Osteological Analysis
The Church of St Michael and St Lawrence, Fewston, North Yorkshire

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NGR: SE 1947 5411

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Summary

York Osteoarchaeology Ltd was commissioned by John Buglass Archaeological Services (JBAS) to carry out the osteological analysis of 145 skeletons recovered during archaeological excavations in 2009 and 2010 of the churchyard of St Michael and St Lawrence, Fewston, North Yorkshire (SE 1947 5411). A total of 64 skeletons were analysed fully, with the remaining 88 being briefly assessed. This report is a draft report on the initial osteological findings. The remaining 88 skeletons will be fully recorded by MSc Palaeopathology students of the University of Durham in 2011 and the results will be combined into a full report on the complete osteological assemblage from Fewston.

The human remains were recovered from an area to the north of the church, which was used for burial in the post-medieval period. However, some remains may have been medieval in date, particularly those burials thought to have been shrouded. All were buried extended and supine, predominantly on a west-east alignment. Twenty-six named individuals were identified either by coffin plate or associated monument inscription, the majority of whom had died in the late nineteenth century. The churchyard was closed for burial in 1896.

Osteological analysis revealed that the burial population comprised an even number of male and female adults, who were predominantly of a mature age. A third of the overall population was made up of non-adults, with a high proportion of adolescents. The youngest age groups (neonates and infants) were underrepresented. The males were taller than average for the period, and the females were of average height. Evidence for childhood stress observed in the form of enamel defects and cribra orbitalia, and healed childhood rickets was present among the adults. At least one infant had been suffering from scurvy. Infectious disease was common, and included inflammatory changes to the legs and respiratory infections (both lung infections and sinusitis).

Over half the male adults had experienced traumatic injuries, including fractures, soft tissue injuries, and a healed blade injury. One female had fractured a vertebra in her neck. Other traumatic lesions were also observed. The amount and type of joint disease (degenerative changes and osteoarthritis) was consistent with a generally older population and the spine, hips and jaws were particularly affected. Again joint disease was more common among the males, and different patterns of joint involvement between the sexes were observed. One mature female probably had osteoporosis, another condition associated with advancing age. Some evidence was found for the wearing of corsets and pipe-smoking. At least one male had probably suffered from Paget's disease and a female had probably been autopsied. Dental health was poor, with high levels of tooth decay and ante-mortem tooth loss, consistent with the consumption of a diet high in refined sugars and processed carbohydrates.

Acknowledgements

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1.0 INTRODUCTION

In April 2010 York Osteoarchaeology Ltd was commissioned by John Buglass Archaeological Services (JBAS) to carry out the osteological analysis of human skeletal remains excavated from the Church of St Michael and St Lawrence, Fewston, North Yorkshire (SE 1947 5411). Most of the remains were excavated in April and May 2009, with a small number of skeletons recovered during further excavations in May 2010. These excavations were carried out prior to the construction of a Heritage Centre at Fewston Church. The excavations in 2010 were undertaken under less controlled circumstances, in response to the collapse of the northern section of the trench.

Fewston church lies in the small village of Fewston, around 9 miles to the west of Harrogate, 9 miles north of Otley, and 14 miles east of Skipton. The area excavated lay to the north of the church, in part of the graveyard apparently used for burial during the post-medieval period. However, it is possible that some of the graves excavated date to the medieval period. Fifteen individuals with legible (or partially legible) coffin plates, mostly dating to the latter half of the nineteenth century, were recovered. A further eleven individuals were associated with monuments, and were more tentatively identified. An additional eight skeletons were possibly associated with monuments, but the identification for these individuals was considered questionable.

Unfortunately, constraints on the time and funding available meant that only a limited number of the skeletons could be analysed in full. With this in mind, the skeletons were prioritised in an attempt to ensure that time was directed towards those most likely to yield demographic and pathological data. All identified individuals (i.e. all those with coffin plates, or associated/ possibly associated with monuments) were recorded. Any skeletons identified by the archaeologists as being of particular interest to them were also recorded, as were most of the group of skeletons excavated in 2010. Following that, the context sheets for each skeleton and photographs of the skeletons *in situ* were studied, and used to create a list of skeletons according to their degree of preservation, completeness, and whether or not the skull and/or pelvis were present. Although crude, it was hoped that this list would allow the better-preserved skeletons to be targeted. Following the analysis of as many skeletons as possible within the time available, all skeletons not analysed were briefly assessed to provide an indication of preservation and completeness, broad age group and the potential to estimate sex, record dental disease and whether or not any obvious pathology was visible.

Context sheets for 148 skeletons were filled in on site during the initial 2009 stage of the excavations. No bone survived for eight of these skeletons (Skeletons 090, 256, 286, 297, 313, 381, 393 and 411), meaning 140 skeletons were recovered in 2009. On analysis and assessment, five of these skeletons appeared to consist of disarticulated remains (Skeletons 015, 024, 028, 162 and 183), and five of the skeletons could not be found (Skeletons 125, 189, 201, 390 and 405). These five may also have been so badly preserved that no bone survived lifting, or they may have been disarticulated remains rather than articulated skeletons. One assessed skeleton (Skeleton 268) comprised one bag of bone from a juvenile and another from an adult, both with the same skeleton number. These were numbered 268A (the juvenile) and 268B (the adult). Two of the analysed skeletons from the same grave had originally been given the same number (Skeleton 138). These were numbered Skeletons 138A and 138B during analysis. So in total there were 132 skeletons from the original 2009 excavations, of which 55 (41.7%) were analysed in full.

Context sheets for twelve skeletons were filled in on site during the 2010 stage of the excavation. An additional skeleton was found during analysis, bringing the total up to thirteen. Nine of these skeletons were fully analysed (69%), with the remaining four assessed.

Combining the skeletons from both phases of excavation, 145 skeletons were excavated, of which 64 were recorded in full (44.1%) and 81 were assessed (55.9%). None of the disarticulated bone recovered from the site was recorded, with the exception of context 162, which was originally thought to be a named individual. Some of the disarticulated contexts may contain the remains of discrete individuals, which would increase the number of skeletons recovered from the site.

It is important to note that this report is a draft report on the initial stage of recording. It is anticipated that further work will be carried out on the collection during the next twelve months, with a final version of the report incorporating this additional information being prepared in a year's time. In view of this, only limited comparisons of the data from Fewston with other sites have been carried out. It is also important to bear in mind that details and interpretations may change following further work.

John Dickinson's Diaries

A local man from Fewston, John Dickinson, kept a diary between 1878 and 1912, and an edited version has been published (Harker 1988). Not all years are covered, as some diaries have been lost, and in other years he appears to have given up keeping his diary, but what survives provides an insight into the daily life of this small community during and immediately after the period many of the named individuals died. In fact, John Dickinson's parents were among the named individuals excavated at Fewston: Mary Dickinson (identified by coffin plate and monument as Skeleton 310) and John Dickinson (identified more tentatively by monument and his position next to Skeleton 310 as Skeleton 351).

John Dickinson's diary begins in 1878, three years after his father's death, and he only occasionally mentions his father. On the 18th of August, 1909 he describes the manner of his father's death: "Thirty-four years ago this evening my father went out with his gun to shoot wood pigeons. He was always a keen sportsman. He did not return home and as the evening wore on mother and I got anxious and later friends joined us and we went down the fields and down to Swinsty. At last we found him, laid on the Braid Lane where he had dropped down dead. No doubt from heart failure" (Harker 1988, 158). Although his mother was alive during the first years of his diary, she too is only infrequently mentioned. There is no surviving diary for 1886, the year his mother died; either he was not keeping a diary at this time or it has been lost. Her death is mentioned in 1909; on the 8th of March he wrote: "It is 23 years today since my mother died after a life of hard work from which I profited" (Harker 1988, 154).

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 (Appendices 1-4). All pathological lesions were recorded and described.

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.

Summary data for each analysed skeleton from Fewston is provided in Table 2 (detail in Appendix 1), and data for the assessed skeletons is provided in Appendix 2.

Table 1 Summary of osteological and palaeopathological results – articulated skeletons

Sk No	SP	F	%	Age	Age Group	Sex	Stature (cm)	Dental Pathology	Skeletal Pathology
044	2	Sli	80-90%	2-3	j	-	-	Caries (deciduous); calculus	-
053	2	Mod	80-90%	46+	ma	F?	159.4	AMTL; caries, calculus, abscesses (x2), periodontal disease (considerable); fractured RI^2	Schmorl's nodes; OA T4; OA left lateral clavicle; possible cyst in occipital bone; slightly bowed humeri; clay-shovellers' fracture C7; cribra orbitalia; maxillary sinusitis
056	2	Sev	80-90%	8-10	j	-	-	Calculus; DEH; LI^2 peg tooth	Cribra orbitalia; cleft neural arches S4-5
077	3	Mod	70-80%	17-20	ya	M?	169.6	AMTL; caries; calculus (occlusal); periodontal disease (slight); DEH; rotated LP_2	Fused intermediate and distal foot phalanges; cribra orbitalia; lytic lesion head of right femur
078	3	Mod	50-60%	1-2½	j	-	-	-	Cribra orbitalia
080	3	Sli	30-40%	36-45	oma	F	163.0	AMTL; caries; calculus; DEH	Schmorl's nodes; OA hips; bowed ulnae, left tibia, medio-lateral curve of sacrum, flared iliac crests - possible osteomalacia/ healed childhood rickets; inflammation of left tibia & both femora; crescent removed from left calcaneus; extended facets on heads second metatarsals
082	4	Sev	30-40%	18+	a	F?	-	-	Frontal sinusitis; OA hips
085	4	Mod	60-70%	18-25	ya	M?	166.4	Caries; calculus; DEH; impaction LM_3	Cribra orbitalia; inflammation of legs

088	1	Sli	80-90%	36-45	oma	M	170.5	AMTL; caries; calculus; periodontal disease (moderate-considerable); slight crowding anterior mandible	Schmorl's nodes; DJD bodies cervical & lumbar spine; OA facets C3-T11, L2-S1; OA axis dens + atlas facet; fusion T4-5, T11-12; large osteophytes between T8-9, L4-5; crush fractures T7, T8, T9, T12, L2; fractured sternum(?); rib fractures x14; OA right clavicle, & right elbow (restricted movement); pronounced enthesophytes iliac crests & ischial tuberosities; healed antemortem blade injury to the posterior cranium (right and left parietals)
093	3	Sev	30-40%	26-35?	yma?	M	-	Caries; calculus; DEH	Sinusitis
094	3	Ext	10-20%	6-8	j	-	-	Calculus	-
095	3	Ext	<10%	1-3	j	-	-	-	-
098	4	Mod	50-60%	18+	a	F?	161.8	AMTL; caries; calculus; DEH; periodontal disease; abscess; two 3rd molars not present (or unerupted)	Schmorl's node; sinusitis; endocranial lamellar bone; rib lesions; inflammation lower legs; border shift at lumbo-sacral border (partial lumbarisation S1, or partial sacralisation of additional lumber vertebra)
101*	3	Sli	50-60%	7-11m (10m)	i	- (M)	-	-	Scurvy
110	3	Ext	<10%	9-12	j	-	-	Calculus; DEH	-
113	3	Sev	20-30%	18+?	a?	F??	-		Pilasterism of femora
116	3	Mod	40-50%	10-12	j	-	-	Caries (deciduous & permanent); calculus; DEH; unusual tooth shape; enamel pearl; possible delayed loss of Rdm^2	Femora flattened medio-laterally
119*	3	Sli	90%+	26-35 (38)	oma	M (M)	175.2	AMTL; caries; calculus; DEH; abscesses x2; pipe-smoking wear	Schmorl's nodes; additional thoracic vertebra; sinusitis; possible trauma to RMC5
122*	4	Sli	90%+	46+ (25?)	ma	F (M?)	163.6	AMTL	Fusion T7-9, DJD bodies C6-7; OA thoracic apophyseal facets; OA L TMJ & both hips; axis in articulation with occipital (possible rheumatoid arthritis?); rib deformation due to corsetry; possible additional lumber vertebra; slightly bowed tibiae
130*	3	Min	95%+	46+ (66)	ma	M (M)	188.8	AMTL; caries; calculus; DEH; periodontal disease; pipe-smoking wear; possible fractured tooth; slight crowding	Schmorl's node; DJD bodies C5-7, T10, T12, L2, S1; OA dens axis + atlas; OA cervical, thoracic & lumbar apophyseal facets; OA R elbow (restricted movement), L wrist, hand; fractured nose; os acromiale R scapula; soft tissue trauma to R shoulder?; fractured R rib; possible trauma to calcanei; ossified cartilage

138A†	3	Mod	60-70%	18+ (?)	a	F (F?)	160.6	AMTL; caries; periodontal disease; rotated canine; calculus	DJD bodies C2-4 (+ eburnation bodies C2-3); OA dens axis + atlas facet; OA facets C4, T6; OA R lateral clavicle, L wrist; autopsy? - top of cranium cut away & possible cuts through sternum and ribs; nodule of lamellar bone on R rib; lamellar bone both femora; possible soft tissue trauma L tibia; cribra orbitalia
138B†	2	Sli	80-90%	46+ (?)	ma	M (M?)	178.6	AMTL; caries; abscess; periodontal disease; resorption of maxillary alveolar bone in areas opposing retained lower teeth	Schmorl's' nodes; DJD spine (+ eburnation bodies C3-5, T6-7); OA atlas facet for dens; OA spine; small pseudoarthrosis between neural arches T5-6 (eburnated); OA both TMJs, manubrium, lateral L clavicle, R shoulder, both hips; possible Paget's disease (pelvis); additional sacralised lumbar vertebra/ lumbarised S1; possible fusion L ilium & sacrum; hallux valgus LMT1; ossified cartilage; cribra orbitalia; maxillary sinusitis (R)
147‡	4	Mod	20-30%	18+	a	F	-	AMTL	DJD body C4, OA apophyseal facet C2; OA both TMJs; possible bowed L femur; maxillary sinusitis (R)
150†	5	Mod	20-30%	18+ (82?)	a	M? (M?)	-	AMTL; caries; DEH	DJD + OA cervical spine; OA R TMJ
153	3	Sli	80-90%	46+	ma	M	179.8	AMTL; calculus; moderate periodontal disease?	Schmorl's' nodes; DJD C5-7 (+ eburnation bodies C5-6), L2-3, L5-S1; OA facets C4-5, C7-T1, T4-6, L1-5; C2-4 fused; OA both hips; lamellar bone on R supraorbital ridge; pilasterism of femora; possible soft tissue trauma to L hip; lamellar bone L femur; lamellar bone nodules on 2x L ribs; maxillary sinusitis (L)
156†	4	Mod	40-50%	18+ (66?)	a	F? (F?)	169.9	AMTL; caries; DEH; slight crowding of mandible	OA apophyseal facet C2 & 3 thoracic facets; OA L TMJ, R shoulder, R elbow, L knee; maxillary sinusitis (bilateral); lamellar bone on 2x L ribs; pilasterism of both femora
159‡	4	Mod	40-50%	46+	ma	F	-	AMTL; caries	Nodules of lamellar bone on dorsal surfaces proximal hand phalanges; maxillary sinusitis (bilateral); lamellar bone + pitting on external mandible (related to AMTL?)
162‡	2	Mod	<5%	18+	a	U	Disarticulated		

165	3	Sev	80-90%	46+?	ma?	M?	-	AMTL; caries; calculus; DEH; periodontal disease; porous alveolar bone + extensive woven bone on L mandible	Schmorl's node; DJD spine (+ eburnation body C3); OA facets S1 & thoracic; OA both TMJs, both shoulders, L elbow, both hips, both ankles, feet, L hand; extensive woven bone on L mandible; possible trauma to R shoulder; os acromiale R scapula; vestigial hook of hamate (R); depression posterior R ilium; plaque lamellar bone on L pubic symphysis; curved sacrum?; soft tissue trauma to L femur; osteitis both lower legs + lamellar bone on both calcanei; possible fracture of L fibula; partial dislocation R ankle; bilateral avulsion fractures 5th metatarsals + second fracture to shaft LMT5; osteochondritis dissecans LMT1
177	3	Sli	90%+	26-35	yma	F	165.8	AMTL; caries; calculus; periodontal disease; dental abscesses; porous alveolar bone; lamellar bone R mandible; slight crowding anterior mandible	Schmorl's nodes; OA facets T4-6; OA R TMJ?; woven bone in R TMJ; bowed humeri & R radius; lamellar bone both tibiae & R fibula; possible trauma to calcanei; possible soft tissue trauma to feet; cribra orbitalia (L)
186	2	Mod	90%+	46+	ma	M	177.5	AMTL	Schmorl's' nodes; DJD spine; OA atlas facet for dens; OA cervical facet; OA both hips; woven bone in R TMJ; absence/ premature fusion part R lambdoid suture + deformation of cranium; possible R cervical rib; rib fractures x2; lamellar bon on both femora; thin shaft of 4th metatarsals
192	3	Mod	80-90%	18-25	ya	M?	178.7	AMTL; caries; DEH; calculus; periodontal disease; abscess; partial eruption RM^3; slight crowding anterior mandible; rotation teeth; pipe-smoking wear	Robust spinous process of axis; possible soft tissue trauma to feet; cribra orbitalia (L); maxillary sinusitis (R - possibly associated with large carious lesion)
198†	3	Mod	<10%	18+ (29)	a	U (F?)	-	-	Lamellar bone on both tibiae
226*	3	Sli	80-90%	46+ (84)	ma	M (M)	183.4	AMTL; caries; DEH; abscess?; unusual wear	Schmorl's nodes; DJD spine (+ eburnation bodies C2-3, C5-6); OA dens axis + atlas facet; erosive lesion on dens; OA apophyseal facets; C3-4 fused; OA R TMJ, both shoulders, L elbow, R wrist, both hips, R foot, hand; possible RA?; fractured R fibula; R fibula & tibia fused; possible soft tissue trauma R ankle; additional lumber vertebra (sacralised) / lumbarised S1

235†	4	Mod	20-30%	18+ (79?)	a	U (M?)	-	-	Undulating sagittal suture
238*	3	Mod	70-80%	35-45 (49)	ma	F (F?)	-	AMTL; caries; DEH; calculus; unusual angular wear; ectopic tooth	Schmorl's nodes; OA L hip, R hand; curved sternum; destructive changes to spine (fungal infection?); infection distal L ulna; lamellar bone R hand; destructive lesion on posterior sternum; cribra orbitalia (bilateral)
241‡	2	Mod	80-90%	46+?	ma?	M	178.4	AMTL; caries; DEH; calculus; abscess + lamellar bone; pipe-smoking wear	DJD spine (+ eburnation bodies C2-3), OA facet T3; C3-4 fused (developmental); OA R foot; endocranial lamellar + woven bone; lamellar bone on both tibiae; lamellar bone R mandible
283‡	4	Sev	30-40%	18-25 (20??)	ya	F (F??)	-	AMTL; caries; DEH; calculus; upper lateral incisors not present	Cribra orbitalia (R); thin & flat metatarsals; ridge of bone on L talus neck
289‡	4	Sev	50-60%	36-45	oma	U	-	AMTL; caries	Schmorl's node; DJD spine ; lytic area inferior C7 + nodule on superior T1; OA atlas facet for dens; OA apophyseal facets; OA both TMJs, R hip; nodule of bone on R mandible; possible scoliosis? (but spine too damaged); maxillary sinusitis (R)
292	5	Sev	10-20%	18+	a	U	-	-	-
300†	4	Mod	50-60%	46+ (77/78?)	ma	F (F?)	162.2	AMTL	DJD spine; OA apophyseal facets; OA both hips, hand; coccyx possibly fused to sacrum?
307†	4	Sli	70-80%	46+ (77/78?)	ma	M (M?)	167.4	AMTL; caries; DEH	DJD spine; OA apophyseal facets; OA both TMJs, medial L clavicle, R shoulder, both hips, both feet, both hands; possible soft tissue trauma to R shoulder; ossified cartilage; rib fracture (possibly healing); hallux valgus RMT1?
310*	2	Min	60-70%	46+ (66)	ma	F (F)	154.3	-	DJD body L4; OA apophyseal facets; OA R knee; R hand; lytic lesion on R scaphoid; possible soft tissue trauma to R knee?; possible trauma to R calcaneus?
319†	2	Sev	60-70%	18-25 (22/23?)	ya	F (F?)	-	AMTL; caries; DEH; calculus; upper second incisors peg shaped; slight crowding anterior mandible; rotated tooth; possible fracture of tooth	Lamellar bone on R tibia & both femora; thin & flattened metatarsals
325*	3	Sev	50-60%	46+ (73)	ma	F (F)	-	AMTL; impacted tooth	DJD spine; OA both TMJs; possible osteoporosis; cribra orbitalia (R)
338	3	Sev	20-30%	11-14	ad	-	-	AMTL; DEH; calculus; woven bone on mandible	Cribra orbitalia (bilateral); possible anaemia (thickened vault bones, including orbits); possible scurvy

									(woven bone on mandible, cranium, & orbits)
339*	1	Min	90%+	36-45 (41)	oma	M (M)	171.6	AMTL; caries; DEH; calculus; abscess; periodontal disease	Schmorl's nodes; OA apophyseal facet L3; OA L medial clavicle & manubrium; cribra orbitalia (bilateral); pitting on external cranium; ossified cartilage; L1 body wedge-shaped (not clear if traumatic); additional lumbar vertebra (sacralised)/ lumbarised S1?
342*	4	Sev	30-40%	18+ (26)	yma	U (M)	-	AMTL; impacted teeth; caries; DEH; calculus	Cribra orbitalia (R); lamellar bone on both femora
348	3	Mod	70-80%	18-25 (poss 16-17)	ya	F	152.6	AMTL; DEH; calculus; 2 teeth NP/U	Schmorl's nodes; OA apophyseal facet; osteochondritis dissecans L ulna?; border shifts x2 (TL & LS borders); cleft neural arches S3-4; bowed tibiae?; rib deformities; lamellar bone on visceral ribs; possible trauma/ developmental anomalies both calcanei; cribra orbitalia (bilateral); maxillary sinusitis
351†	3	Sli	80-90%	46+ (63?)	ma	M (M?)	174.3	AMTL; caries; calculus; DEH; periodontal disease; slight crowding of mandible	Schmorl's nodes; DJD spine; OA apophyseal facets; OA lateral L clavicle; both hips; feet; erosive lesions in hands?; possible absence/ premature fusion of sutures; small facet between atlas & dens; possible fracture LMT5
357‡	3	Mod	5-10%	1-3 (1y 10m??)	j	- (M??)	-		Porosity on endocranial surfaces of vault
360*	3	Mod	70-80%	46+ (67)	ma	M (M)	177.4	AMTL	DJD spine; OA apophyseal facets; OA manubrium & medial clavicles; R lateral clavicle; both hips; right ankle; R foot; R hand; bowed humeri; small facet between atlas & dens; fracture of RMC5; possible fracture of L rib (bar of bone connecting to rib above); ossified cartilage; os acromiale R scapula
363*	2	Mod	80-90%	46+ (54)	ma	F (F)	165.2	AMTL; caries; DEH	Schmorl's' nodes; OA apophyseal facets; OA L TMJ, both hips; 13 rib pairs (pair of lumbar ribs present) & possible additional lumbar vertebra (sacralised)/ lumbarised S1; rib deformity?; ossified rib cartilage; L rib 1 neck tapered and head small; lamellar & woven bone on visceral ribs; lamellar bone on L tibia & femur; maxillary sinusitis (bilateral)

366*	2	Sli	90%+	46+ (76)	ma	M (M)	174.8	AMTL; caries; calculus; periodontal disease; abscess; porous alveolar bone; some teeth with short stubby roots; possible pipe-smoking wear	Schmorl's nodes; DJD spine (+ eburnation bodies C4-5); OA dens axis + atlas facet; OA apophyseal facets; OA lateral clavicles, L shoulder, both wrists, both hips, both knees, L ankle, feet, hands; cleft neural arch atlas & S4-5; spondylolysis L5; ossified cartilage; proximal hand phalanges bent at distal ends; possible trauma to L rib 8; Osgood-Schlatter's disease both tibiae; avulsion fractures both naviculars?; hallux valgus RMT1?; cribra orbitalia (bilateral); maxillary sinusitis (bilateral)
378*	2	Min	90%+	26-35 (34)	yma	F (F)	152.2	AMTL; caries; DEH; abscesses; partial impaction 2 teeth; possible fractured tooth	Woven & lamellar bone on L mandible & maxilla; lamellar bone on tibiae; slight rib deformity?
408*	3	Mod	60-70%	18+ (78)	ma	M? (M)	-	AMTL; caries; calculus; periodontal disease	OA apophyseal facets; OA R hip; slightly bowed R radius?; lytic lesions in hand phalanges
426‡	2	Sli	90%+	26-35 (25??)	yma	F (M??)	162.2	AMTL; caries; DEH; periodontal disease; rotated teeth; slight crowding anterior mandible	Schmorl's nodes; OA apophyseal facets; destructive lesions in spine, sacrum & pelvis (possible echinococcosis/ fungal infection); lamellar & woven bone on most ribs; lamellar bone on both tibiae; deformed ribs; small border shift at thoraco-lumbar border; flattened distal foot phalanx
429	2	Mod	10-20%	1-2	j	-	-	Caries	-
432	4	Sev	20-30%	18+	a	U	-	AMTL	OA both hips; patellar whiskers
435	3	Ext	<10%	18+	a	M?	-	AMTL; calculus; DEH; periodontal disease; pipe-smoking wear?	DJD cervical spine; OA axis dens + atlas facet; OA apophyseal facets; cribra orbitalia (L); maxillary sinusitis (L)
438	2	Mod	40-50%	15-18	ad	-	-	Calculus; DEH; possible late retention deciduous second molars + partial impaction premolars; slight crowding anterior mandible	Possible border shift at thoraco-lumbar border; lamellar bone both femora & tibiae; woven & lamellar bone on ribs; slight rib deformity?
441†	3	Sli	10-20%	18+ (33?)	yma?	M (M?)	-	AMTL; caries; DEH; calculus	OA R TMJ; cribra orbitalia (R)
444	3	Sev	<10%	6-10	j	-	-	-	-
459	0	Sev	90%+	46+	ma	M	184.8	-	Schmorl's nodes; DJD spine; OA apophyseal facets; OA both TMJs, lateral clavicle, both hips; lytic lesions both hands & feet; lamellar bone on both tibiae, R fibula, R MT2-4; lamellar bone on 1 rib; slight border shift at thoraco lumbar border; sinusitis in

									frontal sinus; curved occipital condyles; cleft neural arches S4-5
460	3	Mod	20-30%	18+	a	F?	-	AMTL	OA R hip; maxillary sinusitis (R)

* named individuals (identified by coffin plate)

† named individuals identified by monument, where the identification is reasonable

‡ named individuals identified by monument, where the identification is questionable

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 Jana way 1989, Jana way 1996, Sprigs 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.

Surface preservation, concerning the condition of the bone cortex, was assessed using the seven-category grading system defined by McKinley (2004), 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. 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). Finally, the completeness of the skeletons was assessed and expressed as a percentage: the higher the percentage, the more complete the skeleton.

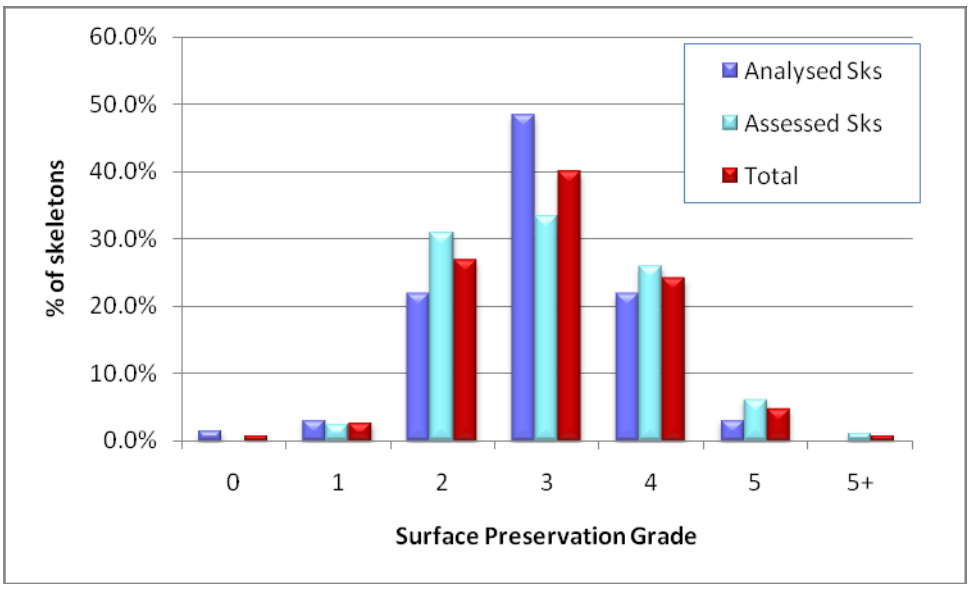
Surface preservation could be variable throughout an individual skeleton, so the condition of the majority of bones in the skeleton was taken as the preservation grade for the whole skeleton. Overall, most skeletons tended to be moderately well preserved (Grade 3), with the bulk of the remainder being either well preserved (Grade 2), or poorly preserved (Grade 4) (Table 2 and Figure 1). A few skeletons were very well or excellently preserved, or very poorly preserved. On balance there was little difference in the proportion of skeletons in each preservation grade between the analysed and assessed skeletons.

Table 2 Surface preservation

SP Grade	Analysed		Assessed		Total	
	n	%	n	%	n	%
0	1	1.6%	0	0.0%	1	0.7%
1	2	3.1%	2	2.5%	4	2.8%
2	14	21.9%	25	30.9%	39	26.9%
3	31	48.4%	27	33.3%	58	40.0%
4	14	21.9%	21	25.9%	35	24.1%

5	2	3.1%	5	6.2%	7	4.8%
5+	0	0.0%	1	1.2%	1	0.7%
Total	**64**		**81**		**145**	

Figure 1 Surface preservation



The type of surface erosion and damage varied. In some skeletons the outer layer of the bone cortex tended to flake and peel away from the rest of the bone and any outer cortex still attached could be brittle and prone to disintegrating. In other skeletons the bone surfaces were eroded, as if they had been sandblasted, leaving the surface roughened to a varying degree depending on the severity of the erosion. Longitudinal cracks in long bones were also observed. Most skeletons had some localised areas of deep erosion, penetrating deep into the bone and modifying the shape. All types of damage and erosion resulted in the loss of surface detail, with the amount of detail lost varying with the severity of the erosion. However, some skeletons had hair preserved, and one even had toenails. Two skeletons had been contaminated by hydrocarbon leaving the bones and teeth stained black.

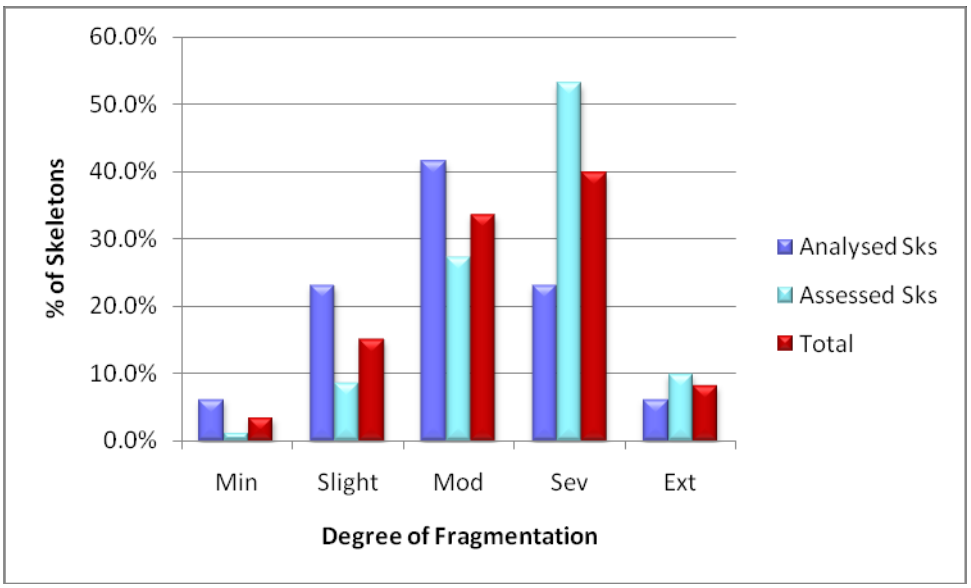
Forty percent of the total skeletons had suffered severe fragmentation, with another third being moderately fragmented (Table 3 and Figure 2). Less than a fifth of the skeletons had only slight or minimal fragmentation. The analysed skeletons tended to be less fragmented, with the majority (40.6%) being moderately fragmented, and a larger proportion of skeletons in the minimal and slight fragmentation categories compared to the assessed skeletons (Table 3 and Figure 2). In comparison, over half the assessed skeletons (53.1%) were severely fragmented, with another 27.2% being moderately fragmented.

