incisive surface RI^2 & RI_2, shallow crescent of wear in incisive surface of RC^1, worn crescent in buccal side of LC_1 Fractures – LM^1 mesio-lingual corner, LI^1 mesial corner, LI^2 distal half buccal side, RC^1 distal side Enamel chips – LI^2, LC^1, LP^1, LP^2, LM^1, LM^2, RI^1, RI^2, RC^1, RP^1, RM^1, RM^2, RC_1, RP_1, RP_2, RM_1, RM_2, RM_3, LC_1, LP_1, LP_2, LM_1

	Right Dentition								Left Dentition							
Present	P	P	P	S	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	S ldb	S lmb	S mldb	-	S dlmb	S bld	F l	S l	F mdb	F l	S blmd	S lmd	S lmd	S dl	S ldb	M bdlm
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	Sd	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	3	4	6	-	4	4	5	5	6	5	4	4	2	6	5	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P	PM	P	P	P	P	P	P	P
Calculus	H ldb	S lmd	S mldb	S mlb	S lmdb	S mldb	S bl	S blm	-	S bld	S blmd	S blmd	M blmd	S lmd	S lmbd	M lmdb
DEH	-	-	-	-	L	-	-	-	-	-	-	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Wear	3	4	5	3	3	5	5	6	-	6	5	4	2	6	5	2

Skeleton Number	**6DT 21**
Phase	23
Radiocarbon date	-
Preservation	Good (Grade 2), severe fragmentation
Completeness	80-90% Cranium, mandible, hyoid; partial manubrium; C1-7, T1-12, L1-5, S1; 12 right & 12 left ribs; right arm; left arm; right hand (3 carpals, MC1-5, 10 proximal, 2 intermediate & 3 distal phalanges); left hand (1 carpal, MC2-5, 5 proximal, 3 intermediate & 2 distal phalanges); os coxae; right leg; left leg; right foot (3 tarsals, MT1-5, 5 proximal phalanges); left foot (1 tarsal)
Age	36-45 years (old middle adult)
Sex	Male
Ancestry	White?
Stature	-
Non-Metric Traits	Ossicles in lambdoid (bilateral); parietal foramen (L); extrasutural mastoid foramen (R); open posterior condylar canal (L); accessory lesser palatine foramen (R) Posterior atlas bridging (R); bipartite transverse foramina (2/4 R, 1/3 L); circumflex sulcus (R); acetabular crease (R); Poirier's facets (bilateral); plaque (bilateral); exostosis in trochanteric fossa (R); vastus fossae (bilateral); double anterior calcaneal facet (R); double inferior talar facets (bilateral)
Pathology	Schmorl's nodes T4-L2 L1 – anterior half of inferior body surface occupied by lytic area (annular ring unaffected), floor rough & irregular; very similar to lesions in lumbar spine of 6DT19 L2 – anterior half of the inferior body surface occupied by lytic area (annular ring preserved), floor rough & irregular; very similar to lesions in lumbar spine of 6DT19 Developmental anomaly of T5 – small cleft in the inferior margin of the inferior right apophyseal facet Cribra orbitalia, bilateral Maxillary sinusitis, left side – lamellar bone Os acromiale, bilateral; tip present on left side (lost post-mortem on right side) Possible avulsion fracture of the medial corner of the coronoid process of the right ulna Possible avulsion fracture of the hook of the right hamate – hook projects 5mm & terminates in a rough & porous flattened surface Well healed fracture of the left fibula – at the junction of the proximal & mid thirds of the shaft; lamellar bone on lateral midshaft Left tibia – has a bone spicule projecting inferiorly from the postero-lateral corner of the proximal end (just distal to the fibular facet); possible soft tissue trauma associated with fracture to left fibula Fracture through the distal joint surface of the right tibia, proximal displacement of the antero-lateral segment Striated lamellar bone on the medial & posterior mid thirds of both tibia shafts; smooth lamellar bone on both proximal femora (inferior to spiral line) Subtle lamellar bone on the visceral necks of right ribs 11 & 12 Cortical defect in the right cuboid distal joint surface (part of facet for MT4) Decapitation, single cut through C5-6, probably delivered from behind: C5 – linear cut that has removed slivers of bone along the length of the anterior and posterior borders of the inferior body surface & the inferior margin of the inferior left apophyseal facet (post-mortem damage to right inferior apophyseal facet); corresponds with the cut to C6 C6 – linear cut that has removed the superior third of both superior apophyseal facets; corresponds with the cut to C5
Dental Health	25 tooth positions, 31 teeth present (6 of which loose, & 2 of which broken) 1 tooth sampled Calculus (flecks to heavy); caries (2 teeth); DEH; abscess RM_1; slight periodontal disease Slight rotation LP^1 Enamel chips – LI^1, LP^1, RI^1

	Right Dentition								Left Dentition							
Present	P(l)	P(l)	P(l)	S(l)	P(l)	P(l)	P(l)	P(l)	P	P	P	P	P	P	P	P
Calculus	S blod	M bdl	H bml	-	M b	S b	S b	S b	S b	S b	F b	F b	F bm	F ml	F bl	-
DEH	-	-	-	-	-	-	-	L	L	-	-	-	-	-	-	P
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Sm
Wear	2	2	3	-	2	2	2	3	3	2	2	2	2	4	3	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	P(B)	P(B)	P	P	P	P	P	P	P
Calculus	S blod	S bld	S bld	S bml	S lbd	F bl	S b	F m	F mlb	S b	F b	F d	-	F lm	F l	F d
DEH	P	-	-	-	-	-	L	L	L	L	-	-	-	-	-	P
Caries	-	-	Mm	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	2	3	2	2	2	3	3	3	3	2	2	2	4	3	2

Skeleton Number	**6DT 22**
Phase	23
Radiocarbon date	-
Preservation	Moderate (Grade 3), severe fragmentation
Completeness	80-90% Cranium, mandible; C1-3, C7 + 1 partial cervical vertebra; T1-12, L1-5, S1-3; 10 right & 12 left ribs; right arm; left arm; right hand (5 carpals, MC1-5, 5 proximal, 4 intermediate & 3 distal phalanges); left hand (3 carpals, MC1-5, 3 proximal & 1 intermediate phalanx); os coxae; right leg; left leg; right foot (5 tarsals, MT1-5, 5 proximal phalanges); left foot (6 tarsals, MT1-3 & 5, 1 proximal phalanx)
Age	26-35 years (young middle adult)
Sex	Male
Ancestry	Mixed?
Stature	176.2cm ±4.32cm (radius, white formula) 169.3cm ±4.30cm (radius, black formula)
Non-Metric Traits	Ossicle at lambda; ossicles in lambdoid (bilateral); parietal foramina (bilateral); ossicle in coronal (R); ossicle at asterion (R); open posterior condylar canal (R); double anterior condylar canals (bilateral) Circumflex sulcus (R); hypotrochanteric fossae (bilateral); third trochanters (bilateral); vastus fossa (R)
Pathology	Schmorl's nodes T6-8, T10-13, L2-4 DJD (OP + PO) costal facets T1 Cribra orbitalia, bilateral Maxillary sinusitis, right side – fine porosity focussed above position RM^1 Possible additional thoracic vertebra – 13 thoracic vertebrae present; right apophyseal joint between T12-13 thoracic in shape (left joint lost post-mortem), apophyseal joints between T13-L1 lumbar in shape; T13 has raised elongated facet on the right pedicle (left pedicle lost post-mortem) Ivory osteoma on right parietal, lambdoid angle Possible healed penetrating injury to the occipital – irregular, slightly 'L' shaped lytic lesion in the left occipital squama, just superior to the lateral end of the nuchal crest (16mm from the lambdoid suture). Margins fairly clear but rounded; floor of lesion flat & even. At the inferior margin of the lesion floor there is a small hole penetrating though to the internal surface, where there is a corresponding lytic lesion (just inferior to the position of the external lesion) surrounded by a larger bevelled area covered in flattened small nodules interspersed with pits & grooves (capillary impressions). Lamellar bone with capillary impressions also present along the superior branch of the cruciform eminence, & along the sagittal sulcus of both parietals, sigmoid sulcus of right temporal & midline of internal frontal squama

	Pale deposits of lamellar bone on two left & two right ribs (11 & 12 both sides) on the visceral surfaces of the neck Cyst in distal left femur – circular lytic lesion on the popliteal surface close to the medial condyle Potential stabbing injury to neck - fragment of right cervical arch (most likely C5) has a linear cut diagonally through the superior right apophyseal facet that has removed the superior-lateral part. Cut angled superior left to inferior right (viewed from behind); no evidence for any cut to C3
Dental Health	29 tooth positions, 26 teeth present (2 of which loose) 1 tooth sampled; 3 teeth lost post-mortem; 1 tooth lost ante-mortem Calculus (flecks to slight); caries (3 teeth); abscess – RM^1; slight periodontal disease Lamellar bone on buccal surface alveolar bone at position LM^1 – possibly associated with AMTL Enamel chips – RC^1, RP^1, LC^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	PM	PM	P	P	PM	P	AM	P	P
Calculus	F dl	F lmd	S bdl	-	S bd	F bdm	F d	-	-	-	F bd	-	F md	-	F m	F m
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	Lm/o	Md	-	-	-	-	-	-	-	-	Sd	-	-	-
Wear	2	2	3	2	2	3	2	-	-	2	3	-	2	-	3	2
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	P	P	P	P	-	P(l)	P(l)	P	P	S	P	P	P
Calculus	F lbdm	S lbdm	S mld	S bmdl	S dm	F mdb	F m	-	S bmd	S bml	F mdl	S mdl	-	S ml	F md	F l
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	2	3	2	2	3	3	-	4	3	3	2	-	3	2	2

Skeleton Number	**6DT 23**
Phase	23
Radiocarbon date	-
Preservation	Good (Grade 2), severe fragmentation
Completeness	80-90% Cranium, mandible, hyoid; C1-5, C7, T1-12, L1-5, S1-2; 12 right & 12 left ribs; right arm; left arm; right hand (5 carpals, MC1-5); left hand (1 carpal, MC1-5, 2 proximal & 1 distal phalanx); hands – 5 proximal, 5 intermediate & 1 distal phalanx; os coxae; right leg (femur, patella, fibula midshaft); left leg; right foot (1 tarsal, 1 proximal phalanx); left foot (2 tarsals, MT1-3, 3 proximal & 1 intermediate phalanx)
Age	18-25 years (young adult)
Sex	Male
Ancestry	Unknown
Stature	-
Non-Metric Traits	Ossicle at lambda; ossicles in lambdoid (bilateral); parietal foramen (R); ossicle at asterion (R); sutural mastoid foramen (R); accessory infraorbital foramen (L); ossicle in sagittal suture (not scored systematically) Circumflex sulcus (L); acetabular crease (L); plaque (R); hypotrochanteric fossa (L); exostosis in trochanteric fossa (L); vastus notch (R); vastus fossa (R); lateral tibial squatting facet (L); absent anterior calcaneal facet (L); double inferior talar facet (L)
Pathology	Schmorl's nodes T10 & L3 Excavated muscle attachment both humeri – pectoralis major (bilateral); teres major (left side); left fibula – soleus Series of four cuts to C2-5 & mandible; full decapitation at C5 (cut at C2 may not have severed head completely)