Table 3 Fragmentation

Frag	Analysed		Assessed		Total	
	n	%	n	%	n	%
Min	4	6.3%	1	1.2%	5	3.4%
Slight	15	23.4%	7	8.6%	22	15.2%
Mod	26	40.6%	22	27.2%	48	33.1%

Sev	15	23.4%	43	53.1%	58	40.0%
Ext	4	6.3%	8	9.9%	12	8.3%
Total	**64**		**81**		**145**	

Figure 2 Fragmentation

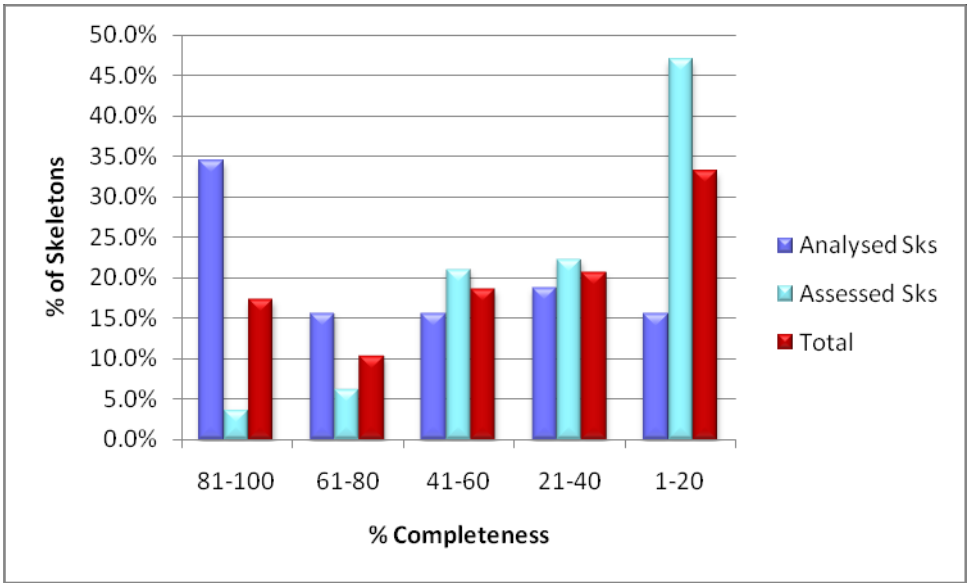


A third of the total skeletons were less than 20% complete, and only 17.2% were over 80% complete (Table 4 and Figure 3). The lack of completeness of the skeletons can be attributed in part to the intercutting of graves, with later graves invariably disturbing older ones. Some skeletons extended beyond the confines of the trench, and so could only be partially recovered. A third of the analysed skeletons were over 80% compete, with the remainder distributed fairly evenly between the categories (Table 4 and Figure 3). In comparison, 46.9% of the assessed skeletons were less than 20% complete, and only 3.7% were over 80% complete. When considered as a proportion of the total skeletons in each completeness category, 88% (22/25) of the skeletons considered to be 80-100% complete were analysed.

Table 4 Completeness

%	Analysed		Assessed		Total	
	n	%	n	%	n	%
81-100	22	34.4%	3	3.7%	25	17.2%
61-80	10	15.6%	5	6.2%	15	10.3%
41-60	10	15.6%	17	21.0%	27	18.6%
21-40	12	18.8%	18	22.2%	30	20.7%
1-20	10	15.6%	38	46.9%	48	33.1%
Total	**64**		**81**		**145**	

Figure 3 Completeness



On average, the skeletons tended to be incomplete, with moderate preservation of surface detail and moderate to severe fragmentation of the bones. However, the preservation varied considerably across the site, with some individuals being over 90% complete, with good surface preservation and minimal fragmentation of bones, whereas others were at the opposite extreme, and eight graves had no bone surviving at all. It is possible that the pronounced slope of Fewston graveyard contributed to the variety of preservation seen. Furthermore, differences in funerary practice, such as the use (or not) of coffins, and the materials chosen for the construction of the coffin and its fittings, may also have affected the preservation of the associated skeletons. The amount of fragmentation experienced by the twelve skeletons excavated in 2010 can be explained by the fact that they were recovered following the collapse of the north section of the site. Much of the fragmentation of their bones is likely to have occurred during the collapse, and in the interval between the collapse and excavation.

The analysed skeletons tended to be more complete and less fragmented than the assessed skeletons, but there was no marked difference in surface preservation between the two groups. This suggests that the attempt to select better-preserved skeletons for analysis was reasonably successful. The lack of difference in surface preservation probably reflects the fact that this was difficult to assess reliably from the context sheets and photographs, and so was not used to help prioritise skeletons for analysis. Some skeletons were chosen for analysis based on factors other than preservation, for example if they were a named individual, or if they had been highlighted as interesting by the archaeologists. Many of these would otherwise have been of much lower priority and probably would not have been analysed. However, some skeletons that ought to have been analysed in preference to others were only assessed, as the data available from the context sheets and photographs suggested they were less well preserved than they were. In contrast, other skeletons appeared better preserved or more complete than they were, and consequently were analysed. This indicates that the attempt to select the better-preserved skeletons for analysis was not always successful.

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.

Since less than half the Fewston skeletal population was recorded in full, it was impossible to calculate an MNI for the sample. The required data was not collected from the assessed skeletons, or from the disarticulated material. Among the analysed skeletons, the minimum number of individuals present was 53. This included 42 adults (right petrous temporal), and eleven non-adults (one infant, nine juveniles and one adolescent, again all represented by the right petrous temporal). The MNI is lower than the number of articulated skeletons excavated, reflecting the incomplete nature of several of the burials.

2.3 ASSESSMENT OF AGE

Age was determined using standard ageing techniques, as specified in Scheuer and Black (2000a, 2000b) and Cox (2000). Age estimation relies on the presence of the pelvis and uses different stages of bone development and degeneration in order to calculate the age of an individual. Age is split into a number of categories, from foetus (up to 40 weeks in *utero*), neonate (around the time of birth), infant (newborn to one year), juvenile (1-12 years), adolescent (13-17 years), young adult (ya; 18-25 years), young middle adult (yma; 26-35 years), old middle adult (oma; 36-45 years), mature adult (ma; 46+) to adult (an individual whose age could not be determined more accurately than that they were eighteen or over). Age estimation of the skeletons was based on as many criteria as possible. 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 underestimated for older individuals. The categories defined here should perhaps 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; no doubt many of those aged '46+' would in actuality have been in their sixties, seventies or eighties when they died.

Of the total sample, 48 (33.1%) skeletons were non-adults and 97 (66.9%) were adults. However, non-adults only made up 20.3% of the analysed skeletons (13/64), illustrating the fact that the methods employed to select skeletons for analysis evidently biased towards the selection of adults. The data for the total sample will therefore provide a better indication of the age distribution within the burial population, but since only basic data was collected for the assessed skeletons, the level of detail available for the whole sample is limited.

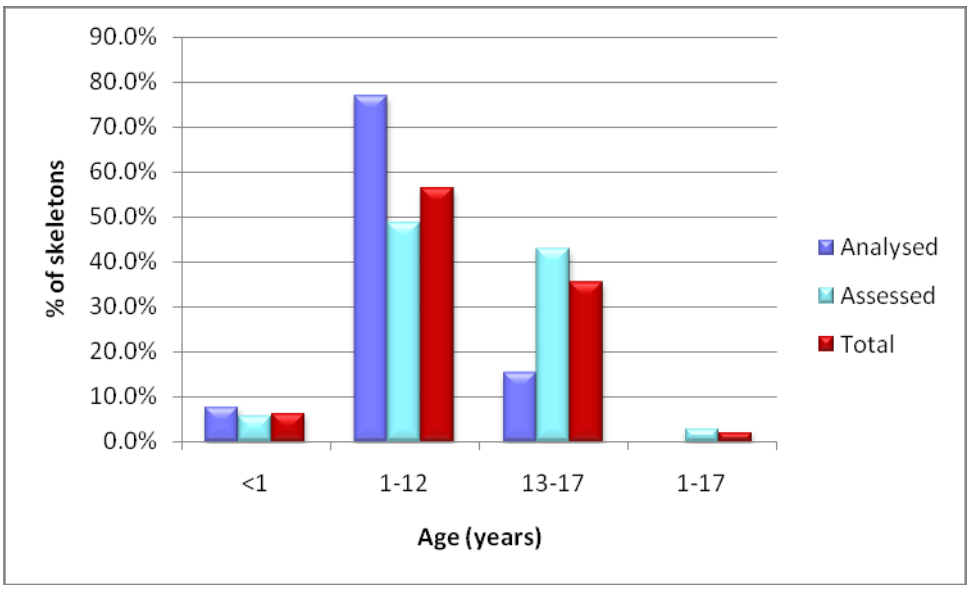
Of the 48 non-adults in the total sample, over half (56.3%) were juveniles (between the ages of 1-12 years), and over a third (35.4%) were adolescents (13-17 years). Only three individuals were younger than one year old, and one could not be placed into a specific age group (Table 5 and Figure 4). Juveniles were over-represented, and adolescents were under-represented among the analysed skeletons (Table 5 and Figure 4).

Table 5 Basic non-adult age distribution (all skeletons)

Age	Analysed		Assessed		Total	
(years)	n	%	n	%	n	%
<1	1	7.7%	2	5.7%	3	6.3%

1-12	10	76.9%	17	48.6%	27	56.3%
13-17	2	15.4%	15	42.9%	17	35.4%
1-17	0	0.0%	1	2.9%	1	2.1%
Total	**13**		**35**		**48**	

Figure 4 Basic non-adult age distribution (all skeletons)



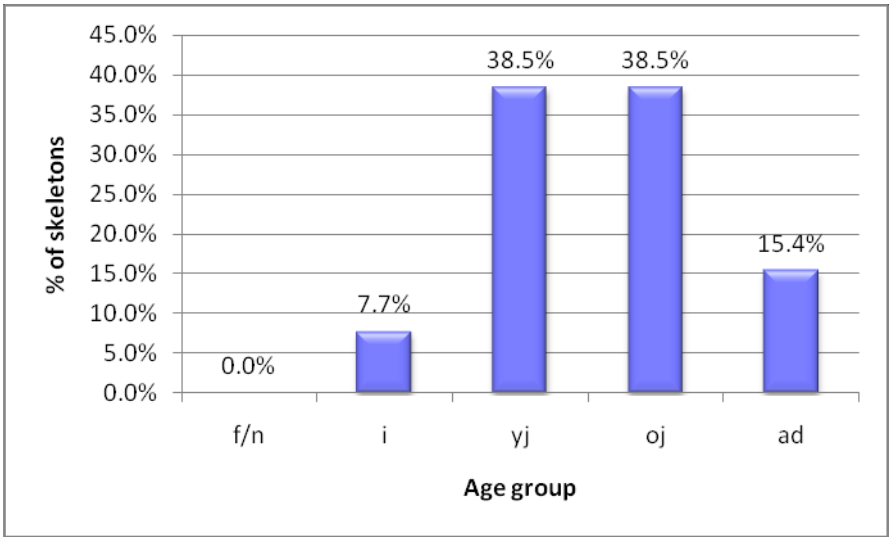
Among the analysed skeletons, the ten juveniles were divided evenly between young juveniles (c. 1-6 years old) and older juveniles (c. 7-12 years old) (Table 6 and Figure 5). The only non-adult younger than this was a ten month old infant (one of the named individuals). Of the two adolescents analysed, one was aged 11-14 years (Skeleton 338), and the other was aged 15-18 years (Skeleton 438).

Table 6 Non-adult age distribution (analysed skeletons)

Age Group*	Analysed	
	n	%
f/n	0	0.0%
i	1	7.7%
yj	5	38.5%
oj	5	38.5%
ad	2	15.4%
Total	**13**	

*f/n = foetus/ neonate (c. <1m); i = infant (1-12m); yj = young juvenile (1-6y); oj = old juvenile (7-12y); ad = adolescent (13-17y)

Figure 5 Non-adult age distribution (analysed skeletons)



The proportion of non-adults in the overall Fewston population (33.1%) is much lower than the proportion that might be expected from documentary evidence. The London Bills of Mortality suggest that around 50% of the population died before the age of 20 years between the early eighteenth and mid nineteenth centuries (Roberts and Cox 2003, 304) and at St Martin's Church, Birmingham, the burial registers suggested that 53.8% of the population had died aged less than 20 years old (Brickley *et al* 2006a). However, the number of non-adults recovered during archaeological excavations is usually less than expected, and at St Martin's Church, the proportion of excavated non-adult burials was only 30.3% (*ibid*). The burials at St Martin's could be divided into lower class burials (earth-cut graves) and middle class burials (brick-lined vaults). The proportion of non-adults among the former (32.8%) was comparable to the proportion seen at Fewston, whereas the proportion of non-adults among the middle class burials was lower at 20.2% (*ibid*). At St George's Crypt, Leeds (in use between 1840 and 1911), the proportion of non-adults (estimated from the minimum number of individuals) was around 27% (Caffell and Holst 2009). Of course the documentary evidence cited above refers to an urban population, and the two comparison sites were also urban. It is interesting that the proportion of non-adult deaths at Fewston (a rural site) appears to be as high as those of urban sites.

It seems highly likely that the burials of neonates and infants in particular were under-represented at Fewston, with just 6.3% of the total non-adults estimated to be under one year old. In comparison, 53.6% of the St Martin's Church non-adults were foetuses or infants (calculated from data in Table 92, Brickley *et al* 2006a, 98). However, the age categories used at St Martin's were not directly comparable with those used at Fewston, as infants were classed as individuals aged from birth to three years of age (*ibid*, 98).

In his diary, John Dickinson refers to two miscarriages suffered by his 'sweetheart' Emma Beecroft: on the 27th of April 1879 he wrote "...met E.B. at the site of her former residence and – poor girl – she told me that she had had a miscarry to me" (Harker 1988, p30); and on the 22nd of December 1879: "Saw E.B. in evening. She tells me she had a miscarriage on Saturday evening last" (Harker 1988, p33). Later he makes several references to miscarriages suffered by his wife: on 31st of May 1892 "Fanny took ill about midnight. Gradually got worse. Sent for doctor about one o'clock. Prematurely delivered of a child about 2 o'clock... She was very much exhausted and we had a very anxious time. But she came round and got apparently out of danger. Took the infant down to Fewston for burial" (Harker 1988, p79); on the 28th of July 1898 "About 11 o'clock Fanny fell ill and after calling in her mother and Mrs Lister she had a miscarriage she being about two months gone with

child" (Harker 1988, p96); and on the 2nd of September 1902: "In the early hours of the morning Fanny was taken ill and the result was a miscarriage. We had not expected this although she had been unwell for the past month or two" (Harker 1988, p127). It is possible that infants and neonates were less well preserved, or were more likely to be disturbed or destroyed by later burials. Alternatively, they could have been clustered within an area of the cemetery that was not excavated (Buteux and Cherrington 2006).

It is interesting that among the analysed skeletons the proportion of older children (aged 7-12 years) is equivalent to the proportion of younger children (aged 1-6 years). Usually, the older children would be at a lower risk of death, and Lewis (2007, 86) suggests that in archaeological populations around 16% of non-adults would be expected in the 5-9 year age group compared to 27.5% in the 1-4 year age group. She suggested that an increase in the proportion of non-adults aged 5-9 years in late medieval sites may be related to the practice of sending them to work as apprentices from the age of seven years (*ibid*, 87). It would be interesting to know whether this pattern would be sustained if all the remaining children from Fewston were analysed in full.

Of note is the high proportion of adolescents in the Fewston population, at 35.4% of the total non-adults. At St Martin's Church, the proportion of adolescents was considerably lower, at 12.4% (calculated from data in Table 92, Brickley *et al* 2006a, 98), and Lewis (2007, 86) states that the proportion of adolescents expected in archaeological populations is around 20%. During the post-medieval period a large number of people moved from the countryside into the growing towns and cities, and a considerable proportion of these would have been in their early teenage years (Roberts and Cox 2003, 294). These individuals would have been particularly vulnerable to infectious diseases, and many died not long after arriving in the cities (*ibid*). Since Fewston is a rural graveyard, it would be expected that there would be a low proportion of adolescents buried there (if this community was undergoing rural-to-urban migration). However, if those individuals who died in the towns were brought back to their original home for burial then this could explain the high proportion of adolescents. Documentary research or further analysis of the hair and skeletal remains may help to investigate this possibility.

That those who died may have been removed elsewhere for burial is apparent from the diary of John Dickinson. On the 21st of September 1881 he reports the death of the new schoolmaster from an infection (identified as typhoid by Harker 1988, p46). On the 24th of September "A hearse from Otley arrived in the village soon after 7. With some difficulty parties were got to put the poor schoolmaster into a coffin [due to fear of the infection]. Then two females, one his sister and the other his sweetheart, cried loud and bitterly. Soon the hearse drove off with the corpse to Sessay near Thirsk where his parents reside" (Harker 1988, p47).

Determining the age at death was not attempted for adults in the assessed group. Therefore, the only data available for adult age at death comes from the analysed skeletons. Nearly half the adults were mature adults, over the age of around 46 years (Table 7 and Figure 6). The remaining adults for whom age could be estimated were distributed fairly evenly between the remaining three age groups, and 17.6% of the adults could not be aged.

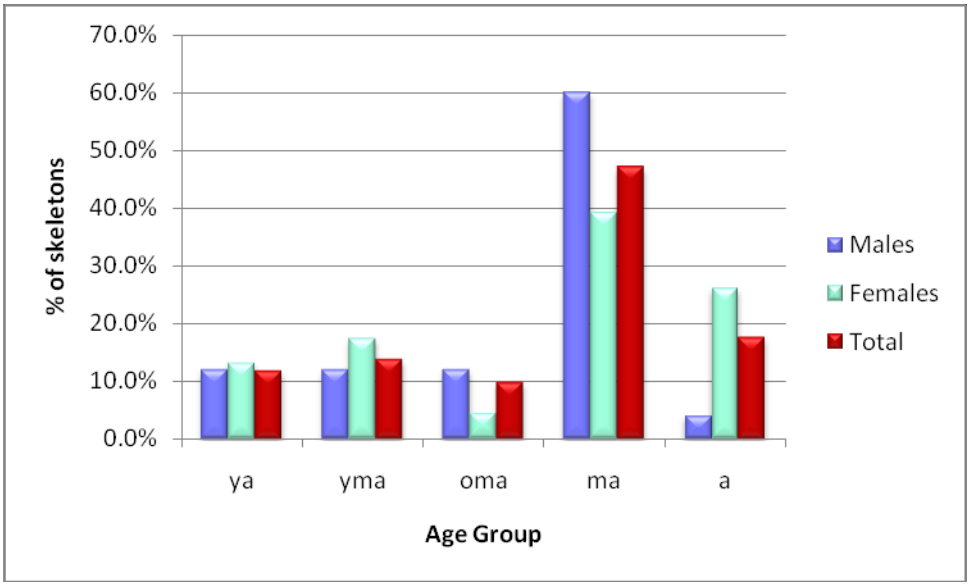
Table 7 Adult age and sex distribution (analysed skeletons)

Age Group*	Analysed Skeletons							
	M	%	F	%	U	%	T	%
ya	3	12.0%	3	13.0%	0	0.0%	6	11.8%

yma	3	12.0%	4	17.4%	0	0.0%	7	13.7%
oma	3	12.0%	1	4.3%	1	33.3%	5	9.8%
ma	15	60.0%	9	39.1%	0	0.0%	24	47.1%
a	1	4.0%	6	26.1%	2	66.7%	9	17.6%
Total	**25**		**23**		**3**		**51**	

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

Figure 6 Adult age distribution (male, female and total analysed skeletons)



A higher proportion of males (60.0%) were mature adults, compared to 39.1% of females (see Table 7 and Figure 6). However, age at death could not be determined for a quarter of the females, whereas only 4.0% of the males could not be aged.

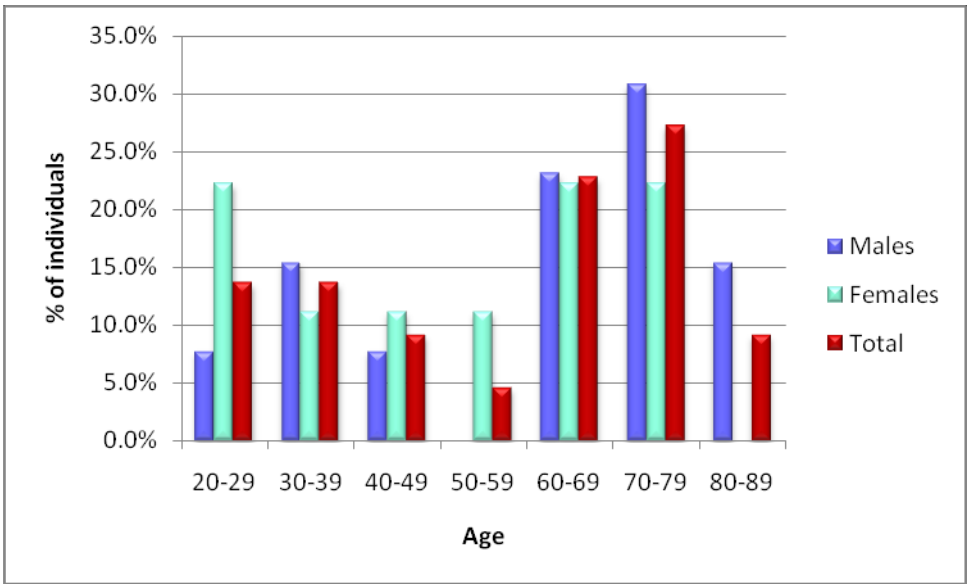
Fourteen of the fifteen named individuals with coffin plates had a legible age at death, as did nine of the eleven individuals identified with reasonable confidence by monument inscriptions. All but one of these individuals were adults; the single non-adult being an infant of ten months. The adults ranged in age from 26 years to 84 years, with a mean age at death of 58.2 years. The mean age at death of the whole group (including the infant) was 55.7 years. Most of the adults were living into their sixties and seventies, with over a third of the adults living past the age of 70 years and nearly 10% living into their eighties (Table 8 and Figure 7). Males were more likely to live longer than females, with 46.2% of males compared to 22.2% of females living past the age of 70. The male mean age at death (62.3 years) was ten years older than the female mean age at death (52.2 years). This broadly corresponds with the trend observed among the analysed skeletons, where a higher proportion of males were mature adults compared to females.

Table 8 Adult age and sex distribution (named individuals)

Age	**Named Individuals**					
(years)	**M**	**%**	**F**	**%**	**T**	**%**
20-29	1	7.7%	2	22.2%	3	13.6%
30-39	2	15.4%	1	11.1%	3	13.6%
40-49	1	7.7%	1	11.1%	2	9.1%

50-59	0	0.0%	1	11.1%	1	4.5%
60-69	3	23.1%	2	22.2%	5	22.7%
70-79	4	30.8%	2	22.2%	6	27.3%
80-89	2	15.4%	0	0.0%	2	9.1%
Total	**13**		**9**		**22**	

Figure 7 Adult age distribution (named individuals)



It is important to stress that none of these individuals were analysed 'blind', i.e. without knowing the age and sex of the individual prior to analysis. It is highly likely that knowledge of the actual age and sex of the individual has subconsciously biased the osteological recording, particularly with regards to age, despite attempting to remain objective. During the course of analysis, it was noted that dental age estimates were not valid for this group. Individuals known to be among the older members of the population demonstrated relatively minimal dental wear; for example, Skeleton 130 who died aged 66 had a dental age of 17-25 years. Furthermore, the amount of ante-mortem tooth loss was high, preventing the scoring of dental wear in a considerable number of individuals.

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 in both males and females relies on the preservation of the skull and the pelvis and can only be carried out once sexual characteristics have developed, during late puberty and early adulthood.

Sex was not estimated for the assessed skeletons. Among the analysed skeletons, the adults were evenly divided between the sexes, with 25 males and 23 females (52.1% and 47.9% respectively of the 48 sexed individuals). Three skeletons could not be sexed (5.9% of the total 51 adults). As would be expected, the ratio of males to females does not differ significantly from a normal sex distribution ($X^2 = 0.0833$, $p<0.05$, 1 d.f.). The slight bias towards males reflects the higher proportion of males seen at most other post-medieval sites, for example St. Martin's Church, Birmingham where 58.1% of the adults were male (Brickley *et al* 2006a) and St. Marylebone, London where 55% of the adults were male (Miles *et al* 2008).

Fifteen individuals had coffin plates and so could be identified with reasonable confidence. Sex could not be determined by osteological methods for two skeletons, but the osteological sex agreed with the known sex in twelve of the remaining thirteen individuals. Skeleton 122 had a markedly female shaped pelvis and skull, and was considered almost certainly female. The coffin plate was almost illegible, and the name had been tentatively read as 'John? Marjerrison'. For this individual it seems most likely that the osteological sex was correct, and the first name may have been Jane or Joan (or similar). Further documentary research may help to clarify the matter. Eleven individuals were more tentatively identified by monument inscriptions. Of these, osteological sex agreed with the known sex in nine individuals, with sex being impossible to determine in the remaining two.

Overall, a higher proportion of the named individuals were male (15/26, 57.7%, including one infant) than female (11/26, 42.3%). It is possible that males were more likely to have a coffin plate or monument inscription than females. However, the sample is small, and although this difference diverged from the expected 50:50 distribution, it was still not statistically significant ($X^2 = 0.6154$, $p<0.05$, 1 d.f.).

2.5 METRIC ANALYSIS

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). Leg measurements were obtained from the femora and tibiae and used to calculate robusticity (*meric* and *cnemic* indices). Standard measurements of the cranium and mandible were taken where preservation allowed.

Data for stature is presented in Table 9. Stature could only be estimated for 30 (58.8%) of the analysed skeletons, due to the amount of fragmentation present. Stature could be estimated for a higher proportion of males (68.0%) than for females (56.5%). It was also possible to use leg bones to calculate stature among a higher percentage of males (15/17, 88.2%) compared to females (9/13, 69.2%), suggesting post-mortem fragmentation of the bones may have been greater in females. Overall, 80.0% of the stature estimates were based on leg bones (24/30), with eighteen of these using the femur and tibia combined.

The males ranged in height from 166.4cm (5'5½") to 188.8cm (6'2"). The mean stature was 176.3cm, or 5'9½". This was comparable with the mean stature of 175.8cm observed among the males from St George's Crypt in Leeds (Caffell and Holst 2009). However, it was greater than the mean stature of males from St Martin's Church, Birmingham (171.8cm, Brickley *et al* 2006a), as well as falling above the range of means (168-174cm) given for post-medieval sites by Roberts and Cox (2003).

The females ranged in height from 152.2cm (5'0") to 169.9cm (5'7"), with a mean stature of 161.0cm (5'3½). This was two or three centimetres higher than the female mean stature seen at St George's Crypt (158.0cm, Caffell and Holst 2009), and St Martin's Church (159.1cm, Brickley *et al* 2006a), but fell within the range of means (156-164cm) given by Roberts and Cox (2003) for the post-medieval period.

Table 9 Stature

Sex	Number		Mean	Range	
	(n)	(%)		Min	Max
Male	17	68.0%	176.3	166.4	188.8
Female	13	56.5%	161.0	152.2	169.9

The stature of the named individuals (whose stature could be calculated) is given in Table 10. It is interesting that George and David Lister are the tallest two males in the group, both being over six foot tall. It is possible that their tall stature was genetic. John and Mary Dickinson (Skeletons 351 and 310) were among the shorter individuals of each sex. Their son, John Dickinson, described his own physical appearance on numerous occasions throughout the course of his diary. In 1881 he weighed 10 stone 3 lbs, and described himself as "slight, rather smart looking and pretty lish and active" (Harker 1988, 50), and in 1889 he weighed "10 stones within one pound" and had not "weighed any more for past few years"; he was a "slender man, but light boned and pretty smart and wiry... and used to be pretty strong for my weight" (Harker 1988, 57). Although he does not mention his height, he gives the impression he was among the smaller men in the community. However, there are too few individuals in the sample to examine variations in stature between families. Also too little is known of the relationships between people.

Table 10 Stature (named individuals)

Males				Females			
Sk No	Name	Stature		Sk No	Name	Stature	
		(cm)	(feet)			(cm)	(feet)
307	Joseph Darnbrook	167.4	5'6"	300	Mary Darnbrook	162.2	5'4
138B	James Dibb	178.6	5'10½"	138A	Elizabeth Dibb	160.6	5'3"
351	John Dickinson	174.3	5'8½"	310	Mary Dickinson	154.3	5'1"
339	Richard Gill	171.6	5'7½"	363	Sarah Gill	165.2	5'5"
130	George Lister	188.8	6'2"	122	J... Marjirrison	163.6	5'4½"
226	David Lister	183.4	6'0"	156	Christiana Patterson	169.9	5'7"
119	Matthew Marjirrison	175.2	5'9"	378	Elina Wigglesworth	152.2	5'0"
366	John Renton Newsome	174.8	5'9"				
360	Gill Wigglesworth	177.4	5'10"				

The *meric* index is a method of calculating the shape and robusticity of the femoral shaft. Half the femora (50.0%) fell into the *platymeric* range (broad and flat), with the majority of the remainder being *eurymeric* (rounded). A small percentage of femora were *stenomeric* (very rounded). The overall means for left and right femora fell into the *eurymeric* category (Table 11). Females tended to have slightly rounder femora than males, with a lower percentage of both left and right femora in the *platymeric* category; females were the only ones to have *stenomeric* femora (Table 12), which is a relatively unusual shape. This trend was also reflected in the mean values for male and female femora, with the mean meric index of male femora being lower than that of females on both the left and right sides (Table 11).

Table 11 Meric index – range and mean

Sex	Right			Left		
	Mean	Range		Mean	Range	
		Min	Max		Min	Max
Male	84.56	74.46	96.29	86.36	76.55	99.63
Female	86.03	74.25	98.51	89.72	78.22	103.83
Total	85.15	74.25	98.51	87.71	76.55	103.83

Table 12 Meric index – number of femora in each category

	Male				Female				Total			
	Right		Left		Right		Left		Right		Left	
Platymeric	9	60.0%	7	46.7%	5	50.0%	4	40.0%	14	56.0%	11	44.0%
Eurymeric	6	40.0%	8	53.3%	5	50.0%	4	40.0%	11	44.0%	12	48.0%
Stenomeric	0	0.0%	0	0.0%	0	0.0%	2	20.0%	0	0.0%	2	8.0%
	15		15		10		10		25		25	

The *cnemic* index of the tibiae was calculated in order to establish the degree of tibial shaft flatness. The majority (72.3%) of tibiae were *eurycnemic* (broad), with most of the remainder being *mesocnemic* (average). One tibia was *platycnemic* (flattened), and one was *hyperplatycnemic* (extremely flattened). The overall means for left and right tibiae fell into the *eurycnemic* range (Table 13). Females showed a slight tendency to have flatter tibiae than males, as both the *platycnemic* and *hyperplatycnemic* tibiae belonged to female individuals (Table 14). However, the female means still fell into the *eurycnemic* range (Table 13).

Table 13 Cnemic index – range and mean

Sex	Right			Left		
	Mean	Range		Mean	Range	
		Min	Max		Min	Max
Male	72.79	65.21	84.67	73.35	64.94	85.39
Female	71.41	50.93	82.68	72.72	65.31	77.68
Total	72.18	50.93	84.67	73.06	64.94	85.39

Table 14 Cnemic index – number of tibiae in each category

	Male				Female				Total			
	Right		Left		Right		Left		Right		Left	
Hyperplatycnemic	0	0.0%	0	0.0%	1	9.1%	0	0.0%	1	4.0%	0	0.0%
Platycnemic	0	0.0%	0	0.0%	1	9.1%	0	0.0%	1	4.0%	0	0.0%
Mesocnemic	5	35.7%	1	8.3%	2	18.2%	3	30.0%	7	28.0%	4	18.2%
Eurycnemic	9	64.3%	11	91.7%	7	63.6%	7	70.0%	16	64.0%	18	81.8%
	14		12		11		10		25		22	

The cranial index describes the shape of the cranium, and it was possible to calculate this for eighteen adult crania (35.3%). As with stature, it was possible to calculate the cranial index for a greater proportion of the males (12/25, 48.0%) compared to females (6/23, 26.1%), again suggesting female skeletons had experienced a greater degree of fragmentation.

Forty-four percent of the crania were *mesocranic*, or of average shape, with most of the remainder being *dolichocranic* (long headed); 16.7% were *brachycranic* (round headed) (Table 15). Males tended to be long headed, with 58.3% in the *dolichocranic* category, and none in the *brachycranic* (round headed) group. In contrast females were divided evenly between the average (*mesocranic*) and round headed groups (*brachycranic*) (Table 15). This difference was reflected in the mean cranial index for each sex: the male mean fell into the *dolichocranic* (long headed) range, whereas the female mean was at the upper end of the *mesocranic* (average) range, bordering on the *brachcranic* (round headed) range (Table 16). The overall mean fell into the *mesocranic* (average) group.

Table 15 Cranial index – number of crania in each category

	Male		Female		Total	
Dolichocranic	7	58.3%	0	0.0%	7	38.9%
Mesocranic	5	41.7%	3	50.0%	8	44.4%
Brachycranic	0	0.0%	3	50.0%	3	16.7%
Hyperbrachycranic	0	0.0%	0	0.0%	0	0.0%
	12		6		18	

Table 16 Cranial index – mean and range

	Mean	Range	
		Min	Max
Male	74.79	70.83	78.42
Female	79.34	76.33	82.94
Total	76.31	70.83	82.94

2.6 NON-METRIC TRAITS

Non-metric traits are additional sutures, facets, bony processes, canals and foramina, which occur in a minority of skeletons and are believed to suggest hereditary affiliation between skeletons (Saunders 1989). The origins of non-metric traits have been extensively discussed in the osteological literature and it is now thought that while most non-metric traits have genetic origins, some can be produced by factors such as mechanical stress (Kennedy 1989) or environment (Trinkhaus 1978). 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.

Frequencies for cranial non-metric traits among the adults are presented in Table 17. *Ossicles* (additional bones) were present in half the left and right lambdoid sutures (at the back of the cranium), with 20% of the adults having an *ossicle at lambda*. Bennett (1965) has suggested that the formation of ossicles in this suture may be related to stresses placed on the growing cranium during foetal life and early infancy, and with regards Skeleton 186 (mature adult male) the ossicles observed in his lambdoid sutures were probably associated with anomalies in the fusion of his sutures (see below). Ossicles also occurred in other sutures in this population, although the number of individuals with sutures obliterated reduced the number of observations possible. *Open posterior condylar canals* (small additional holes in the base of the cranium) were particularly common. *Mastoid foramina* tended to be *extrasutural*, and *double anterior condylar canals* (variations in the base of the

cranium) were more frequently observed on the left side. *Metopic sutures* (retention of a suture in the frontal bone) occurred in 16.3% of the adults. *Palatine, maxillary and mandibular tori* (additional nodules of bone buttressing the jaws) were observed in 10-25% of the jaws. Other traits were also present (Table 17).

Table 17 Cranial non-metric traits (adults)

Midline Traits	Trait Present	Part Present	%
Ossicle at Lambda	6	30	20.0%
Ossicle at Bregma	0	32	0.0%
Metopic Suture	7	43	16.3%
Palatine Torus	8	34	23.5%
Precondylar Tubercle	2	38	5.3%

Paired Traits	Right			Left		
	Trait Present	Part Present	%	Trait Present	Part Present	%
Highest Nuchal Line	4	35	11.4%	3	34	8.8%
Lambdoid Ossicle	18	34	52.9%	18	34	52.9%
Coronal Ossicle	0	29	0.0%	1	29	3.4%
Ossicle at Asterion	4	34	11.8%	6	36	16.7%
Ossicle at Parietal Notch	2	36	5.6%	5	39	12.8%
Ossicle at Pterion	1	12	8.3%	1	10	10.0%
Parietal Foramen	16	38	42.1%	19	40	47.5%
Auditory Torus	0	41	0.0%	0	43	0.0%
Foramen of Huschke	0	42	0.0%	1	42	2.4%
Mastoid For. Extrasutural	19	32	59.4%	18	31	58.1%
Sutural Mastoid Foramen	11	31	35.5%	11	32	34.4%
Open Post. Condylar Canal	24	32	75.0%	21	31	67.7%
Double Condylar Facet	1	32	3.1%	1	32	3.1%
Double Ant. Condylar Canal	2	37	5.4%	7	36	19.4%
For. Ovale Incomplete	1	33	3.0%	0	32	0.0%
Open For. Spinosum	0	32	0.0%	5	32	15.6%
Access. Less. Palat. For.	15	30	50.0%	13	28	46.4%
Maxillary Torus	6	28	21.4%	5	31	16.1%
Mandibular Torus	6	40	15.0%	5	38	13.2%
Staphne's Defect	0	33	0.0%	0	32	0.0%
Zygomatic. Facial For. Abs.	2	33	6.1%	4	32	12.5%
Access. Infra-orb. For.	2	20	10.0%	2	18	11.1%
Access. Supraorbital For.	4	31	12.9%	4	27	14.8%
Bridging Supraorbital Notch	8	29	27.6%	8	26	30.8%
Anterior Ethmoid For. Ex.	7	12	58.3%	10	12	83.3%
Posterior Ethmoid For. Ex.	2	7	28.6%	2	8	25.0%

The frequency of post-cranial non-metric traits is presented in Table 17. *Double anterior calcaneal facets* and *double inferior talar facets* (variation in the shape of the ankle joint) were particularly common, affecting 66-73% of calcanei and tali. *Peroneal tubercles* (nodules of bone on the outer surface of the calcaneus) were also

frequently observed. *Exostosis in the trochanteric fossae* (small spicules of bone at the top of the femur shaft) affected 60.7% of right and 73.1% of left femora, with *plaque* (roughened area of bone on the neck of the femur) observed on 55.6% of right and 50.0% of left femora. *Acetabular creases* (small folds in the joint surface of the hip) were present in 51.5% of right and 63.3% of left acetabuli. *Bipartite transverse foramina* (double rather than single holes in the neck vertebrae) were also reasonably common. Other traits were less frequently observed (see Table 17).

Table 18 Post-cranial non-metric traits (adults)

Midline Traits	Trait Present	Part Present	%
Sternal Foramen	1	13	7.7%

Paired Traits	**Right**			**Left**		
	Trait Present	Part Present	%	Trait Present	Part Present	%
Lateral Atlas Bridging	1	25	4.0%	1	29	3.4%
Double Atlas Facet	0	28	0.0%	0	32	0.0%
Posterior Atlas Bridging	1	30	3.3%	2	31	6.5%
Transverse For. Bipartite	13	22	59.1%	9	21	42.9%
Suprascapular Foramen	0	19	0.0%	1	10	10.0%
Accessory Acromial Facet	1	16	6.3%	1	13	7.7%
Circumflex Sulcus	10	29	34.5%	9	20	45.0%
Supracondyloid Process	0	35	0.0%	0	29	0.0%
Septal Aperture	2	34	5.9%	0	27	0.0%
Accessory Sacral Facet	4	19	21.1%	2	15	13.3%
Acetabular Crease	17	33	51.5%	19	30	63.3%
Allen's Fossa	5	19	26.3%	3	17	17.6%
Poirier's Facet	2	15	13.3%	5	13	38.5%
Plaque	10	18	55.6%	8	16	50.0%
Hypotrochanteric Fossa	11	38	28.9%	12	40	30.0%
Exostosis in Troch. Fossa	17	28	60.7%	19	26	73.1%
Third Trochanter	4	33	12.1%	4	33	12.1%
Emarginate Patella	0	16	0.0%	0	13	0.0%
Vastus Notch	5	16	31.3%	1	13	7.7%
Vastus Fossa	7	15	46.7%	5	12	41.7%
Med. Tib. Squatting Facet	0	29	0.0%	0	29	0.0%
Lat. Tib. Squatting Facet	11	29	37.9%	8	28	28.6%
Peroneal Tubercle	12	19	63.2%	14	24	58.3%
Double Ant. Calc. Facet	19	26	73.1%	20	29	69.0%
Absent Ant. Calc. Facet	3	26	11.5%	4	30	13.3%
Double Inf. Talar Facet	19	27	70.4%	20	30	66.7%
Med. Talar Facet	5	26	19.2%	8	23	34.8%
Lat. Talar Extension	8	26	30.8%	8	28	28.6%
Os Trigonum	1	31	3.2%	2	33	6.1%

2.7 CONCLUSION

Unfortunately, the shortage of time and funding precluded full analysis of the whole sample excavated from Fewston. This is particularly regrettable given the rural nature of the population and the rarity of such rural samples for the post-medieval period in Britain. An attempt was made to target the best preserved skeletons for full analysis, as well as all named individuals and any other skeletons identified by the archaeologists. In total 64 of the 145 skeletons excavated were analysed and the remainder were assessed. The preservation varied enormously across the site, with some skeletons being complete, with good surface preservation and minimal fragmentation, but others being so badly degraded that no bone survived to be lifted.

Basic data on age-at-death collected during assessment indicated that a third of the total sample excavated were non-adults, of which over half were juveniles and over a third were adolescents. The youngest age groups (foetuses, neonates and infants) were under-represented. The high proportion of adolescents was unexpected. Non-adults were under-represented among the analysed skeletons, but of those analysed in full the juveniles were evenly split between the younger (1-6 year) and older (7-12 year) age categories.

The adults were evenly divided between males and females, and nearly half were mature adults, with the rest distributed fairly evenly between the remaining age groups. A higher proportion of the males were mature adults compared to the females. Data from the named individuals indicated that over a third of the adults were living past the age of seventy, with a mean age at death of 58.2 years. The male mean age at death (62.3 years) was ten years older than the mean female age at death (52.2 years), which supported the osteological results.

The average male height was tall for the post-medieval period, while the average female height fell in the middle of the range of mean statures previously reported for the period. Male crania were long or average in shape, whereas female crania were round or average shape. Femora were rounded, with females tending to have rounder femora than males, and tibiae were broad, with females tending to have flatter tibiae than males. Several non-metric traits were recorded for both the cranial and post-cranial skeleton.

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.

Given the time constraints it was not possible to carry out adequate research into the conditions observed, or to produce detailed prevalence rates, and both will be required to understand the health of this population. Analysis of the skeletons not yet recorded would contribute further data that could be incorporated in the final version of the report.

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 these individuals will usually have been unaware of their condition. 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 (Barnes 1994). It may also provide information on levels of maternal health (Sture 2001).

The number of miscarriages suffered by John and Fanny Dickinson described in John's diary (Harker 1988) could suggest developmental anomalies in the miscarried foetuses, the risk of which would be increased by the fact that John and Fanny were cousins. John Dickinson himself came to the conclusion that the close familial relationship between him and Fanny had contributed to the delayed physical and mental development of their only surviving daughter, Dorothy. On the 20th of November 1902, he wrote: "Dorothy is a whining sort of a child as yet and I don't think she is so forward or well developed physically or mentally as most girls of her age. I sometimes fear that the fact of Fanny and I being cousins may account for her weakness" (Harker 1988, p129). It is interesting that references are made elsewhere in his diaries to the marriage of cousins, or relatives of some sort. For example, in 1898 he wrote "George Dickinson and Polly Archer got married today... George is my cousin and Polly is my niece"; adding rather hypocritically "I don't care for this marrying of relations but it seems to be inevitable sometimes" (Harker 1988, p97). Writing about a man named King Grange he included the sentence: "Daughter had a child by him" (Harker 1988, p72). However, it is not clear whether he meant the daughter of King Grange (which would have been incest) or the daughter of a widow he had married. Nonetheless, it appears that marriage within families occurred relatively frequently in the Fewston population, which will have had implications for the frequency of developmental anomalies. It would be interesting to conduct a more thorough documentary search into the relationships between individuals, reconstructing the family trees of the families in the area to determine the amount of intermarriage that occurred.

3.1.1 Transitional Vertebrae and Additional Vertebrae

The normal human spine consists of seven cervical (neck), twelve thoracic (chest) and five lumbar (lower back) vertebrae, making a total of 24 independent segments. The sacrum (at the base of the spine, forming the back of the pelvis) is usually composed of five fused vertebral segments, and the coccyx (vestigial tail) is normally made up of four fused vertebral segments. The overall total of vertebral segments is therefore 33.

Additional vertebrae occur when there is an extra vertebral segment, increasing the total number of segments in the spine. They usually occur at the junction between the thoracic and lumbar vertebrae (where they take on the appearance of a thoracic vertebra), or at the junction between the lumbar vertebrae and the sacrum. In the latter instance they either appear as an additional (sixth) lumbar vertebra, or become partially or fully incorporated into the sacrum (Barnes 1994, 78).

Transitional vertebrae can occur at the borders between different types of vertebra, when a vertebra from one group takes on some or all of the characteristics of an adjacent group, for example the first lumbar vertebra (in the lower back) may develop vestigial ribs (Barnes 1994, 79-116). The process by which this happens is known as 'border shifting'. The end result is to increase the number of segments in one part of the spine at the expense of the adjoining part (e.g. increasing the number of thoracic vertebrae to 13 through incorporating the first lumbar vertebra, but decreasing the number of lumbar vertebrae to four). Transitional vertebrae are reasonably

common, particularly at the lumbosacral border (between the fifth lumbar vertebra and the sacrum, at the base of the spine), but the consequences of the border shift become more severe the higher up the spine it occurs (Barnes 1994, 79-116).

A complete and well preserved spine is required to determine whether any variation in the expected number of vertebrae in each group is the result of a genuine extra vertebral segment (i.e. an additional vertebra) or due to a border shift, and if the latter, what kind of shift has taken place. Unfortunately, many of the Fewston individuals had incomplete spines, or spines so fragmented that it was impossible to reassemble individual vertebrae or to sequence them (i.e. place them in order and so identify specific ones). Of the adults with at least one identifiable vertebra (i.e. identified as a specific vertebra), only thirteen (29.5%) had between 24-29 identifiable vertebral segments present, indicating a near-complete spine. Males tended to have better-preserved spines than females, with 39.1% (9/23) of male spines and 19.0% (4/21) of female spines comprising 24-29 segments. Since few of the individuals from Fewston had intact, well-preserved spines it was frequently impossible to identify whether anomalies in the vertebral column were due to additional vertebrae, or to transitional vertebrae. Consequently both have been considered together.

Additional or transitional vertebrae were seen in thirteen individuals from Fewston, including six females, six males and an adolescent. However, only one of the six females and four of the six males had near-complete spines. Based on these figures, 25.0% of females (1/4 with near-complete spines) and 44.4% of males (4/9 with near-complete spines) were affected by either an additional vertebra or a transitional vertebra. However, the calculation of prevalence rates has clearly been upset by the poor preservation.

Two individuals probably had additional vertebrae. Skeleton 119 (old middle adult male) had a relatively complete spine (29 segments), with thirteen thoracic vertebrae and thirteen right ribs. He may have had an additional vertebra that had taken on thoracic characteristics. The lumbar vertebrae of Skeleton 122 (mature adult female) were damaged and incomplete but it was apparent that six had been present instead of the usual five. There were no apparent border shifts at the thoraco-lumbar or lumbo-sacral borders so this may have been an additional vertebra that had taken on lumbar characteristics. However, her spine was not compete (22 segments) so the additional lumbar vertebra could have been the result of a border shift. Both individuals shared the same surname: Skeleton 119 was identified as Matthew Marjerrison and Skeleton 122 as J... Marjerrison, so it is possible they were related. However, the female may have married into the family rather than being a blood relative.

Four individuals either had an additional lumbar vertebra that had become partially incorporated into the sacrum (sacralisation), or their first sacral vertebrae were partially lumbarised (separated from the sacrum and taking on lumbar characteristics). Three of these were male individuals with relatively complete spines, suggesting sacralisation of an additional lumbar vertebra may be the more likely option. However, all had damaged sacra making it impossible to assess the number of segments present. These were Skeletons 138B (mature adult, 28 segments), 226 (mature adult, 26 segments), and 339 (old middle adult, 29 segments). Although all three were named individuals (James Dibb?, David Lister and Richard Gill), none shared the same surname; however, research into their family trees would be required to determine whether they were or were not related. Skeleton 098 (adult female?) had an incomplete spine (12 segments), so it was impossible to determine whether she had an extra sacralised lumbar vertebra, or a lumbarised first sacral vertebra.

Skeleton 363 (mature adult female) probably had two border shifts, one at the thoraco-lumbar border and the second at the lumbo-sacral border. Again the latter may have involved sacralisation of an additional lumber vertebra or lumbarisation of the first sacral vertebra, but her sacrum was too damaged to be assessed. She had thirteen pairs of ribs, with rib facets on her first lumbar vertebra indicating this vertebra had been incorporated into the thoracic part of her spine. She had four lumbar vertebrae with typical morphology, and then a transitional vertebra at the lumbo-sacral border. The latter shared some features in common with the three male individuals discussed above, one of whom was Richard Gill. Again, it is interesting the Skeleton 363 was identified as Sarah Gill, but she may not have been a blood relative of Richard Gill if she married into the family.

Three individuals had slight border shifts at the thoraco-lumbar borders, all of them in a cranial direction, i.e. the border moved upwards and the twelfth thoracic vertebrae took on partial lumbar characteristics. The twelfth thoracic vertebra in Skeleton 426 (young middle adult female) had a curved superior left facet and a flat superior right facet, with small rib facets; her twelfth ribs were small and tapered. The twelfth thoracic vertebra in Skeleton 459 (mature adult male) was lumbar in shape (both superior facets were curved) but the rib facets were retained. In Skeleton 438 (15-18 year old adolescent) the twelfth ribs were short and tapered, and the vertebra tentatively identified as T12 had a small rib facet on the right pedicle. Unfortunately little of the spine of this individual survived.

Skeleton 348 (young adult female) had six lumbar vertebrae, but her spine was too incomplete (14 segments) to determine whether this was the result of an additional segment or a border shift. It was feasible that a cranial (upwards) shift at the thoraco-lumbar border had led to the incorporation of T12 into lumbar part of the spine.

Unfortunately the spine and ribs of Skeleton 186 (mature adult male) were badly fragmented and not all the vertebrae of ribs could be identified. He was the only individual who had experienced a probable cranial (upward) shift at the cervico-thoracic border (between the neck and chest vertebrae). His uppermost right rib was tightly curved, narrow and angular, with a thick sternal end bearing a flattened oval facet on the outer margin. Presumably this was in contact with the rib beneath, but that part of the rib had been damaged post-mortem. In shape, this second rib shared features with the normal appearance of a first rib, although the sternal end was wide. The first and second left ribs were normal, and C7 and T1 were too damaged to examine the details of their shape. It seems likely that he had a fully-fledged cervical (neck) rib on the right side (Type IV, Barnes 1994, 100). Barnes (1994, 100) reports that cervical ribs occur in 0.5-1.0% of individuals, and that fully developed cervical ribs usually occur just on one side of the body, as occurred here. Skeleton 186 may have experienced problems with the circulation and pressure on the nerves in his right arm, both of which could lead to muscle weakness (Barnes 1994, 101).

Finally, the first coccygeal vertebra of Skeleton 300 (mature adult female) was possibly fused to the sacrum. However, the area was damaged post-mortem and most of the rest of the spine had been lost making it difficult to evaluate.

Where the likely direction of the border shift could be determined it was usually cranial (upwards). According to Barnes (1994, 80), cranial shifting is not as commonly observed as caudal (downward) shifting, and it tends to be more common in females.

3.1.2 Cleft Neural Arches

Cleft neural arches occur when the two halves of the vertebral arch, which surrounds and protects the spinal cord, fail to unite during development (Barnes 1994). The gap in the bone is filled with a tough fibrous tissue in life, and so the spinal cord remains protected and these defects are asymptomatic. They are usually seen at the border regions between different vertebral types, particularly in the lumbo-sacral region when the entire sacrum may be involved (Barnes 1994). A cleft in the neural arch of the atlas was observed in Skeleton 366 (mature adult male), identified as John Renton Newsome. The prevalence among the Fewston adults was 2.9% (1/34 atlas arches); among males the prevalence was 5.0% (1/20 atlas arches). Three individuals had partially cleft sacral arches. Skeletons 056 (8-10 year old juvenile) and 426 (young middle adult female) had clefts in the arches of the sacrum (S4-5), but clefts in these arches may be part of the normal population variation (Roberts and Manchester 2005, 55). Skeleton 348 (young adult female) had cleft neural arches in S3-4. This individual also had a transitional vertebra at the lumbo-sacral border (see above), and the two may have been associated.

3.1.3 Craniosynostosis/ Sutural Agenesis

The bones in the cranial vault meet at joints named sutures. Failure of a suture to develop is known as sutural agenesis, whereas premature fusion of a suture is known as craniosynostosis (Barnes 1994). Since the presence of sutures allows the cranium to expand in size during childhood to accommodate the growing brain, if a suture is absent or fuses too early it can prevent the cranium from growing in a certain direction. If other sutures are present and open then the brain and cranium will grow in that direction instead, and the end result will be a deformed cranium. Sutural agenesis can be hereditary, and runs in families. Craniosynostosis can be caused by a variety of factors, including foetal cranial position *in utero*, birth trauma, infection whilst in the womb, endocrine dysfunction and metabolic disorders (such as rickets) (Jimenez *et al.* 1994). In general, craniosynostosis affects males more often than females (Aufderheide and Rodríguez-Martín 1998), although certain sutures (notably the coronal) are more commonly involved in females (Kimonis *et al* 2007, Barnes 1994). Premature fusion of the sutures can occur as part of a congenital syndrome (Barnes 1994), and over 180 such syndromes associated with craniosynostosis have been recorded (Kimonis *et al* 2007).

Skeleton 186 (mature adult male) had either agenesis or premature fusion of part of his right lambdoid suture at the back of his head. The medial half of the right lambdoid suture was invisible, and the bone surface was completely smooth with no trace of a suture ever having been present. The lateral half of the suture was almost entirely occupied by ossicles, which measured around 20mm (anterior-posterior) and were therefore unusually large. There was also a cluster of multiple ossicles at asterion and along the parieto-mastoid suture. The medial half of the left lambdoid suture was partially obliterated, but traces of the suture lines were still visible. One medium sized ossicle (20mm) occurred at the midpoint of the suture. The shape of the cranium was deformed. The frontal bone (forehead) protruded on the right side, with the right frontal boss and right supraorbital (brow) ridge more pronounced than on the left side. The occipital (at the back of the head) protruded more on the left side, with a pronounced bulge in the left occipital squama and the external occipital protuberance offset to the right. The right mastoid process (lump of bone behind the ear) was set further forward than on the left side, suggesting asymmetry in the position of the ears. These changes were pronounced enough that they must have been visible during life, particularly those affecting the shape of his face. However, the degree to which they may have affected the way he felt about his appearance, or the way others perceived him is not known. It is interesting that Skeleton 186 was one of two individuals buried in a coffin with a glass pane over the face.

The pattern of growth seen in the cranium of Skeleton 186 is typical of that seen in modern patients with premature fusion of the lambdoid suture or other sutures around the back of the head, and the resulting shape is termed *posterior plagiocephaly* (Jimenez *et al.* 1994). The presence of ossicles in the lambdoid sutures has been related to deformation in the shape of the cranium, being found in studies of crania deliberately modified as a cultural practice and those deformed through premature fusion of a suture (Sanchez-Lara *et al* 2007; O'Loughlin 2004). In theory, increased tension placed on the opposite side to the fused suture spreads the suture apart, encouraging the formation of ossicles within the suture to bridge the gap (Sanchez-Lara *et al* 2007). El-Najjar and Dawson (1977) found an increased number of ossicles on the side showing the greatest deformation. Skeleton 186 also had a probable cervical rib (discussed above) and it is possible he had suffered a developmental syndrome. The lambdoid suture was affected in 3.7% of 27 relatively intact crania.

The cranium of Skeleton 351 (mature adult male, potentially identified as John Dickinson) had no trace of a squamous or parieto-mastoid suture on the right side, but these sutures were clearly visible on the left side; these are sutures between the parietal and temporal bones on the side of the head, just above the ear. Likewise, there was no visible occipito-mastoid suture (between the occipital and temporal bones behind the ear) on the left side, but it was clearly visible on the right side. It is possible this individual had also suffered premature fusion or absence of sutures. However, there was no visible deformation in the shape of the cranium, which would be expected unless the changes on each side had exerted a similar restraint on the pattern of growth. Although the cranium seemed low, other individuals in this population also had low crania. It is a possibility that the missing sutures in this individual were due to age-related changes.

3.1.4 Block Vertebrae

The third and fourth cervical vertebrae in Skeleton 241 (mature adult male) were fused together. Although vertebrae can fuse as a result of joint disease or trauma, because the join between them was smooth and featureless it seems most likely this pair had failed to separate during development (Barnes 1994, 63-67). According to Barnes (1994, 67), the cervical and lumbar spine are more prone to block vertebrae than the thoracic spine. Block vertebrae occur in Klippel-Feil syndrome, with two fused cervical vertebrae (most commonly the second and third) occurring in Type II Klippel-Feil (Barnes 1994, 67). This type is the most common type, and usually the individual experiences no symptoms (Barnes 1994, 69). Twenty-three individuals had the second to seventh vertebrae present, indicating that block cervical vertebrae occurred in 4.3% of the population. The frequency among males was 6.7% (1/15).

3.1.5 Other Congenital Anomalies

The spine of Skeleton 289 (unsexed old middle adult) was badly fragmented, but the thoracic bodies showed subtle changes possibly associated with scoliosis (sideways curvature of the spine). These included asymmetry in the size and width and angle of the left and right pedicles, and asymmetric body shapes. Unfortunately not enough of the spine or ribs were preserved to verify whether this individual had suffered from scoliosis.

Small variations in the shape of skeletal elements were observed in certain individuals. These are likely to be

developmental in origin, but may fall within the normal range of variation. Prevalence rates should be calculated in order that they may be compared with other populations. These included:

- The sagittal suture divides the parietal bones along the midline at the top of the head. In Skeleton 235 (adult male?, tentatively identified as Thomas Patterson) the sagittal suture did not run in a straight line, but deviated markedly from side to side.

- The hamate is a small bone in the wrist that usually has a large hook-like extension. In Skeleton 165 (mature adult male?) the hook on his right hamate was small and underdeveloped.

- The sternum (breastbone) of Skeleton 238 (mature adult female, identified as [Eliza?]beth [D?]emaine) had a pronounced anterior curve.

- Unusual joint morphology was noted between the talus and calcaneus (tarsal bones in the ankle and heel) of Skeleton 348 (young adult female)

- In two individuals the atlas had a tiny facet for the dens of the axis, with a corresponding small facet for the atlas on the axis dens. The individuals affected were Skeleton 351 (mature adult male, probably John Dickinson) and Skeleton 360 (mature adult male, identified as Gill Wigglesworth). Although not apparently related, further research would be required into their family trees.

- Both first ribs in Skeleton 363 (mature adult female, identified as Sarah Gill) had large prominent tubercles, and the neck of the left rib tapered to a small pointed head with a small facet for articulation with the first thoracic vertebra. She also had transitional vertebrae and a possible additional vertebra (discussed above). It is possible that the shape of her first ribs was related to another border shift at the cervico-thoracic border.

- Skeleton 459 (mature adult male) had a pronounced curve (almost 90º) in his occipital condyles, with a corresponding curve in his atlas facets. These form the joint between the base of the skull and the top of the vertebral column.

3.2 METABOLIC DISEASE

Humans require an adequate supply of nutrients during childhood to support normal growth and development. Particular conditions are associated with the lack of specific nutrients, for example scurvy results from a diet lacking in vitamin C (found in fresh fruit and vegetables, and marine fish) and rickets from a lack of vitamin D (produced by the body during exposure to sunlight). Diagnosis of nutritional deficiencies in ancient populations is complicated by the fact that the skeletal changes can be difficult to diagnose, and that nutritional deficiencies tend not to occur in isolation (a diet deficient in one nutrient is very often deficient in others). In addition, many of the skeletal changes that develop in a child as a response to nutritional deficiency will be largely remodelled by the time the individual reaches adulthood (Ortner 2003, Lewis 2007).

3.2.1 *Cribra Orbitalia* and Anaemia

Cribra orbitalia, or fine pitting of the orbital roof, tends to develop during childhood, and often recedes during adolescence or early adulthood. Until recently, it was thought to be related to iron deficiency anaemia, a condition with complex causes linked to the environment, hygiene and diet (Stuart-Macadam 1992). However, a recent study has suggested that other forms of anaemia are more likely causes (Walker *et al* 2009). These include megaloblastic anaemia, which results following a diet deficient in Vitamin B_{12} (found in animal products) and/ or folic acid, and haemolytic anaemia (e.g. sickle cell anaemia and thalassemia, found in areas of the Old World prone to malaria). It was also suggested that chronic infections and scurvy (Vitamin C deficiency) may have led to the development of cribra orbitalia in Europe (*ibid*). *Cribra orbitalia* is commonly observed in archaeological populations, particularly associated with agricultural economies (Roberts and Cox 2003), and is often used as an indicator of general stress (Lewis 2000, Roberts and Manchester 2005).

Forty-six adults and six non-adults could be assessed for the presence or absence of *cribra orbitalia*. It was observed in two-thirds of the non-adults (4/6, 66.7%), affecting 60.0% of left (3/5) and right orbits (3/5). The prevalence among adults was lower, with around a third of individuals affected (Table 19). The frequency of left and right orbit involvement was similar. A slightly higher proportion of males had *cribra orbitalia* (39.1%) compared to females (36.8%; Table 19). However, an identical proportion of right orbits was involved in both sexes, with the difference manifesting in the left orbits.

Table 19 Prevalence of cribra orbitalia (adults)

Sex	Right Orbit			Left Orbit			Individuals		
	A	P	%	A	P	%	A	P	%
Males	6	18	33.3%	7	20	35.0%	9	23	39.1%
Females	6	18	33.3%	5	16	31.3%	7	19	36.8%
Unsexed	0	1	0.0%	0	2	0.0%	0	4	0.0%
Total	12	37	32.4%	12	38	31.6%	16	46	34.8%

A = number of orbits/ individuals with orbits affected; P = number of orbits/ individuals with orbits present for observation

Skeleton 338 (11-14 year old adolescent) had cribra orbitalia, and also displayed other skeletal changes possibly associated with anaemia (although other differential diagnoses should be investigated). Unfortunately, all that survived of this individual was the skull and bones of the upper right arm, shoulder and torso. The bones of the cranial vault appeared normal externally, but post-mortem breaks revealed them to be greatly expanded. For example, the central part of the orbit roofs measured 6-7mm thick, and the parietal bones measured 7-8mm thick at the squamous sutures (a region of the skull normally much thinner). The extra thickness was made up of spongy bone, as if the diploë was expanded; the inner and outer tables of the cranial vault were almost non-existent, with just a thin layer of cortical bone covering the surface. In addition, this individual had thin and patchy woven bone distributed around the external surface of the skull, including the right mandible and maxilla (particularly along the alveolar bone and surrounding the infraorbital foramen), inside the nasal cavity, on the right orbit roof, left sphenoid greater wing and on the temporal bones. Further woven and lamellar bone was observed on the internal surface of the occipital bone, and slight porosity was noted on the greater wings of the sphenoid. The woven bone may have been associated with the expanded vault bones, or it could have been due to a separate condition. The distribution of the lesions strongly suggests scurvy as a possible diagnosis. It may

be that this individual was suffering from both scurvy and anaemia, indicating a crude prevalence of 7.7% individuals with both conditions (1/13 non-adults).

3.2.2 Scurvy

Scurvy develops following a prolonged deficiency in Vitamin C, which is found in fresh fruits and vegetables, as well as in marine fish. It is important to bear in mind that cooking food will destroy a large percentage of the Vitamin C it contains (Ortner 2003, 384). According to Aufderheide and Rodríguez-Martín (1998) it will take one to three months for the first symptoms to appear, if the consumption of Vitamin C is stopped completely. Children and infants are more likely to develop scurvy than adults, and the skeletal changes are usually most severe in infants. Ortner (2003, 384) has reported that the highest prevalence of scurvy occurs among infants between eight to ten months of age, although Lewis (2007, 127) indicates a broader age bracket of six months to two years.

Skeleton 101 (identified as Roman[d?] Marjerrison, aged 10 months) displayed a suite of skeletal changes frequently attributed to scurvy (Ortner 2003, 384-387). These included woven bone in the right orbit (with *cribra orbitalia* in his left orbit), and fine porosity of the external surfaces of many cranial bones (notably the greater wings of the sphenoid, occipital squama and parietal bones). Dense porosity was also observed on the alveolar bone of the maxilla (around the tooth sockets of the upper jaw) and around the inferior orbital foramen (beneath the eye), on the right coronoid process of the mandible (left side lost post-mortem), and in the supraspinous fossa of the scapulae (shoulder blades). Diffuse woven and lamellar bone was present on the internal surfaces of the cranium, and lamellar bone was observed on both humeri (upper arms) and ilia (pelvis). It seems likely that this individual had suffered from scurvy, and at ten months of age he would have been at the peak of the vulnerable age group (Ortner 2003, 384).

Skeleton 338 (11-14 year old adolescent) has already been described above. This individual also displayed a pattern of woven bone formation that may indicate scurvy, including woven bone formation in the right orbit.

The crude prevalence of non-adults suffering from scurvy at Fewston was 15.4% (2/13 non-adults). However, the true prevalence may have been higher: only six non-adults had preserved orbits (allowing for assessment of the presence of woven bone), which could indicate a prevalence in the region of 33.3%.

3.2.3 Rickets and Osteomalacia

Lack of Vitamin D leads to the development of rickets and osteomalacia in children, and osteomalacia in adults (Lewis 2007, 119). The poorly mineralised bone resulting from Vitamin D deficiency is incapable of supporting normal loads, and as a result it bends under weight-bearing. As children as growing, the long bones are affected; in adults the bones of the torso are more commonly involved (Ortner 2003, 393-401). Vitamin D can be synthesised by the body during exposure to sunlight, so rickets and osteomalacia are usually associated with post-medieval urban populations (Lewis 2007, 121; Ortner 2003, 393).

None of the non-adults showed signs of rickets. However, eight of the adults had at least one unusually bowed or curved long bone, but further research will be required to determine whether these were the result of rickets or another condition. In two of these individuals only one long bone was observed to be affected, and it seems

likely that the unusual shape was probable due to another cause (e.g. long healed and well remodelled fracture, or post-mortem damage influencing the appearance of the bone). The left femur of Skeleton 147 (adult female) seemed bowed, and although post-mortem damage may have made it appear more curved than it was, it is interesting that this individual was buried with her left leg slightly flexed and the left knee placed over the right. The right radius of Skeleton 408 (old middle adult male, identified as Richard Gill) curved in the opposite direction to normal, although post-mortem damage must also be considered as a cause of this strange appearance.

The remaining six individuals all had at least two bowed long bones, and usually both sides were affected. These must be considered as potentially having suffered from rickets as a child. Five of these individuals were females, including: Skeleton 053 (mature adult female?) and Skeleton 177 (young middle adult female) both with bowed humeri, and possibly also the right radius in Skeleton 177; and Skeleton 122 (mature adult female, identified as J... Marjerrison) and Skeleton 348 (young adult female), both with slightly bowed tibiae. By far the most convincing skeletal changes were observed in Skeleton 080 (old middle adult female), who had a bowed left tibia (right tibia lost post-mortem), both ulnae, and possibly also both radii. She also had changes to her pelvis that may indicate she also suffered from osteomalacia. Her iliac crests were flared outward, and although her sacrum did not exhibit the sharp right-angle associated with osteomalacia, it was curved laterally (sideways) as if it was affected by scoliosis. The only male affected was Skeleton 360 (mature adult male, identified as Gill Wigglesworth) whose humeri were bowed. Possibly of relevance to this section of the report was the subjective observation that pilasterism, where the femur is buttressed by a ridge of bone down the length of the back of the shaft, appeared to be common. However, femoral shapes and the measurements required to calculate the pilasteric index were not recorded systematically.

In crude terms, the proportion of adults affected by bowing of more than one long bone was 13.6% (6/44 adults with arm and/or leg bones surviving). This is much higher than the crude prevalence of 3.7% reported by Roberts and Cox (2003, 309-310) for the post-medieval period, and is surprising in a rural population where exposure to sunlight would presumably have been common. The prevalence among females was higher at 23.8% (5/21) compared to the male prevalence of 4.5% (1/22). However, further research into rickets and osteomalacia in Fewston, and in comparative urban populations, is required. Ideally a systematic survey of the shape of the long bones would be required, with accurate prevalence rates calculated. It may be worth exploring the potential of techniques such as geometric morphometrics in this area.

3.2.4 Osteoporosis

Osteoporosis develops when bone mass is lost, making the bones less dense and more fragile. Bone mass is lost with increasing age in both sexes, but the change is more rapid in post-menopausal women. Bone mass can also be lost in response to pathological conditions, including endocrine disorders, malnutrition, and as a result of reduced mobility (Aufderheide and Rodríguez-Martín 1998, Ortner 2003). Osteoporotic bone is more prone to fractures, as the bone is no longer capable of withstanding normal biomechanical forces, and certain sites are characteristic fracture locations. These include the distal radius (wrist), neck of the femur (hip), and vertebral bodies (spine) (Ortner 2003, Roberts and Manchester 2005).

Skeleton 325 (mature adult female, identified as Grace Hutton) had possibly suffered from osteoporosis. The cortical bone of all her postcranial bones was spongy and porous in cross-section, and it was frequently thinner

than might be expected. For example, the cortex of the tibia only measured 1-2mm thick at the middle of the shaft. This appearance was consistent with descriptions given by Ortner (2003, 412). Osteoporosis is difficult to diagnose in archaeological remains, as most skeletons will not show signs of the condition that are detectable without radiography or microscopic analysis (Roberts and Cox 2003). Consequently any prevalence rates given are likely to be below the true frequency. Roberts and Cox (2003) report a crude prevalence of 1.2% for the post-medieval period. The crude prevalence at Fewston was 2.0% of all 51 adults.