	C2 – 1) linear cut that has removed the inferior surface of the body and right lamina (fracture of anterior third of body). Cut angled superior right to inferior left; corresponds to cut 1 to C3 & cut to right gonial angle of mandible 2) linear cut that removed a sliver of bone from the inferior surface of the left lamina; corresponds to cut 2 on C3 C3 – 1) linear cut that has removed the superior quarter of the superior left apophyseal facet; cut angled posterior-inferior to anterior-superior; corresponds to cut 1 on C2 2) linear cut inferior to cut 1 that has removed a sliver of bone from the superior margin of the left lamina, terminating just medial-posterior to the superior left apophyseal facet; delivered from behind, presumably angled superior-right to inferior-left 3) linear cut that has removed the lateral inferior margin of the inferior right apophyseal facet (probably did not penetrate completely through the medial part of the facet); cut angled slightly superior right to inferior left & delivered from behind; corresponds with cut on C4 C4 – shallow linear cut (2mm long) lateral to the inferior border of the superior right apophyseal facet; corresponds with cut 3 on C3; delivered from posterior right C5 – linear cut that has removed the inferior surface of the body, angled posterior-inferior to anterior-superior (possible fracture of anterior body). The angle of the cut was such that the inferior right apophyseal remained unscathed. Presumably would have cut through C6 – but C6 lost post-mortem Mandible – has a cut penetrating 17mm into the posterior surface of the right ramus located 12mm superior to the gonial angle; fracture line continues from the anterior margin of the cut to the inferior margin of the mandible (separating the fragment of gonial angle from the rest of the mandible); probably correlates with cut 1 on C2 & C3
Dental Health	32 tooth positions, 31 teeth present 1 tooth sampled Calculus (flecks to medium); slight periodontal disease

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F bdm	F bmdl	F mbdl	F dl	F m	F B	S b	F b	F b	F b	F bl	F b	S bd	S bm	S bdm	F m
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	2	2	3	3	4	4	3	3	3	2	3	2	1
Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	P	P	P	S	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	F bdm	S lmd	S lmdb	-	S b	M b	S bm	S b	S b	S b	S bm	S b	S b	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	3	-	2	3	4	4	4	4	3	3	2	3	2	1

Skeleton Number	**6DT 24**
Phase	21
Radiocarbon date	-
Preservation	Good (Grade 2), minimal fragmentation
Completeness	90%+ Cranium, mandible, hyoid; manubrium, sternum; C1-7, T1-12, L1-5, S1-4; 11 right & 11 left ribs; right arm; left arm; right hand (5 carpals, MC1-5, 4 proximal, 3 intermediate & 1 distal phalanx); left hand (4 carpals, MC1-5, 5 proximal, 4 intermediate & 3 distal phalanges); os coxae; right leg; left leg; right foot (7 tarsals, MT1-5, 5 proximal & 2 distal phalanges); left foot (7 tarsals, MT1-5, 3 proximal, 1 intermediate & 1 distal phalanx)
Age	18-25 years (young adult)
Sex	Male?

Ancestry	White
Stature	173.8cm ±2.99cm (femur & tibia, white formula)
Non-Metric Traits	Ossicle in lambdoid (R); parietal foramen (R); ossicle at parietal notch (R); ossicles at asterion (bilateral); sutural mastoid foramen (R) Bipartite transverse foramen (0/5 R, 1/4L); hypotrochanteric fossa (L); vastus notch (L); lateral tibial squatting facet (L); double inferior talar facet (R)
Pathology	Schmorl's nodes T7-8, T10-11 Possible soft-tissue trauma to the right inferior costal facet on the body of T5 T10 & 11 both have crescents of lytic activity in a band around the anterior border of the inferior body surface occupying the area of the annular ring Cranium slightly asymmetric – occipital protrudes inferiorly on the right side Cranial border shift at thoraco-lumbar border – apophyseal joints between T11-12 thoracic in shape (normal); T12 lacks a costal facet on the right pedicle, and only has a small nodule of bone on the left pedicle. Only 11 pairs of ribs present Cleft neural arch – S1 & S4 Rib lesions – 7 right ribs (ribs 5-11) have lamellar bone deposits on the visceral surfaces of the necks and shafts. Left ribs unaffected Developmental anomaly of both scapulae – small notch with rounded margins present in the anterior margin of both glenoid fossae Underdeveloped hooks of hamate on both sides; right trapezoid also underdeveloped on the proximal-dorsal surface RMC3 – possible deposit of lamellar bone on the medial surface of the shaft Slight ridge of bone along the length of the centre of the palmar surfaces of all intermediate hand phalanges Three distal hand phalanges have well-defined triangular depressions on the palmar surface of the proximal end – insertion points for flexor digitorum profundus Possible inflammation of the right auricular surface – superior part of demiface covered in small porosity & osteophytes along margin & apex Pilasterism of both femora Osteochondritis dissecans of the medial condyle of the right femur – circular lytic lesion (13mm diameter), distinct margins, floor rough & porous Developmental anomaly of both tibiae – depression on the postero-medial surface of the proximal shaft (just distal to the metaphysis) Both fibulae flattened at distal thirds; both have shallow depression occupying part of the articular surface for the tibia Hallux valgus of LMT1 – lytic lesion on the medial surface of the head, margins clear & sharp, floor of lesion occupied by two shallow hollows. The left first proximal foot phalanx shows a marked asymmetry, with the main axis diverging laterally Possible cyst in a left proximal foot phalanx – circular hole (3mm diameter) in one side close to the proximal end, opening onto an enlarged hollow; sharp margins Potential peri-mortem cut/ fracture through the inferior spinous process of C7; no evidence for any cut to T1
Dental Health	32 tooth positions, 28 teeth present 1 tooth sampled; 1 tooth lost post-mortem; 2 teeth not present/ unerupted Calculus (slight – most tooth surfaces unrecordable as obscured by concretions); caries (2 teeth); slight periodontal disease Slight crowding of anterior mandible; slight rotation RI_2 Slight crowding of anterior maxilla Enamel chips – RI^1, LI^1

	Right Dentition								Left Dentition							
Present	PM	P	P	S	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	-	Sd	-	-	-	-	Sb	Sb	Sb	Sb	Sb	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	3	3	-	2	3	3	3	4	3	3	2	2	3	2	1

Maxilla	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Mandible	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Present	NP/U	P	P	P	P	P	P	P	P	P	P	P	P	P	P	NP/U
Calculus	-	S l	-	S m	-	-	S m	S b	S b	S mb	-	-	-	S d	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	Mm	-	-	-	-	-	-	-	-	-	-	Mm	-	-
Wear	-	3	4	2	2	3	4	4	4	4	3	2	2	4	2	-

KEY:
Present - Tooth presence; am - ante-mortem tooth loss; pm - post-mortem tooth loss; p - tooth present; p(l) – tooth present but socket absent; p (u) – tooth present but unerupted; e – erupting; s – sampled; - - jaw not present
Caries - Calculus; F - flecks of calculus; S - slight calculus; M - moderate calculus; H - heavy calculus; a - all surfaces; b - buccal surface; d - distal surface; m - mesial surface; l - lingual surface; o - occlusal surface
DEH - dental enamel *hypoplasia*; l - lines; g - grooves; p - pits
Caries - caries; s - small lesions; m - moderate lesions; l - large lesions
Wear - dental wear; numbers from 1-8 - slight to severe wear

Additional bone found with the articulated skeletons

Sk	Context	Bone Element	Detailed Description	Side	%	SP	No. Frags	Age	Sex	Other
3DT2	4024	incisor	upper second; intact	R	100		1	A	?	Slight wear
3DT3	4025	mandible	right ramus	-	20	2	1	A	M?	
3DT6	4046	lumbar vertebra (L5?)	right half body	-	30		1	A	?	Possibly part of 3DT3
3DT6	4046	distal first foot phalanx	intact	L	100		1	A	?	Possibly part of 3DT3
3DT6	4046	vertebra	body fragment	-			1	A	?	Possibly part of 3DT3
3DT7	4065	proximal first foot phalanx?	proximal joint?	?	30	3	1	A	?	
3DT7	4065	ulna?	shaft	?	5	3	1	A?	?	
3DT11	4092	nasal	intact	R	100	1	1	A?	?	
3DT13	4112	MT1	intact	R	100	1	1	A	?	
3DT13	4112	proximal first foot phalanx	intact	R	100	1	1	A	?	
3DT13	4112	distal first foot phalanx	intact	R	100	1	1	A	?	
3DT13	4112	distal first foot phalanx	intact	L	100	1	1	A	?	
3DT17	4130	distal first foot phalanx	damage to proximal end	L	90	3	1	A	?	
3DT18	4115, 4287	proximal first foot phalanx	intact	L	100	2	1	A	?	
3DT18	4115, 4287	MC4	intact	L	100	1	1	A	?	
3DT23	4168	vomer	body fragment	-	10	3	1	A?	?	
3DT25	4194	femur	diaphysis	L	80	2	1	I	-	91.51mm long = c.1-3m
3DT29	4280	ulna?	distal end?	?	<5	3	1	A	?	
3DT29	4280	long bone	shaft fragment	?	<5	3	1	A?	?	

3DT30	4282	incisor	lower first; intact	L?	100		1	A	?	moderate wear, moderate calculus (buccal & lingual)
3DT32	4234	incisor	upper first; intact	R	100	2	1	A	?	flecks calculus, slight DEH
3DT33	4253	patella	intact	R	100		1	A	?	
3DT34	4258	rib	shaft	?	20	1	1	A?	?	
3DT37	4344	calcaneus	superior-posterior part	R	30	1	2	A	?	
3DT41	10008	talus		R	80	3	1	A	?	
3DT41	10008	fragments		?	<10	3	3	A?	?	
3DT43	4438	clavicle	complete	R	100	3	2	YA	?	proximal end in early stages fusion
3DT43	4438	rib	sternal third	R	30	3	1	YA	?	
3DT45	4448	molar	lower second; intact	R	100	1	1	A	?	minimal wear
3DT45	4448	MT4	proximal three-quarters	L	90	2	1	A?	?	
3DT46	4429	proximal foot phalanx	intact	?	100	1	1	A	?	
3DT46	4429	proximal fifth? foot phalanx	intact	L?	100	1	1	A	?	
3DT46	4429	rib	shaft	?	20	3	1	A?	?	
3DT46	4429	thoracic vertebra	tip spinous process	-	10	3	1	A	?	marked - either 'sk 34' or 'sk 54'
3DT51	4470	distal first foot phalanx	intact	R	100	2	1	A	?	
3DT51	4470	rib	shaft	?	20	3	1	A?	?	
3DT51	4470	long bone	shaft fragment	?	<5	3	1	A?	?	
6DT3	1025	scapula	medial third spine	L			1	A?	?	
6DT17	1121, 1207, 1210	os coxa	superior margin acetabulum	R	<5		1	A	?	
6DT20	1125, 1212	temporal	anterior zygomatic arch	R			1	A	?	probably part of Sk 6DT18
6DT20	1125, 1212	vertebra	left neural arch fragment	-			1	A	?	probably part of Sk 6DT18
6DT22	1129	patella	intact	R	100	1	1	A	?	
6DT23	1175, 1202	scapula	acromion process	L			1	A	?	os acromiale

Disarticulated, comingled hands of Skeletons 6DT14, 6DT17, 6DT18 and 6DT20

Sk	Context	Bone Element	Detailed Description	Side	%	SP	No. Frags	Age	Sex	Other
'6DT17'	1121	MC3	intact	R	100	2	1	A	?	
'6DT17'	1121	MC	distal three-quarters	?	70	2	1	A	?	
'6DT17'	1121	MC1	distal three-quarters	R?	70	2	1	A?	?	
'6DT17'	1121	trapezium	intact	R	100	2	1	A	?	
'6DT17'	1121	proximal hand phalanx	intact	?	100	2	1	A	?	
'6DT17'	1121	proximal fifth? hand phalanx	intact	R?	100	2	1	A	?	oval deposit of lamellar bone on dorsal shaft close to proximal end
'6DT17'	1121	proximal first hand phalanx	distal end incomplete	R?	90	2	1	A	?	
'6DT17'	1121	intermediate	intact	?	100	1	1	A	?	