3.3 TRAUMA

Trauma was commonly seen amongst the Fewston individuals, with eighteen adults affected by some form of trauma (35.3% of the 51 adults present). These included fourteen males (56.0% of 25 males) and four females (17.4% of 23 females). Fractured bones and soft-tissue injuries were amongst the most common types of trauma seen.

Working with farm animals and agricultural machinery would have posed their hazards, and could explain the high frequency of injuries among the males. On the 23rd of November 1884, in his capacity as Guardian of the sick club, John Dickinson visited an injured member: "went up to William Wilsons of Gill Beck to see John Wilson who injured his fingers through a trap with a stone" (Harker 1988, 56). He also described an accident suffered by his wife on the 17th of August 1897: "After tea I and my wife and Dorothy yoked up to drive to Bland Hill. In trotting along down North Lane the horse fell and my wife fell out onto the road and hurt herself, but not seriously, I think. But she and Dorothy turned back and I went on" (Harker 1988, 88). Two days later he noted: "Fanny stiff from her accident on Tuesday" (Harker 1988, 89).

3.3.1 Fractures

Eleven adults had fractured one or more bones during life (21.6% of all adults), with the total number of bones fractured being 33. Ten were male (40.0% of males), who had fractured 32 bones between them, and one was female (4.3% of females); she had fractured one bone. The prevalence of fractures in different bones is given in Table 20. All bones were only examined macroscopically and no radiographs were taken. Radiographs will be required to fully describe and interpret the fractures seen, as well as to help determine whether individuals with possible fractures had fractured the bone or not. A future radiographic study may alter the prevalence rates observed, as would recording the rest of the population.

As a comparison to the figures in Table 20, the ribs (4.2%), femur (1.3%) and humerus (1.1%) were the bones most frequently fractured in the post-medieval period (Roberts and Cox 2003, 302). The fibula (0.8%), vertebrae (0.3%) and bones in the hand (0.7%) were also fractured; no record is made of any fractures to the sternum, tarsals or foot bones (Roberts and Cox 2003, 302).

Table 20 Fracture prevalence (bone elements)

Bone	Male			Female			Unsexed			Total		
	A	P	%	A	P	%	A	P	%	A	P	%
MT 5	3	28	10.7%	0	18	0.0%	-	0	-	3	46	6.5%
Navicular	2	28	7.1%	0	12	0.0%	-	0	-	2	40	5.0%

T7 body	1	10	10.0%	0	10	0.0%	-	0	-	1	20	5.0%
T8 body	1	11	9.1%	0	9	0.0%	-	0	-	1	20	5.0%
T9 body	1	11	9.1%	0	9	0.0%	-	0	-	1	20	5.0%
Sternum	1	12	8.3%	0	9	0.0%	-	0	-	1	21	4.8%
L2 body	1	12	8.3%	0	9	0.0%	-	0	-	1	21	4.8%
T12 body	1	11	9.1%	0	11	0.0%	-	0	-	1	22	4.5%
C7 spinous process	0	17	0.0%	1	8	12.5%	0	1	0.0%	1	26	3.8%
Fibula	2	38	5.3%	0	20	0.0%	-	0	-	2	58	3.4%
Ribs	16	328	4.9%	0	252	0.0%	0	2	0.0%	16	582	2.7%
MC 5	1	26	3.8%	0	18	0.0%	-	0	-	1	44	2.3%
C3-L5 bodies	5	274	1.8%	0	184	0.0%	0	8	0.0%	5	466	1.1%

The only long bone fractured was the fibula, with two males affected. Skeleton 226 (mature adult male, identified as David Lister) had a healed fracture of his distal right fibula near the ankle with the distal end displaced laterally (outwards). The fibula and tibia had fused together at the distal end along the posterior margin of the fibrous joint between the two bones, leaving a gap of 5mm between the two bones. It seems likely that soft tissues were also damaged. Skeleton 165 (mature adult male?) had possibly suffered a fracture to his left fibula. All his lower leg bones were enlarged and he had probably been suffering from osteitis (infection of the bone cortex). The massive changes to the normal bone profiles made it difficult to determine purely on a visual examination whether or not there were underlying fractures. He had also suffered other fractured bones and a partially dislocated ankle (discussed below). Skeleton 459 (mature adult male) had a possible fracture of his right proximal fibula, but the amount of post-mortem fragmentation made it difficult to assess. This bone was considered more likely to be normal and was not included in Table 20.

The fifth metatarsal (on the outer side of the foot) was the most frequently fractured bone, with two males affected. Skeleton 165 (mature adult male?) had bilateral avulsion fractures of his fifth metatarsals, where the styloid process (nodule of bone at the near end) was pulled away from the rest of the shaft. An area on the lateral side of the right cuboid (the bone at the base of the fourth and fifth metatarsals) displayed a puzzling area of eburnation (osteoarthritis) as usually there would be no bone on that side of the cuboid to cause such bone polishing. However, it is considered most likely that the avulsed fragment of the fifth metatarsal ended up in contact with the cuboid at that point. The left fifth metatarsal also had a second healed fracture in the shaft just distal to the proximal joint surfaces. The distal three-quarters of the shaft was angled sharply medially (towards the rest of the foot), and the bone would have rested on top of the fourth metatarsal. This individual had also suffered a possible fibula fracture, as well as partial dislocation of his right ankle. According to Dandy and Edwards (2003, 269) avulsion fractures, sometimes with accompanying shaft fractures, can occur as a result of 'trivial twisting injuries of the forefoot'. However the range of (possible) other injuries to his feet and lower legs may suggest the injury was far from trivial. Skeleton 351 (mature adult male, possibly identified as John Dickinson) also had a possible fracture to his left fifth metatarsal shaft at the same location as that seen in Skeleton 165. The change in angulation to the distal shaft was the same.

Skeleton 366 (mature adult male, identified as John Renton Newsome) had possible bilateral avulsion fractures of both naviculars (located in the instep of the foot). Both tubercles were flattened and the surface was irregular and porous. This is where the *tibialis posterior* muscle inserts, a muscle involved in plantar flexion of the foot (pushing the foot down, as if standing on tip-toe) and inversion of the foot (turning the sole of the foot inwards)

(Stone and Stone 1997).

Skeleton 360 (mature adult male, identified as Gill Wigglesworth) had a well-healed fracture in the distal third of his right fifth metacarpal (bone on the 'little finger' side of the palm of the hand), with the head angled in a palmar direction. This type of injury typically results from punching with the fist (Dandy and Edwards 2003, 222), and may indicate inter-personal violence. That disagreements occasionally erupted into violence is evident in John Dickinson's diary. On the 8th of February 1892 he referred to an altercation between himself and David Petty; he wrote: "David Petty... makes a point of insulting both Cousin Bill and me whenever we meet with him... Today he used the most insulting language and in my temper – I was shovelling gravel – I threw a shovelfull right on top of him. He was very frightened and calmed down. I don't like bother of this sort" (Harker 1988, 75). He also notes other episodes of violence carried out by others elsewhere in his diaries.

Skeleton 130 (mature adult male, identified as George Lister) had a fracture of the right nasal bone, which had a diagonal cleft running from the inferior medial corner to the middle of the lateral border (Plate 1). According to Dandy and Edwards (2003, 141), s are common and will affect the shape of the nose. Since the presence of nasal bones was not recorded systematically, it was not possible to calculate a true prevalence rate (hence this injury is not included in Table 20).

Plate 1 George Lister (Sk 130) with a nose fracture

Most of the fractures observed affected the torso, with the bulk occurring in a single male individual (Skeleton 088). Five males had experienced rib fractures, including Skeletons 088, 130, 186, 307 and 360. Skeleton 130 (mature adult male, identified as George Lister) had a healed fracture of his ninth right rib, just distal to the angle. Skeleton 186 (mature adult male) had two healed rib fractures, one in a right rib just distal to the angle and the second in the shaft of a possible right rib. Skeleton 307 (mature adult male, possibly identified as Joseph Darnbrook) had a fracture in an unsided rib shaft, which may have been in the process of healing at the time of death (based on the presence of woven bone at the site). Skeleton 360 (mature adult male, identified as Gill Wigglesworth) had a possible healed fracture in a left rib shaft; a bar of bone (apparently an extension of the callus) connected this rib to the rib above. However, a developmental anomaly may also have been the cause of this lesion, and it will require further consideration. Skeleton 088 (old middle adult male) had fourteen healed fractures in eleven ribs. Where the ribs could be identified to side and position, they occurred in the lower part of his rib cage and mostly close to the head, neck or angle: left ribs 8, 9, 10 and 12, and right rib 10. The left 9th rib had three fractures. These may have been associated with injuries to his spine and sternum (discussed below). Rib fractures occur as a result of falls, blows to the torso, or just coughing, and they are commonly seen in archaeological populations (Roberts and Manchester 2005). Multiple rib fractures are more serious, and may impact on respiration; they are more likely to be caused by a direct blow (Dandy and Edwards 2003, 161-162).

As well as fourteen rib fractures, Skeleton 088 (old middle adult male) had crush fractures of five vertebrae in his lower thoracic (T7-9 and T12) and lumbar spine (L2); the fractures in T8, T9 and T12 had corresponding fractures in their respective ribs. The seventh thoracic vertebra had a slight depression in the anterior half of the

inferior body. The bodies of T8 and T9 were wedge-shaped, and T9 had an array of fissures running through the inferior body surface. Large osteophytes on the right sides of the bodies of T8 and 9 met each other and interlocked, but the vertebrae were not fused. The body of T12 was also wedge-shaped, the anterior wall of the body was buttressed by pillars of osteophytes, and T11 and the T12 were fused on the left side with a large bulging osteophyte. It seems likely that the fusion and osteophyte formation was related to the fractures. The body of L2 was slightly concave on the right side, with a corresponding frill of osteophytes around the right side of the superior body. Fractures of the vertebral bodies usually result from falls, with the patient either landing on their feet (usually falls from a height in young individuals) or on their bottoms (usually through slipping in elderly individuals) (Dandy and Edwards 2003, 154). The fourth and fifth thoracic vertebrae of Skeleton 088 were fused along the posterior body, at the right apophyseal facets (joints at the back of the vertebrae) and at the laminae (arches at the back of the vertebrae). A subtle vertical ridge of bone traversing the left lamina may have been a well-healed fracture, but it was difficult to be certain.

In addition to the rib and vertebral fractures, Skeleton 088 had also fractured his sternum (breastbone), and such fractures are usually associated with other injuries. The force required to fracture the sternum by direct trauma is considerable, but the sternum can also fracture when the thoracic spine is flexed violently. If the latter was the cause, then wedge fractures in the thoracic spine will be associated (Dandy and Edwards 2003, 166). Given the presence of wedge fractures in his thoracic spine, it seems likely that Skeleton 088 had experienced such extreme flexion of his thoracic spine. Further research into this suite of injuries may shed light onto the likely cause.

Skeleton 053 (mature adult female?) had a healed fracture of the spinous process of her seventh cervical vertebra. This is the nodule of bone that can be palpated at the base of the back of the neck. This type of fracture has been termed ‘clay shoveller’s fracture’ as it was common among untrained unemployed men put to work digging drainage ditches through clay soils in Western Australia (McKellar Hall 1940). It was suggested that their lack of experience in that type of manual work, and poor physical condition led to the fractures.

3.3.2 Partial Dislocation

Skeleton 165 (mature adult male?) had partially dislocated his right ankle. The right tibia had a small ridge of osteophytes along the medial edge of the distal joint surface, lateral to the medial malleolus. This ridge prevented the talus from achieving its normal position in relation to the tibia. The anterior part of the distal joint of the tibia was enlarged by osteophytes by around 11mm, and much of the anterior portion of the joint was eburnated (as a result of osteoarthritis), with a corresponding area of eburnation on the talus. Osteophytes on and around the lateral joint surface of the talus and the distal fibula also suggested the bones were not in normal articulation. This individual had also experienced other traumatic injuries to his feet and (possibly) lower legs.

3.3.3 Spondylolysis

When the neural arch of a vertebra separates from the body at the *pars interarticularis* this is termed ‘spondylolysis’. It occurs in 4-8% of modern populations, most commonly in the fifth lumbar vertebra, and affects both halves of the arch (Aufderheide and Rodríguez-Martín 1998). The condition has been associated with hyperextension of the spine in young individuals (particularly athletes), and may result from a stress fracture or direct trauma (Dandy and Edwards 2003). However, some individuals may have an underlying

genetic predisposition to developing the condition (Aufderheide and Rodríguez-Martín 1998). Although many individuals with spondylolysis will be unaware of their condition (Salter 1999) some will suffer lower-back pain as a result (Dandy and Edwards 2003). Pain may worsen as the individual ages and loses muscle tone (Sture 2001).

Spondylolysis was seen in the fifth lumbar vertebra of Skeleton 366 (mature adult male, identified as John Renton Newsome), occurring bilaterally (on both sides). The condition affected 7.1% of the males (1/14 fifth lumbar vertebral arches), and 3.8% of adults (1/26 fifth lumbar vertebral arches).

3.3.4 Os Acromiale

The acromion process of the scapula projects over the shoulder joint and meets the clavicle. The tip of this process develops separately and usually fuses to the rest of the bone as the individual approaches adulthood (Scheuer and Black 2000a). It is thought that severe stress to the rotator cuff muscles of the shoulder during growth can prevent the tip of the acromion from fusing with the rest of the scapula, known as 'os acromiale'. Os acromiale leads to increased flexibility at the shoulder joint, allowing a greater range of movement (Knüsel 2000). Os acromiale in medieval populations has been associated with the intensive practice of archery from a young age (Roberts and Manchester 2005, 151-152; Knüsel 2000; Stirland 2005).

Os acromiale was seen in the right scapulae of three mature adult males: Skeleton 130 (identified as George Lister), Skeleton 165, and Skeleton 360 (identified as Gill Wigglesworth). The prevalence among males was 12.0% (3/25 acromion processes), and among the adults it was 7.0% (3/43 acromion processes). This is only slightly higher than the modern prevalence of 3-6% reported by Roberts and Manchester (2005, 152).

3.3.5 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. In Osgood-Schlatter's disease, the bone at the attachment point is pulled away from the rest of the tibia (Aufderheide and Rodríguez-Martín 1998, Dandy and Edwards 2003). It is caused either by a direct blow to the tibial tuberosity, or by the quadriceps muscle exerting too much pull on the attachment site, and is often seen in athletes (Aufderheide and Rodríguez-Martín 1998). It tends to occur in boys between 10-15 years of age (Aufderheide and Rodríguez-Martín 1998). This condition was observed in both tibiae of Skeleton 366 (mature adult male, identified as John Renton Newsome), where the superior halves of the tibial tuberosities were noticeably concave. Both appeared well remodelled, which would be expected if the lesions had occurred during adolescence. Among the Fewston males, the frequency was 4.9% (2/41 proximal tibiae); among the adults it was 2.5% (2/81 proximal tibiae).

3.3.6 Osteochondritis Dissecans

Trauma can damage the blood supply to part of a joint surface leading to localised death of the tissue, and this small piece can then become detached from the rest of the joint surface (Roberts and Manchester 2005). In skeletal remains the lesion manifests as a roughly circular, porous hollow in the joint surface.

Skeleton 165 (mature adult male?) had an osteochondritis dissecans lesion taking up most of the inferior part of

the proximal joint surface of his left first metatarsal (inner foot). This lesion accompanied other traumatic changes to his feet (and possibly lower legs). The frequency of lesions in the first metatarsal in males was 3.3% (1/30 proximal first metatarsals); among adults the frequency was 2.0% (1/50 proximal first metatarsals). Skeleton 348 (young adult female) had an oval hollow in her proximal ulna joint surface (elbow), which may have been due to osteochondritis dissecans (or could have been developmental). The ulna was involved in 4.8% of females (1/21 proximal ulnae), and 1.8% of adults (1/55 proximal ulnae).

3.3.7 Blade Injury

Skeleton 088 (old middle adult male) had a transverse, elongated oval depression (51mm long, 81mm wide) at the back of his head. The lesion was located on his right parietal, extending just across the sagittal suture onto the left parietal. The superior half of this lesion was linear, flat and straight. The inferior half was angled away from the superior part, and the surface was rough and irregular. The appearance suggested a blade injury delivered from above and directed slightly posteriorally (backwards) that had cut into the outer surface of the right parietal, with the bone flaking away at the inferior border of the cut. The margins of the lesion were rounded, and slightly overlapped the floor of the lesion, and the floor of the lesion was covered in well remodelled lamellar bone, suggesting the lesion had healed. This individual had also suffered multiple healed injuries to his torso. The frequency of blade injuries was 2.2% in the adults with parietal bones preserved (1/45), and 4.2% in males with parietal bones preserved (1/24).

3.3.8 Soft-Tissue Trauma

Soft tissue trauma was also observed in the Fewston population. Unfortunately, time constraints meant that prevalence rates could not be calculated and only a brief description of the lesions is provided here. The shoulder region was involved in three individuals. The acromial end of the right clavicle was affected in Skeleton 130 (mature adult male, identified as George Lister), who also had associated os acromiale of his right scapula, and Skeletons 165 (old middle adult male?) and 307 (mature adult male, possibly identified as Joseph Darnbrook) had both experienced trauma to their right rotator cuff (muscles that support and move the shoulder joint). The hand was involved in Skeleton 119 (old middle adult male, identified as Matthew Marjerrison), who had possible soft tissue trauma to his right fifth metacarpal. One individual had possible soft tissue trauma to a rib: Skeleton 366 (mature adult male, identified as John Renton Newsome) whose left 8th rib was affected.

Five individuals had experienced soft tissue trauma to the lower limbs. Skeleton 153 (mature adult male) had probably experienced trauma to his left hip resulting in pronounced enthesophytes along the length of the intertrochanteric line of his left femur. Skeleton 165 (old middle adult male?) had probably damaged the *adductor longus* muscle of his left leg, leading to ossification along the attachment site on the left femur. This injury may have been associated with the multiple traumatic injuries to his feet and lower legs described above. Skeleton 310 (mature adult female, identified as Mary Dickinson) had possibly damaged tissues around her right knee. Skeleton 138A (adult female, possibly identified as Elizabeth Dibb) may have damaged tissues in her left lower leg, as she had a sharp crest of bone along the proximal end of the interosseous crest on her left tibia. Finally, Skeleton 192 (young adult male) had possibly damaged tissues in his right foot.

3.3.9 Calcaneus lesions

Four individuals had similar small lesions in their calcanei (heel bones). Essentially a chunk of bone was missing from the anterior subtalar facet (part of the joint surface with the talus), at the superior medial corner of the facet for the cuboid bone. The appearance varied from a slight flattening of the area, to a crescent shaped lytic area, as if a piece had been 'bitten' out of the bone. The surface of the lesion was roughened and slightly porous, and enthesophytes were sometimes present along the adjacent unaffected margin. The skeletons affected were: Skeleton 080 (old middle adult female) – left calcaneus (right unaffected); Skeleton 130 (mature adult male, identified as George Lister) – both calcanei; Skeleton 177 (young middle adult female) – both calcanei; and Skeleton 310 (mature adult female, identified as Mary Dickinson) – both calcanei. The frequency of lesions among male calcanei was 4.8% (2/42), and among female calcanei it was 14.7% (5/34). The frequency in adult calcenei was 9.0% (7/78).

These lesions may be the result of avulsion fractures, usually caused through twisting the ankle in such a way that the bifurcate ligament is strained, and the portion of the calcaneus to which it is anchored becomes detached (Daftary *et al* 2005, Robbins *et al* 1999). These fractures are difficult to detect in modern patients, and as a result the detached portions usually fail to fuse (Daftary *et al* 2005). They are usually seen in males (Daftary *et al* 2005, Robbins *et al* 1999), which contrasts with the frequencies observed at Fewston, where females were more frequently affected. However, there is a possibility these lesions are developmental, and further research is required.

3.4 INFECTIOUS DISEASE

Bone tissue cannot respond quickly to an infectious disease, so evidence of any acute illness with a quick resolution (i.e. the patient recovers or dies within a short space of time) will not be seen in the skeleton (Roberts and Manchester 2005). However, bone can respond to the presence of a chronic infection through laying down new bone. Initially, this new bone is disorganised and termed 'woven bone', but with time, as healing takes place, this bone is remodelled and becomes transformed into more organised 'lamellar bone'. The presence of woven bone therefore indicates an infection that was active at the time of death, and lamellar bone indicates an infection that had healed; the presence of both together can suggest a recurring, or long-standing infection (Roberts and Manchester 2005). Although the new bone deposition may have been associated with a specific disease in life, it is almost always impossible to diagnose this from the bones alone.

John Dickinson made references to infectious diseases in the community throughout the course of his diary. He described his five-year-old daughter being taken ill with measles in late January 1897, and the worry this occasioned himself and his wife until she recovered (Harker 1988, 85). In 1891 he reported on the progress of an outbreak of influenza in the community. On the 2nd of May he wrote: "Much influenza about and the people sorely oppressed. Several deaths have occurred. Many families are in a poor way all being ill and nobody to look after them. My wife all night with her mother who is very ill of it... I drink a lot of whisky which I think helps to ward off influenza" (Harker 1988, 68). A few days later, on the 7th of May he recorded: "Wife staying all night with her mother who is very weak... Thomas Rickard, a labourer for the waterworks died yesterday from influenza. William Wilson of Gill Becks, Blubberhouses, is also dead from the same cause. I registered the deaths of the Scotts of Norwood, mother and daughter" (Harker 1988, 68), illustrating the impact such infections could have on a small community. Of course, acute infections such as these would not have left any

trace on the skeleton.

The fear of infection comes across particularly vividly in the recounting of the illness (identified as typhoid by Harker 1988, 46) and death of the new schoolmaster. On the 21st of September, 1881 Dickinson wrote: "The schoolmaster in a dying state all afternoon. Mother was the only person who durst stay with him. The rest all frightened of the infection. The poor fellow expired about 7 o'clock. Mother laid him out assisted by a girl who had come from Barnsley to see him. Village in an alarmed state as there are other cases of fever" (Harker 1988, 46). According to the editor, the body was locked inside the house out of fear the infection would spread (Harker 1988, 46-47).

Although it might be assumed that a supply of clean water would be easier to achieve in the countryside than in the growing towns and cities, this was evidently not always the case. From 1850 water supply to the nearby Timble village had relied upon water transported from a spring two miles away, through a series of open courses and stone drains (Harker 1988, 46). However, the supply became polluted and was realised to be a source of infection. It was described by John Dickinson on the 13th of October, 1881 thus: "There is talk about the deficient water supply and drainage of the village, and it is thought that the sanitary authority will take the matter in hand to compel the proprietors to alter things. But the proprietors fear the cost and so we drink water highly polluted with sewage and our sinks are simply beastly. So much for the intelligent and industrious population who would suffer fevers and murrains sooner than spend a few pounds on purifying the water and improving the drainage" (Harker 1988, 48). The water supply was only remedied in 1884 (Harker 1988, 49).

Although living in a rural area, this did not mean the community was isolated from urban life and urban infections. John Dickinson made trips to Otley and Leeds, as well as further afield, and described occasions where large numbers of people gathered for social reasons which would have provided ample opportunity for infectious diseases to spread (Harker 1988). Living in a farming community would also have exposed the population to the risk of infections carried and spread by animals, as well as to infections arising through close contact with the soil.

3.4.1 Maxillary Sinusitis

Maxillary sinusitis commonly occurs as a result of upper respiratory tract infections, pollution, smoke, dust, allergies, or a dental abscess that has penetrated the sinus cavity (Roberts and Manchester 2005). Recording maxillary sinusitis in the Fewston individuals was hampered by the number of intact crania, which meant that the sinus cavities could not be observed. Intact sinuses were present in six females (three with bilateral intact sinuses), and eleven males (five bilateral). Observation of these sinuses, through drilling a small hole into the posterior maxilla and using an endoscope to view the internal sinus, would contribute valuable data to the calculation of the prevalence of this condition in the Fewston population.

One non-adult had sinusitis in both sinuses (14.3% of seven non-adults with sinuses present to observe). The frequency of sinusitis in non-adult right sinuses was 20.0% (1/5), and in the left it was 14.3% (1/7). Sinusitis was observed in sixteen adults (55.2% of those with sinuses present to observe), and was more common among females (of whom two-thirds were affected) than males (Table 21). The prevalence of sinusitis among right and left sinuses is also presented in Table 21. The frequency of sinusitis at Fewston was far higher than the 6.9% frequency reported for the post-medieval period (Roberts and Cox 2003), which was unexpected given the rural

nature of the population. It could be that the sinusitis was predominantly linked to dental caries rather than to air quality in this population, and it is interesting that the high female prevalence accompanied a higher frequency of dental caries among the female individuals. Further research would be required to examine this possibility.

Table 21 Maxillary sinusitis prevalence (sinuses and individuals)

Sex	Right Maxilla			Left Maxilla			Individuals		
	A	P	%	A	P	%	A	P	%
Males	5	10	50.0%	5	8	62.5%	7	16	43.8%
Females	7	10	70.0%	6	8	75.0%	8	12	66.7%
Unsexed	1	1	100.0%	0	1	0.0%	1	1	100.0%
Total	13	21	61.9%	11	17	64.7%	16	29	55.2%

A = number of sinuses/ individuals with maxillary sinusitis; P = number of sinuses/ individuals possible to observe

Two individuals had infectious lesions in the sinuses of their frontal bones. These were Skeletons 082 (adult female?) and 459 (mature adult male). Since the frontal sinuses were not recorded systematically for the presence or absence of sinusitis, it was not possible to calculate a prevalence rate.

3.4.2 Respiratory Infections

Lung infections can lead to deposits of new bone on the visceral surfaces of the ribs (Roberts and Manchester 2005) and in a high percentage of individuals these lesions have been associated with tuberculosis (Santos and Roberts 2006, Matos and Santos 2006, Mays *et al* 2002, Santos and Roberts 2001). Tuberculosis was undoubtedly prominent in the nineteenth century, and Roberts and Cox (2003) have suggested it may have been responsible for around a quarter of all deaths in London at that time. However, diagnosis of tuberculosis cannot be made solely based on the presence of rib lesions, since other respiratory infections (e.g. chronic bronchitis and pneumonia, Roberts and Cox 2003), exposure to smoky or polluted atmospheres, and inhalation of fungal spores (Aufderheide and Rodríguez-Martín 1998) can also cause new bone formation on the ribs. Other parts of the skeleton (e.g. the spine, and major joints) are affected in a relatively small proportion of individuals suffering from tuberculosis (Santos and Roberts cite between 1% and 9%, 2001), meaning that direct archaeological evidence for the disease is uncommon. New bone formation elsewhere in the skeleton combined with rib lesions has been associated with tuberculosis and Santos and Roberts (2001) describe a young woman with pulmonary tuberculosis who showed extensive new bone formation affecting much of her skeleton as well as her ribs. On balance, it is safest to attribute rib lesions without associated changes to an unspecified lung infection, although tuberculosis remains a real possibility.

Eight adults (21.1% of 38 adults with rib fragments present) and one adolescent (14.3% of 7 non-adults with rib fragments present) had new bone formation on the visceral (lung) surfaces of their ribs. Six of these adults were females (33.3% of 18 with rib fragments preserved); although in one individual the lesion was more doubtful. This was Skeleton 138A (adult female?, possibly identified as Elizabeth Dibb), where a pronounced, localised nodule of lamellar bone on a right rib may have been related to a healed lung infection, or could have been due to a healed fracture. Skeleton 098 (adult female?) had woven bone on the visceral shaft of one left rib, just distal to the angle, with a more subtle deposit in a similar location on a right rib. Two left ribs belonging to

Skeleton 156 (adult female?, tentatively identified as Christiana Patterson) had elongated oval areas of lamellar bone on their visceral necks. Skeleton 363 (mature adult female, identified as Sarah Gill) had lamellar bone deposits on the necks of three right ribs, and three left ribs, with the deposits on the left ribs extending further down the shafts. In one of these left ribs the lamellar bone surrounded a deposit of woven bone. However, the more extensive deposits of bone were seen in two of the younger females. Skeleton 348 (young adult female) had lamellar bone on five right ribs (necks, and some deposits on the sternal thirds of the shaft), and three left ribs (necks). In two of the latter ribs, the lamellar bone surrounded a deposit of woven bone. Skeleton 426 (young middle adult female) had woven and lamellar bone on almost all her ribs, with thicker and more extensive deposits observed on the right ribs. These lesions may have been associated with destructive lesions observed in her spine (discussed below).

The two male adults with rib lesions were Skeleton 153 and Skeleton 459, and the frequency of rib lesions among the males was lower at 10.5% (2/19 males with rib fragments preserved). There were nodules of lamellar bone on the visceral necks of two left ribs from Skeleton 153 (mature adult male). Skeleton 459 (mature adult male) had an elongated deposit of lamellar bone towards the sternal end of one right rib. No other ribs appeared to be affected, but the sternal ends tended to be lost post-mortem. The 15-18 year old adolescent (Skeleton 438) had small patches of woven bone on the visceral neck of one right rib and two left ribs. The deposit on one of the left ribs was larger, and appeared to be transitional to lamellar bone. A further two left ribs had subtle deposits of lamellar bone.

3.4.3 Endocranial Bone Formation

New bone formation on the endocranial (internal) surface of the cranium is more commonly seen in infants and young children, and is believed to result following inflammation or haemorrhage of the meningeal blood vessels. The possible causes identified include chronic meningitis, trauma, anaemia, neoplastic disease (cancer), metabolic diseases (scurvy and rickets), venous drainage disorders and tuberculosis (Lewis 2007).

Endocranial bone formation was observed in three individuals, including two adults and an adolescent. Skeleton 098 (adult female?) had a thick deposit of lamellar bone on her internal occipital bone (on and around the cruciform eminence, particularly focussed in the sagittal sulcus and right transverse sulcus) and in the sigmoid sinus of her right temporal bone. These sinuses are associated with venous drainage from the skull. Skeleton 241 (mature adult male) had a small area of woven bone in the sigmoid sulcus of his left temporal bone. Skeleton 338 (11-14 year old adolescent) had a mixture of woven and lamellar bone on the internal occipital bone, again focussed around the cruciform eminence and sulci; a faint capillary texture was noted.

The frequency of involvement of the occipital bone was 2.3% in the adults (1/44 occipital bones present), and 12.5% in the non-adults (1/8 occipital bones); among the females the prevalence was 5.6% (1/18 occipital bones). Bone formation on the inner temporal bone occurred in 4.4% of adult temporal bones (2/45), with a similar prevalence in both males (4.0%, 1/25) and females (5.3%, 1/19). These prevalence rates should be regarded as crude rates, as intact crania could not easily be observed without the use of an endoscope.

3.4.4 Inflammation of the Legs

Woven and lamellar bone is frequently found on the lower legs of archaeological skeletons, and its prevalence has often been used as a general measure of stress in past populations (Ortner 2003). Inflammation of these bones may be due to infection, but other causes are possible, including low-grade trauma, and chronic ulceration; the latter two changes are particularly common in the shaft of the tibia (Roberts and Manchester 2005; Ortner 2003).

Sixteen adults (including nine females and seven males) and one non-adult showed signs of inflammation of the legs. In all but two of these individuals the bone formation was lamellar only, indicating the infection had healed. Skeleton 098 (adult female?) had lamellar bone deposits on both tibiae, with a small deposit of woven bone on her right tibia indicating a long standing infection that was still active at the time of death. Skeleton 165 (mature adult male?) is described below. The tibiae (shins) were most commonly involved, with 25.9% of adult tibiae affected, followed by the femur (18.2%). Only 5.2% of fibulae were affected (Table 22) and inflammation of the fibula always occurred in conjunction with inflammation of the tibia. In almost all individuals, the changes were bilateral. Inflammation of the tibia was more common among females, where over a third of tibiae were affected (Table 22). In males it was the femur that was the most commonly affected bone (20.5%, Table 22). The proportion of fibulae affected was similar for both sexes.

Table 22 Prevalence of lamellar bone (adults)

Bone	Male			Female			Unsexed			Total		
	A	P	%	A	P	%	A	P	%	A	P	%
Femur	9	44	20.5%	7	41	17.1%	0	3	0.0%	16	88	18.2%
Tibia	8	43	18.6%	13	36	36.1%	0	2	0.0%	21	81	25.9%
Fibula	2	38	5.3%	1	20	5.0%	-	0	-	3	58	5.2%

In Skeleton 165 (mature adult male?) both tibiae and fibulae were swollen and enlarged, particularly in their distal thirds. The left fibula was more affected than the right side. The bone surfaces were covered in uneven deposits of lamellar bone, in some places relatively smoothed over, but in others covered with nodules and spicules of bone. Patches of woven bone were also observed. This individual may well have been suffering from osteitis (inflammation of the bone cortex), and there may have been at least one underlying fracture (in the left tibia). Radiographs of the bones would be required to evaluate the changes seen. In addition to the lesions in their lower legs, Skeleton 165 also had lamellar bone on both calcanei (heel bones) and he had extensive deposits of woven bone over much of his left mandible. Whether the latter was associated with the infection of his lower legs is not clear; it may have been related to poor dental health or to another condition entirely.

Skeleton 363 (mature adult female, identified as Sarah Gill) had thick lamellar bone deposits on the bones surrounding her left knee, including her proximal left tibia and distal left femur (on the popliteal surface at the back of the knee).

3.4.5 Fungal Infection/ Echinococcosis?

Skeleton 426 (young middle adult female) had unusual destructive lesions in her spine. These focussed on the ninth to eleventh thoracic vertebrae, and had particularly targeted the spinous process, pedicles, apophyseal facets and laminae. The lesions were primarily destructive, with sharp margins and little or no evidence for any bone formation. The tenth thoracic vertebra had an aggressive lytic lesion in the right transverse process and pedicle (which joins the arch to the body), such that the portion of bone bearing the superior right apophyseal facet and posterior part of the pedicle was completely separated from the rest of the bone. This fragment was present, and was noted to be porous, with a roughened surface texture. The superior right apophyseal facet had ragged, sharp margins, and a small crescent removed from the superior border. Almost all the anterior right transverse processes had been destroyed by a scooped-out lytic lesion (19 x 11mm) leaving just a 1-3mm thickness of bone at the posterior surface of the transverse process. The right inferior apophyseal facet had been completely destroyed, and viewed from behind the inferior border of the lamina was higher on the right side than on the left. The lamina was covered in a thin layer of lamellar bone and pinprick porosity, which occasionally penetrated right through to the anterior surface. There was also a subtle, shallow scooped-out lesion on the right side of the body.

This destructive activity extended to the vertebrae immediately above and below. The inferior apophyseal facet of the ninth thoracic vertebra had been destroyed in much the same manner as that of the tenth, with the lamina also higher on the right side than on the left and displaying lamellar bone and porosity. The eleventh thoracic vertebra had a deep, focal area of lytic activity in a crescent around and undermining the inferior border of the superior right apophyseal facet, which continued onto the pedicle. The apophyseal facet was reduced in size, with irregular jagged margins (as observed in T10). The right side of the body had deep, sharp-edged lytic lesions, as if a small cluster of porosity had merged together anterior to the costal facet and on the pedicle. These were located in a shallow scooped-out area on the right side of the body, similar to that observed on the tenth thoracic vertebra.

Further destructive lesions were observed elsewhere in the spine. These included the right side of the body of T12, a small focal cluster of porosity at the inferior tip of the right inferior apophyseal facet of L4, and a cluster of porosity on the anterior body of T3. The sacrum had a shallow scooped-out lesion on the anterior bodies of S2-3, surrounded by a small rim of irregular lamellar bone. At the superior margin of this lesion there was a deep destructive lesion surrounded by irregular porosity, with further destructive lesions on the left side of the body of S2, extending onto the body of S3 (just visible through the anterior sacral foramen). There was a small lytic area on the right retro-auricular surface of the right os coxa (pelvic bone), and another small destructive lesion on the superior border of the left acetabulum (hip socket). This individual also had extensive lamellar and woven bone formation on her ribs, which were most pronounced on the right side.

Skeleton 238 (mature adult female, identified as [Eliza?]beth [D?]emaine) also had destructive lesions in her spine. These were focussed around the right half of the superior body and along the anterior margin of her fifth lumbar vertebra, resulting in a ragged, moth-eaten appearance. The right side of the body was covered in irregular lamellar bone spicules, with lytic scooped-out areas also present; the destructive changes extended onto the right inferior body surface. The inferior body surface of her fourth lumbar vertebra mirrored the changes seen in the fifth lumbar vertebra. The body surface was rough and irregular, with pronounced lytic activity in a band along the right and anterior body margins. Lamellar bone spicules and a scooped-out

depression were also present on the right side of the body. The third lumbar vertebra had small spicules of lamellar bone and porosity on the right side of the body. The second lumbar vertebra had slight porosity on the left and right sides of the body, with smooth lamellar bone peppered with small porosity on the right lamina and surrounding the right inferior apophyseal facet. The first lumbar vertebra also had some lamellar bone on the left lamina and the left transverse process, and twelfth thoracic vertebra had lamellar bone deposits with porosity on both laminae and the spinous process. No rib lesions were observed. The posterior surface of her sternum exhibited destructive lesions accompanied by thin spicules of lamellar bone. The area affected was roughened in texture, and porous, and this porous area was slightly depressed compared to the surrounding bone.

In addition to the spinal changes, the distal end of her left ulna had a swollen area on the medial and posterior shaft, composed of lamellar bone blending well into the surrounding cortex. The centre of the swollen area had a cluster of fine porosity. Further lamellar bone was deposited along the posterior mid shaft, and there were clusters of porosity on the olecranon process. There was also a cluster of porosity on the distal end of her right radius, focussed primarily on the styloid process. Lamellar bone was observed on the shaft of her right first and fourth metacarpals.

Although destructive lesions in the spine are among the most common skeletal changes associated with tuberculosis, the part of the vertebra targeted is almost invariably the vertebral body. Even if the lesions extend onto the vertebral arches, the apophyseal joints and spinous processes are almost never destroyed. Also, tuberculosis does not normally target three or more vertebrae, and if several vertebrae are involved then they are usually not separated by unaffected vertebrae (Ortner 2003, 230-231). On this basis, the destructive lesions seen in Skeleton 426 were most unlikely to have been caused by tuberculosis. Although the destruction of the bodies of the fourth and fifth lumbar vertebrae of Skeleton 238 was more typical of that seen in tuberculosis, the distribution of lesions elsewhere in her spine was not. Multiple vertebrae were affected, and bone formation and porosity were observed on the neural arches and spinous and transverse processes of other vertebrae.

Unfortunately, there was limited time available to consider differential diagnoses. Two options that could be considered are fungal infections and echinococcosis. Fungal infections are uncommon as, despite frequent exposure to fungal spores, the majority of the population can overcome the threat of infection. Disease usually only develops in individuals with an inadequate immune response, perhaps as a result of malnutrition or an existing disease (Ortner 2003, 235). Fungal spores are usually inhaled and consequently the initial lesions are found in the lungs. The distribution of lesions is usually fairly random, and can be similar between different types of fungi making it difficult to distinguish between them on skeletal changes alone. However, mycotic (fungal) infections vary with geographical region, so location is an important factor in diagnosis (Ortner 2003, 325-326). Although Ortner (2003, 326-328) discusses various mycotic infections according to region, he mainly focuses on the Americas and makes limited comment relating to the rest of the world. However, he notes that North American blastomycosis, acquired through close contact with the soil, can occur worldwide. Males are more frequently affected (presumably as they are more likely to be exposed to soil-borne fungal spores), most commonly between the ages of 30-50 years. Lytic lesions can appear in any bone, but are most commonly seen in the vertebrae and ribs, skull, tibia and tarsals (Ortner 2003, 326). The appearance of the lesion in the distal ulna of Skeleton 238 was very similar to that illustrated in a distal humerus in Ortner (2003, 333, Figure 12.6). Given the rural nature of the community and the likelihood than many were farmers, exposure to fungal spores could be considered likely.

Echinococcosis results from a parasitic infection following infestation with one of two species of tapeworm (*Echinococcus granulosus* and *Echinococcus multilocularis* (Ortner 2003, 337). Since part of the tapeworm lifecycle takes place in animals, it might be expected to be common in a farming environment. *E. granulosus* (found worldwide) requires the presence of dogs and domestic herd animals (particularly sheep), and leads to the formation of hydatid cysts. *E. multilocularis* causes the less common alveolar type of echinococcosis, found predominantly in the Northern Hemisphere (*ibid*). Infection can be caused by direct contact with dogs, or through contamination of pasture, crops and drinking water with dog faeces (*ibid*), all of which were no doubt possible at Fewston (particularly in view of the contaminated drinking water supplying the village of Timble, Harker 1988, 46-49). Both types of echinococcosis can affect the skeleton, with the hydatid cyst form of the disease leading to bone resorption and necrosis (death), and the more aggressive alveolar form of the disease resulting in extensive destructive changes and necrosis (Ortner 2003, 337-338). The hydatid cyst form of echinococcosis affects the skeleton in 2% of those infected, predominantly the spine (41.6%) and os coxa (pelvis), but the majority of bones can be involved (with the exception of the ulna, carpals and tarsals, Ortner 2003, 338). Like tuberculosis, the vertebral bodies are preferentially targeted by the disease, but unlike tuberculosis the transverse processes and neural arches can also be affected (Ortner 2003, 338). Of note is the restriction of skeletal changes to a single bone, two or more adjacent bones, or a limited region of the skeleton (Ortner 2003, 338). The changes observed in the spine of Skeleton 426 in particular appear likely to be caused by echinococcosis; the lack of ulnar involvement and more diffuse spread of lesions around the skeleton suggest this condition was less likely in Skeleton 328.

Further research is required into these conditions to evaluate whether it is possible to suggest what caused the lesions observed in these two individuals. Of course, each could have been suffering from a different condition, and both could have had more than one condition at the same time thus complicating the diagnosis. Other diseases not discussed here may also warrant consideration. Currently, it appears echinococcosis was more likely in Skeleton 426, and a fungal infection was more likely in Skeleton 328. However, the fact that mostly females were affected is not typical of the pattern seen in modern populations.

3.4.5 Other Inflammatory Lesions

Two individuals had deposits of woven bone on the temporal half of their right temporomandibular joints (between the lower jaw and the base of the cranium). This woven bone was actually on the joint surface itself, and it is not clear whether it was related to degenerative changes or infection. The individuals were Skeleton 177 (young middle adult female) and Skeleton 186 (mature adult male).

Woven bone covered much of the left half of the mandible of Skeleton 165 (mature adult male?), who also had probable osteitis of his lower legs which may have been associated. Skeleton 338 (11-14 year old adolescent) had patchy woven bone on their right mandible and maxilla, as well as elsewhere on their cranium and right clavicle. The pattern of distribution could suggest scurvy. Woven and lamellar bone surrounded an abscess in the left mandible of Skeleton 378 (young middle adult female, identified as Elina Wigglesworth), with further patchy deposits elsewhere on the mandible and maxilla. This was probably associated with the dental abscess, and dental disease should be considered as a possible cause of the lesions seen in both the other skeletons.

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

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).

Although 45 adults (20 females, 23 males and 2 unsexed) had some vertebral bodies preserved, only six adults had complete spines (2 females and 4 males), i.e. comprising the bodies of six cervical vertebrae (C1 was excluded as it does not have a body), twelve thoracic vertebrae, five lumbar vertebrae and the body of the first sacral vertebra. Most spines were very incomplete, which combined with the post-mortem fragmentation and erosion, often made it difficult to identify specific vertebrae. For the purposes of calculating prevalence rates, any unidentified vertebral bodies that were present were counted, provided they could be identified to vertebra type (i.e. cervical, thoracic, lumbar or sacral). In total there were 565 vertebral bodies (excluding the first cervical and including the first sacral), which gave an average of 12.6 vertebral bodies per skeleton (half the expected 24). The cervical vertebrae were best represented, with an average of 3.7 vertebrae per individual (62.2% of the expected number), followed by the sacrum (53.3% of the expected number) and thoracic spine (average of 6.0 vertebrae per individual, or 49.6% of the expected number). The lumbar spine was particularly poorly represented, with an average of 2.6 lumbar vertebrae per individual (43.7% of the expected number). The female spines were less well preserved with on average 10.5 vertebral bodies per individual (210/20) compared to the 14.7 average number of bodies per male skeleton (337/23).

The overall frequency of vertebral bodies affected by degenerative changes was 20.7% (Table 23). However, this figure does not take account of the age distribution of the sample. Degenerative changes to the spine were only seen in the old middle, mature and unaged adults, and the proportion of vertebral bodies affected increased from the old middle adult group (17.6%) to the mature adult group (29.1%; Table 23). Overall, the cervical (neck) vertebrae were most frequently affected, followed by the first sacral vertebra and the lumbar spine. The thoracic vertebrae were least affected by degenerative changes (Table 23). Among the mature adults, the proportion of lumbar and sacral vertebrae affected by degenerative changes approached the proportion of cervical vertebrae involved (Table 23).

Table 23 Prevalence of DJD of the vertebral bodies

Sex	Age Group	Cervical Bodies			Thoracic Bodies			Lumbar Bodies			Sacral Bodies			Total Bodies		
		With DJD	N	%	With DJD	N	%	With DJD	N	%	With DJD	N	%	With DJD	N	%
Male	YA	0	12	0.0%	0	12	0.0%	0	6	0.0%	-	0	-	0	30	0.0%

	YMA	0	10	0.0%	-	0	-	-	0	-	-	0	-	0	10	0.0%
	OMA	5	18	27.8%	0	30	0.0%	3	16	18.8%	0	3	0.0%	8	67	11.9%
	MA	33	58	56.9%	18	110	16.4%	21	46	45.7%	6	9	66.7%	78	223	35.0%
	A	6	7	85.7%	-	0	-	-	0	-	-	0	-	6	7	85.7%
	Total	**44**	**105**	**41.9%**	**18**	**152**	**11.8%**	**24**	**68**	**35.3%**	**6**	**12**	**50.0%**	**92**	**337**	**27.3%**
Female	YA	0	6	0.0%	0	8	0.0%	0	6	0.0%	0	2	0.0%	0	22	0.0%
	YMA	0	18	0.0%	0	33	0.0%	0	14	0.0%	0	2	0.0%	0	67	0.0%
	OMA	-	0	-	0	3	0.0%	-	0	-	-	0	-	0	3	0.0%
	MA	4	22	18.2%	5	54	9.3%	4	10	40.0%	1	7	14.3%	14	93	15.1%
	A	4	8	50.0%	0	10	0.0%	0	6	0.0%	0	1	0.0%	4	25	16.0%
	Total	**8**	**54**	**14.8%**	**5**	**108**	**4.6%**	**4**	**36**	**11.1%**	**1**	**12**	**8.3%**	**18**	**210**	**8.6%**
Unsexed	YA	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
	YMA	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
	OMA	3	6	50.0%	4	8	50.0%	0	1	0.0%	-	0	-	7	15	46.7%
	MA	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
	A	0	3	0.0%	-	0	-	-	0	-	-	0	-	0	3	0.0%
	Total	**3**	**9**	33.3%	**4**	**8**	50.0%	**0**	**1**	0.0%	**-**	**0**	-	**7**	**18**	**38.9%**
Total	YA	0	18	0.0%	0	20	0.0%	0	12	0.0%	0	2	0.0%	0	52	0.0%
	YMA	0	28	0.0%	0	33	0.0%	0	14	0.0%	0	2	0.0%	0	77	0.0%
	OMA	8	24	33.3%	4	41	9.8%	3	17	17.6%	0	3	0.0%	15	85	17.6%
	MA	37	80	46.3%	23	164	14.0%	25	56	44.6%	7	16	43.8%	92	316	29.1%
	A	10	18	55.6%	0	10	0.0%	0	6	0.0%	0	1	0.0%	10	35	28.6%
	Total	**55**	**168**	**32.7%**	**27**	**268**	**10.1%**	**28**	**105**	**26.7%**	**7**	**24**	**29.2%**	**117**	**565**	**20.7%**

N = Number of vertebrae with at least one body surface present

Degenerative changes were more common among the male vertebrae (27.3%) compared to female vertebrae (8.6%, see Table 23), and although this may reflect the bias towards younger individuals in the female group, the difference remained when the mature adults were compared: the mature female prevalence of 15.1% was less than half the mature male prevalence of 35.0% (see Table 23). The difference was particularly striking in the cervical vertebrae (56.9% of mature male vertebrae affected compared to 18.2% of mature female vertebrae) and the sacrum (66.7% of mature male vertebrae compared to 14.3% of mature female vertebrae). The lumbar spine was the only region where the mature female prevalence (40.0%) approached the mature male prevalence (45.7%; see Table 23).

Eight adults had eburnation of at least one cervical body (29.6% of 27 adults with at least one cervical body present to observe). The frequency among males was particularly startling, as 53.8% of males with at least one cervical body had eburnation on the body surfaces (7/13). The prevalence among females was much lower at 7.7% (1/13 females with cervical bodies). Even more unusually, Skeleton 138B (mature adult male, possibly identified as James Dibb) had eburnation on the bodies of two thoracic vertebrae (the inferior surface of T6 and superior surface of T7) in addition to eburnation on the bodies of C3-5. Eburnation of the bodies of the cervical vertebrae has been identified as typical of rheumatoid arthritis (RA) (Resnick and Niwayama 1988, 1035), but the distribution of lesions throughout the skeleton and other joint diseases need to be considered carefully before a differential diagnosis is attempted.

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).

3.5.2.1 Osteoarthritis of the Spine

Forty-five adults had apophyseal facets preserved, including 21 females, 23 males and one unsexed adult. However, only three individuals (all males) had all apophyseal facets present. The problem of incomplete spines has been discussed above in relation to the number of vertebral bodies preserved (section 3.5.1). A similar approach was taken to calculating prevalence rates: all unidentified facets (i.e. those which could not be identified to a specific vertebra) were still counted if they could be identified to a vertebra type (i.e. cervical, thoracic, lumbar or sacral). If all apophyseal facets were present, then each skeleton would have 98. However, the number of facets per skeleton was only 52.2. Again female skeletons were less well preserved, with an average of 40.3 facets per skeleton (847/21) compared to the male average of 63.0 per skeleton (1450/23).

Overall, 13.6% of apophyseal facets were affected by osteoarthritis, with the highest prevalence seen in the sacral facets (21.3%), followed by thoracic and lumbar facets, with the lowest prevalence in the cervical facets (9.9%;Table 24). Although all age groups were affected by OA, the two younger age groups displayed only minimal involvement, with 0.4% of young adult facets and 2.6% of young middle adult facets involved. Notably, only thoracic facets were affected in these two younger age groups. The frequency of OA increased markedly in the two older age groups, with 17.9% of old middle adult facets and 18.3% of mature adult facets affected (Table 24). This parallels the increase in degeneration of the vertebral bodies with age (see section 3.5.1).

As with vertebral body degeneration, there was a marked disparity between the frequency of OA in males and females, with the male prevalence (18.6% of facets) being far higher than the female prevalence (5.4% of facets; Table 24). Slightly different patterns of involvement were apparent between the sexes. The highest female prevalence was observed in the thoracic spine (8.8% of facets), with just 4.5% and 4.4% of sacral and lumbar facets affected respectively. Their lowest prevalence was seen in the cervical spine, where 1.4% of the facets were affected. In contrast, over a third of sacral facets had been affected by OA in the male individuals, with the prevalence dropping to 22.7% in the lumbar spine, 19.5% in the thoracic spine and 13.9% in the cervical spine (Table 24). Young females were apparently more prone to developing OA in the thoracic spine, whereas young males were more likely to develop OA in the lumbar spine.

Table 24 Prevalence of osteoarthritis in the spine (facets affected)

Sex	Age Group	Cervical Facets			Thoracic Facets			Lumbar Facets			Sacral Facets			Total Facets		
		With OA	N	%	With OA	N	%	With OA	N	%	With OA	N	%	With OA	N	%
Male	YA	0	58	0.0%	0	66	0.0%	0	19	0.0%	-	0	-	0	143	0.0%
	YMA	0	25	0.0%	0	3	0.0%	1	2	50.0%	-	0	-	1	30	3.3%
	OMA	13	76	17.1%	26	129	20.2%	13	62	21.0%	2	6	33.3%	54	273	19.8%
	MA	48	285	16.8%	103	464	22.2%	50	199	25.1%	7	19	36.8%	208	967	21.5%
	A	6	37	16.2%	-	0	-	-	0	-	-	0	-	6	37	16.2%
	Total	**67**	**481**	**13.9%**	**129**	**662**	**19.5%**	**64**	**282**	**22.7%**	**9**	**25**	**36.0%**	**269**	**1450**	**18.6%**
Female	YA	0	30	0.0%	1	36	2.8%	0	22	0.0%	0	2	0.0%	1	90	1.1%
	YMA	0	73	0.0%	8	142	5.6%	0	51	0.0%	0	6	0.0%	8	272	2.9%
	OMA	-	0	-	0	11	0.0%	-	0	-	0	2	0.0%	0	13	0.0%
	MA	0	65	0.0%	19	151	12.6%	9	99	9.1%	1	10	10.0%	29	325	8.9%
	A	3	53	5.7%	5	61	8.2%	0	31	0.0%	0	2	0.0%	8	147	5.4%
	Total	**3**	**221**	**1.4%**	**33**	**401**	**8.2%**	**9**	**203**	**4.4%**	**1**	**22**	**4.5%**	**46**	**847**	**5.4%**
Unsexed	YA	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
	YMA	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
	OMA	2	28	7.1%	4	11	36.4%	0	11	0.0%	-	0	-	6	50	12.0%
	MA	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
	A	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
	Total	**2**	**28**	**7.1%**	**4**	**11**	**36.4%**	**0**	**11**	**0.0%**	**-**	**0**	**-**	**6**	**50**	**12.0%**
Total	YA	0	88	0.0%	1	102	1.0%	0	41	0.0%	0	2	0.0%	1	233	0.4%
	YMA	0	98	0.0%	8	145	5.5%	0	53	0.0%	0	6	0.0%	8	302	2.6%
	OMA	15	104	14.4%	30	151	19.9%	13	73	17.8%	2	8	25.0%	60	336	17.9%
	MA	48	350	13.7%	122	615	19.8%	59	298	19.8%	8	29	27.6%	237	1292	18.3%
	A	9	90	10.0%	5	61	8.2%	0	31	0.0%	0	2	0.0%	14	184	7.6%
	Total	**72**	**730**	**9.9%**	**166**	**1074**	**15.5%**	**72**	**496**	**14.5%**	**10**	**47**	**21.3%**	**320**	**2347**	**13.6%**

N = Number of facets present

Osteoarthritis also affected the joint between the dens of the axis and the atlas (the two uppermost vertebrae in the spine). Overall, 23.5% of atlas facets (8/34) and 13.9% of axis facets (5/36) were affected. Changes in one or both facets were observed in nine adults, including seven males, one female and one unsexed adult. Again the prevalence was higher among males, with 33.3% of atlas facets (6/18) and 25.0% of axis facets (5/20) affected, compared to 6.7% of atlas facets (1/15) and 0.0% (0/15) axis facets among females. Five individuals (four males, one female) had OA of either/ both facets coupled with eburnation of at least one cervical body.

In Skeleton 122 (mature adult female, identified as J... Marjerrison) the dens of the axis was actually in articulation with the base of the cranium. There was an irregular crescent-shaped facet on the anterior margin of the foramen magnum (hole where the spinal cord exits the base of the skull), formed from osteophytes. The appearance of the facet did not look developmental. Unfortunately, the atlas had been lost post-mortem so it was not possible to observe exactly how the three bones articulated. The anterior surface of superior half of the axis dens had also been destroyed by an erosive lesion. The combination of lesions was reminiscent of changes typically seen in patients with rheumatoid arthritis. These included atlanto-axial impaction (also known as cranial settling), where the axis moves upwards into contact with the base of the skull and the atlas dislocates downwards. Cranial settling is seen in 5-22% of patients with rheumatoid arthritis, and can be fatal (Resnick and Niwayama 1988, 1030). Cranial settling is often associated with erosive lesions of the axis dens (seen in

14-35% of patients with RA, Resnick and Niwayama 1988, 1031). Skeleton 122 also had three fused thoracic vertebrae (T7-9).

A thorough investigation of the joint changes seen in this population is warranted, particularly with a consideration of rheumatoid arthritis and the seronegative spondyloarthropathies.

3.5.2.2 Extra-Spinal Osteoarthritis

Thirty-two adults had developed OA of their extra-spinal joints (i.e. joints other than those in the spine, discussed above). These included sixteen males, fourteen females and two unsexed adults. The majority were mature adults. Due to time constraints it was not possible to calculate the frequency of osteoarthritis is all extra-spinal joints (i.e. joints other than those in the spine, discussed above). However, the prevalence of OA in a selection of major joints is provided in Table 25.

Table 25 Prevalence of osteoarthritis in the extra-spinal joints (joints affected)

Bone	Male			Female			Unsexed			Total		
	With OA	N	%	With OA	N	%	With OA	N	%	With OA	N	%
TMJ	12	46	26.1%	9	37	24.3%	2	3	66.7%	23	86	26.7%
Shoulder	9	36	25.0%	1	25	4.0%	0	2	0.0%	10	63	15.9%
Elbow	4	33	12.1%	1	27	3.7%	0	1	0.0%	5	61	8.2%
Wrist	3	31	9.7%	1	19	5.3%	3	31	9.7%	7	81	8.6%
Hip	21	39	53.8%	12	33	36.4%	3	3	100.0%	36	75	48.0%
Knee	2	41	4.9%	2	30	6.7%	0	3	0.0%	4	74	5.4%
Ankle	4	43	9.3%	0	37	0.0%	0	3	0.0%	4	83	4.8%

TMJ = temporomandibular joint; Shoulder = gleno-humoral joint; Elbow = distal humerus, proximal radius and proximal ulna; Wrist = distal radius, scaphoid and lunate; Hip = acetabulum and proximal femur; Knee = distal femur, patella and proximal tibia; Ankle = distal tibia and talus

Nearly half of all hip joints were affected by OA, making this the most frequently involved joint (Table 25; Plate 2). Just over a quarter of temporo-mandibular (TMJ) joints were affected (this is the joint between the lower jaw and the base of the cranium), and 15.9% of shoulder joints had developed OA. A similar frequency of wrist (8.6%) and elbow (8.2%) joints were affected, as well as 5.4% of knees. The ankle was the joint least likely to develop OA, with a frequency of 4.8%. When degenerative changes do occur in the ankle they are usually associated with trauma (Aufderheide and Rodríguez-Martín 1998), and this was true for Skeleton 165 (mature adult male?) who had fractured bones in his feet and suffered a partial dislocation of his right ankle with secondary OA.

Plate 2 Femora of David Lister (Sk 226) with osteoarthritis

The high prevalence of OA was not unexpected considering the bias towards older adults in the Fewston population. The hips and knees, being the weight-bearing joints of the lower limb, frequently develop OA in modern populations (Roberts and Manchester 2005), with Aufderheide and Rodríguez-Martín (1998) suggesting over 50% of those over 60 years of age may suffer from degeneration of the hips. Although OA of the upper limb joints (shoulder, elbow and wrist) may also be associated with advancing age, it could also develop through trauma or occupation-related stress (Aufderheide and Rodríguez-Martín 1998).

OA of the tempero-mandibular joint may be associated with the loss of teeth during life, as the changes in chewing stresses alter the pattern of force transmitted through the joint (Aufderheide and Rodríguez-Martín 1998). The frequency of ante-mortem tooth loss was certainly high in the Fewston population, and it would be interesting to investigate whether degeneration of the tempero-mandibular joints was actually associated with it.

On balance, males appeared more likely to develop OA of their joints, with almost all joints displaying a higher prevalence than seen in the equivalent female joints (see Table 25). The only joint displaying a higher female prevalence was the knee, although a similar proportion of male and female TMJ joints were affected. None of the females had developed OA of their ankle joints, which may reflect the usual association of degeneration of this joint with trauma. However, these comparisons do not take account of the age distribution of the sample, and to be valid prevalence rates would need to be compared within each age group.

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).

The comments made in section 3.5.1 regarding the preservation of vertebral bodies should be considered when examining the data on Schmorl's nodes. Schmorl's nodes were observed in 19.5% of the vertebral bodies, predominantly in the thoracic spine where 32.8% of bodies were affected. The lumbar spine was involved less frequently, with 21.0% of bodies affected (Table 26). No Schmorl's nodes were seen in the cervical spine or first sacral vertebra. The highest prevalence rates were seen in the old middle adults (32.9% of vertebral bodies), followed by the mature adults (21.2% of vertebral bodies; Table 26). Schmorl's nodes were more common among male vertebrae, where 22.3% of the vertebral bodies were affected, compared to female vertebrae (15.2%, see Table 26).

Table 26 Prevalence of Schmorl's nodes (vertebrae)

Sex	Age Group	Cervical Bodies			Thoracic Bodies			Lumbar Bodies			Sacral Bodies			Total Bodies		
		With SN	N	%	With SN	N	%	With SN	N	%	With SN	N	%	With SN	N	%
Male	YA	0	12	0.0%	2	12	16.7%	0	6	0.0%	-	0	-	2	30	6.7%
	YMA	0	10	0.0%	-	0	-	-	0	-	-	0	-	0	10	0.0%
	OMA	0	18	0.0%	17	30	56.7%	5	16	31.3%	0	3	0.0%	22	67	32.8%

	MA	0	58	0.0%	38	110	34.5%	13	46	28.3%	0	9	0.0%	51	223	22.9%
	A	0	7	0.0%	-	0	-	-	0	-	-	0	-	0	7	0.0%
	Total	**0**	**105**	**0.0%**	**57**	**152**	**37.5%**	**18**	**68**	**26.5%**	**0**	**12**	**0.0%**	**75**	**337**	**22.3%**
Female	YA	0	6	0.0%	3	8	37.5%	0	6	0.0%	0	2	0.0%	3	22	13.6%
	YMA	0	18	0.0%	8	33	24.2%	1	14	7.1%	0	2	0.0%	9	67	13.4%
	OMA	-	0	-	3	3	100.0%	-	0	-	-	0	-	3	3	100.0%
	MA	0	22	0.0%	13	54	24.1%	3	10	30.0%	0	7	0.0%	16	93	17.2%
	A	0	8	0.0%	1	10	10.0%	0	6	0.0%	0	1	0.0%	1	25	4.0%
	Total	**0**	**54**	**0.0%**	**28**	**108**	**25.9%**	**4**	**36**	**11.1%**	**0**	**12**	**0.0%**	**32**	**210**	**15.2%**
Unsexed	YA	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
	YMA	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
	OMA	0	6	0.0%	3	8	37.5%	0	1	0.0%	-	0	-	3	15	20.0%
	MA	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
	A	0	3	0.0%	-	0	-	-	0	-	-	0	-	0	3	0.0%
	Total	**0**	**9**	**0.0%**	**3**	**8**	**37.5%**	**0**	**1**	**0.0%**	**-**	**0**	**-**	**3**	**18**	**16.7%**
Total	YA	0	18	0.0%	5	20	25.0%	0	12	0.0%	0	2	0.0%	5	52	9.6%
	YMA	0	28	0.0%	8	33	24.2%	1	14	7.1%	0	2	0.0%	9	77	11.7%
	OMA	0	24	0.0%	23	41	56.1%	5	17	29.4%	0	3	0.0%	28	85	32.9%
	MA	0	80	0.0%	51	164	31.1%	16	56	28.6%	0	16	0.0%	67	316	21.2%
	A	0	18	0.0%	1	10	10.0%	0	6	0.0%	0	1	0.0%	1	35	2.9%
	Total	**0**	**168**	**0.0%**	**88**	**268**	**32.8%**	**22**	**105**	**21.0%**	**0**	**24**	**0.0%**	**110**	**565**	**19.5%**

3.6 MISCELLANEOUS

Assorted lesions were observed that either did not fit into the categories discussed above, or were ambiguous in terms of what caused them. Unfortunately, time constraints meant that it was not possible to present a full description of all lesions here, but particular conditions have been addressed. Further research would be required into all these conditions, including the ones discussed below, as only a cursory consideration has been possible.

3.6.1 Rib Deformity

The ribs of seven individuals were not the usual shape. Five females were affected, including three with fairly definite changes: Skeleton 348 (young adult), Skeleton 363 (mature adult, identified as Sarah Gill), and Skeleton 426 (young middle adult). A further two females had less definite rib deformities, and these were Skeleton 122 (mature adult female, identified as J... Marjerrison) and Skeleton 378 (young middle adult female). Only one male (Skeleton 307, mature adult possibly identified as Joseph Darnbrook) had ribs that may have been shaped unusually, but the changes were less certain. The remaining individual was an adolescent, aged 15-18 years (Skeleton 438).

In the majority of individuals the curvature of the upper ribs tended to be compressed laterally, so the ribs did not curve out to the side as far as would be expected; instead they had a tight angle, and a flattened shaft that projected forwards at the sternal ends. Vertical height of the upper rib shafts was also reduced, resulting in a near-triangular cross section, and the inferior (lower) margin was unusually sharp. Lower ribs tended to be angled downwards, tapering towards their sternal ends. Similar patterns of rib deformation have previously been observed at other post-medieval sites, including Priory Yard, Norwich (Caffell and Holst 2007) and St

George's Crypt, Leeds (Caffell and Holst 2009).

The shape changes could have been related to wearing tightly laced corsets, which would have been fashionable at the time, and in this respect it is interesting that the majority of individuals affected were female. Rib deformities in London's post-medieval populations have been attributed to corsetry (Natasha Powers pers. com.; see also http://mymuseumoflondon.org.uk/blogs/blog/fashionable-bodies/). Waist size reduction began in adolescence, illustrated by a quotation from *The Englishwoman's Domestic Magazine* in May 1867 (quoted by Picard 2005, 174): "I was placed at the age of fifteen at a fashionable school in London, and there it was the custom for the waists of the pupils to be reduced one inch per month until they were what the lady principal considered small enough. When I left school at seventeen, my waist measured only thirteen inches, it having been formerly twenty-three inches in circumference". The extent to which women living in a rural farming community in Yorkshire would have followed wealthy London fashions is debatable, and it is likely the corsets they wore did not change the shape to the same extreme, but the fact that such fashions were adopted by the lower classes and servants is attested (Werner 1998). However, osteomalacia can lead to reduced curvature and anterior projection of the ribs (Ortner 2003, 399) and in view of the evidence for rickets in this population (discussed above) it would be wise to consider this as a differential diagnosis. If osteomalacia were the cause then associated deformities would be expected in the spine (*ibid*). Other conditions to consider would include *pectus carinatum* ('pigeon chest') (Groves *et al* 2003).

Unfortunately, it was not possible to calculate a prevalence rate for rib deformity at Fewston due to the number of individuals with badly fragmented, incomplete ribs too poorly preserved to assess shape easily. It was also difficult to determine whether or not some ribs were deformed, and carrying out a systematic survey of rib shapes using geometric morphometrics may be informative.

3.6.2 Paget's Disease

Skeleton 138B (mature adult male, possibly identified as James Dibb) had pronounced changes to the texture of the bone in his pelvis. The bones were thickened and disproportionately heavy, and post-mortem breaks revealed that the normal spongy texture of the bone had become filled in with dense, granular, slightly 'fluffy' bone. The surface texture of the bone was also abnormal, and it was apparent that the normal bone structure had changed. The macroscopic appearance of the bone suggested Paget's disease was likely, but radiographic or histological analysis would be required to substantiate this diagnosis. A neoplastic cause (cancer) should also be considered a possibility. During the quick assessment of un-recorded skeletons, another individual (Skeleton 180) was noted to have similar bone changes. Full analysis of this skeleton would be required to determine the age and sex, as well as to provide a detailed record of the bone changes observed. Again radiography of all bones, and/ or histology would be essential in forming a diagnosis.