		hand phalanx								
'6DT17'	1121	intermediate hand phalanx	intact	?	100	1	1	A	?	
'6DT17'	1121	intermediate hand phalanx	proximal end damaged	?	90	2	1	A	?	
'6DT17'	1121	proximal/ intermediate hand phalanx	distal three-quarters	?	80	1	1	A?	?	
'6DT17'	1121	distal hand phalanx	intact	?	100	1	1	A	?	
'6DT17'	1121	distal hand phalanx	intact	?	100	2	1	A	?	
'6DT17'	1210	MC5	intact	L	100	3	1	A	?	
'6DT17'	1210	MC4	intact	L	100	3	1	A	?	
'6DT17'	1210	MC2/3	proximal end incomplete	?	90	1	1	A	?	
'6DT17'	1210	MC1	proximal end	R	20	1	1	A	?	
'6DT17'	1210	proximal hand phalanx	intact	?	100	1	1	A	?	
'6DT17'	1210	MC5	proximal two-thirds	L	70	2	1	A	?	
'6DT17'	1210	proximal hand phalanx	intact	?	100	1	1	A	?	
'6DT17'	1210	proximal fifth? hand phalanx	intact	L?	100	3	1	A	?	
'6DT17'	1210	distal first hand phalanx	intact	L	100	1	1	A	?	
'6DT18'	1123	MC2	proximal two-thirds	L	70	1	1	A?	?	
'6DT18'	1123	MC3	proximal half	L	40	1	1	A?	?	
'6DT18'	1123	MC4	proximal three-quarters	L	70	1	1	A?	?	
'6DT18'	1123	MC	distal third	?	20	1	1	A	?	
'6DT14'	1209	scaphoid	intact	L	100	2	1	A	?	
'6DT14'	1209	capitate	intact	L	100	2	1	A	?	
'6DT14'	1209	hamate	intact	L	100	1	1	A	?	
'6DT14'	1209	MC3	distal end lost pm	L	80	1	1	A	?	
'6DT14'	1209	MC4	proximal two-thirds	R	70	2	1	A?	?	
'6DT14'	1209	MC1	intact	L	100	2	1	A	?	
'6DT14'	1209	MC1	distal end lost pm	L	90	2	1	A	?	
'6DT14'	1209	trapezium	intact	L	100	2	1	A	?	
'6DT14'	1209	proximal hand phalanx	intact	?	100	2	1	A	?	
'6DT14'	1209	proximal hand phalanx	ends damaged	?	90	2	1	A	?	
'6DT14'	1209	proximal hand phalanx	proximal three-quarters	?	80	2	1	A	?	
'6DT14'	1209	proximal first hand phalanx	proximal end damaged	L?	90	2	1	A	?	
'6DT14'	1209	intermediate hand phalanx	intact	?	100	1	1	A	?	
'6DT14'	1209	proximal/ intermediate hand phalanx	distal two-thirds	?	60	2	1	A?	?	
'6DT17'	1121	MC3	intact	R	100	2	1	A	?	
'6DT17'	1121	MC4	proximal two-thirds	R	70	2	1	A?	?	
'6DT17'	1121	MC5	proximal three-quarters	R	80	2	1	A?	?	
'6DT20'	1125	MC5	intact	R	100	2	1	A	?	
'6DT20'	1125	MC3	proximal end damaged	R	90	3	1	A	?	
'6DT20'	1125	hamate	intact	R	100	2	1	A	?	

'6DT20'	1125	capitate	intact	R	100	3	1	A	?	
'6DT20'	1125	triquetral	intact	R	100	2	1	A	?	
'6DT20'	1125	scaphoid	medial half	R	70	3	1	A	?	
'6DT20'	1125	lunate	part notch & scaphoid facet	R?	30	2	1	A	?	
'6DT20'	1125	trapezium	distal half	R	40	2	1	A	?	
'6DT20'	1125	pisiform	half	?	40	2	1	A	?	
'6DT20'	1125	MC2	proximal half	L	60	2	1	A?	?	
'6DT20'	1125	MC2?	proximal end lost pm	R?	90	3	1	A	?	
'6DT20'	1125	MC1	distal half	R	50	2	1	A	?	
'6DT20'	1125	MC1	distal three-quarters	L	70	2	1	A	?	
'6DT20'	1125	MC1	proximal end	L	10	2	1	A	?	
'6DT20'	1125	MC1	proximal end	R	10	2	1	A	?	
'6DT20'	1125	MC	part head	?	5	2	1	A	?	
'6DT20'	1125	proximal hand phalanx	complete	?	100	2	4	A	?	
'6DT20'	1125	proximal hand phalanx	proximal end damaged	?	90	2	1	A	?	
'6DT20'	1125	proximal fifth? hand phalanx	intact	R?	100	2	1	A	?	
'6DT20'	1125	proximal fifth? hand phalanx	distal three-quarters	L?	80	1	1	A?	?	
'6DT20'	1125	proximal hand phalanx?	distal two-thirds	?	60	2	1	A?	?	
'6DT20'	1125	proximal hand phalanx?	distal three-quarters	?	70	2	1	A?	?	
'6DT20'	1125	proximal hand phalanx?	distal three-quarters	?	80	3	1	A?	?	
'6DT20'	1125	proximal hand phalanx	distal three-quarters	?	80	2	1	A?	?	
'6DT20'	1125	proximal first hand phalanx	one side lost pm	?	60	2	1	A?	?	
'6DT20'	1125	intermediate hand phalanx	intact	?	100	1	1	A	?	
'6DT20'	1125	intermediate hand phalanx	intact	?	100	2	1	A	?	
'6DT20'	1125	intermediate hand phalanx	intact	?	100	2	1	A	?	
'6DT20'	1125	intermediate hand phalanx	intact	?	100	2	1	A	?	
'6DT20'	1125	intermediate hand phalanx	intact	?	100	2	1	A	?	
'6DT20'	1125	intermediate fifth? hand phalanx	intact	?	100	3	1	A	?	
'6DT20'	1125	intermediate hand phalanx	intact	?	100	1	1	A	?	
'6DT20'	1125	intermediate hand phalanx	ends damaged	?	80	3	1	A	?	
'6DT20'	1125	distal first hand phalanx	intact	L	100	2	1	A	?	
'6DT20'	1125	fragments		?	<5	3	2	A?	?	
'6DT20'	1125	fragments		?	<5	2	3	A?	?	

Appendix B: Osteological and Palaeopathological Catalogue – Disarticulated Bone

ID	Context	Bone Element	Detailed Description	Side	%	SP	No. Frags	Age	Sex	Other
1	4000	cranium	vault fragments	?	<5	2	2	?	?	
2	4000	humerus	proximal third diaphysis	R	30	2	1	Ad	-	Excavated muscle attachment (pectoralis major & teres major); proximal end unfused
3	4000	humerus	mid-distal third	R	30	2	1	A?	?	
4	4000	humerus	mid-distal third	R	30	3	1	A?	?	
5	4000	proximal hand phalanx	intact	?	100	2	1	A	?	
6	4000	rib	proximal third	R	30	2	1	A	?	
7	4000	rib	shaft	R?	20	2	1	A?	?	
8	4000	rib	shaft	?	10	2	1	A?	?	
9	4000	femur	part proximal shaft	L?	10	2	1	A?	?	
10	4000	MT1	damage to proximal end	R	90	2	1	A	?	
11	4000	long bone	shaft fragments	?	<5	2	2	A?	?	
12	4017	scapula	medial half spine & border	L?	10	4	1	A?	?	
13	4017	fibula	proximal end	R?	5	2	1	A	?	
14	4019	humerus	proximal third	L	40	2	1	A	?	
15	4019	humerus	mid-distal third	R	30	2	1	A?	?	
16	4019	humerus	proximal shaft	L	10	2	1	A?	?	
17	4019	radius	distal half	L	50	3	1	A	?	
18	4019	ulna	proximal & distal ends lost post-mortem	L	90	4	3	A?	?	
19	4019	rib	angle & shaft	R	30	2	1	A?	?	
20	4019	rib	angle & shaft	R	50	3	1	A?	?	
21	4019	rib	tubercle, angle & shaft	R	50	3	1	A	?	
22	4019	rib (12th?)	proximal shaft	R	50	3	1	A?	?	
23	4019	os coxa	posterior-medial ilium	R	30	3	1	YMA?	M?	Auricular surface probably stage 2/3 (eroded)
24	4019	femur	proximal two-thirds	R	60	3	2	A	?	
25	4019	femur	distal quarter	R	20	3	1	A	?	
26	4019	femur	distal quarter	R	20	3	1	A	?	
27	4019	femur	proximal quarter	L	20	3	1	A	?	
28	4019	femur	medial half distal quarter	L	10	3	4	A	?	
29	4019	tibia	proximal third	L	30	3	1	A	?	
30	4019	long bone	shaft fragments	?	<10	2	7	A?	?	
31	4019	long bone	shaft fragment	?	<10	3	1	A?	?	
32	4021	cranium	vault fragments	?	<5	2	4	A?	?	
33	4021	radius	proximal end	L	10	3	1	A	?	
34	4021	cervical vertebra	intact	-	100	1	1	A	?	
35	4021	cervical vertebra	left body & pedicle	-	30	3	1	A	?	

36	4021	cervical vertebra	body	-	40	3	1	A	?	
37	4021	thoracic vertebra	neural arch, pedicles (transverse & spinous processes lost pm)	-	50	2	1	A	?	
38	4021	lumbar vertebra/ T12	inferior apophyseal facets & spinous process	-	30	2	1	A	?	
39	4021	rib	shaft fragments	?	<5	3	5	A?	?	
40	4021	os coxa	superior pubic ramus, acetabulum	R	5	2	1	A	?	
41	4021	tibia	anterior proximal shaft tibial tuberosity)	R?	5	2	3	A	?	
42	4021	fibula	proximal-mid shaft	?	50	4	2	A?	?	
43	4021	MT3	intact	L	100	1	1	A	?	
44	4021	proximal first foot phalanx	intact	L	100	1	1	A	?	
45	4021	proximal first foot phalanx	distal half	R?	50	1	1	A?	?	
46	4021	proximal foot phalanx	intact	?	100	1	1	A	?	
47	4021	proximal foot phalanx	intact	?	100	1	1	A	?	
48	4021	distal first hand phalanx	intact	L	100	2	1	A	?	
49	4021	proximal hand phalanx	proximal end	?	30	2	1	A	?	
50	4021	fragment		?	<5	3	1	NA	-	unfused billowed surface
51	4037	rib	sternal end	?	10	2	1	YMA?	?	
52	4037	rib	shaft fragment	?	5	2	1	A?	?	
53	4037	rib	shaft fragment	?	<5	2	1	A?	?	
54	4037	fragments		?	?	3	2	?	?	
55	4040	axis	intact	-	100	2	1	A	?	
56	4040	humerus	proximal-mid two-thirds shaft	R	60	2	1	A/Ad?	?	Excavated muscle attachment (teres major)
57	4040	humerus?	part head & neck	?	<10	2	1	Ad	-	recently fused - fusion line clear
58	4047	scapula	coracoid & superior margin glenoid	R	10	2	1	A	?	
59	4047	radius	distal quarter	L	20	2	1	A	?	
60	4047	T11	damage to anterior body, spinous process lost pm	-	90	3	1	A	?	Articulates with T12 (ID61); OP + PO both costal facets; inferior facets lumbar in shape

61	4047	T12	damage to anterior body, spinous process lost pm	-	90	3	1	A	?	Articulates with T11 (ID60); OP + PO both costal facets; inferior facets lumbar in shape
62	4047	thoracic vertebra	left transverse process, left lamina, left inferior facet	-	30	3	1	A	?	
63	4047	proximal hand phalanx	intact	?	100	2	1	A	?	
64	4047	fragments		?	<5	2	8	?	?	
65	4048	proximal first hand phalanx	intact	R	100	2	1	A	?	Part of articulated hand (ID 65-71)
66	4048	distal first hand phalanx	intact	R	100	2	1	A	?	Part of articulated hand (ID 65-71)
67	4048	proximal hand phalanx	intact	R?	100	2	1	A	?	Part of articulated hand (ID 65-71)
68	4048	proximal hand phalanx	intact	R?	100	2	1	A	?	Part of articulated hand (ID 65-71)
69	4048	intermediate hand phalanx	intact	R?	100	2	1	A	?	Part of articulated hand (ID 65-71)
70	4048	intermediate hand phalanx	intact	R?	100	2	1	A	?	Part of articulated hand (ID 65-71)
71	4048	distal hand phalanx	intact	R?	100	2	1	A	?	Part of articulated hand (ID 65-71)
72	4051	rib	shaft	?	10	1	1	A?	?	
73	4051	lumbar vertebra?	inferior body	-	20	2	1	A	?	
74	4051	lumbar vertebra	superior right apophyseal facet & part right body	-	5	2	1	A	?	
75	4059	parietal	part squama	?	10	2	1	A?	?	
76	4059	rib	shaft (upper rib)	R	10	2	1	A?	?	
77	4059	fibula	proximal-mid two-thirds shaft	?	40	3	1	A?	?	
78	4059	MT1	damage to head	R	90	3	1	A	?	
79	4059	fibula?	shaft	?	10	3	3	A?	?	
80	4059	long bone	shaft fragments	?	<10	3	8	A?	?	
81	4066	cervical vertebra	left apophyseal facets & lamina	-	30	2	1	A?	?	
82	4066	cervical vertebra	left apophyseal facets	-	20	2	1	A?	?	
83	4066	ulna/fibula	shaft	?	10	2	2	A?	?	
84	4066	fragment		?	<5	2	1	A?	?	
85	4078	atlas	left half, posterior bar, part right	-	60	1	2	A	?	
86	4078	cervical vertebra	right apophyseal facets & lamina	-	20	1	1	A	?	
87	4078	cervical vertebra	left apophyseal facets, both laminae	-	40	2	2	A?	?	
88	4078	vertebra	posterior body fragment	-	<5	2	1	A?	?	

89	4078	hyoid	two-thirds body	-	30	1	1	A?	?	
90	4078	humerus	distal quarter	R	20	2	1	A	?	
91	4078	ulna?	shaft	?	20	3	1	A?	?	
92	4078	rib (11th?)	proximal end	L	20	2	1	A	?	
93	4078	patella	lateral margin damaged pm	R	90	2	1	A	?	
94	4078	femur	shaft fragment	?	20	2	1	A?	?	
95	4078	cranium	vault fragments	?	30	2	3	N/F	-	
96	4078	cranium	vault fragments	?	10	2	3	N/F	-	
97	4078	tibia	proximal two-thirds diaphysis	L	70	2	1	N/F	-	thick woven bone on medial shaft, bowed antero-posteriorly
98	4078	humerus?	shaft	?	10	3	1	A?	?	
99	4078	long bone	2 joining fragments	?	10	2	2	A?	?	
100	4078	long bone	fragments	?	<5	3	5	A?	?	
101	4078	fragment		?	5	4	1	A?	?	
102	4078	fragment		?	<5	1	1	A?	?	
103	4085	temporal	squamous	?	10	2	1	A?	?	
104	4085	cranium	vault fragments	?	<5	3	3	A?	?	
105	4085	thoracic vertebra	left transverse process, inferior facets	-	30	2	2	A?	?	scattered small porosity with rounded margins on posterior surface
106	4085	thoracic vertebra	left transverse process, superior facet & pedicle	-	10	3	1	A?	?	
107	4085	thoracic vertebra	part spinous process, inferior laminae, inferior facets	-	20	2	1	A?	?	fine porosity with rounded margins on posterior surface
108	4085	rib	shaft fragments	?	10	2	3	A?	?	
109	4085	rib	shaft fragments	?	<5	2	4	A?	?	
110	4085	radius?	distal third shaft	L	20	4	1	A?	?	
111	4085	MC1	intact	R	100	1	1	A	?	
112	4085	proximal hand phalanx	intact	?	100	3	1	A	?	
113	4085	proximal hand phalanx	intact	?	100	3	1	A	?	
114	4085	proximal hand phalanx	intact	?	100	4	1	A	?	
115	4085	proximal hand phalanx	distal three-quarters	?	90	3	1	A	?	
116	4085	proximal first hand phalanx	intact	R	100	3	1	A	?	
117	4085	distal first hand phalanx	intact	R	100	3	1	A	?	
118	4085	femur	head & superior neck	L?	10	1	1	A	?	
119	4085	femur	distal third	L	30	2	1	A	?	
120	4085	tibia	lateral condyle & posterior-lateral shaft	L	20	2	1	A	?	

121	4085	patella	intact	L	100	2	1	A	?	
122	4085	MT3	intact	R	100	1	1	A	?	
123	4085	long bone	fragments	?	<10	2	3	A?	?	
124	4085	long bone	fragments	?	<10	3	6	A?	?	
125	4085	long bone	fragment	?	<10	4	1	A?	?	
126	4085	fragments		?	<5	2	15	A?	?	
127	4091	tibia	shaft	L	20	3	3	A	?	
128	4091	rib	angle	R	5	3	1	A	?	
129	4099	parietal	anterior-lateral corner (coronal & squamous suture)	R	30	2	1	A	?	
130	4099	mandible	almost complete	-	95	2	2	A	?	Occludes with maxillae (ID 131 and 132)
131	4099	maxilla	palate, alveolar bone, frontal process	L	80	2	2	A	?	Articulates with maxilla (ID 132), occludes with mandible (ID 130
132	4099	maxilla	palate, alveolar bone	R	60	2	2	A	?	Articulates with maxilla (ID 131), occludes with mandible (ID 130)
133	4099	mandible	anterior right body, mentum, left side	-	70	2	2	A	?	
134	4099	atlas	complete	-	100	1	4	A	?	
135	4099	cervical vertebra	spinous process lost pm	-	90	1	1	A	?	
136	4099	T1	spinous process lost pm	-	90	1	3	A	?	
137	4099	proximal hand phalanx	distal two-thirds	?	70	2	1	A?	?	
138	4099	mandible/ maxilla	fragments alveolar bone	?	<5	2	2	A?	?	
139	4099	fragments		?	<5	3	3	A?	?	
140	4099	hyoid	left greater horn	-	30	2	1	A?	?	
141	4103	os coxa	acetabulum, AIIS, ischium	R	30	2	1	A	?	Joins together with os coxa (ID 143) from context 4104; acetabular crease
142	4103	long bone	?fibula? shaft	?	10	4	1	A?	?	
143	4104	os coxa	auricular PIIS, PSIS	R	20	2	1	YMA	M	Joins together with os coxa (ID 141), from context 4103
144	4104	os coxa	iliac crest	R?	10	2	1	A	?	
145	4104	humerus	proximal two-thirds	L	60	2	1	A	?	
146	4104	proximal hand phalanx	distal three-quarters	?	70	2	1	A	?	
147	4104	fibula	distal third	L	30	3	1	A	?	
148	4104	cervical vertebra	left side	-	50	2	1	A	?	
149	4104	thoracic vertebra	left arch & part right lamina	-	30	2	1	A?	?	
150	4104	rib	shaft fragments	?	10	2	2	A?	?	
151	4104	rib	shaft fragment	?	10	1	1	A?	?	

152	4111	proximal first foot phalanx	intact	L	100	1	1	A	?	
153	4111	proximal foot phalanx	intact	?	100	1	1	A	?	
154	4111	intermediate foot phalanx	intact	?	100	1	1	A	?	
155	4114	molar	upper first(?); disto-buccal root tip lost pm	L	90	1	1	A	?	slight calculus (distal & lingual), medium carious lesion on mesial side
156	4114	humerus/ femur	proximal epiphysis	?	<10	4	1	Ad	-	unfused
157	4114	long bone	shaft fragments	?	<10	4	3	A?	?	
158	4118	zygoma	intact	L	100	1	1	A	?	
159	4118	cranium	vault fragments	?	<10	2	2	A?	?	
160	4118	thoracic vertebra (upper)	spinous process lost pm	-	90	1	3	A	?	
161	4118	thoracic vertebra	right inferior body	-	20	2	1	A	?	
162	4118	rib 1	angle, shaft, tubercle	L	70	2	1	A	?	
163	4118	rib 2	neck, tubercle, angle	L	20	1	2	A?	?	
164	4118	rib 11/12	proximal end	R	20	2	1	A	?	
165	4126	MT5	proximal three-quarters	L	90	4	1	A	?	Articulates with MT4 (ID 166)
166	4126	MT4	proximal two-thirds	L	70	3	1	A	?	Articulates with MT5 (ID 165)
167	4126	MT (3?)	shaft	?	70	3	1	A?	?	
168	4129	sphenoid	left greater wing	-	20	2	1	A	?	
169	4129	temporal	mastoid region, EAM	L	40	3	1	A	?	
170	4129	temporal	part squama	?	5	2	1	A?	?	
171	4129	canine?	probably lower, heavily worn	R?	80	3	1	A	?	
172	4129	vertebra	body fragment	?	<10	2	1	A	?	
173	4129	fragments		?	<10	2	6	A?	?	
174	4132	premolar	upper, possibly second; intact	R	100	1	1	A	?	slight calculus (buccal, mesial & distal)
175	4139	MT1	intact	L	100	1	1	A	?	
176	4148	ulna	distal epiphysis lost pm	L	90	4	1	Ad	-	proximal epiphysis fully fused, distal epiphysis unfused; possibly Sk 3DT18
177	4148	thoracic vertebra	body	-	50	3	1	A	?	Schmorl's node, inferior surface
178	4148	MT5	proximal half	L	50	3	1	A	?	
179	4148	MT4?	distal three-quarters	L	80	2	1	A	?	
180	4153	radius	distal third	R	40	3	1	A	?	
181	4153	fibula	proximal end	R	10	3	1	A	?	
182	4153	T12?	posterior body, right arch &	-	70	3	1	A	?	