The cause of Paget's disease is not known, but it may be viral in origin (Ortner 2003, 435). The disease causes a huge increase in the rate of bone remodelling, with an imbalance in the rate of bone destruction and bone formation leading to poorly organised bone structure. The process begins in one location, but can spread to involve the whole bone, and more than one bone can be affected (Ortner 2003, 435-436). Ortner (2003, 435) reports the pelvis to be involved in 30% of individuals with Paget's disease, although other bones were more frequently affected; the axial skeleton in particular is usually targeted. Unfortunately (for the purposes of observing the bone structure) the cranium of Skeleton 138B was intact. Paget's disease predominantly affects

older individuals, particularly males, with 90% of those affected older than 40 years of age (Ortner 2003, 435). A crude prevalence of 2.0% was calculated for the Fewston population (1/51 adults), with 4.0% (1/25) males affected. This was broadly comparable to the prevalence of 3% among individuals over 40 cited by Ortner (2003, 435). However, the crude prevalence does not take account of the age distribution, and nor does it include the second skeleton displaying similar changes. It is interesting that Paget's disease is particularly common in the north-west of Britain, where the frequency of Paget's disease is 8.3% (Roberts and Manchester 2005, 251).

3.6.3 Autopsy

The cranium of Skeleton 138A (adult female, possibly identified as Elizabeth Dibb) was encircled by a transverse cut through the forehead (located around 24mm above the orbits), sides (just above the squamous sutures), and back (just above the external occipital protuberance). The top part of the cranial vault was completely separate and could be detached from the rest of the skull (Plate 3). The outer edges of the cut were smooth and linear, but the inner half was jagged and irregular, with bone projecting above the line of the cut on the lower half of the cranium. This appearance was consistent the entire way around the cranium. In places it can be seen that the cut was approached from different angles, with overlapping cut marks. The only part of the sternum present was two thin linear strips from either side of the body, and all surviving left ribs (except ribs 1 and 2) terminated in a diagonal and fairly linear break through the shafts. These breaks all lined up and may have been the result of a cut through the thorax. However, the level of post-mortem damage made assessing the appearance of the ribs and sternum difficult. The logical interpretation is that the top of the cranium was removed during an autopsy, or that the body was used for dissection practice. Further investigation into autopsy practices and the history of autopsy and dissection are required, with comparisons made with appropriate material (appropriate specialists need to be contacted for advice about this subject).

Plate 3 Skull of Elizabeth Dibb? (Sk 138A) with probable autopsy cuts

There was no evidence for any pathological condition in Skeleton 138A that might have necessitated an autopsy. However, it is important to remember that the majority of conditions will not affect the skeleton, and so no evidence of them would be expected. Of note was the fact that Skeleton 138A was probably buried at the same time as Skeleton 138B, in one of the deepest graves at Fewston. If both individuals died at the same time, or in unexplained circumstances this may have warranted a medical investigation. As both individuals were tentatively identified as husband and wife (James and Elizabeth Dibb), research into the history of these individuals may be possible and could prove fruitful.

3.7 CONCLUSION

A range of pathological conditions were seen at Fewston. Relatively minor congenital conditions were noted, including vertebral anomalies such as transitional vertebrae, possible additional vertebral segments and block (fused) vertebrae. One man had a deformed cranium as a result of premature fusion of part of a skull suture, and

a second male may also have experienced premature skull suture fusion. Evidence for nutritional deficiencies was present, with at least one child suffering from scurvy, and several adults displaying signs of healed childhood rickets. Poor childhood health was also indicated by the presence of cribra orbitalia and enamel defects in the teeth.

Traumatic injuries were relatively common, particularly among males, as over half the male population had experienced trauma. The most frequent types of injury included broken bones (all healed) and damage to soft tissues. One male had multiple fractures to his torso, and another had multiple injuries to the bones in his feet and legs, including fractures, soft tissue injuries and a dislocated joint. These more extensive injuries could suggest more serious accidents. One of these males also had a healed head wound caused by a sharp blade. Other traumatic conditions observed included os acromiale, Osgood-Schlatter's disease, spondylolysis and osteochondritis dissecans.

Signs of infection were relatively common, particularly affecting the legs, which often show signs of inflammation in archaeological populations. Extensive inflammatory changes in the lower legs of the individual with the multiple foot and leg trauma may have been associated with the injuries sustained. Infections of the upper respiratory tract (in the form of sinusitis) may have been associated with tooth decay. Lung infections (in the form of new bone formation on the ribs) also occurred, many of which were still active at the time the person died. There was also possible evidence for tapeworm infection and/ or fungal infection in two females. Degenerative joint disease was extremely common (particularly among males), probably largely reflecting the high proportion of older adults in this group; joint disease was also associated with injuries. Degenerative joint disease and osteoarthritis had affected the spine and limb joints (particularly the hips). The joint between the lower jaw and the cranium was also affected, and this may have been associated with dental disease. Different patterns of joint disease were seen in males and females. Some individuals may have been suffering from rheumatoid arthritis. Another condition often associated with age, osteoporosis, was seen in a mature female.

The deformed ribs of five females and one adolescent could have developed through wearing tightly laced corsets. An older male had possibly been suffering from Paget's disease, and an autopsy had presumably been carried out on his wife when she died.

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. All teeth and jaws were examined macroscopically for evidence of pathological changes.

Forty-four (86.3%) of the adults had teeth and/or jaws surviving, enabling dental disease to be recorded. These comprised nineteen females (82.6%), 23 males (92.0%) and two unsexed adults (66.7%). The age-breakdown of the group is shown in Table 27, which highlights the bias towards older individuals, particularly among the male group.

Table 27 Age and sex composition of adults with surviving teeth and/or jaws

Age Group	Male		Female		Unsexed		Total	
	n	%	n	%	n	%	n	%
YA	3	13.0%	3	15.8%	0	0.0%	6	13.6%
YMA	3	13.0%	3	15.8%	0	0.0%	6	13.6%
OMA	3	13.0%	2	10.5%	1	50.0%	6	13.6%
MA	13	56.5%	7	36.8%	0	0.0%	20	45.5%
A	1	4.3%	4	21.1%	1	50.0%	6	13.6%
Total	**23**		**19**		**2**		**44**	

Given the level of post-mortem damage, some skeletons had teeth surviving with the relevant socket(s) lost post-mortem. Among the adults, 1075 tooth sockets were available for observation of which 572 were from male individuals, 488 were from females, and 15 were from unsexed adults. The number of teeth present was 524, of which 55 were loose (i.e. their corresponding socket did not survive). There were 314 teeth available from male individuals (31 loose), 208 from female individuals (22 loose), and 2 from unsexed adults (both loose). Post-mortem tooth loss was seen in 103 sockets (9.6%), with similar proportions of teeth lost post-mortem among males (56, 9.8%) and females (45, 9.2%); two sockets among the unsexed individuals displayed post-mortem tooth loss (13.3%).

Eleven non-adults had fully erupted deciduous and/or permanent teeth. Fully erupted permanent teeth were present in four of the older juveniles (50 teeth) and both adolescents (41 teeth), numbering 91 teeth in total. Fully erupted deciduous teeth were present the five younger juveniles (45 teeth) and three of the older juveniles (21 teeth), numbering 66 deciduous teeth in total.

Dental disease tends to increase with age, and so the prevalence of conditions is presented for each age group. When considering the data below it is important to bear in mind that 59 of the assessed skeletons had at least some teeth or jaw bones surviving, so effectively only half the population from Fewston has been studied with regards dental disease. Thirty of these assessed skeletons were adults and 29 were non-adults, and analysis of these individuals would improve understanding of dental disease in the Fewston population significantly, particularly among the non-adults.

4.1 CALCULUS

Calculus (mineralised dental plaque) is commonly observed in archaeological populations whose dental hygiene was not as rigorous as it is today. If plaque is not removed from the teeth effectively (or on a regular basis) then these plaque deposits mineralise and form concretions of calculus on the tooth crowns or roots (if these are exposed), along the line of the gums. Mineralisation of plaque can also be common when the diet is high in protein (Roberts and Manchester 1995, Hillson 1996).

Calculus was present on 376 teeth (71.8%, Table 28). The vast majority of teeth (342, 91.0%) had either flecks of calculus or slight calculus deposits. Only 25 teeth had medium deposits (6.6%) of calculus and just nine (2.4%) exhibited heavy deposits of calculus. Roberts and Cox (2003) report a drop in the prevalence of calculus during the post-medieval period. It is possible the individuals from Fewston were practicing a degree of oral hygiene. Alternatively, post-mortem damage could have led to the loss of calculus deposits. Females

were less prone to calculus than males, with 57.7% of female teeth affected compared to 81.5% of male teeth.

Table 28 Dental calculus (teeth affected)

Age	Male Teeth			Female Teeth			Unsexed Teeth			Total Teeth		
Group	Calc	Total	%	Calc	Total	%	Calc	Total	%	Calc	Total	%
YA	61	80	76.3%	50	78	64.1%	-	0	-	111	158	70.3%
YMA	44	54	81.5%	23	52	44.2%	-	0	-	67	106	63.2%
OMA	40	53	75.5%	4	9	44.4%	0	1	0.0%	44	63	69.8%
MA	101	116	87.1%	33	41	80.5%	-	0	-	134	157	85.4%
MA	10	11	90.9%	10	28	35.7%	0	1	0.0%	20	40	50.0%
Total	256	314	81.5%	120	208	57.7%	0	2	0.0%	376	524	71.8%

Calculus was also observed on the non-adult teeth, affecting 30.3% (20/66) of their deciduous teeth and 47.3% (43/91) of their permanent teeth. The prevalence of calculus on the deciduous teeth rose from the younger juveniles, where 11.1% of the teeth were affected (5/45), to the older juveniles, where 71.4% of the teeth were affected (15/21). The proportion of permanent teeth affected remained fairly similar between the older juveniles (48.0%, 24/50) and the adolescents (46.3%, 19/41).

4.2 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.

Thirty-three of the adults had cavities in their teeth (86.8% of adults with at least one tooth present), and all the young middle adults and old middle adults were affected (Plate 4). Carious lesions were seen in 177 teeth (Table 29), and the 33.8% prevalence was higher-than-average for the period (11.2%, Roberts and Cox 2003). Caries prevalence increased with age from the young adults to the old middle adults, but dropped in the mature adults (Table 29 and Figure 8). The drop in prevalence in the mature adults is unexpected, as caries prevalence usually increases with age, but it can probably be explained by the high frequency of ante-mortem tooth loss in this population (see Section 4.4).

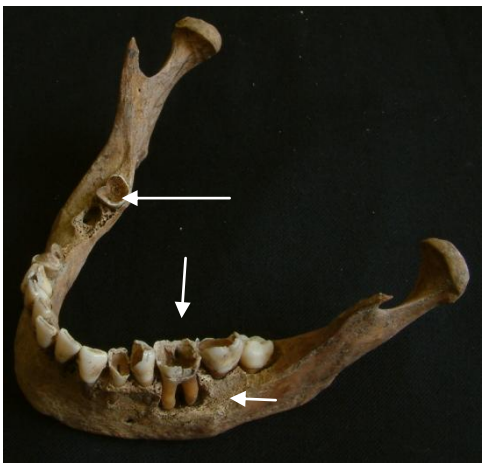


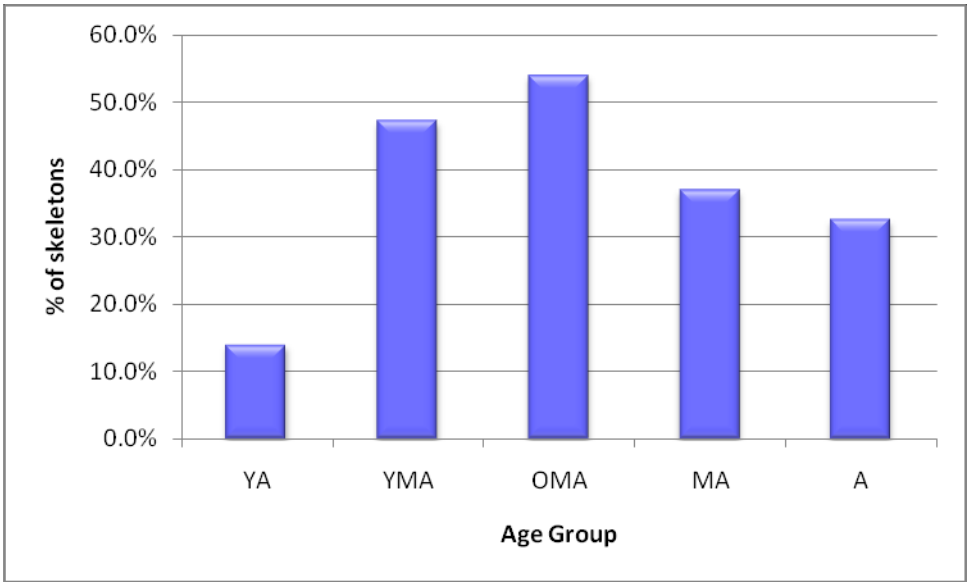
Plate 4 Elina Wigglesworth (Sk 378) Mandible with multiple caries and abscess

Table 29 Dental caries (permanent teeth)

Age	Male Teeth			Female Teeth			Unsexed Teeth			Total Teeth		
Group	Caries	Total	%	Caries	Total	%	Caries	Total	%	Caries	Total	%
YA	17	80	21.3%	5	78	6.4%	-	0	-	22	158	13.9%
YMA	10	54	18.5%	40	52	76.9%	-	0	-	50	106	47.2%

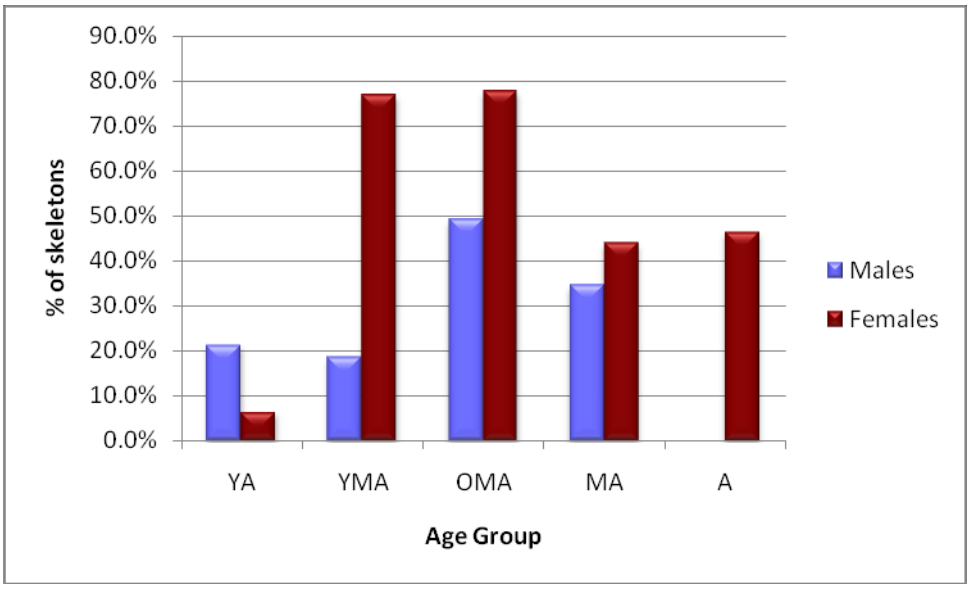
OMA	26	53	49.1%	7	9	77.8%	1	1	100.0%	34	63	54.0%
MA	40	116	34.5%	18	41	43.9%	-	0	-	58	157	36.9%
A	0	11	0.0%	13	28	46.4%	0	1	0.0%	13	40	32.5%
Total	93	314	29.6%	83	208	39.9%	1	2	50.0%	177	524	33.8%

Figure 8 Prevalence of dental caries (teeth affected)



The drop in the price of sugar just before 1850 led to a massive increase in the prevalence of dental caries in British populations (Corbett and Moore 1976), and this no doubt underlies the high frequency of tooth decay observed at Fewston. The location of the cavities followed a pattern typical of high-sugar diets, with lesions located in the pits and fissures of the occlusal (chewing) surfaces and at the contact points between the teeth (*ibid*). In total 203 cavities were observed, as 22 teeth had two or more lesions present. Half of these lesions were located at either the mesial or distal contact points between the teeth (105/203, 51.7%), with 24 cavities (11.8%) in the occlusal surfaces. Over a quarter of the lesions were so large the point of origin could not be determined (56, 27.6%). The remaining lesions were buccal (15, 7.4%) or lingual (3, 1.5%). During recording it seemed there were a large number of anterior teeth (incisors and canines) with cavities, either at the contact points between the teeth or so large that the entire crowns had been destroyed. Calculation of prevalence rates for individual teeth is required to investigate patterns of caries further. Caries prevalence was higher among females, with 39.9% of their teeth affected compared to 29.6% of male teeth (see Table 29). Females had a higher caries prevalence in all age groups, except for the young adults (see Table 29 and Figure 9).

Figure 9 Prevalence of dental caries (male and female teeth affected)



Three of the juveniles had experienced tooth decay, including two younger juveniles (Skeletons 429 and 044, aged 1-2 years and 2-3 years respectively) and one older juvenile (Skeleton 116, aged 10-12 years). The latter individual had developed cavities in both their deciduous and permanent teeth. Overall 9.1% of the deciduous teeth were affected (6/66), with a frequency of 11.1% (5/45) among the younger juveniles and 4.8% in the older juveniles (1/21). The prevalence of caries in the non-adult permanent dentition was 2.2% (2/91); with 4.0% of the older juvenile permanent teeth affected (2/50).

The lesions were all located on the occlusal surfaces or at the contact points between the teeth, following the same pattern of caries as observed in the adults. One of the younger juveniles (Skeleton 044, aged 2-3 years) had cavities in their deciduous upper central incisors, which may suggest they were bottle fed, or given sweetened comforters to suck. Bottle-feeding was evidently practiced in the area as John Dickinson described how his newborn daughter was fed in his diary (Wednesday, 19th of August 1891): "She sucks her mother's breasts and also gets nourishment out of a bottle and tube" (Harker 1988, p70).

4.3 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, or periodontal disease (Roberts and Manchester 1995).

Twenty-three tooth positions were affected by dental abscesses (2.1%, Table 30), equivalent to the 2.2% prevalence of dental abscesses reported by Roberts and Cox for the post-medieval period (Roberts and Cox 2003). The frequency of dental abscesses peaked in the young middle adults, with 6.8% of their tooth positions affected (Table 30 and Figure 10). This high frequency was influenced by one female individual (Skeleton 177) who had six abscesses in total, one of which encompassed the roots of both the upper left incisors, and which had opened onto both the labial (lip) and lingual (tongue) sides. The drop in abscess prevalence among the mature adults may be related to the corresponding drop in caries prevalence and increase in ante-mortem tooth

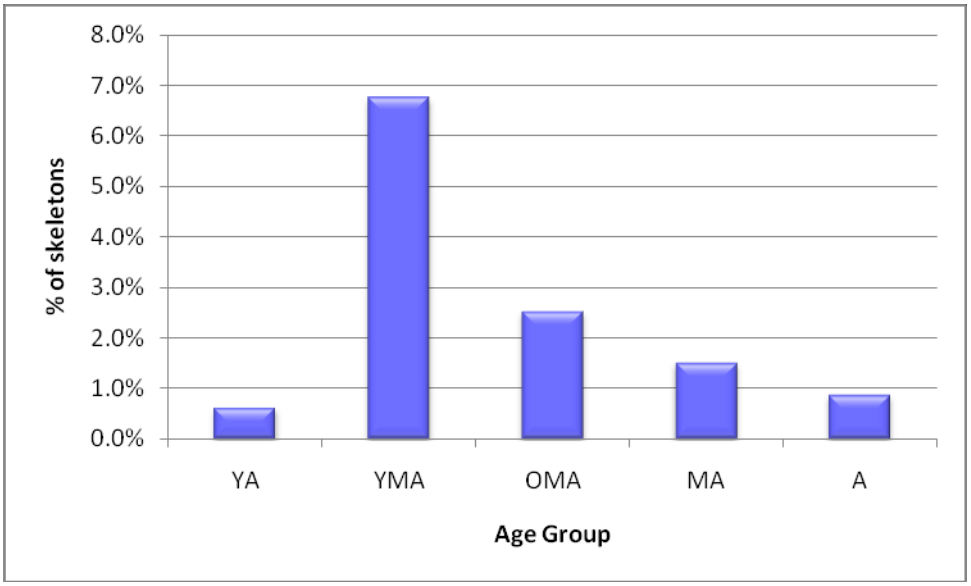
loss observed.

Fourteen (60.9%) of the abscesses occurred at the roots of teeth with large carious lesions that had destroyed a considerable part of the crowns, and another was associated with a tooth with a small cavity (4.3%). Five of the remaining teeth had been lost post-mortem and three had been lost ante-mortem.

Table 30 Dental abscesses (tooth positions)

Age Group	Male Tooth Positions			Female Tooth Positions			Unsexed Tooth Positions			Total Tooth Positions		
	Abscess	Total	%	Abscess	Total	%	Abscess	Total	%	Abscess	Total	%
YA	1	77	1.3%	0	85	0.0%	-	0	-	1	162	0.6%
YMA	1	64	1.6%	9	84	10.7%	-	0	-	10	148	6.8%
OMA	3	77	3.9%	0	30	0.0%	0	12	0.0%	3	119	2.5%
MA	6	342	1.8%	2	189	1.1%	-	0	-	8	531	1.5%
A	0	12	0.0%	1	100	1.0%	0	3	0.0%	1	115	0.9%
Total	11	572	1.9%	12	488	2.5%	0	15	0.0%	23	1075	2.1%

Figure 10 Prevalence of dental abscesses (tooth positions affected)



The prevalence of dental abscesses was slightly higher among the female individuals, who had 2.5% of their tooth positions affected compared to 1.9% tooth positions in males. This higher female prevalence could be associated with the higher frequency of dental caries amongst the women.

4.4 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.

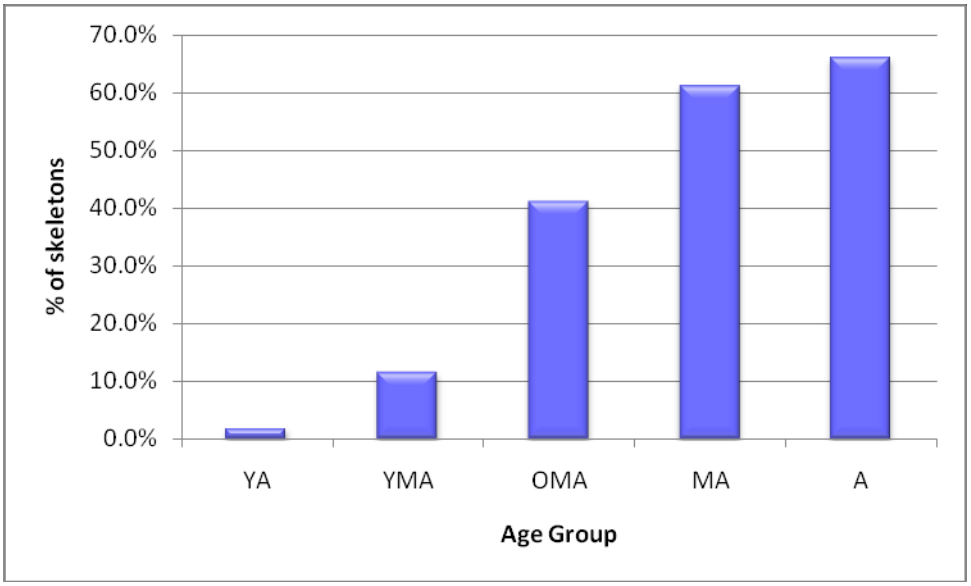
Almost all the adults from Fewston (40/44, 90.9%) had experienced ante-mortem tooth loss, and 43.7% of the teeth had been lost ante-mortem (Table 31), which is nearly double the average for the period of 23.4% reported by Roberts and Cox (2003). It was also considerably higher than the frequency of AMTL seen at St Martin's

(26.8%). The bias towards older individuals in the Fewston sample may be contributing to the apparent high frequency of AMTL compared with other sites of the period. AMTL certainly increased with age, rising from 1.9% among the young adults to 61.2% among the mature adults (Table 31 and Figure 11). It was also observed in one of the adolescents (Skeleton 338, 11-14 years), who had lost one of their first permanent molars. The prevalence of AMTL among the adolescent tooth positions was 2.4% (1/41).

Table 31 Teeth lost ante-mortem (tooth positions affected)

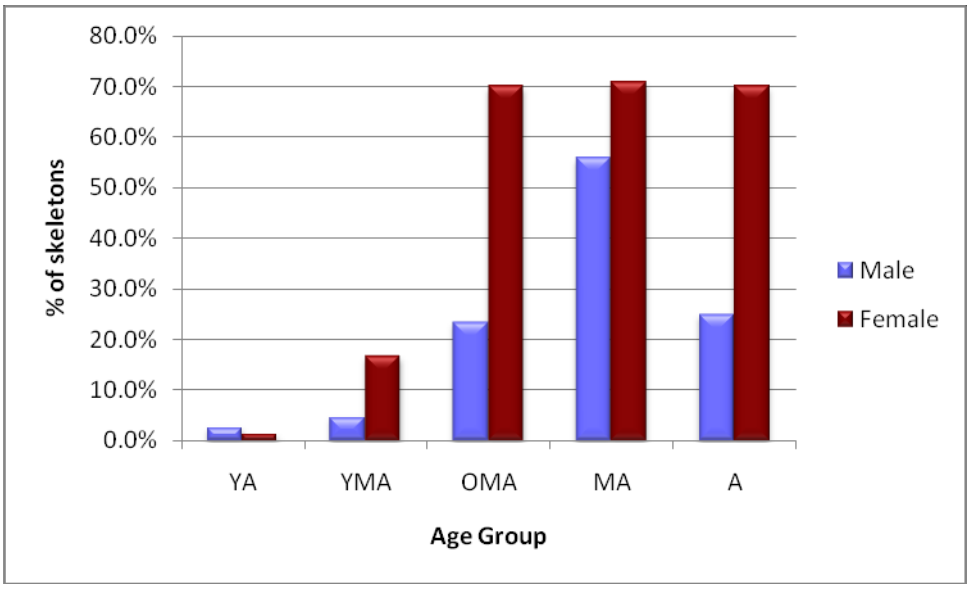
Age Group	Male Tooth Positions			Female Tooth Positions			Unsexed Tooth Positions			Total Tooth Positions		
	AMTL	Total	%	AMTL	Total	%	AMTL	Total	%	AMTL	Total	%
YA	2	77	2.6%	1	85	1.2%	-	0	-	3	162	1.9%
YMA	3	64	4.7%	14	84	16.7%	-	0	-	17	148	11.5%
OMA	18	77	23.4%	21	30	70.0%	10	12	83.3%	49	119	41.2%
MA	191	342	55.8%	134	189	70.9%	-	0	-	325	531	61.2%
A	3	12	25.0%	70	100	70.0%	3	3	100.0%	76	115	66.1%
Total	217	572	37.9%	240	488	49.2%	13	15	86.7%	470	1075	43.7%

Figure 11 Percentage of teeth lost ante-mortem



Females were apparently at greater risk of AMTL than males, with 49.2% of female teeth lost ante-mortem, compared to 37.9% of male teeth (see Table 31). Females suffered a greater amount of AMTL in all age group, with the exception of the young adults (see Table 31 and Figure 12). This could be the result of the higher frequencies of dental caries and abscesses they experienced in comparison to males.

Figure 12 Percentage of teeth lost ante-mortem (males and females)



Four females (Skeletons 122, 147, 325, and 363) had edentulous mandibles, where all the teeth from the lower jaw had been lost during life (in Skeleton 325 the mandible was edentulous with the exception of an impacted third molar). Three of these were mature adults, and the fourth was an unaged adult. One female (Skeleton 460, unaged adult) and two mature adult males (Skeletons 138B and 360) had edentulous maxillae (loss of all teeth from the upper jaw). Skeleton 138B had two curved depressions in the alveolar bone of his upper jaw that corresponded with the positions of two remaining teeth in his lower jaw. It seems likely that pressure from these lower teeth had led to increased resorption of the alveolar bone in these areas.

Dental caries was probably a major contributing factor to AMTL in this population, given the high frequencies observed. Periodontal disease was also observed in this population, with 23 (85.2%) of the 27 individuals possible to observe displaying some degree of alveolar bone resorption. It is also possible that some teeth were deliberately extracted (Hillam 1990, Roberts and Cox 2003). Although none of the individuals had been buried with dentures, it seems likely that these were worn by those who could afford them. John Dickinson refers to dentures in his diary on Friday, 29th of May 1891, when he was 46 years old: "At Otley... Got fit on for two new teeth, bottom front ones. All the rest of my teeth are fairly sound and good so that I don't show amiss in that respect" (Harker 1988, p68-69).

4.5 ENAMEL HYPOPLASIA

Dental enamel hypoplasia (DEH) is the presence of lines, grooves or pits on the surface of the tooth crown, which occur 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).

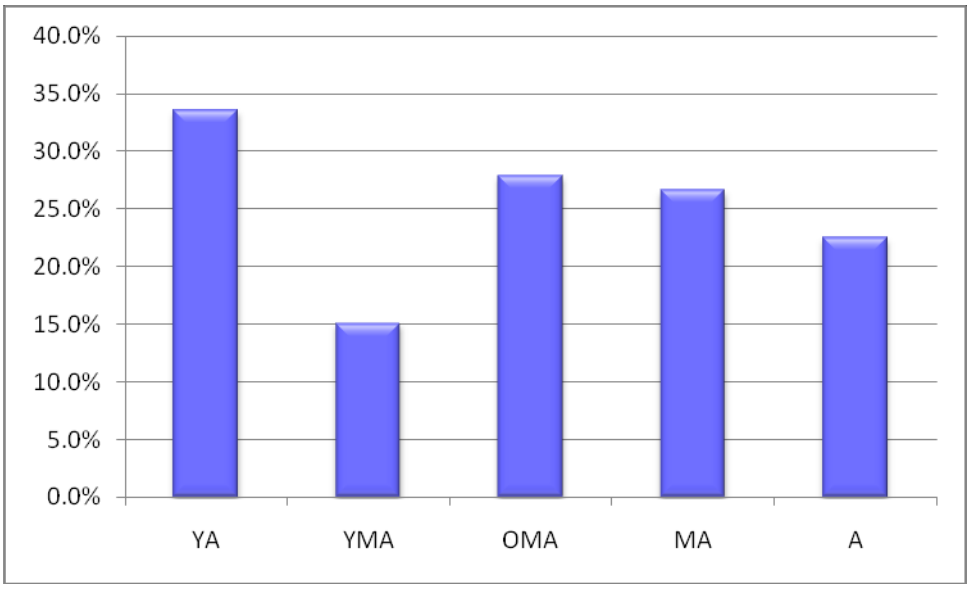
Because trauma can also cause DEH to one or two teeth, all individuals with less than three teeth present to observe, or who had less than three teeth affected by DEH were excluded from the totals. A quarter (26.2%) of the teeth had been affected by DEH amongst the adults (Table 32). The frequency of DEH peaked in the young

adults, where 33.5% of the teeth were affected (Table 32 and Figure 13). It has been suggested that those experiencing stress during childhood may continue to experience stress into adult life, and so be more likely to die (Lewis 2007, 106). DEH was more frequently observed among females, with 33.5% of their teeth affected compared to 21.5% of male teeth. Young adult females showed a particularly high prevalence of 51.3% (Table 32). Either females suffered a greater degree of stress during childhood than their male counterparts, or they were more likely to survive episodes of stress.

Table 32 Teeth with DEH (minimum of three teeth affected)

Age Group	Male Teeth			Female Teeth			Unsexed Teeth			Total Teeth		
	DEH	Total	%	DEH	Total	%	DEH	Total	%	DEH	Total	%
YA	13	80	16.3%	40	78	51.3%	-	0	-	53	158	33.5%
YMA	11	54	20.4%	5	52	9.6%	-	0	-	16	106	15.1%
OMA	14	53	26.4%	3	7	42.9%	0	1	0.0%	17	61	27.9%
MA	29	113	25.7%	12	41	29.3%	-	0	-	41	154	26.6%
A	0	11	0.0%	9	28	32.1%	0	1	0.0%	9	40	22.5%
Total	67	311	21.5%	69	206	33.5%	0	2	0.0%	136	519	26.2%

Figure 13 Percentage of teeth with DEH (minimum of three teeth affected)



No DEH was observed among the deciduous dentitions. However, three non-adults (both adolescents and one of the older juveniles) had DEH in their permanent teeth. The overall prevalence of 26.4% (24/91) was almost identical to that seen in the adult teeth. The highest prevalence was seen in the adolescent permanent teeth, where 48.8% of the teeth were affected (20/41). Among the older juveniles the prevalence was much lower at 8.0% (4/50).

4.6 DENTAL ANOMALIES

Skeleton 283 (young adult female) lacked both her upper lateral incisors. The upper canines were positioned right next to the upper central incisors, leaving no gap into which the lateral incisors could have erupted. It seems likely that the lateral incisors were congenitally absent, but a radiograph would be required to make sure they were not present unerupted in the jaw. Overall the prevalence of absent/ unerupted upper second incisors was 3.3% (2 of 60 upper second incisor tooth positions).

Various eruption anomalies involving the third molars were observed, which is not unexpected as these are the teeth most prone to congenital absence, delayed eruption or impaction (Hillson 1996). Four of the young adults (two females and two possible males) had third molars that were in the process of erupting. All four molars were involved in Skeletons 283 (female) and 085 (male?), with both lower third molars involved in Skeleton 319 (female), and the upper right third molar in Skeleton 192 (male?). The third molars usually erupt around the age of eighteen, but eruption can occur in the early twenties (Hillson 1996, 140).

Seven adults (three females and four males) had third molars that were either congenitally absent, or had failed to erupt. Once more, radiographs would be required to investigate which was the likely cause. These included both upper third molars in Skeletons 119 (old middle adult male) and 348 (young adult female), both lower third molars in Skeleton 426 (young middle adult female), both left third molars in Skeleton 098 (adult female?), the lower left third molar in Skeleton 077 (young adult male?), and the upper left and both lower third molars in Skeletons 119 (old middle adult male) and 241 (mature adult male). Overall the prevalence of absence or non-eruption of the third molars was 10.2%, with fifteen of 147 third molar tooth positions affected.