			superior left arch							
183	4153	molar	lower first; intact	L	100	1	1	A	?	
184	4162	occipital	left condyle	-	10	3	1	A	?	
185	4162	cranium	vault fragment	?	<5	3	1	A?	?	
186	4162	scapula	glenoid, coracoid	R	20	4	1	A	?	
187	4162	humerus	distal third shaft	L	20	3	1	A?	?	
188	4162	MT3	proximal quarter	L	90	4	1	A?	?	
189	4162	proximal first foot phalanx	intact	R	100	3	1	A	?	sharp edged lytic lesion on medial surface of head
190	4162	rib 1	shaft, sternal end	L	50	2	1	A	?	
191	4162	rib	shaft fragment	L?	<10	2	1	A?	?	
192	4162	long bone	shaft fragments	?	<10	3	5	A?	?	
193	4171	canine	upper	L?	90	1	1	A	?	slight calculus (buccal); small chip to enamel of central incisive surface, buccal side; fracture distal half incisive surface exposing dentine
194	4171	premolar	upper first; intact	R	100	1	1	A	?	
195	4171	premolar	upper second(?); intact	R	100	1	1	A	?	flecks calculus
196	4171	molar	upper first(?); disto-buccal root lost pm	R	90	1	1	A	?	slight calculus
197	4171	molar	upper second(?); crown & part roots	R	70	1	1	A?	?	flecks calculus
198	4171	premolar	lower second; intact	R?	100	1	1	A	?	flecks calculus
199	4171	clavicle	sternal third	L	20	3	1	A	?	
200	4171	humerus	distal third shaft	L	20	3	1	A?	?	
201	4171	femur	proximal quarter	R	20	3	1	A	?	Allen's fossa
202	4171	femur	distal joint	L	10	3	1	A	?	
203	4171	femur	shaft (distal?)	?	10	2	1	A?	?	
204	4171	tibia	proximal (posterior half)	R	10	4	1	A	?	
205	4171	tibia	midshaft	L	20	2	1	A?	?	slightly swollen area of lamellar bone along the medial side of the anterior crest; striated lamellar bone in medial & lateral surfaces
206	4171	calcaneus	superior & medial parts	R	70	2	1	A	?	double anterior calcaneal facet
207	4171	rib	angle	R	20	3	1	A?	?	
208	4171	rib	shaft	?	<10	2	2	A?	?	
209	4171	long bone	shaft fragments	?	<10	2	2	A?	?	
210	4174	cranium	vault fragment	?	<10	3	1	A?	?	
211	4186	femur	distal third (lateral condyle	R	40	4	1	A	?	ID 211-214 probably one

			lost pm)							skeleton
212	4186	tibia	proximal three-quarters	L	90	4	1	A	?	ID 211-214 probably one skeleton
213	4186	tibia	proximal two-thirds (lateral condyle lost pm)	R	60	4	1	A	?	ID 211-214 probably one skeleton
214	4186	fibula	proximal half	L?	50	4	1	A	?	ID 211-214 probably one skeleton
215	4186	talus	intact	R	100	1	1	A	?	double inferior talar facet
216	4186	long bone	fragment	?	<10	2	1	A?	?	
217	4193	frontal	left half & medial right superior orbit	-	50	1	2	F/N	-	
218	4193	cranium	vault fragment	?	20	1	1	F/N	-	
219	4193	cranium	vault fragment	?	10	1	1	F/N	-	
220	4193	fibula	distal half diaphysis	?	40	1	1	F/N	-	
221	4193	rib	angle & shaft	L	80	1	1	F/N	-	
222	4196	tibia	intact	L	100	1	2	A	?	
223	4196	fibula	distal third	R	30	3	1	A	?	
224	4196	calcaneus	damage to anterior	R	95	3	1	A	?	double anterior calcaneal facet
225	4196	talus	intact	L	100	3	1	A	?	
226	4196	medial cuneiform	intact	L	100	2	1	A	?	
227	4196	MT1	intact	L	100	2	1	A	?	
228	4196	MT2?	damage to proximal end	L	95	2	1	A	?	
229	4196	MT4	intact	L	100	3	1	A	?	
230	4196	proximal first foot phalanx	proximal end	?	20	2	1	A	?	
231	4196	proximal foot phalanx	intact	?	100	2	1	A	?	
232	4196	proximal foot phalanx	intact	?	100	2	1	A	?	
233	4197	scapula	glenoid, base coracoid, superior axillary border	R	30	2	1	A	?	
234	4205	clavicle	medial three-quarters	L	90	3	2	YA	?	sternal end partially fused
235	4205	scapula	glenoid fossa	R	10	1	1	A	?	
236	4205	ulna	distal quarter	R	20	2	2	A	?	
237	4205	ulna	midshaft	R?	10	2	2	A?	?	
238	4205	proximal hand phalanx	intact	?	100	3	1	A	?	
239	4205	proximal fifth hand phalanx	intact	L	100	2	1	A	?	
240	4205	os coxa	pubis, acetabulum, superior ramus, part inferior ramus	R	20	2	1	YMA	M	phase 3
241	4205	fibula	distal quarter	R	10	3	1	A	?	
242	4205	fibula	proximal third shaft	?	30	3	1	A?	?	

243	4205	calcaneus	complete	R	100	2	2	A	?	double anterior calcaneal facet
244	4205	talus	intact	R	100	2	1	A	?	double inferior talar facet
245	4205	MT2?	intact	R	100	1	1	A	?	Articulates with MT3 (ID 246)
246	4205	MT3	intact	R	100	1	1	A	?	Articulates with MT2 (ID 245)
247	4205	cervical vertebra	left transverse process lost pm	-	95	1	1	A	?	
248	4205	thoracic vertebra	neural arch	-	50	1	1	A	?	ossified ligamentum flavum
249	4205	thoracic vertebra	neural arch	-	50	1	2	A	?	ossified ligamentum flavum
250	4205	T11/12	body, right pedicle, right superior facet	-	50	2	1	A	?	Schmorl's nodes, superior & inferior surfaces
251	4205	T11?	anterior body damaged, spinous process lost pm	-	80	2	1	A	?	Schmorl's nodes, superior & inferior surfaces
252	4205	rib 1	complete	R	100	1	2	A	?	
253	4205	rib 2	proximal half	R	50	1	2	A	?	
254	4205	rib 2/3	tubercle, angle & shaft	L	40	1	1	A	?	
255	4205	rib (upper)	tubercle	L	10	1	1	A	?	
256	4205	rib (lower)	shaft	L	20	1	1	A?	?	
257	4205	rib	shaft	R	30	1	1	A?	?	
258	4205	rib	shaft	L	10	1	1	A?	?	
259	4205	rib	shaft fragments	?	10	1	3	A?	?	
260	4229	proximal first foot phalanx	intact	R	100	1	1	A	?	
261	4232	MT4	intact	R	100	0	1	A	?	
262	4232	MT2?	proximal three-quarters	L	80	4	1	A?	?	
263	4251	os coxa?	ilium?	?	<10	1	1	A?	?	
264	4251	long bone	shaft fragment	?	<10	1	1	A?	?	
265	4251	long bone	shaft fragment	?	<10	2	1	A?	?	
266	4252	fibula	shaft (proximal?)	?	20	3	1	A?	?	
267	4255	frontal	left orbit margin, left zygomatic process	-	10	2	1	A?	?	
268	4255	temporal	squama	?	20	2	1	A?	?	
269	4274	lumbar vertebra	damage to anterior body	-	80	3	1	A	?	osteophytes around superior body margin
270	4274	intermediate hand phalanx	intact	?	100	3	1	A	?	
271	4275	thoracic vertebra	damage to anterior body, left transverse & spinous processes lost pm	-	80	3	1	A	?	Schmorl's nodes, superior & inferior surfaces
272	4275	cranium	fragment	?	<10	3	1	A?	?	
273	4275	fragments		?	<10	4	3	A?	?	

274	4277	lunate	dorsal-lateral part lost pm	R	80	1	1	A	?	
275	4278	ulna	proximal third	R	30	3	1	A	?	osteophytes around proximal joint margin
276	4278	calcaneus	intact	R	100	3	1	A	?	double anterior calcaneal facet
277	4278	proximal first foot phalanx	intact	R	100	2	1	A	?	
278	4278	rib	shaft fragment	?	20	3	1	A	?	
279	4325	molar	lower third; intact	R	100	3	1	A	?	
280	4325	radius	proximal third	R	30	2	1	A	?	
281	4325	proximal foot phalanx	intact	R?	100	2	1	A	?	
282	4325	rib 12	proximal third	L	40	1	1	A	?	
283	4325	rib	proximal quarter	L	20	2	1	A	?	
284	4325	rib (2nd?)	shaft	?	10	2	1	A?	?	
285	4334	thoracic vertebra (upper)	intact	-	100	2	1	A	?	
286	4334	rib	angle & shaft	L	60	3	1	A?	?	
287	4334	rib	sternal half	L	50	3	1	A	?	
288	4336	lumbar vertebra	left superior facet & transverse process lost pm	-	90	3	1	A	?	Schmorl's nodes, superior & inferior surfaces
289	4336	intermediate hand phalanx	intact	?	100	2	1	A	?	
290	4336	rib	tubercle & angle	L	20	3	1	A	?	
291	4336	rib	angle	L	20	3	2	A?	?	
292	4336	rib	shaft	L	20	3	1	A?	?	
293	4336	rib	shaft fragment	?	<10	3	1	A?	?	
294	4336	os coxa	iliac crest	?	<10	2	1	A	?	
295	4336	fragment		?	<10	3	1	A?	?	
296	4339	rib	neck & tubercle	L	10	3	1	A	?	
297	4339	fragment		?	<10	2	1	A?	?	
298	4349	MT5	proximal three-quarters	R	90	2	1	A?	?	
299	4349	long bone	shaft fragment	?	<10	2	1	A?	?	
300	4349	fragment		?	<10	2	1	A?	?	
301	4351	cervical vertebra	inferior left apophyseal facet not present	-	90	2	1	A	?	decapitation: diagonal linear cut has removed the inferior left apophyseal facet & sliver from inferior surface of left transverse process; cut surface smooth & polished along posterior, rougher and peeled along anterior; cut angled from superior left to inferior right
302	4356	rib	shaft	?	20	4	1	A?	?	

303	4356	fibula?	shaft	?	10	2	1	A?	?	
304	4356	fragments		?	<10	3	3	A?	?	
305	4358	rib (upper)	shaft	R	20	3	1	A?	?	
306	4358	rib	shaft	?	10	3	1	A?	?	
307	4358	rib	shaft fragment	?	<5	3	1	A?	?	
308	4361	frontal	left zygomatic process, lateral left orbit	-	10	3	1	A	M?	
309	4368	maxilla	alveolar bone	L	30	2	1	A	?	
310	4368	humerus	complete	L	100	3	5	A	?	
311	4368	cranium	vault fragments	?	<10	2	4	A?	?	
312	4368	radius	anterior part proximal quarter	R	10	2	3	A	?	
313	4368	proximal hand phalanx	loss of proximal palmar area	?	90	2	1	A	?	
314	4368	MT1	proximal end	L	40	2	1	A	?	
315	4368	MT	distal end	?	20	2	1	A	?	
316	4368	proximal foot phalanx	intact	?	100	1	1	A	?	
317	4368	rib	angle	?	30	2	1	A?	?	
318	4368	rib	angle	?	20	2	1	A?	?	
319	4368	rib	shaft fragments	?	10	2	2	A?	?	
320	4400	scapula	acromion, lateral spine, coracoid, glenoid, axillary border	R	40	3	3	A	?	ID 320-323 possibly all part of one scapula
321	4400	scapula	medial spine, superior angle	R	20	3	1	A	?	ID 320-323 possibly all part of one scapula
322	4400	scapula	inferior lateral border	R?	<10	3	1	A	?	ID 320-323 possibly all part of one scapula
323	4400	scapula	lateral border	R?	<10	3	1	A	?	ID 320-323 possibly all part of one scapula
324	4400	radius	distal three-quarters	R	60	3	2	A	?	swollen area of slightly porous lamellar bone on the medial-posterior surface of the distal third of the shaft c. 30mm from the distal end; pronounced lytic lesion in the centre of the lamellar bone (16 x 4mm) which penetrates deep into the bone (possibly to medullary cavity), margins of lytic lesion clear & fairly sharp; possible osteomyelitis
325	4400	MC2	intact	R	100	2	1	A	?	