Impacted teeth were also observed. Usually these were only partially impacted, with the tooth erupting at an angle. Any fully impacted teeth that had completely failed to erupt would not have been visible unless the jaws had broken post-mortem to allow observation, and it must be remembered that some of the absent or unerupted teeth described above may have been impacted. Skeleton 325 (mature adult female) had an impacted lower left third molar, whose cusp tips were just protruding through the alveolar bone; her remaining teeth had been lost ante-mortem. The lower left third molar was also impacted in Skeleton 378 (young middle adult female), and her upper right third molar was small and only partially erupted (possibly also partially impacted). In two individuals it appeared that ante-mortem tooth loss had allowed a previously impacted tooth to begin eruption. The lower right third molar of Skeleton 098 (adult female?) was in the process of erupting, and it seemed that the ante-mortem loss of the lower right first molar had allowed the second molar to drift and tilt mesially, creating space distal to it, thus enabling the third molar to erupt. In Skeleton 342 (young middle adult male) it was the upper left third molar that was erupting, presumably following the ante-mortem loss of the second molar; all three remaining third molars were partially impacted. Overall, the prevalence of impaction among the third molars was 5.4% (8/147 tooth positions).

The lower right second premolar of Skeleton 438 (adolescent, 15-18 years old) was not fully erupted to occlusion, displaced lingually (towards the inside of the mouth), angled slightly mesially, and was rotated. This tooth could have been partially impacted. The second premolar usually erupts to replace the second deciduous molar around the age of ten to eleven years (Ubelaker 1989, p64), but in Skeleton 438 the socket for the lower right deciduous molar was partially present, suggesting this tooth had been retained past the age at which it is normally lost (although the tooth itself was not present, presumably lost post-mortem). Late retention of this tooth could have led to the anomalies of eruption observed in the permanent second premolar. The lower left second premolar was also rotated, and a small partial socket for the second deciduous molar was also observed, indicating both sides of the mouth could have been affected.

Skeleton 238 (old middle adult female) had a tooth erupting into the lower border of her left nasal aperture. Only a small part of the crown of this tooth was visible, and although it looked slightly like a deciduous canine not enough was visible to identify with any certainty the tooth involved. It seems unlikely that the tooth would

have been visible during life, as it had barely penetrated the bone and probably had not emerged through the skin. Ideally the tooth should be radiographed, and further research into ectopic teeth is required. It was impossible to calculate a prevalence rate when the tooth involved could not be identified.

Two females, one male and two non-adults had rotated teeth. In Skeleton 426 (young middle adult female), Skeleton 438 (adolescent, 15-18 years old), and Skeleton 116 (juvenile, 10-12 years old) both lower second premolars were rotated. The overall prevalence of rotated second premolars (adults and non-adults combined) was 12.5% (6/48 second premolars); among adults the prevalence was 4.8% (2/42), and among non-adults it was 66.7% (4/6). In Skeleton 138A (adult female) her upper left canine was rotated, and in Skeleton 192 (young adult male?), his lower right canine and first premolar were rotated. Rotation occurred in 2.5% of lower first premolars in adults (2.5%, 1/40). A similar proportion of canines from adults were rotated (2.1%, 2/95), with the upper canines being more prone to rotation (2.6%, 1/39) compared to lower canines (1.8%, 1/56).

Slight crowding of the anterior teeth was observed in the mandibles of four females, four males and the adolescent with the possible late retention of the deciduous second molars (Skeleton 438). One of the male individuals (Skeleton 130, mature adult male) also had slight crowding of his anterior maxillary teeth.

Two individuals had small, slightly peg-shaped upper second incisors. Both upper lateral incisors were involved in Skeleton 319 (young adult female), and the upper left lateral incisor was affected in Skeleton 056 (juvenile, 8-10 years). The prevalence among adults was 7.4% (2/27 upper lateral incisors), and among non-adults it was 16.7% (1/6); the overall prevalence was 9.1% (3/33).

Other unusual shaped teeth observed were both upper first permanent molars in Skeleton 116 (juvenile, 10-12 years), which had square crowns and four roots (rather than being rhomboid shaped with three roots). Skeleton 366 (mature adult male) had four teeth with short stubby roots of equivalent length to (or shorter than) the crowns. The teeth affected were the upper central incisors, upper left first premolar and lower right second premolar. All other teeth present had normal length roots. An enamel pearl was observed on the upper right first permanent molar in Skeleton 116 (juvenile, 10-12 years).

Seven males and one female displayed unusual wear patterns in their teeth. Six of the males had smooth neat crescents worn into their anterior teeth, which probably resulted from habitually smoking a pipe (Capasso *et al* 1999). These wear patterns were seen in 37.5% of the males with at least some of their anterior teeth present, although only three males had all anterior teeth present so the calculated prevalence should be regarded as the minimum. The left side was evidently the preferred side for holding the pipe, and the teeth most frequently involved were the lower canines and first premolars (Table 33). In Skeleton 192 (young adult male?) the left side was probably preferred as the equivalent teeth on the right side had been largely destroyed by carious lesions.

Table 33 Male teeth with pipe-smoking wear

%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0 %	20.0 %	11.1 %	0.0%	0.0%	0.0%	
n1	R	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	L
n2		6	11	9	9	10	10	9	10	11	7	10	10	9	11	9	4	
TP		8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8	

TP	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
n2	6	7	12	12	13	16	8	8	9	12	17	12	14	10	9	4
n1	0	0	0	0	0	1	1	0	0	2	5	3	1	0	0	0
%	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%	12.5 %	0.0%	0.0%	16.7 %	29.4 %	25.0 %	7.1%	0.0%	0.0%	0.0%

TP = tooth position; n1 = number of teeth with pipe-smoking wear; n2 = number of teeth present; % = percentage of teeth with pipe-smoking wear

Skeleton 226 (mature adult male) had strange wear of his upper left second premolar, which might possibly have been associated with pipe-smoking. As well as fairly convincing pipe-smoking wear on his lower left canine and first premolar, Skeleton 119 (old middle adult male) also had some unusual wear on the upper right canine and first premolar which may also have been associated with pipe-smoking. Skeleton 238 (old middle adult female) had angular wear on her upper right first premolar, and between her first and second upper right incisors which formed an inverted 'V' shape. The wear appeared too angular to be caused by a pipe, but may have been associated with some other habitual activity.

John Dickinson was evidently determined to take up the habit of pipe-smoking, although apparently not successfully. On Friday the 9th of December 1881 he wrote: "Bought half an ounce of tobacco and two cigars. Purposes learning to smoke. Never fairly mastered it yet" (Harker 1988, p51). On Tuesday, 20th of December he noted: "Very comfortable in house. Smoking several pipes of tobacco. I don't think I am any the worse in health for smoking although it makes me spit a good deal. But I am not yet master of it. I think of trying to master the habit and becoming a regular user of the weed as the habit of smoking seems to make one feel more sociable and contented" (Harker 1988, p51). However, sixteen years later in 1897 his diary entry for Monday, 1st of March read: "Smoked two pipes of tobacco in the evening and was sick in consequence. I somehow cannot master smoking and I don't think I ever shall. I don't know whether to persevere or not as the habit is at best pernicious" (Harker 1988, p86). A few days later on the 17th of March he recorded: "Three pipes of tobacco today but not by any means the master of it yet. Nature revolts against it I suppose. Perseverance may season me but it seems difficult" (p87).

Skeleton 053 (mature adult female?) had a fractured upper right second incisor, where the labial (lip) side of the tooth crown had sheared off down to the level of the alveolar bone. Three other skeletons also had possible tooth fractures, including Skeleton 319 (young adult female; possible fracture of upper right second molar), Skeleton 378 (young middle adult female; possible fracture of lower right first premolar) and Skeleton 130 (mature adult male; possible fracture of upper right second molar).

4.7 CONCLUSION

Dentitions belonging to 44 adults and eleven non-adults were analysed, providing an insight into dental disease at Fewston. However, it must be borne in mind that over half the population with surviving dentitions were not recorded, and analysis of these skeletons would further understanding of dental health in a rural post-medieval community. The number of non-adults recorded in particular was small, and a larger sample would be required to better understand the development of dental disease during childhood.

Deposits of mineralised plaque were seen on nearly three-quarters of the teeth among the adults, suggesting they may not have practiced rigorous dental hygiene. However, the majority of deposits were relatively slight. Women were less likely to have deposits of mineralised plaque on their teeth compared to men. The high

frequency of tooth decay and the pattern of cavity location were both consistent with a diet high in sugar and refined carbohydrates. Tooth decay was seen in both the milk and permanent teeth of children, with the frequency increasing with age until the old middle adult age group. Tooth decay was no doubt a leading cause of dental abscesses in this population, as those abscesses observed were invariably associated with large cavities in the teeth. Both tooth decay and abscesses probably contributed to the loss of teeth during life, and some teeth may have been deliberately extracted. Periodontal disease was also observed, and could have contributed to the high frequency of ante-mortem tooth loss at Fewston. The decline in the frequency of tooth decay and dental abscesses in the mature individuals can probably be explained by the increased prevalence of ante-mortem tooth loss in the older age group. Women had a higher frequency of tooth decay, dental abscesses and ante-mortem tooth loss than their male counterparts. Defective enamel formation observed in the permanent teeth suggested some individuals experienced episodes of ill health (perhaps disease or poor nutrition) during childhood. Again, women showed a higher prevalence of these lesions.

A proportion of the men evidently smoked pipes, leaving traces of the practice in their teeth. Assorted dental anomalies were observed, some of which may be related to heredity. These included absent or impacted teeth, a tooth erupting in the base of the nose, variations in tooth shape, rotation and crowding of teeth. At least one individual had fractured a tooth.

5.0 MORTUARY PRACTICE

All burials (where it could be ascertained) were buried extended and supine (on their backs, with their legs extended), with arms usually symmetrically arranged with hands placed beside or on the hips. Other arm positions noted included the hands placed over the lower abdomen, or arms flexed at the elbow with hands over the opposite elbows or on the chest. As would be expected in a post-medieval Christian burial ground, almost all burials were oriented west-east, with the heads to the west. A few burials deviated slightly from this orientation, but Skeleton 387 was aligned southwest-northeast, with the head to the southwest.

The majority of burials were contained within coffins, but some were probably shrouded. It is possible that these shrouded burials were earlier, and some may even date to the medieval period. Two individuals were buried in coffins with glass windows set over the face. These were Skeleton 186 (mature adult male) and Skeleton 082 (adult female?). It was interesting that Skeleton 186 had a developmental anomaly that had affected the shape of his face. Litten (1991, 85-118) makes no mention of the practice of including a glass window in the coffin in his review of coffin construction and use. However, John Dickinson described such a coffin at a local funeral (though not at Fewston) on Christmas Eve in 1881: "(Today) attended Robert Newsoms funeral... They had him brought to his old home at Snowden and took the coffin out of the hearse. It had a glass over the face... He was buried at Weston. So ends the Newsom family, Robert being the last left of the name" (Harker 1988, 51). Whether this Robert Newsom was a relative of Skeleton 366, identified as John Renton Newsome is not known. However, since latter died in 1892 and the former was described as being the last of the name in 1881 they may not have been related.

Some individuals were interred in brick-lined graves, and at St Martin's, Birmingham such graves were interpreted as middle class (as opposed to the lower class earth-cut graves, Brickley *et al* 2006). It is likely that

the same was true at Fewston, with the slightly wealthier members of the community paying for the construction of brick vaults. Data needs to be collated on which individuals were buried in such vaults at Fewston.

The dates of death of the named individuals spanned 79 years, from 1842 to 1921, although since only one individual died later than 1895 the majority died in the 53 years between 1842 and 1895 (Table 34 and Table 35). The dates of death of those buried with coffin plates were on average later (1862-1921) than those identified by monuments (1842-1884), although there was a degree of overlap. The year of birth was estimated for those individuals where the date of death and age at death were known; the exceptions were Grace Hutton whose date of birth was provided on her coffin plate, and George Lister and Richard Gill whose dates of birth were given on their monuments. These spanned 117 years, from 1778 to 1895, although if Roman Marjerrison (who was born and died in 1895) is removed the span is reduced to 83 years (1779-1861). Again the date of birth of the monument burials (1778-1851) was generally earlier than that of those with coffin plates (1804-1895).

It is evident from the coffin plates and burial memorials that people were frequently buried in small family groups, usually husband and wife, occasionally children also. However, it cannot be assumed that all pairs of male and female graves were husbands and wives, as one such pair were an adult brother and sister who died in their early twenties (Bentley and Sarah Darnbrook). That grave plots were reserved, and husbands and wives expected to be buried together is illustrated by the monument to George Lister (Skeleton 130) and his wife, which had evidently been erected prior to his wife's death in 1897. Her name appeared on the monument yet a small plaque affixed to the base of the monument recorded that she had been interred at Undercliffe Cemetery in Bradford "in consequence of an order dated July 30th 1896, issued from the Home Office closing Fewston churchyard for burial, and the previous omission of the churchyard authorities to protect this vault from its operation". Some form of exemption must have been arranged for Grace Hutton (Skeleton 325), who was buried in Fewston churchyard with her first husband (Richard Gill) in 1921 despite the closure of the graveyard and having remarried following his death.

That closure of the graveyard was necessary is illustrated in John Dickinson's diary in 1892 (21st of November): "Talked with the Vicar about proposed addition to churchyard. The present churchyard is full over and over again and the sights when digging graves are revolting" (Harker 1988, 82). The following day he "attended meeting of parishioners to consider adding ground to Fewston churchyard" and "got put on committee to push the matter on" (Harker 1988, 82). On the first of January, 1898 he expressed his dissatisfaction with the lack of provision following closure of the burial ground: "Attended a meeting of Joint Burial Committee at Fewston Board School at 2 o'clock. I was appointed as one of a deputation to meet Leeds Waterworks Committee at Leeds to consult about a site for a burial ground. It is very shamefull [sic] that the old churchyard should be closed and no steps yet taken to form a new ground" (Harker 1988, 93). The new burial ground was not opened until the 30th of September 1908, duly noted by Dickinson: "They opened the new burial ground at Fewston today" (Harker 1988, 149). Further research needs to be undertaken into where burial too place in the intervening period.

Table 34 Named individuals identified by coffin plate

Sk No	Year of Birth	Date of Death			Named Individual		Age at death		Sex		Monument Inscription	Coffin Plate Inscription	Notes
		Day	Month	Year	First Name	Surname	Doc	Ost	Doc	Ost			
101	1895	4	Dec	1895	Roman[d?]	Marjerrison	10m	7-11m	M	-		Roman[d?] Marjerrison/ Died/ 4th December 1895/ Aged 10 months	Very ornate lettering, difficult to read
119	1852	25	Feb	1890	Matthew	Marjerrison	38	26-35	M	M		Mathew Marjerrison/ Died/ 25th February 1890/ Aged 38 years	
122	?	27	Feb	?	J(ohn?)	Marjerrison	?	46+	M?	F		J[ohn?] Marjerison/ Died [27th?] February ????/ Aged 25 years	Partially illegible coffin plate
130	1816	19	Jul	1882	George	Lister	66	46+	M	M	In lasting remembrance of George Lister of Timble Great, in this parish, yeoman. Born February 16th 1816, died July 19th 1882. Interred in this vault. Also Ann, widow of the above, born March 28th 1820, died May 29th 1897. Interred at Undercliffe Cemetery, Bradford in consequence of an order dated July 30th 1896, issued from the Home Office closing Fewston Churchyard for burial, and the previous omission of the churchyard authorities to protect this vault from its operation	George Lister/ Died/ July 19th 1882/ Aged 66 years	
226	1804	16	Apr	1888	David	Lister	84	46+	M	M		David Lister/ Died/ 16th April 1888/ Aged 84 years	
238	1839	?	Apr	1888	[Eliza?]beth	[D?]emaine	49	36-45	F	F		[.....]beth [....]emaine/ Died/ ? April 1888/ 49 years	
310	1820	6	Mar	1886	Mary	Dickinson	66	46+	F	F	In memory of John Dickinson, of Timble Great, who died August 18th 1875, aged 63 years. 'In the midst of life we are in death'. Also of Mary, relict of the above named John Dickinson, who died 6th March 1886, aged 66 years	Mary Dickinson/ Died/ 6th March 1888/ Aged 66 years	
325	1847	3	Apr	1921	Grace	Hutton	73	46+	F	F	In loving memory of Richard Gill of Brameville House, Norwood. Born January 3rd 1843, died February 11th 1884. 'In the midst of life we are in death'. Also Grace Hutton, widow of the above and wife of Thomas Hutton, Fairfield, Huby. Died April 3rd 1921 in her 74th year. 'At rest'	Grace Hutton/ Born/ 23rd Nov 1847/ Died/ 3rd April 1921	

339	1843	11	Feb	1884	Richard	Gill	41	36-45	M	M	In loving memory of Richard Gill of Brameville House, Norwood. Born January 3rd 1843, died February 11th 1884. 'In the midst of life we are in death'. Also Grace Hutton, widow of the above and wife of Thomas Hutton, Fairfield, Huby. Died April 3rd 1921 in her 74th year. 'At rest'	[.....] / 11th February 1884/ [.....]	From the location of Richard Gill's headstone
342	1836	1	Nov	1862	Bentley	Darnbrook	26	18+	M	U	Here resteth in joyfull hopes of the resurrection to eternal life Sarah Darnbrook, youngest daughter of Joseph and Mary Darnbrook of Norwood. Who departed this life May 26th 1854 in the 23rd year of her age. We cannot Lord thy purpose see/ but all is well that's done by thee. Also Bentley Darnbrook of Otley late of Norwood. Son of the above named Joseph Darnbrook. He departed this life Novr 1st 1862 aged 26 years	Bentley Darnbrook ...	Plate disintegrated on lifting, and detail not photographed
360	1819	24	Apr	1886	Gill	Wigglesworth	67	46+	M	M		Gill Wigglesworth/ Died/ 24th April 1886/ Aged 67 years	
363	1835	13	Nov	1889	Sarah	Gill	54	46+	F	F	In lov[ing memory of?] Sarah Gill who [died?] ... [November?] [13 or 15?] [1889?] aged [31?] years.	Sarah Gill/ Died Nov 13th 1889/ Aged 54 years	Monument badly eroded and largely illegible
366	1816	3	Feb	1892	John Renton	Newsome	76	46+	M	M		John Renton Newsome/ Died/ 3rd Feb 1892/ Aged 76 years	
378	1861	27	Feb	1895	Elina	Wigglesworth	34	26-35	F	F		Elina Wigglesworth/ Died/ 27th February 1895/ Aged 34 years	
408	1805	18	May	1883	Richard	Gill	78	18+	M	M?	Sacred to the Memory of Richard Gill of Norwood, who died May 18th 1883, aged 78 years. Also Maria, his wife, who died August 1st 1876, aged 70 years. Likewise one son and two daughters. Viz; Maria, died Octr 27th 1852, aged 14 years. John, died Novr 22nd 1854, aged 25 years. Martha Rayner, died March 11th 1881, aged 32 years. 'Thy will be done'	Richard Gill/ Died/ May 18th 1883/ Aged 78 years	

Year of birth estimated (except for Skeletons 130, 325 and 339); Doc = Documentary source of age/ sex; Ost = osteological age/ sex

Table 35 Named individuals identified by monument

Sk No	Year of Birth	Date of Death			Named Individual		Age at death		Sex		Monument Inscription	Notes
		Day	Month	Year	First Name	Surname	Doc	Ost	Doc	Ost		
138A	?	?	?	?	Elizabeth	Dibb	?	18+	F	F	James Dibb of [Norwood?] ... [March?] 17..... [Also?] Elizabeth [his wife?]	
138B	?	?	?	?	James	Dibb	?	46+	M	M	James Dibb of [Norwood?] ... [March?] 17..... [Also?] Elizabeth [his wife?]	
150	1778	10	Mar	1860	Joseph	Patterson	82	18+	M	M?	Sacred to the memory of Joseph Patterson late of Timble Great, who died March 10th 1860, aged 82 years. Also Christiana, Wife of the aforesaid, who died Octr 23rd 1854, aged 66 years. For eighty years he lived a toilsome life/ Honest and careful both himself and Wife/ And though on earth his hard won riches lie/ We trust he has far greater in the sky/ For Penitence and Patience mark'd his later days/ Jesus [his?]... [mercy] ...ll/ his praise	
156	1788	23	Oct	1854	Christiana	Patterson	66	18+	F	F?	Sacred to the memory of Joseph Patterson late of Timble Great, who died March 10th 1860, aged 82 years. Also Christiana, Wife of the aforesaid, who died Octr 23rd 1854, aged 66 years. For eighty years he lived a toilsome life/ Honest and careful both himself and Wife/ And though on earth his hard won riches lie/ We trust he has far greater in the sky/ For Penitence and Patience mark'd his later days/ Jesus [his?]... [mercy] ...ll/ his praise	
198	1813	21	April	1842	Hannah	Holmes	29	18+	F	U	Sacred to the Memory of Hannah, wife of George Holmes, of Norwood, who died April 21st 1842, aged 29 years. My work is well done. Also Martha, Daughter of the Above, who died March 15th 1859, aged 25 years. Be of good cheer thy sins is forgiven	
235	1786	31	Jan	1865	Thomas	Patterson	79	18+	M	U	In memory of Thomas Patterson, late of Fewston, who died at Armley, January 31st 1865, aged 79 Years	
300	1793	7	Sep	1870	Mary	Darnbrook	77/78	46+	F	F	In affectionate remembrance of Joseph Darnbrook, Otley late of Norwood, who departed this Life March 7th 1869, in the 78 year of His age. Also Mary his Beloved Wife who died Sepr 7th 1970 in the 78 year of Her age. Mourn not for us nor sorrow take / But love each other for our sake	Coffin plate recovered, but too decayed to read
307	1847	7	Mar	1869	Joseph	Darnbrook	77/78	46+	M	M	In affectionate remembrance of Joseph Darnbrook, Otley late of Norwood, who departed this Life March 7th 1869, in the 78 year of His age. Also Mary his Beloved Wife who died Sepr 7th 1970 in the 78 year of Her age. Mourn not for us nor sorrow take / But love each other for our sake	Coffin plate recovered, but too decayed to read
319	1832	26	May	1854	Sarah	Darnbrook	22/23	18-25	F	F	Here resteth in joyfull hopes of the resurrection to eternal life Sarah Darnbrook, youngest daughter of Joseph and Mary Darnbrook of Norwood. Who departed this life May 26th 1854 in the 23rd year of her age. We cannot Lord thy purpose see/ but all is well that's done by thee. Also Bentley Darnbrook of Otley late of Norwood. Son of the above named Joseph Darnbrook. He departed this life Novr 1st 1862 aged 26 years	

351	1812	18	Aug	1875	John	Dickinson	63	46+	M	M	In memory of John Dickinson, of Timble Great, who died August 18th 1875, aged 63 years. 'In the midst of life we are in death'. Also of Mary, relict of the above named John Dickinson, who died 6th March 1886, aged 66 years	
441	1851	19	Mar	1884	Daniel	Fox	33	18+	M	M	In loving memory of Daniel Fox late of Fewston, who died March 19th 1884 aged 33 years. From pain and weariness to rest/ God in his mercy called him home/ To lie upon his saviour's breast/ Where wasting death can never come	

Year of birth estimated; Doc = Documentary source of age/ sex; Ost = osteological age/ sex

6.0 DISCUSSION AND SUMMARY

The limited time and funding available precluded full analysis of all 145 skeletons excavated from Fewston, and only 64 skeletons were recorded in full. Limited data was obtained on the remaining 81 skeletons during a rapid assessment. Furthermore, it was not possible to consider all pathological conditions observed during analysis with the thoroughness required, and not enough time was available to calculate true prevalence rates or to compare data with other sites. As such, the data presented in this report provides just a glimpse into the lives of the population buried at Fewston, and the patterns of health revealed should be regarded with caution until they are examined with greater thoroughness and placed into context. It is envisaged that further research will be carried out on this population during the coming year, hopefully allowing recording of the assessed skeletons and more detailed analysis of particular pathological conditions. Such work should also allow the Fewston remains to be placed into context through appropriate comparisons with other post-medieval populations. Of particular interest is the rural nature of the population, which provides a unique opportunity to compare patterns of health and disease between rural and urban populations.

The potential for documentary research is also great. The community was small and closely-knit with families apparently living in the area for generations. It should prove possible to reconstruct family trees through tracing birth, marriage and death certificates, and so gain information on marriage patterns, birth rates and causes of death. Census data could be used to trace individuals and households through the century and perhaps gain information on occupations, economic status, and household size. Since descendants of these families still live in the area around Fewston, there is potential to collect anecdotal information about the community and way of life. Some individuals may even have carried out research into their family histories which could be a useful resource provided they would be willing to share it. Local newspapers could be consulted for information on events within the community. There is also the diary of John Dickinson, providing an invaluable insight into life in the late nineteenth century. He frequently details the meals he ate, the work he carried out, social activities he enjoyed, and illnesses suffered by himself and others, all against a backdrop of weather information. It is not known to what extent the original diaries have been edited and reduced; it is possible that additional useful details may be contained in the originals. Establishing the nature of the population and the environment in which they lived will be crucial in placing the skeletal remains into context. The presence of 26 identified individuals among the burials, including the parents of John Dickinson, adds an extra dimension to the possibilities of linking the documentary and osteological data.

The analysis carried out to date has revealed some interesting patterns. The population consisted of adults of both sexes (equal numbers of males and females) and children, as would be expected in a parish graveyard where all members of the population were buried. Children were under-represented in the analysed sample, but basic data from the assessed skeletons suggested that over half were juveniles and much of the remainder were adolescents. Neonates and infants were noticeable by their absence, perhaps buried elsewhere within the cemetery (although taphonomic conditions and disturbance of graves could have contributed). It was particularly interesting that the proportion of older children and adolescents was higher than may be expected, particularly in a period when adolescents migrated away from rural areas to look for work in the growing cities (Roberts and Cox 2003, 294). Perhaps those dying away from home due to exposure to unfamiliar infectious diseases were returned to Fewston for burial.

The adult population was biased towards mature adults, with nearly half the adult population probably aged over

46 years when they died and the mean age at death of the named individuals was 58.2 years. This bias was particularly apparent among the males, both in the analysed sample and in the named individuals (where the male mean age at death was ten years older than the female mean age at death). It appeared that females were more likely to die young than males.

The adult women were of average height for the post-medieval period, but the men were taller than average. Above average height could suggest a favourable childhood, relatively protected from episodes of poor nutrition and disease. However, this impression was not supported by the frequency of *cribra orbitalia* (lesions in the orbits often used as a measure of childhood stress) and enamel defects observed among the adults and children. There was also evidence that several of the adults may have experienced rickets as children, which was unexpected in a rural population where it was assumed that exposure to sunlight would not be a problem. The number of children in the sample was too small to gain a full understanding of childhood health in this population, but one infant had been suffering from scurvy when they died, and an adolescent may have been suffering from anaemia (and possibly scurvy as well). That poverty could occur in rural areas as well as urban contexts was made clear in the diaries of John Dickinson, although he himself fared reasonably well (Harker 1988).

There was certainly evidence for infectious disease in the Fewston population. Many adults had involvement of their legs, particularly the shins and thigh bones, and one man may have had a more severe infection of the bone cortex itself which could have been linked to trauma. However, the majority displayed well-remodelled lamellar bone, indicating the individuals had survived the episode of infection and the lesions had healed. Although population density was nowhere near as great as that in the urban areas, people did travel and visit towns and cities, and in so doing no doubt exposed themselves to new infections that they then brought back with them to their small community. The drinking water was identified as a source of infection in the nearby village of Timble in the late nineteenth century (Harker 1988, 46-49). Living in a rural area in close contact with livestock and soil, people were presumably at greater risk of animal-borne diseases and parasites, and two women had pathological conditions tentatively identified as fungal or parasitic infections. The prevalence of upper respiratory tract infections (maxillary sinusitis) was higher than expected for a rural population presumably not exposed to urban pollution, and it may have been associated with tooth decay. Bone formation on the ribs indicated infections of the lungs, and these were seen in eight adults and an adolescent.

Accidental injuries were frequent, and over half of the men had evidence for injuries in their bones possibly associated with the hazards of farming. Two men had sustained multiple injuries, one to their feet and legs with associated infection, and the other to the torso. The latter also had a healed blade injury to the back of the head. Rib fractures were common, and affected five men. One woman had sustained a clay shoveller's fracture in her neck, possibly indicating that women also carried out physical tasks. However, since modern patients with these fractures tended to be inexperienced individuals unaccustomed to physical exertion (McKellar Hall 1940), this may suggest otherwise.

Unsurprisingly, considering the general older age distribution of the adults, joint disease (degeneration of the joints and osteoarthritis) was common. The hips were particularly involved, which would be expected as these are major weight-bearing joints of the legs, and the spine was also affected. The high frequency of degeneration of the joint between the lower jaw and the cranium may have been associated with the loss of teeth during life. In most individuals these degenerative changes were probably related to advancing age, although activity may

have impacted to an extent. Males displayed a higher frequency of osteoarthritis, and the pattern of joint involvement tended to differ from that seen in females. Some individuals may have been suffering from rheumatoid arthritis and this possibility requires further investigation. Another condition also associated with advancing age was also observed, with one mature female possibly suffering from osteoporosis.

Evidence for corset wearing was suspected in five females and an adolescent, resulting in alteration in the shape of their ribs. However, a male individual possibly also displayed unusual rib shapes. Other habitual behaviour was suggested by grooves in the teeth of seven men that implied they smoked pipes on a regular basis. One man may have had Paget's disease, a disease of unknown cause that is common in the north-west of England (Roberts and Manchester 2005, 251) and his wife had been autopsied before burial.

Developmental anomalies occurred in the skeletal remains, and most of these were minor variations in the composition of the spine. A prematurely closed suture in the cranial vault of one man would have altered his appearance. Dental anomalies were also relatively commonly observed, and both skeletal and dental anomalies could potentially be associated with inbreeding within a rural population, which was also reported in the diary of John Dickinson. However, further research would be required to evaluate this possibility.

The high frequency of tooth decay suggested consumption of a diet high in refined sugars and processed carbohydrates, which had probably led to dental abscesses and the considerable loss of teeth during life. Some of these may have been deliberately extracted. Mineralised plaque was also observed, although usually in small quantities, suggesting inadequate oral hygiene may have contributed to the poor dental health. Such a pattern of dental disease appears typical for the nineteenth century, and as would be expected, the condition of the teeth deteriorated with age.

7.0 FUTURE RECOMENDATIONS

It is recommended that the assessed skeletons from Fewston are analysed in full, with the results of analysis incorporated with the existing body of data. This would expand the sample size and would allow better understanding of disease patterns in the population. The results also need to be placed into context through documentary and historical research, and through comparison with other post-medieval populations. Particular attention should be paid to the potential to explore urban versus rural differences in health. The opportunity to apply techniques such as radiography, histology, geometric morphometrics, and isotope analysis should also be considered where such methods would answer specific research questions.

Potential general avenues of further research include, but are not limited to:

- Evaluation of non-adult health and nutritional deficiencies
- Examination of patterns of joint disease in greater detail
- Radiographic and/ or histological analysis of individuals with suspected Paget's disease
- Radiographic analysis of fractured bones and research into the causes of the types of fractures seen
- Research into differential diagnoses for unidentified pathological conditions
- Examination of the possibility that some of the adolescents had migrated to urban areas, died there, and been returned to Fewston for burial (isotopic analysis of teeth and hair/ bone samples?)
- Use of geometric morphometrics in assessing rib shapes to establish the degree and type of rib

deformation with greater accuracy

- Use of geometric morphometrics to identify bowed long bones, particularly when such changes are subtle and less likely to be obvious during macroscopic observation
- Sampling of individuals with rib lesions (plus control sample) to test for the presence of *Mycobacterium tuberculosis*
- Evaluation of the possibility that intermarriage within families increased the frequency of developmental anomalies in the bones and teeth
- Potential for limited testing of ageing and sexing methods using the sample of named individuals

Student projects could be designed to examine specific hypotheses, comparing data from Fewston with that from other post-medieval populations. A pilot study of the potential link between skull shape and inheritance is already being carried out by a PhD student at Durham University, Charlotte King, and Dr Charlotte Henderson intends to record muscle attachment sites to investigate whether or not a person's occupation can play a role in enlargement of these sites.

Incorporating future research carried out by students into the final report will not be a straightforward task, particularly since the entire population was not recorded in full initially. There is a real risk that data recorded by other individuals will not be consistent with the data already recorded by the main author (ACC), meaning that the data collected from the remaining 88 skeletons may not be comparable with the data from the 64 already analysed. If different students record the same data independently of each other then conflicts may arise that will be difficult to resolve, e.g. skeletons assigned to different age or sex groups. Issues such as these could make the production of a meaningful and unified end report a challenge. It is difficult to envisage how some of these problems will be resolved whilst at the same time allowing students the freedom to design and follow research questions that interest them, and to formulate their own responses to deal with methodological issues. However, integration of the results obtained by the students from further analysis of the remains from Fewston will be undertaken once their work has been completed in the autumn of 2011.