326	4400	MT4	proximal three-quarters	R	90	2	1	A?	?	
327	4400	lumbar vertebra	body, left superior facet & transverse process	-	60	3	1	A	?	
328	4400	lumbar vertebra	inferior right facet	-	10	2	1	A?	?	
329	4400	femur	complete	R	100	3	3	A	?	plaque
330	4400	zygoma	frontal & temporal processes	R	80	2	1	A	?	
331	4400	temporal	petrous part, IAM, carotid canal	L	20	2	1	A	?	
332	4400	temporal	mastoid region, part EAM	L	30	3	1	A	M?	
333	4400	temporal	glenoid fossa	L	10	3	1	A	?	
334	4400	frontal	right zygomatic process	-	<	5	2	A	?	
335	4400	frontal	left half squama, glabella, left orbit	-	40	2	5.5	A	?	superior orbital notch bridged; fused to parietal (ID 336)
336	4400	parietal	anterior & central squama	L	30	2	2.5	A	?	fused to frontal (ID 335)
337	4400	frontal	central-posterior squama	-	10	2	0.5	A	?	faint metopic suture?; fused to parietal (ID 338)
338	4400	parietal	anterior medial corner	R	20	2	0.5	A	?	fused to frontal (ID 337)
339	4400	parietal	medial	L	20	2	2	A	?	fused to right parietal (ID 340)
340	4400	parietal	medial	R	20	2	2	A	?	fused to left parietal (ID 339)
341	4400	zygoma	frontal process	L	20	2	1	A	?	
342	4400	mandible	left ramus, coronoid process, condyle	-	20	2	2	A	?	
343	4400	mandible	left alveolar bone	-	20	2	1	A	?	
344	4400	maxilla	frontal process	R?	<10	2	1	A?	?	
345	4400	cranium	vault fragments	?	<10	2	20	A?	?	
346	4400	fragments		?	<10	2	21	A?	?	
347	4400	rib 2	shaft	R	20	3	1	A?	?	
348	4400	rib 3?	neck, tubercle, shaft	R	90	3	3	A	?	
349	4400	rib	neck, tubercle, shaft	R	80	3	3	A	?	
350	4400	rib	proximal	R	60	3	2	A	?	
351	4400	rib	angle & shaft	R	60	3	1	A?	?	
352	4400	rib	shaft	R	40	3	2	A?	?	
353	4400	rib	shaft	R	30	3	2	A?	?	
354	4400	rib	shaft fragments	?	<10	3	3	A?	?	
355	4411	clavicle	medial third	L	40	4	1	A	?	sternal end fused
356	4411	femur	distal end	L	10	2	1	A	?	
357	4411	femur	distal end	R	10	2	1	A	?	
358	4411	MT3	proximal three-quarters	L	90	3	1	A?	?	
359	4411	rib	tubercle & angle	L	20	4	1	A?	?	

360	4420	tibia	shaft (mid-distal quarter)	L?	20	3	1	A?	?	
361	4421	calcaneus	lateral side damaged	L	90	3	1	A	?	double anterior calcaneal facet
362	4421	medial cuneiform	intact	R	100	2	1	A	?	
363	4421	parietal	posterior-lateral corner	L?	10	2	1	A?	?	
364	4421	rib	proximal quarter	R	20	2	2	Ad	?	head unfused
365	4421	rib	angle & shaft	R	40	2	1	A?	?	
366	4421	rib 2	shaft	R?	20	3	1	A?	?	
367	4421	rib	shaft	?	10	2	1	A?	?	
368	4421	rib	shaft	?	<10	3	7	A?	?	
369	4421	MT?	shaft?	?	40	3	1	A?	?	
370	4428	calcaneus	intact	R	100	3	1	A	?	double anterior calcaneal facet
371	4428	talus	damage to head	R	90	2	1	A	?	double inferior talar facet; pair with talus (ID 372)
372	4428	talus	intact	L	100	2	1	A	?	double inferior talar facet; pair with talus (ID 371)
373	4428	MT4	distal three-quarters	R	90	3	1	A	?	
374	4428	cervical vertebra	right neural arch	-	40	2	1	A	?	
375	4431	axis	left transverse process lost pm	-	90	2	1	A	?	
376	4431	cervical vertebra	body, right arch, spinous process, left lamina	-	70	2	3	A	?	
377	4431	thoracic vertebra	right pedicle, right arch	-	40	3	1	A	?	
378	4431	T12	anterior body damaged	-	90	3	2	A	?	Schmorl's nodes, superior & inferior surfaces; superior facets lumbar in shape, vestigial rib facet on right pedicle
379	4431	sacrum	S1 body, left ala, posterior right ala	-	30	2	1	A	?	
380	4431	sacrum	part neural arch	-	10	3	1	A	?	
381	4431	clavicle	sternal half shaft	R	50	3	1	A?	?	
382	4431	clavicle	lateral third shaft	R	40	3	1	A?	?	soft tissue trauma to deltoid attachment
383	4431	proximal hand phalanx	intact	?	100	2	1	A	?	
384	4431	intermediate hand phalanx	in	?	100	2	1	A	?	
385	4431	MC5	proximal two-thirds	L	70	2	1	A?	?	
386	4431	MC1	distal half	?	30	2	2	A?	?	
387	4431	MC (4/5?)	distal half	?	40	2	1	A	?	
388	4431	MC1?	half proximal	?	10	2	1	A	?	

			end							
389	4431	rib	tubercle & angle	R	30	3	1	A	?	
390	4431	rib	proximal quarter	L	20	3	1	A	?	
391	4431	rib	shaft	L	30	3	2	A?	?	
392	4431	rib	shaft fragments	?	10	3	2	A?	?	
393	4431	rib	shaft fragment	?	<10	3	1	A?	?	
394	4431	os coxa	iliac crest	?	5	3	1	A	?	
395	4431	femur	proximal quarter	L	20	2	1	A	?	
396	4431	talus	medial & plantar parts of head lost pm	L	90	2	2	A	?	
397	4431	navicular	dorsal	?	40	2	2	A	?	
398	4431	MT1	lateral-distal half lost pm	R	70	2	1	A	?	
399	4431	MT1	lateral-distal half lost pm	R	70	2	2	A	?	
400	4431	MT5	proximal two-thirds	L	70	2	1	A?	?	
401	4431	MT4	proximal two-thirds	L	60	2	1	A?	?	
402	4431	MT 3/4?	proximal two-thirds shaft	L	50	2	1	A?	?	
403	4431	proximal first foot phalanx	damage to ends	L	90	2	1	A	?	
404	4431	proximal foot phalanx	distal three-quarters	?	80	2	1	A?	?	
405	4431	fragments		?	10	2	6	A?	?	
406	4460	rib	shaft	?	20	2	1	A?	?	
407	4460	proximal foot phalanx	intact	?	100	2	1	A	?	
408	4464	rib	neck & tubercle	L	20	3	1	A	?	
409	4464	MT1	damage to ends	L	80	2	1	A	?	
410	4464	long bone	shaft fragments	?	<10	3	4	A?	?	
411	4464	rib	shaft (possibly animal?)	?	10	3	1	A?	?	
412	4466	parietal	posterior-lateral corner	L	20	3	1	A?	?	
413	4466	rib	angle & shaft	L	20	3	2	A?	?	
414	4466	rib?	shaft fragment	?	10	3	1	A?	?	
415	4467	femur	mid & distal third shaft	L	40	3	3	A?	?	
416	4467	femur	?distal third shaft	?	<10	3	1	A?	?	
417	4477	cervical vertebra	intact	-	100	3	1	A	?	
418	4477	MT2	intact	R	100	2	1	A	?	82.84mm long
419	4477	proximal first foot phalanx	intact	L	100	3	1	A	?	
420	4477	proximal foot phalanx	intact	?	100	3	1	A	?	
421	4477	rib	proximal third	R	40	3	2	A	?	
422	4477	rib	shaft	R	40	3	1	A?	?	
423	4477	rib	shaft	?	20	3	1	A?	?	
424	4477	rib	shaft fragments	?	<10	3	8	A?	?	
425	4477	fragment		?	<10	3	1	A?	?	

426	4493	tibia	distal three-quarters (medial malleolus lost pm)	R	70	2	1	A	?	striated lamellar bone on medial mid third shaft
427	4493	femur	distal joint surface	R	10	1	1	A	?	
428	4493	radius	midthird shaft	?	20	2	1	A?	?	
429	4493	fibula	distal third shaft	L	10	1	1	A?	?	
430	4493	navicular	fragment	?	30	2	1	A?	?	
431	4504	ulna	proximal three-quarters (olecranon process lost pm)	L	60	3	1	A?	?	
432	4504	os coxa	pubis, inferior symphysis & inferior ramus	R	10	2	1	YMA/OMA?	M	
433	4505	os coxa	part acetabulum	L	10	2	1	A	?	
434	4505	ulna	distal quarter	L	20	2	1	A	?	
435	4505	MT4	proximal three-quarters	R	90	2	1	A	?	
436	4505	MT3	proximal three-quarters	R	80	2	1	A	?	
437	4505	fragment		?	<10	3	1	A?	?	
438	4506	femur	complete	R	100	2	3	A	?	plaque
439	4506	calcaneus	lateral side damaged	L	90	2	1	A	?	
440	4506	fibula	proximal half shaft	?	50	3	4	A?	?	
441	4506	radius	proximal three-quarters shaft	L	80	2	6	A	?	
442	4506	radius	midshaft	L	50	2	2	A?	?	
443	4506	MT2	proximal two-thirds	L	60	2	1	A?	?	
444	4506	radius	distal end	L	10	2	1	A	?	
445	4506	rib	proximal quarter	L	20	3	1	Ad/YA	?	head fusing
446	4506	rib	angle	L	20	3	1	A?	?	
447	4506	rib	neck & tubercle	L	10	4	1	A?	?	
448	4506	rib	angle	L	10	3	1	A?	?	
449	4506	rib	angle & shaft	L	30	3	1	A?	?	
450	4506	rib	neck & tubercle	L	10	2	1	A?	?	
451	4506	rib	shaft	L?	20	2	1	A?	?	
452	4506	rib	shaft	?	10	3	1	A?	?	
453	4506	rib	shaft fragment	?	<10	2	1	A?	?	
454	4506	long bone	shaft fragments	?	<10	2	4	A?	?	
455	4507	thoracic vertebra	left transverse process & superior apophyseal facet	-	20	3	1	A	?	
456	4507	rib	shaft	?	20	3	1	A?	?	
457	4507	rib	shaft	?	<10	3	1	A?	?	
458	4508	humerus	distal joint lost pm	R	90	2	2	A	?	
459	4508	occipital	squama, nuchal crest, external occipital protuberance	-	40	3	2	A?	M?	
460	4508	cranium	vault fragments	?	<10	3	2	A?	?	
461	4508	T12	body, right arch, spinous process, left lamina	-	30	1	1	A	?	

462	4508	thoracic vertebra	left pedicle, superior facet & lamina, right lamina & inferior facet	-	30	2	2	A	?	
463	4508	navicular	tuberosity lost pm	L	90	3	1	A	?	
464	4508	os coxa	ischium, lateral ilium, ASIS, AIIS, acetabulum	R	40	3	5	A	?	ID 464-465 possibly same os coxa
465	4508	os coxa	auricular, part iliac crest, part sciatic notch	R	30	3	6	YMA/OMA	M?	ID 464-465 possibly same os coxa
466	4508	os coxa	iliac crest	?	<5	3	1	A	?	
467	4508	os coxa	iliac crest	?	<5	3	1	A	?	
468	4508	os coxa	fragments	?	<5	3	2	A	?	
469	4508	fibula	distal half	R	50	2	2	A	?	
470	4508	fibula	distal quarter shaft	L	20	2	1	A?	?	
471	4508	fibula?	shaft	?	10	2	2	A?	?	
472	4508	fibula	shaft	?	20	2	1	A?	?	
473	4508	fibula?	shaft	?	10	2	1	A?	?	
474	4508	fibula?	shaft	?	5	2	1	A?	?	
475	4508	rib 11/12	proximal half	L	60	3	2	A	?	
476	4508	rib	angle & shaft	L	30	3	2	A?	?	
477	4508	rib	tubercle & angle	R	10	3	2	A	?	
478	4508	rib	shaft	R?	10	3	1	A?	?	
479	4508	rib	shaft	?	<10	3	6	A?	?	
480	4508	fragments		?	<10	3	8	A?	?	
481	4510	occipital	left squama	-	20	3	3	A	?	ID 481-485 all part of same cranium (15 fragments in total)
482	4510	temporal	mastoid, posterior squama, EAM	L	50	3	2	A	M	ID 481-485 all part of same cranium (15 fragments in total)
483	4510	parietal	lateral half	L	50	3	5	A	?	ID 481-485 all part of same cranium (15 fragments in total)
484	4510	frontal	left squama, orbit margin & left half glabella	-	40	3	4	A	M?	ID 481-485 all part of same cranium (15 fragments in total)
485	4510	zygoma	intact	L	100	3	1	A	?	ID 481-485 all part of same cranium (15 fragments in total)
486	4510	cranium	vault fragments	?	10	3	2	A?	?	possibly part of skull ID 481-485
487	4510	humerus	distal three-quarters	L	90	3	2	A	?	
488	4510	humerus	head	?	<10	2	1	A	?	
489	4510	femur	shaft	L	80	3	7	A?	?	
490	4510	femur	head	L?	10	3	1	A	?	
491	4510	femur	distal joint fragments	?	<10	3	2	A?	?	

492	4510	tibia	proximal quarter	R	30	3	3	A	?	
493	4510	fragments		?	<10	3	10	A?	?	
494	4511	clavicle	sternal end lost pm	R	80	2	1	A	?	
495	4511	clavicle	mid-lateral shaft	L	50	2	1	A?	?	
496	4511	scapula	lateral end spine	R	20	2	1	A?	?	
497	4511	scapula	lateral border	R	10	2	1	A?	?	
498	4511	ulna	olecranon & distal joint lost pm	L	90	2	1	A?	?	
499	4511	ulna	distal quarter	R	20	2	1	A	?	
500	4511	sternum	superior body (1st segment)	-	20	3	1	A	?	
501	4511	sternum	body	-	10	3	1	A?	?	
502	4511	sternum	body	-	<10	3	1	A?	?	
503	4511	thoracic vertebra	right side body, pedicle & superior facet	-	20	2	1	A	?	Schmorl's node, inferior surface
504	4511	vertebra	posterior-inferior body	-	<10	1	1	A	?	Schmorl's node, inferior surface
505	4511	vertebra	body fragment; lumbar?	-	20	2	1	A	?	Schmorl's node
506	4511	vertebra	body fragment	-	<10	2	1	A	?	
507	4511	vertebra	body fragment	-	<10	1	1	A	?	
508	4511	rib 1	intact	L	100	1	1	A	?	
509	4511	rib 2?	proximal quarter	R	20	2	1	A	?	
510	4511	rib	head, neck & tubercle	R	10	2	1	A	?	
511	4511	rib 11/12	proximal third	L	30	2	1	A	?	
512	4511	rib	shaft	L	20	2	1	A?	?	
513	4511	calcaneus	posterior-lateral surface damaged, systentaculum tali lost pm	L	70	2	1	A	?	
514	4511	MT2	proximal three-quarters	R	90	3	1	A?	?	MT2-5 (ID 514-517) articulate
515	4511	MT3	intact	R	100	3	1	A	?	MT2-5 (ID 514-517) articulate
516	4511	MT4	proximal & distal ends damaged	R	90	3	1	A	?	MT2-5 (ID 514-517) articulate
517	4511	MT5	proximal three-quarters	R	80	3	1	A?	?	MT2-5 (ID 514-517) articulate
518	4511	proximal first foot phalanx	intact	R	100	3	1	A	?	
519	4511	proximal foot phalanx	distal three-quarters	?	80	3	1	A?	?	
520	4511	fragments		?	<10	2	3	A?	?	
521	4511	fragment		?	<10	3	1	A?	?	
524	4511	rib	angle	L	10	3	1	A?	?	
525	4511	rib	shaft	?	10	3	1	A?	?	
522	4514	patella	intact	R	100	2	1	A	?	
523	4514	rib	tubercle, angle & shaft	L	30	3	1	A	?	
526	10000	os coxa	acetabulum	?	<10	2	2	A	?	
527	10000	os coxa	part ilium	?	<10	3	1	A?	?	
528	10000	os coxa	part ilium	?	<10	3	1	A?	?	
529	10000	femur	midshaft	?	20	3	5	A?	?	
530	10000	radius	midshaft	?	10	3	1	A?	?	

531	10000	lumbar vertebra	right body, pedicle & superior facet	-	10	3	1	A	?	
532	10000	lumbar vertebra	right lamina, inferior facet	-	10	3	1	A	?	
533	10000	lumbar vertebra?	right pedicle & part body	-	5	3	1	A	?	
534	10000	fragments		?	<10	3	9	A?	?	
535	10011	fragment		?	<10	3	1	A?	?	
536	10021	radius	proximal half shaft	L	50	2	1	A?	?	
537	1000	temporal	glenoid fossa	L	10	2	1	A	?	
538	1000	proximal hand phalanx	intact	?	100	1	1	A	?	
539	1000	calcaneus	posterior-inferior damaged pm	R	80	2	1	A	?	peroneal tubercle
540	1000	MT2	intact	L	100	2	1	A	?	85.00mm long
541	1000	MT4	intact	L	100	2	1	A	?	79.87mm
542	1000	MT3	intact	L	100	2	1	A	?	68.47mm long
543	1000	fibula	proximal third	L	30	2	2	A	?	
544	1000	fibula	distal half	L	50	2	2	A	?	deposit of lamellar bone on lateral shaft; shaft flattened medio-laterally
545	1000	ulna	mid & distal two-thirds	R	60	2	1	A?	?	possible well healed fracture of distal third
546	1000	tibia	midshaft	?	10	2	1	A?	?	
547	1000	tibia	anterior proximal third	L	10	3	1	A?	?	
548	1000	tibia?		L?	<10	2	1	A?	?	
549	1000	long bone	shaft fragment	?	<10	2	1	A?	?	
550	1000	long bone	shaft fragment	?	<10	3	1	A?	?	
551	1000	long bone	shaft fragment	?	<10	4	1	A?	?	
552	1000	fragment		?	<10	2	1	A?	?	
553	1006	parietal	posterior-lateral corner	R?	10	3	1	A?	?	
554	1008	fragments		?	<10	3	3	A?	?	
555	1017	fibula	proximal quarter shaft	?	20	3	1	A?	?	
556	1018	frontal	lateral right orbit, right zygomatic process	-	20	3	1	A	M?	
557	1026	humerus	proximal-distal shaft	R	80	2	2	A?	?	
558	1031	clavicle	medial three-quarters	R	90	3	1	Ad/YA	?	proximal end unfused
559	1031	rib	proximal third	R	30	3	1	Ad/YA	?	head unfused
560	1031	rib	head & tubercle	R	10	3	1	Ad/YA	?	head unfused
561	1031	rib	sternal third	R?	20	3	1	Ad/YA	?	sternal end billowed
562	1031	rib	shaft	?	10	2	1	A?	?	
563	1031	cervical vertebra	superior body damaged	-	90	2	1	Ad/YA	?	annular rings fusing
564	1031	scapula	lateral spine, part glenoid fossa	R	20	3	2	A?	?	
565	1031	fragment		?	<10	3	1	A?	?	
566	1032	rib	angle & shaft	R	20	2	1	A?	?	

567	1032	rib	shaft fragment	?	<10	3	1	A?	?	
568	1032	MT3	intact	R	100	2	1	A	?	
569	1032	MT4	intact	R	100	2	1	A	?	
570	1032	proximal first foot phalanx	intact	L	100	2	1	A	?	
571	1032	proximal (5th?) foot phalanx	intact	L?	100	2	1	A	?	
572	1032	proximal (5th?) foot phalanx	intact	R?	100	2	1	A	?	
573	1032	proximal foot phalanx	intact	?	100	2	1	A	?	
574	1032	proximal foot phalanx	intact	?	100	2	1	A	?	
575	1032	proximal foot phalanx	intact	?	100	2	1	A	?	
576	1037	temporal	glenoid fossa & root zygomatic process	L	10	1	1	A?	?	
577	1040	fibula	proximal shaft	?	10	1	1	A?	?	Joins together with fibula (ID 578), from context 1043
578	1043	fibula	midshaft	?	50	1	1	A?	?	Joins together with fibula (ID 577), from context 1040
579	1043	fragments		?	<10	1	3	A?	?	
580	1043	fragments		?	<10	3	2	A?	?	
581	1043	fragment		?	<10	2	1	A?	?	
582	1048	mandible	left coronoid process lost pm	-	95	2	2	YA	M?	
583	1048	mandible	right side & mentum	-	50	2	2	YA	M?	Shallow linear horizontal cut (2.5mm long) into posterior left ramus roughly equidistant between condyle & gonial angle; cut surfaces smooth & same colour as surrounding bone; *****; possibly same mandible as ID 584
584	1048	mandible	left gonial angle & ramus (coronoid process lost pm)	-	20	2	2	A?	M??	Shallow linear horizontal cut (4.3mm long) into posterior ramus a third of the way from the gonial angle; cut surfaces smooth and same colour as surrounding bone; possibly

										same mandible as ID 583
585	1048	canine	lower; intact	L	100	1	1	A	?	slight wear, faint DEH, slight calculus, chip to enamel on buccal surface
586	1048	premolar	lower second; intact	L	100	1	1	A	?	no wear, slight calculus
587	1048	canine	upper; intact	R	100	1	1	A	?	slight wear, faint DEH, slight calculus
588	1048	incisor	upper second; intact	R	100	1	1	A	?	slight wear, faint DEH, slight calculus
589	1048	incisor	lower first; intact	R	100	1	1	A	?	slight wear, slight calculus
590	1048	sphenoid	left greater wing	-	20	1	1	A?	?	
591	1048	maxilla	alveolar bone	?	5	1	1	A?	?	
592	1048	sternum	body fragment	-	20	2	1	A?	?	
593	1048	sternum	body fragment	-	20	2	1	Ad/A?	?	
594	1048	scapula	glenoid fossa, lateral border, coracoid, acromion	R	40	2	6	A	?	os acromiale
595	1048	scapula	superior third of glenoid fossa	R	5	2	1	A	?	
596	1048	scapula	part lateral border inferior to glenoid	R	10	2	1	A?	?	
597	1048	scapula	inferior angle & inferior part lateral border	R	10	2	1	A	?	
598	1048	scapula	lateral spine, lateral border, acromion	R	20	2	1	A	?	
599	1048	scapula	inferior glenoid	R	<10	2	1	A	?	
600	1048	humerus	lateral condyle & epicondyle lost pm	R	95	2	3	A	?	excavated muscle attachment (teres major); septal aperture; fine porosity & eburnation distal joint
601	1048	humerus	lateral half head & proximal end lost pm	R	90	2	2	A	?	subtle deposit lamellar bone on anterior surface of distal end
602	1048	ulna	intact	R	100	2	1	A	?	excavated muscle attachment (brachialis)
603	1048	ulna	proximal two-thirds	L	70	2	1	A	?	excavated muscle attachment (brachialis)

604	1048	ulna	distal joint & small fragment shaft	L	10	2	1	A	?	
605	1048	radius	ends slightly damaged	L	95	2	1	YA?	?	fusion line still visible at distal end
606	1048	radius	head lost pm, distal shaft fragmented	R	80	2	8	YA?	?	fusion line still visible at distal end
607	1048	scaphoid	intact	L	100	1	1	A	?	
608	1048	MC1	intact	R	100	3	1	A	?	
609	1048	MC1	proximal two-thirds	L	70	2	1	A	?	
610	1048	MC2	ends slightly damaged	L	95	2	1	A	?	
611	1048	MC3	complete	L	100	2	2	A	?	
612	1048	MC3	proximal half	R	50	1	1	A	?	
613	1048	MC4	head lost pm	R	90	3	1	A	?	
614	1048	MC5	intact	R	100	2	1	A	?	
615	1048	MC5	intact	R	100	3	1	A	?	
616	1048	MC5	proximal half	L	50	3	1	A	?	
617	1048	MC	distal half	?	50	2	1	A	?	
618	1048	proximal first hand phalanx	half proximal end lost pm	?	70	2	1	A	?	
619	1048	proximal hand phalanx	intact	?	100	3	1	A	?	
620	1048	proximal hand phalanx	intact	?	100	3	1	A	?	
621	1048	proximal hand phalanx	proximal end damaged	?	95	2	1	A	?	
622	1048	proximal hand phalanx	distal joint lost pm	?	90	2	1	A	?	
623	1048	proximal hand phalanx	proximal end lost pm	?	80	2	1	A	?	well remodelled lamellar bone on dorsal shaft
624	1048	proximal hand phalanx	proximal end lost pm	?	70	2	1	A	?	
625	1048	proximal hand phalanx	distal half (half shaft lost longitudinally)	?	60	2	1	A	?	
626	1048	proximal hand phalanx	distal half	?	60	2	2	A	?	
627	1048	intermediate hand phalanx	intact	?	100	3	1	A	?	
628	1048	intermediate hand phalanx	intact	?	100	2	1	A	?	
629	1048	intermediate hand phalanx	intact	?	100	2	1	A	?	
630	1048	intermediate hand phalanx	intact	?	100	2	1	A	?	
631	1048	intermediate hand phalanx	intact	?	100	1	1	A	?	
632	1048	distal hand phalanx	intact	?	100	1	1	A	?	

633	1048	distal hand phalanx	proximal end lost pm	?	95	2	1	A	?	
634	1048	os coxa	part posterior acetabulum & auricular surface lost pm	L	90	3	6	YA	M	pubic symphysis billowed, auricular surface billowed, fusion lines visible on iliac crest; pair with os coxa (ID 635); articulates with sacrum (ID 367)
635	1048	os coxa	most of ilium; ischium	R	60	3	6	YA	M	probably same os coxa as ID 636; pair with os coxa (ID 634); articulates with sacrum (ID 367)
636	1048	os coxa	pubis	R	30	3	1	YA	M	possibly part of os coxa (ID 635)
637	1048	sacrum	S1, bodies S2-3	-	30	3	3	YA?	M?	bodies partially fused to each other; articulates with os coxae (ID 634 & 635) & with L5 (ID 640)
638	1048	L3	right inferior body damaged	-	95	3	1	YA?	?	articulates with L4 (ID 639)
639	1048	L4	anterior & right body damaged	-	80	3	1	YA?	?	articulates with L3 (ID 638) & L5 (ID 640)
640	1048	L5	anterior body damaged	-	90	3	1	YA?	?	articulates with L4 (ID 639) & sacrum (ID 637)
641	1048	femur	proximal third	R	30	2	3	A	?	
642	1048	femur	distal third	R	30	2	1	A	?	
643	1048	femur	distal joint	L	10	3	2	A	?	
644	1048	femur	midshaft	R	40	2	1	A?	?	
645	1048	patella	apex damaged	R	95	2	1	A	?	
646	1048	patella	apex damaged	L	95	3	1	A	?	
647	1048	patella	complete	L	95	2	4	A	?	
648	1048	patella	superior & lateral	L	60	2	2	A	?	
649	1048	tibia	medial malleolus & anterior proximal joint lost pm	L	95	2	2	A	?	striated lamellar bone on medial shaft, especially pronounced on midshaft
650	1048	tibia	distal three-quarters	R	80	2	1	A	?	faint striated lamellar bone over medial shaft
651	1048	tibia	anterior proximal end damaged, anterior midshaft lost	R	90	2	2	A	?	lamellar bone over medial & posterior shafts
652	1048	tibia	proximal joint	?	5	1	1	A?	?	
653	1048	fibula	shaft	R	80	3	5	A?	?	
654	1048	talus	head damaged	R	95	3	1	A	?	

655	1048	navicular	dorsal half	R	60	2	1	A	?	
656	1048	MT2	head & plantar shaft lost pm	R	70	3	1	A?	?	
657	1048	MT4	head lost pm	R	90	3	1	A?	?	
658	1048	MT	shaft	L??	70	3	1	A?	?	
659	1048	proximal foot phalanx	distal two-thirds	?	70	2	1	A?	?	
660	1048	intermediate foot phalanx	intact	?	100	2	1	A	?	
661	1048	sacrum	inferior right border	-	5	3	1	A	?	
662	1048	sacrum	inferior left border	-	5	3	1	A	?	
663	1048	lumbar vertebra	left half body & inferior right body	-	40	3	2	YA?	?	
664	1048	lumbar vertebra	body fragment	-	50	3	1	YA?	?	
665	1048	lumbar vertebra	left two-thirds body, superior left facet	-	50	3	1	YA?	?	
666	1048	thoracic vertebra	superior right body lost pm	-	80	3	1	YA?	?	Schmorl's node, inferior surface
667	1048	thoracic vertebra	left transverse process & tip spinous process lost pm	-	90	3	1	YA?	?	Schmorl's node, inferior surface
668	1048	thoracic vertebra	right transverse process & tip spinous process lost pm	-	90	3	1	YA?	?	Schmorl's node, inferior surface; small area of lamellar bone on anterior body
669	1048	lumbar vertebra	inferior facets & most spinous process	-	30	3	1	A?	?	
670	1048	lumbar vertebra	right half neural arch	-	30	3	1	A	?	
671	1048	lumbar vertebra	inferior facets & part spinous process	-	20	3	1	A?	?	
672	1048	lumbar vertebra	right pedicle & par superior facet	-	10	3	1	YA?	?	
673	1048	lumbar vertebra	left inferior facet & lamina	-	20	3	1	A?	?	
674	1048	lumbar vertebra	right superior facet & pedicle	-	5	3	1	A?	?	
675	1048	lumbar vertebra	inferior facets & part spinous process	-	20	3	1	A?	?	
676	1048	cervical vertebra	left transverse process lost pm	-	90	2	1	A	?	decapitation: diagonal linear cut has removed the inferior two-thirds of the left inferior apophyseal facet, inferior left lamina, spinous process & sliver from inferior surface of right lamina & sliver from

										inferior margin of right apophyseal facet; cut surface smooth & polished; cut angled from superior left to inferior right
677	1048	cervical vertebra	part right transverse process lost pm	-	95	2	1	A	?	
678	1048	rib 1	intact	R	100	3	1	Ad/YA	?	
679	1048	rib 12	proximal half	R	40	3	1	YA	?	
680	1048	rib	proximal quarter	R	20	2	1	YA	?	
681	1048	rib	proximal quarter	R	20	2	1	YA	?	
682	1048	rib 11(10?)	proximal two-thirds	R	70	2	1	YA	?	
683	1048	rib 10(11?)	proximal third	R	30	3	1	A	?	
684	1048	rib	shaft	R	70	2	2	A?	?	
685	1048	rib	angle	R	20	2	1	A?	?	
686	1048	rib	angle	R	20	2	1	A?	?	
687	1048	rib	angle	R	20	2	1	A?	?	
688	1048	rib	tubercle & angle	R	20	2	1	A	?	
689	1048	rib	tubercle & angle	R	20	3	1	A	?	
690	1048	rib	neck & tubercle	R	10	2	1	A	?	
691	1048	rib 2	angle, shaft, tubercle	R	40	2	1	A	?	
692	1048	rib	shaft	R	50	3	1	A?	?	
693	1048	rib	angle	R	20	2	1	A?	?	
694	1048	rib	angle	R?	10	2	1	A?	?	
695	1048	rib 11/12?	proximal third	L	30	3	1	YA	?	
696	1048	rib	shaft	?	30	2	2	A?	?	
697	1048	rib	shaft	?	20	2	1	A?	?	
698	1048	rib	shaft	?	10	2	1	A?	?	
699	1048	rib	sternal quarter	?	20	2	1	YA	?	
700	1048	rib	shaft	?	10	2	1	A?	?	
701	1048	rib	shaft	?	10	2	1	A?	?	
702	1048	rib	shaft	?	10	2	1	A?	?	
703	1048	rib	shaft	?	10	2	1	A?	?	
704	1048	rib	shaft	?	20	2	2	A?	?	
705	1048	rib 11/12?	shaft	L?	20	3	1	A?	?	
706	1048	rib	shaft fragment	?	5	2	1	A?	?	
707	1048	rib	shaft fragment	?	5	2	1	A?	?	
708	1048	rib	shaft fragment	?	<5	2	1	A?	?	
709	1048	rib	shaft fragment	?	<5	2	1	A?	?	
710	1048	rib	shaft fragment	?	5	2	1	A?	?	
711	1048	rib	shaft fragment	?	<5	2	1	A?	?	
712	1048	rib	shaft fragment	?	5	2	1	A?	?	
713	1048	rib	shaft fragment	?	<5	2	1	A?	?	
714	1048	os coxa	iliac crest epiphysis	?	<5	3	1	YA	?	in process of fusion
715	1048	sacrum?	fragment	?	5	2	1	A?	?	
716	1048	sacrum?	part auricular surface?	?	<5	2	1	YA	?	
717	1048	sacrum?	part auricular surface?	?	<5	1	1	YA	?	

718	1048	long bone	shaft fragments	?	<5	2	3	A?	?	
719	1048	fragments		?	<5	4	9	A?	?	
720	1048	fragments		?	<5	3	4	A?	?	
721	1048	fragments		?	<5	2	70	A?	?	
722	1054	temporal	petrous, EAM, glenoid fossa, anterior squama, supramastoid region	R	70	1	5	A	M?	
723	1054	cranium	vault fragment	?	<10	1	1	A	?	
724	1073	radius	medial half distal joint	L	<10	1	1	A	?	
725	1073	MC	shaft	?	80	1	1	A?	?	
726	1073	proximal fifth hand phalanx	intact	L	100	1	1	A	?	
727	1073	intermediate hand phalanx	intact	?	100	1	1	A	?	
728	1073	rib	shaft fragments	?	<10	1	3	A?	?	
729	1078	L5	right half body	-	30	2	1	A	?	
730	1080	ulna	shaft fragment	?	<10	1	1	A?	?	
731	1087	MT5	intact	R	100	1	1	A	?	short & chunky (52mm long on medial side)
732	1087	MT4?	head damaged, inferior proximal shaft lost pm	R?	60	1	1	A	?	short & chunky
733	1087	MT	shaft	?	60	1	1	A	?	
734	1087	proximal foot phalanx	intact	?	100	1	1	A	?	
735	1093	parietal	anterior-medial corner	L	20	1	1	A	?	
736	1095	scapula	spine, superior lateral border	L	30	3	1	A?	?	
737	1107	temporal	mastoid, EAM, petrous, glenoid fossa, inferior squama	R	80	3	1	A	M?	
738	1107	femur	greater trochanter & superior neck lost pm	L	90	3	4	A	?	
739	1107	fragment		?	<10	2	1	A	?	
740	1108	femur	medial proximal third, part lesser trochanter	L	10	2	11	A?	?	
741	1114	proximal first foot phalanx	intact	L	100	2	1	A	?	
742	1114	MT4	proximal half	L	50	2	1	A?	?	
743	1114	rib	angle	R?	10	2	1	A?	?	
744	1114	rib	shaft	R	40	2	2	A?	?	
745	1114	rib	sternal end lost pm	?	10	2	1	YMA?	?	
746	1114	rib	sternal end	?	10	2	1	YMA?	?	
747	1114	rib	shaft	L?	20	2	1	A?	?	
748	1114	rib	sternal shaft	?	10	2	1	A?	?	
749	1158	mandible	both condyles lost pm & alveolar bone damaged	-	90	2	1	A	M	

750	1200	radius?	midshaft	?	20	2	1	A?	?	
751	1201	humerus	midshaft	R	40	3	1	A?	?	