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APPENDICES

Appendix 1: Osteological and Palaeopathological Catalogue – Articulated Skeletons

Skeleton Number	**044**									
Period	Post-Medieval									
Preservation	Good (Grade 2), slight fragmentation									
Completeness	80-90%; cranium, mandible & maxilla; vertebrae –atlas (L + R arches), axis (body, dens, arches), 5 cervical, fragments of 12 thoracic vertebrae, L1-5, sacrum (3 bodies); 12 right ribs, 11 left ribs; shoulders, right arm (proximal ulna lost pm), left arm; 8 metacarpals, 5 proximal phalanges; pelvis (ilia, L ischium, L pubis); right leg (proximal femur incomplete), left leg; 5 metatarsals									
Age	2-3 years (juvenile)									
Sex	-									
Stature	-									
Non-Metric Traits	Parietal foramen (R); posterior condylar canals open (L & R) Transverse foramen bipartite (2/5 R, 1/5 L); hypotrochanteric fossa (L)									
Pathology	Dark black stains on the superior and inferior margins of the heads and necks of almost all left and right ribs. Possibly related to decomposition processes?									
Dental Health	20 deciduous teeth present, all erupted; 3 permanent teeth present (RM^1, LM^1, and RM_1), all unerupted ; 4 deciduous teeth with caries; flecks of calculus									
	Right Dentition					Left Dentition				
Present	P	P	P	P	P	P	P	P	P	P
Calculus	F d	-	-	-	-	F d	-	-	-	F d
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	Sm	Sm	-	-	-	-
Wear	1	2	2	2	2	2	2	2	2	1
Maxilla	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Mandible	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Present	P	P	P	P	P	P	P	P	P	P
Calculus	F d	-	-	-	-	-	-	-	-	F d
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	Mo	-	-	-	-	-	-	Mo	-
Wear	2	1	1	2	2	2	1	2	2	2

Skeleton Number	**053**	
Period	Medieval/ Post-Medieval	
Preservation	Good (Grade 2), moderate fragmentation	
Completeness	80-90%; cranium, mandible & maxilla, ear ossicle (incus x1); small fragment sternum; vertebrae – C1-7, T1-12; arches L1-5; 11 right ribs, 12 left ribs, unsided rib frags; shoulders; right arm; left humerus; hands (7 right carpals, RMC1-5, LMC5, 9 proximal, 6 intermediate & 3 distal phalanges); pelvis (right os coxa, fragments left ilium); legs; feet (7 right tarsals, 7 left tarsals, RMT1-5, LMT1-5, 10 proximal, 3intermediate & 3 distal phalanges)	
Age	46+ years (mature adult)	
Sex	Female?	
Stature	159.4cm ±4.24 (radius)	
Non-Metric Traits	Ossicles in lambdoid (bilateral); open foramen spinosum (L); accessory lesser palatine foramina	

	(bilateral) Transverse foramen bipartite (2/4 R, 2/4 L); acetabular crease (R); hypotrochanteric fossae (bilateral); exostosis in trochanteric fossae (bilateral); vastus notch (bilateral); lateral tibial squatting facets (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facet (bilateral); medial talar facets (bilateral)
Pathology	Schmorl's nodes T6-9 (deep and sharp-edged lytic lesions in inferior bodies) OA inferior L facet T4 OA left lateral clavicle The occipital has a lytic lesion (c. 10 x 6mm) on the left side of the cruciform eminence, just inferior to the left transverse sulcus. The lesion is a smooth-walled hollow which seems to have originated within the bone, and has perforated the inner and outer tables of the vault. These apertures have sharp and irregular margins, but the internal appearance is smooth and oval. Possible cyst? Further hollows present to the right of the cruciform eminence, but these have only penetrated the inner table and look more like arachnoid granulations. Further arachnoid granulations visible on the inner surfaces of the parietals and frontal. Both humeri are slightly bowed medio-laterally, with a gentle curve at the junction of the mid and distal thirds of the shaft. The tip of the spinous process of C7 is enlarged and flattened antero-posteriorally). The posterior surface is covered with irregular osteophytes & porosity, and the superior and lateral margins are sharp. Possible avulsion fracture of tip – clay shovellers' fracture. The tip of the spinous process of C6 is bifid, and the right prong is also flattened and slightly porous; the left prong tip is damaged post-mortem. T1 – the very tip of the spinous process has been lost post-mortem, but what is present seems normal. Cribra orbitalia (Grade 2), bilateral, small foramina present in both orbits. Bilateral maxillary sinusitis – spicules of lamellar bone on sinus walls, especially on anterior right side.
Dental Health	32 tooth positions; 18 teeth; 12/32 lost AM; 2/32 lost PM 7/18 teeth with caries, 9 lesions; calculus (slight to heavy); 2 abscesses ($L1^2$ & RP_2); considerable periodontal disease with cratering of alveolar bone around roots of lower incisors; RI^2 – crown destroyed by large carious lesion, root sheared away on buccal side leaving flat smooth vertical surface with a small flake of root on the buccal side close to the level of the alveolar bone (hairline crack separates it from the rest of the root) – AM fracture of tooth. LM^1 tilted mesially, reducing distance between crowns P^1 and M^1

	Right Dentition								Left Dentition							
Present	AM	AM	AM	AM	P	P	P	P	P	P	P	P	AM	P	P	P
Calculus	-	-	-	-	-	-	-	S mbld	S bdm	-	S bmld	S bdl	-	S bmld	S mlb	M dblm
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	La	-	-	La	-	Sd	-	Mb Md	So Mm	So
Wear	-	-	-	-	8	7	8?	6	5	-	6	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	AM	P	AM	PM	PM	P	P	P	P	P	P	AM	AM	AM	AM	AM
Calculus	-	-	-	-	-	S bd	H lbm	H lmbd	H lbmd	H blm	S blm	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	La	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	5	4	4	4	4	4	-	-	-	-	-

Skeleton Number	**056**
Period	Post-Medieval
Preservation	Good (Grade 2), severe fragmentation
Completeness	80-90%; cranium, mandible & maxilla, ear ossicle (incus x1); manubrium & sternum; vertebrae – atlas (arch), axis (body & arch), C3-7, T1-12 (fragmented), L1-5, S1-5, Cx1; 9 right ribs, 11 left ribs; shoulders; arms; hands (RMC1 & LMC1, plus 6 unidentified metacarpals, 6 proximal, 4 intermediate

	& 1 distal phalanges); pelvis (ilia, ischia, pubes); right leg (femur, proximal 1/3 tibia, proximal & distal fibula); left leg (femur, proximal 2/3 tibia, fibula); feet (7 right tarsals, 7 left tarsals, RMT1-5, LMT1-5, 6 proximal, 1 intermediate & 1 distal phalanx)
Age	8-10 years (juvenile)
Sex	-
Stature	-
Non-Metric Traits	Ossicle in lambdoid (R); parietal foramen (L); extrasutural mastoid foramen (R); open foramen spinosum (L); accessory lesser palatine foramina (bilateral) Allen's fossa (R); hypotrochanteric fossae (bilateral); third trochanters (bilateral)
Pathology	Cribra orbitalia (Grade 4), right side Cleft arches in S4-5
Dental Health	10 deciduous teeth present, all erupted; 1probably exfoliated (or lost AM) 17 permanent teeth – of which 4 erupting & 4 unerupted (all four second molars, plus LC_1) DEH 2 permanent teeth; LI^2 smaller in size than RI^2 & crown tending towards peg shape (is narrow mesio-distally & slightly rounded in occlusal outline although still maintaining incisor shape)

	Right Dentition								Left Dentition							
Present	-	P(U)	P	P	P	P	P(E)	P	P	P(E)	P	P(E)	P	P	P(U)	-
Calculus	-	-	F m	F bl	F d	F b	-	-	-	-	-	-	F d	F md	-	-
DEH	-	-	-	-	-	-	L	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	1	2	3	2	1	1	1	1	2	1	2	1	-	-
Maxilla	**-**	**7**	**6**	**e**	**d**	**c**	**2**	**1**	**1**	**2**	**c**	**4**	**e**	**6**	**7**	-
Mandible	-	**7**	**6**	**e**	**d**	**c**	**2**	**1**	**1**	**2**	**c**	**d**	**e**	**6**	**7**	**-**
Present	-	P(U)	P	P	P	P	P(E)	P	P	P	P	AM/ exfoliated	P	P	P(U)	-
Calculus	-	-	F l	F md	F d	-	F l	-	-	-	F bm	-	F d	F d	-	-
DEH	-	-	-	-	-	-	-	-	-	L	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	1	2	3	2	2	1	1	1	2	-	2	2	-	-

Skeleton Number	**077**
Period	Medieval/ Post-Medieval
Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	70-80%; cranium, mandible & maxilla; vertebrae – C1-7, T1 & fragments at least 5 thoracic vertebrae, fragments at least 5 lumbar vertebrae, S4-5, Cx1; 6 right ribs, 7 left ribs, unsided rib frags; right shoulder, left scapula; right arm; left humerus; hands (6 right carpals, 7 left carpals, RMC1-5, LMC1-5, 4 proximal, 4 intermediate & 4 distal phalanges); pelvis; legs (left fibula lost pm); feet (7 right tarsals, 7 left tarsals, RMT1-5, LMT1-5, 9 proximal, 3intermediate & 3 distal phalanges)
Age	17-20 years (young adult)
Sex	Male?
Stature	169.6cm ±3.37 (tibia)
Non-Metric Traits	Highest nuchal line (R); ossicles in lambdoid (bilateral); ossicles at asterion (bilateral); sutural mastoid foramen (bilateral) Transverse foramen bipartite (1/1 R, 3/3 L); circumflex sulci (bilateral); accessory sacral facet (R); acetabular crease (L); hypotrochanteric fossae (bilateral); third trochanter (R); lateral tibial squatting facet (R); peroneal tubercle (L); lateral talar extension (R)
Pathology	Fused pair of intermediate and distal foot phalanges Small lytic lesion (8 x 5mm, 2.6mm deep) in the head of the right femur, slightly posterior and inferior to the fovea capitis. Margins sharp, irregular outline, floor of lesion irregular, edges slightly overhanging hollow. Left head too damaged to observe.

	Cribra orbitalia, right side (Grade 2), left side (Grade 3)
Dental Health	30 tooth positions; 29 teeth (2 of which loose); 1/30 lost AM; 1/30 lost PM; 1 not present/ unerupted 1/30 teeth with caries; calculus (flecks to heavy), localised area of heavy calculus on upper left teeth, including on occlusal surfaces, one of occluding teeth (LM_1) lost AM; DEH one tooth; slight periodontal disease; LP_2 rotated slightly mesial to lingual; right side of upper dental arcade slightly concave on buccal side, but left side could look different due to PM loss LP^1

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	PM	P	P	P	P
Calculus	-	F m	-	-	-	F b	F b	F m	S dm	S bdm	S bmld	-	H a	H a	H a	M dbm
DEH	-	-	-	-	-	-	-	-	L	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	Sd	-	-
Wear	1	2	5	2	2	3	2	4	4	3	4	-	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	P	P	P	P	P	P	P	AM	P	NP/U
Calculus	F m	F md	F md	S md	S md	S mbdl	S bmd	S lmbd	S md	F md	M blmd	S mdb	S bdm	-	S bmdl	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	5	3	3	3	4	4	4	4	4	3	2	-	2	-

Skeleton Number	**078**
Period	Post-Medieval
Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	50-60%; cranium, mandible & maxilla; vertebrae –atlas (L + R arches), 3 R & 3 L cervical arches, 3 R & 1 L thoracic arches, 3 R & 3 L lumbar arches; 7 right ribs, 8 left ribs; shoulders, right arm, left arm (ulna lost pm); pelvis (ilia, R ischium); femora
Age	1-2½ years (juvenile)
Sex	-
Stature	-
Non-Metric Traits	Parietal foramen (L); posterior condylar canal open (L) Transverse foramen bipartite (1/3 R, 1/3 L); hypotrochanteric fossae (bilateral)
Pathology	Cribra orbitalia (Grade 2), bilateral, very fine pinprick holes clustered along anterior margin. Some porosity present in both maxillary sinuses but could be related to eruption of teeth
Dental Health	3 deciduous teeth present, 1 erupted, 2 erupting; 7 deciduous teeth lost pm; 3 permanent teeth present (LI^2, RI_2 & LM_1), all unerupted

	Right Dentition					Left Dentition				
Present	P (E)	P	PM	PM	PM	PM	PM	PM	PM	P(E)
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	-	1	-	-	-	-	-	-	-	-
Maxilla	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Mandible	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Present	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-

DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**080**
Period	Post-Medieval
Preservation	Moderate (Grade 3), slight fragmentation
Completeness	30-40%; mandible; one unidentified thoracic vertebra, T10-11 (or 11-12); 9 right ribs, 4 left ribs, unsided rib frags; right scapula, left clavicle; right ulna & radius; left ulna & radius; pelvis; right leg (femur, fibula), left leg (femur, tibia); feet (2 right tarsals, 2 left tarsals, RMT2-3, LMT2)
Age	36-45 years (old middle adult)
Sex	Female
Stature	163.0cm ±3.55 (femur & tibia)
Non-Metric Traits	Circumflex sulcus (R); third trochanters (bilateral); lateral tibial squatting facet (L); peroneal tubercle (L); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral); os trigonum (bilateral); lateral talar extensions (bilateral)
Pathology	Schmorl's nodes T10-11 (or 11-12), and unidentified thoracic vertebra OA hips Both ulnae have a pronounced posterior curve in the shaft at the junction of the proximal and mid thirds, more so than normal. The curve is more pronounced in the right ulna compared to the left. The distal half of the right ulna shaft is also curved medially with the distal end curving back to lateral. The left ulna has a slight curve in the proximal-mid third of the shaft, with the distal half angled medially (distal end lost pm). The right radius has a pronounced lateral curve in the mid third of the shaft, possibly made to look worse by pm damage to the lateral side. It also has more of a posterior curve in the mid third of the shaft than normal. The left radius has a slight lateral curve at the midshaft, no real posterior curve, and looks much straighter than right radius. However, distal joint surface of left radius possibly angled to face more medially than usual & possibly rotated slightly medially. Both humeri lost pm. Both femora have necks angled superiorly – coxa valga. Distal third of thirds of shafts rotated medially & slight medial curve of shaft at the junction of the mid & distal thirds. Distal thirds of shafts possibly slightly expanded, with a gentle bulge medially and laterally. Left tibia definitely bowed, with a pronounced medial curve at the junction of the proximal and mid thirds of the shaft, with the proximal joint surface angled slightly laterally as a result. Proximal end rotated medially. Right tibia lost pm. Right fibula seems fairly straight – has a slight posterior curve across the length of the shaft, but this probably normal. Distal end much rounder in cross-section than normal, not flattened. Left fibula lost pm. Os coxae – the anterior thirds of both iliac crests are flared outwards (laterally) The sacrum is moderately curved antero-posteriorally, but does not form a sharp angle (is a fairly even curve across the whole length). However, is also curved medio-laterally – the right ala is convex along its superior surface and is higher than the left ala, which is concave along its superior surface. The superior surface of the body of S1 is angled slightly to face left. When viewed from the anterior, the superior margin of the body of S2 is off-set more to the R compared to the inferior margin of S2. The inferior part of the left auricular surfaces also curves laterally. There is a ridge of lamellar bone between the bodies of S1-2 on the anterior surface. The superior right anterior foramen is more oval and elongated along the superior inferior axis, whereas the left anterior superior foramen is rounder. Overall looks like the sacrum has scoliosis. T10 (or 11) spinous process curved to the right. Ossification of the ligamentum flavum on the inferior right side. Striated lamellar bone on the medial & lateral mid thirds of the left tibia shaft. Subtle striated lamellar bone on the mid femoral shafts, predominantly lateral-posterior surfaces but some on medial –posterior surfaces. Left calcaneus – small crescent removed from the anterior talar facet along the medial-anterior border (medial superior border of cuboid facet), surface of crescent porous and rough. Enthesophyte on lateral side of anterior calcaneus at superior lateral corner of cuboid facet, projecting anteriorly. Right calcaneus normal. Fracture or NMT? Both second metatarsals have raised flattened areas (c. 5mm diameter) proximal to the heads on the medial dorsal surfaces of the shafts. The surfaces are slightly roughened, but otherwise look like

	facets extending from the head.															
Dental Health	16 tooth positions; 2 teeth; 9/16 lost AM; 5/16 lost PM 1/2 teeth with caries; calculus (flecks); DEH one tooth															
	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	AM	AM	AM	AM	PM	P	PM	PM	PM	PM	P	AM	AM	AM	AM	AM
Calculus	-	-	-	-	-	F m	-	-	-	-	F md	-	-	-	-	-
DEH	-	-	-	-	-	L	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	Lo	-	-	-	-	-
Wear	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**082**
Period	Post-Medieval
Preservation	Poor (Grade 4), severe fragmentation
Completeness	30-40%; cranium, left mandible; atlas & axis; right & left scapulae; arms (incomplete); fragments pelvis; legs (incomplete); feet (4 right tarsals, 3 left tarsals, RMT5, LMT1 & 5)
Age	18+ years (adult)
Sex	Female?
Stature	-
Non-Metric Traits	Metopic suture; ossicle at parietal notch (L); extrasutural mastoid foramen (R); open posterior condylar canals (bilateral); double anterior condylar canal (L) Acetabular creases (bilateral); lateral tibial squatting facet (R); double anterior calcaneal facet (R); double inferior talar facets (bilateral); medial talar facet (L); lateral talar extension (L)
Pathology	OA hips Lamellar bone & some porosity in frontal sinus
Dental Health	0 tooth positions; 0 teeth

Skeleton Number	**085**
Period	Post-Medieval
Preservation	Poor (Grade 4), moderate fragmentation
Completeness	60-70%; cranium, mandible & partial maxilla; part manubrium; axis (R arch), 2 fragments cervical vertebra, 11 fragments from at least 11 thoracic vertebrae, 2 lumbar bodies; part R ala of sacrum; 10 right ribs, unsided rib frags; right shoulder, left clavicle; arms (incomplete); hands (left hamate); pelvis (right ilium, small part left acetabulum); legs; feet (5 right tarsals, 3 left tarsals, RMT1-5, 2 unidentified MT shafts, 2 proximal phalanges)
Age	18-25 years (young adult)
Sex	Male?
Stature	166.4cm ±2.99 (femur & tibia)
Non-Metric Traits	Ossicles in lambdoid (bilateral); parietal foramina (bilateral); ossicle at parietal notch (L); ossicle at asterion (L); sutural mastoid foramen (L); posterior condylar canals open (bilateral); double anterior condylar canal (L); accessory lesser palatine foramen (R) Circumflex sulcus (R); acetabular crease (L); peroneal tubercles (bilateral)
Pathology	Faint striated lamellar bone on medial midshafts both tibiae & on posterior-medial & posterior-lateral

	midshafts both femora Cribra orbitalia (Grade 2), left side
Dental Health	17 tooth positions; 25 teeth (of which 9 loose, 3 erupting & 1 impacted); 1/17 lost PM 3/25 teeth with caries; calculus (flecks); DEH; all four third molars visible at varying stages of eruption. RM^3 – only small aperture in alveolar bone, crown well below level of CEJ RM^2; LM^3 – crown partially emerged through alveolar bone, tip of cusps past CEJ LM^2 on lingual side; RM_3 – crown partially emerged, tip of cusps level with midpoint of crown RM_2, erupting straight up; LM_3 – crown partially emerged through alveolar bone but erupting at an angle with occlusal surface tilted mesially & cusps in contact with distal CEJ LM_2, impacted.

	Right Dentition								Left Dentition							
Present	P(E)	P	P	P	P	P	P	P	P	-	P	P	P	-	P	P(E)
Calculus	-	F l	F md	-	F m	F md	F d	-	F d	-	-	F b	-	-	F lb	-
DEH	-	-	L	-	L	L	-	L	-	-	L	L	L	-	L	-
Caries	-	-	-	-	Sd	-	-	Sd	-	-	-	-	-	-	-	-
Wear	-	2	2	1	2	2	2	2	2	-	2	1	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(E)	P	P	P	PM	P	-	-	-	-	P	P	P	P	P	P(E)
Calculus	-	S bm	F d	-	-	Crown broken	-	-	-	-	S md	-	-	-	-	-
DEH	-	-	-	L	-		-	-	-	-	L	L	L	L	-	-
Caries	-	-	La	-	-		-	-	-	-	-	-	-	-	-	-
Wear	-	2	-	1	-		-	-	-	-	2	1	1	2	2	-

Skeleton Number	**088**
Period	Post-Medieval
Preservation	Very good (Grade 1), slight fragmentation
Completeness	80-90%; cranium, mandible & maxilla, hyoid (body); sternum; vertebrae – C1-7, T1-12, L1-5, S1-4; 12 right ribs, 12 left ribs, unsided rib frags; shoulders; arms; hands (2 right carpals, 3 left carpals, RMC1-4, LMC1-5, 7 proximal phalanges); pelvis; legs; part left foot (3 left tarsals)
Age	36-45 years (old middle adult)
Sex	Male
Stature	170.5cm ±2.99 (femur & tibia)
Non-Metric Traits	Highest nuchal lines (bilateral); ossicles in lambdoid (bilateral); ossicles at parietal notches (bilateral); extrasutural mastoid foramina (bilateral); posterior condylar canals open (bilateral); palatine torus; bridging of supraorbital notches (bilateral), accessory infraorbital foramen (L), accessory supraorbital foramen (R) Transverse foramen bipartite (2/2 R, 2/3 L); circumflex sulci (bilateral); accessory sacral facet (R); exostosis in trochanteric fossae (bilateral)
Pathology	Schmorl's nodes T10-12, L2 DJD vertebral bodies – C3-6 (with eburnation of bodies C3-4 & C5-6), L2, L4-5; OA dens axis + facet on atlas; OA facets C3-7, T1-11, L2-5, S1; OA costal facets, with eburnation on L transverse process T1. Spinal OA possibly associated with trauma, or could be independent of trauma. T4-5 fused along right side of the posterior border of the body, with small osteophytes bridging the joint surface. The entire right apophyseal facets are surrounded by bulging osteophytes, which extend along the lamina. Left lamina also bridged by osteophytes but left apophyseal facets not fused. Slight, subtle vertical ridge of bone traversing the left lamina of T4, possibly a healed fracture? But could be associated with the joint changes and fusion of vertebrae. T11-12 fused with large bulging flowing osteophytes on the left side of the body. Small osteophytes are found elsewhere around the body margins, but these have not connected with each other and fused. Joint space preserved. Right apophyseal facets interlocking tightly but do not seem to be fused around the margins. The left apophyseal facets seem relatively normal (what can be seen of them from the sides). Probably secondary to crush fracture of T12 (see below) T8-9 – there is a large horizontal osteophyte on the inferior right body of T8, meeting a similarly large

horizontal osteophyte on the superior right body of T9. These meet and interlock, but are not actually fused. Otherwise similar in character to those between T11-12. Probably secondary to crush fractures of bodies (see below).

Also large horizontal thick osteophytes on the superior right anterior body of L5 and L4, and on the inferior right anterior body of L4. Possibly associated with severe OA of right apophyseal facets L4-5? These are around 3-4 times the usual size, considerably altered in shape and topography.

Several vertebrae have crush fractures:

T7 has a slight depression in the anterior half of the inferior body.

T8 – body compressed vertically & slightly wedge-shaped, measuring 14mm vertically at the anterior border of the body. A ring of osteophytes around the superior margin has left the superior body surface slightly concave along the anterior border.

T9 is also wedge-shaped, and also measures 14mm at the anterior body. The inferior body surface has a large fissure running in an arc across the surface, each end terminating just anterior to the costal demi-facet. The fissure curves anteriorly, off-set slightly to the left side. A small fissure extends from near the apex of the larger fissure towards the right anterior body. The large fissure is partially filled in on either side, but is deep in the central section. The width ranges from 2-4mm. The area anterior to the fissure is concave and there is a marked step between the two parts of the body surface (posterior to and anterior to the large fissure). Also osteophytes buttressing the left anterior wall of the body, and a large osteophyte projecting from the anterior border of the right inferior demifacet (with a corresponding osteophyte on the head of right Rib 10). The large osteophytes between T8-9 (described above) probably relate to these fractures.

T10 – body normal, anterior body 23mm vertically.

T11 – also seems normal, anterior body measures 22.5mm, apart from the fact it is fused to T12.

T12 – wedge-shaped body, anterior body 14mm vertically & buttressed by pillars of osteophytes. Fused to T11 on left side (see above), probably in response to the fracture.

L2 – superior body slightly concave on right side, with corresponding frill of osteophytes along right side of superior body.

The sternum seems short (80mm long), and likely that lowest segment missing as three rib facets on each side & 2 facets on inferior surface. The posterior surface is relatively straight and smooth, with a slight bulge around the junction between the first and second body segment. Immediately inferior to this gentle bulge there is an area of flattened smooth lamellar bone, the superior margin of which follows a roughly horizontal line across the body. The anterior surface of the body has a marked concavity in the inferior half of the first segment, which extends onto second segment. The lower segments bulge anteriorly, so that the lower half of the body is quite thick. The sternum measures 10mm thick at the most concave part of the superior part, and 20mm thick at the inferior body. The three rib facets on each side bear marked projections of osteophytes (ossified cartilage), which are difficult to measure exactly, but project around 17mm from the sides of the body. These osteophytes curve along their length, surrounding a deep hollow in the centre. The osteophytes extend onto the anterior body of the sternum, especially at the uppermost pair of ossified rib facets (located between segments 1-2). The superior half of the first segment is also covered in thick osteophytes. Unfortunately the manubrium has been lost pm. Possible fracture of sternum.

Fourteen rib fractures observed. Ribs ordered by shape and also checking articulations with vertebrae, enabling specific ribs to be identified:

Left rib 8 – healed fracture in midshaft, with subsequent pm break through fracture site. Gentle bulge on internal, inferior & superior surfaces, no visible malalignment, smooth and well modelled lamellar bone.

Left rib 9 – at least three fractures (sternal end not identified); one fracture just distal to the tubercle, with long thin spicules of lamellar bone projecting from superior surface (angled medially and superiorly) and inferior surface (angled laterally and inferiorly). No visible displacement, internal surface smooth with gentle bulge. Second fracture in midshaft about level with the fracture in rib 8. Again with pm break through the fracture site. Gentle bulge on internal, superior and inferior surfaces, much flatter on external surface, very smooth and well modelled lamellar bone with little displacement of fragments. Third fracture around the junction of the mid and sternal thirds, again smooth rounded lamellar bone with a subtle bulge on the interior and inferior surfaces and a slight bulge on the exterior. Very little displacement evident, but not much of the rest of the sternal shaft present to observe.

Left rib 10 – subtle bulge on interior and inferior of shaft just proximal to angle, smooth lamellar bone, no visible displacement.

Left rib 12 – healed fracture immediately distal to head, internal surface of neck thickened with lamellar bone, with slight bulge on superior and inferior margins. External surface has slightly irregular spicules & porosity. Possible slight displacement of shaft anteriorly, with some rotation so internal surface angled more inferiorly.

Right rib 10 – spicules of lamellar bone projecting from the inferior margin of the neck adjacent to the head. External surface roughened & spicules of lamellar bone present. Internal surface smooth &

	quite concave. Large osteophytes projecting from the anterior border of the superior half of the head facet (corresponding osteophyte on T9). Possible fracture. Remaining rib fractures all in unidentified and unsided shaft fragments. 1 – immediately proximal to sternal end, possibly left rib. Pronounced bulge of lamellar bone on external surface, small bulges on inferior, superior and internal surfaces. External surface slightly irregular with some porosity, margins of lamellar bone reasonably clear. Slight external displacement of sternal end. 2 – subtle bulge in shaft fragment, on internal, superior and inferior surfaces, very smooth lamellar bone, no visible displacement. 3 – 2 fractures in shaft fragment close to sternal end, c 40mm apart. Both have smooth & flat internal surfaces, bulges on inferior and superior margins & rounded bulges on external surfaces. Smooth lamellar bone, subtle margins, no visible displacement. 4 – slight bulges in superior & inferior margins of shaft fragment close to sternal end. External surface slightly concave, internal surface smooth and flat. 5 – bulges in shaft fragment at inferior and superior margins, subtle bulge on external surface, internal surface smooth and flat. 6 – pm break through fracture so have area just next to break. Slightly bulged on external surface & inferior margin, internal surface and superior margin too damaged to observe. All rib fractures well healed, no evidence for infection and very little or no evidence for displacement or poor alignment. Seems likely that connected with vertebra fractures, as where the positions can be identified they occur in lower ribs associated with the fractured vertebrae. Rib cortices seem thin and not much trabecular bone. OA medial & lateral right clavicle, & right elbow. Small unidentified fragment of bone (part distal ulna?) with porosity & eburnation. Right elbow has pronounced joint changes – very large osteophyte occupying the olecranon fossa, with a rounded knob 11mm in diameter projecting 11mm posteriorally beyond the surface of the distal humerus. Osteophytes also occupying the coronoid fossa & radial fossa of the humerus. Marginal osteophytes (5-9mm in size) along either side of the posterior distal joint surface of the humerus, and along the superior margins of the trochlea and capitulum. The capitulum is almost entirely eburnated, with fine porosity over the inferior and lateral margins. The osteophytes in the olecranon, radial and coronoid fossae severely restrict the range of movement possible at the elbow – would have prevented full extension and flexion. Right ulna head massively enlarged with osteophytes around the lateral margins, large thick osteophytes on the coronoid process (c. 12mm thick superior-inferior), and a large rounded nodule of bone on the superior lateral margin f the olecranon process next to the joint surface. The right radius head is enlarged, with large osteophytes around the circumference & projecting distally. The entire proximal surface of the head is eburnated and porous. The radial tuberosity is surrounded by enthesophytes on the proximal, distal and posterior margins, and the surface of the tuberosity is porous. Left elbow normal. The pelvis has pronounced enthesophytes on both ischial tuberosities, occupying the entire superior part of the tuberosities, creating an undulating and irregular surface. Some porosity also present. Also enthesophytes along iliac crests & on greater trochanters of femora. There is a transverse linear lytic lesion on the posterior cranium, on the right parietal extending over the sagittal suture to the left parietal around a quarter of the way along from lambda. The majority of the lesion is on the right parietal, with only 11mm extending onto the left parietal. The lesion is 51mm long medio-laterally & 18mm wide. The ends are rounded creating an elongated oval shape. The superior half of the lesion os linear and fairly straight & flat. The inferior half is angled postero-inferiorly and has a somewhat irregular surface. The floor of the lesion is covered with well remodelled lamellar bone, and is slightly porous. The edges are rounded lamellar bone, which look like it overlaps the original margins of the lesion. Likely antemortem healed blade injury, delivered from above and directed slightly posteriorally. The inferior part of the lesion probably where a flake of bone broke away from the vault.
Dental Health	28 tooth positions; 10 teeth; 10/28 lost AM; 8/28 lost PM 8/10 teeth with caries; calculus (slight to moderate); moderate to considerable periodontal disease; slight crowding of anterior mandible

	Right Dentition								Left Dentition							
Present	AM	AM	AM	AM	PM	PM	-	-	PM	-	-	PM	AM	AM	AM	AM
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	AM	AM	P	PM	P	P	PM	P	P	P	P	P	P	P	PM	AM
Calculus	-	-	S bldm	-	S mbld	S mlbd	-	M lmdb	M lmdb	M blmd	S blmd	S lmdb	-	-	-	-

DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	Sb	-	Sd	-	-	-	Sd	Sd	Sd	Sd	La	La	-	-
Wear	-	-	6	-	5	4	-	5	5	5	5	3	-	-	-	-

Skeleton Number	**093**	
Period	Medieval/ Post-Medieval	
Preservation	Moderate (Grade 3), severe fragmentation	
Completeness	30-40%; cranium, mandible & maxilla; vertebrae – axis dens, fragments of cervical vertebrae (5 body fragments of at least 4 vertebrae, 3 L arch frags. 2 R arch frags.); part left scapula; fragments of right humerus, radius and ulna; proximal left humerus; small part right acetabulum; fragments of right femur, tibia and fibula; left leg; feet (3 right tarsals, 4 left tarsals, RMT1 & 3, LMT1, 4-5, 4 unidentified MTs)	
Age	26-35 years? (young middle adult)	
Sex	Male	
Stature	-	
Non-Metric Traits	Ossicles in lambdoid (bilateral); sutural mastoid foramen (R); open foramen spinosum (L); palatine torus; mandibular tori (bilateral); bridging of supraorbital notch (L); retained sutura mendosa (bilateral; not scored systematically) Double anterior calcaneal facet (L); double inferior talar facet (L)	
Pathology	Bilateral maxillary sinusitis – cobweb of lamellar bone spicules, more pronounced on right side	
Dental Health	28 tooth positions; 19 teeth (1 of which loose) 2/29 teeth with caries (small lesions at buccal CEJ); calculus (flecks to slight); DEH; 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	S d	S dl	S mld	S md	S md	S md	S d	S md	-	-	S d	S md	S md	S md	S ml	S dlm
DEH	-	-	L	-	-	-	L	-	L	-	-	-	-	L	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Sb
Wear	2	3	4	3	2	2	3	4	4	3	3	3	4	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
Calculus	F m	F md	F md	F d	F d	S m	-	-	-	S lm	S lm	S dm	S dm	F md	F ml	S lmd
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-
Caries	-	Sb	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	2	3	4	2	2	3	-	-	-	4	3	3	3	4	3	2

Skeleton Number	**094**	
Period	Medieval/ Post-Medieval	
Preservation	Moderate (Grade 3), extreme fragmentation	
Completeness	10-20%; partial cranium, left mandible & part left maxilla, ear ossicle (malleus x1); midshaft right humerus; unsided tibia shaft fragment; c. 18 unidentified long bone shaft fragments	
Age	6-8 years (juvenile)	
Sex	-	
Stature	-	
Non-Metric Traits	Ossicle at lambda	
Pathology	-	
Dental Health	8 deciduous teeth present, all erupted (of which 2 loose); 19 permanent teeth present, of which 4	

				erupted, 5 possibly erupted (RI^2, LI^1, RI_2 RI_1, & LI_1) and 10 unerupted (RM^2, LC^1, LP^1, LP^2, LM^2, RM_2, RP_2, RP_1, RC_1 & LM_2) Calculus (flecks to slight)											
	Right Dentition								Left Dentition							
Present	-	P(U)	P	-	P	-	P	-	P	-	P	P	P	P	P(U)	-
Calculus	-	-	F b	-	S b	-	-	-	-	-	F b	F md	F md	F md	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	1	-	3	-	1	-	1	-	4	3	2	1	-	-
Maxilla	**-**	**7**	**6**	**-**	**d**	**-**	**2**	**-**	**1**	**-**	**c**	**d**	**e**	**6**	**7**	**-**
Mandible	**-**	**7**	**6**	**e**	**-**	**-**	**2**	**1**	**1**	**-**	**c**	**d**	**e**	**6**	**7**	**-**
Present	-	P(U)	P	P	-	-	P	P	P	-	P	P	P	P	P(U)	-
Calculus	-	-	F l	-	-	-	F b	F d	S d	-	S ldb	F d	F bd	F l	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	1	3	-	-	2	1	2	-	4	3	4	1	-	-

Skeleton Number	**095**	
Period	Medieval/ Post-Medieval	
Preservation	Moderate (Grade 3), extreme fragmentation	
Completeness	<10%; partial cranium (basilar of occipital, petrous portions of temporals, vault fragments), ear ossicle (incus x1)	
Age	1-3 years (juvenile)	
Sex	-	
Stature	-	
Non-Metric Traits	-	
Pathology	-	
Dental Health	4 deciduous teeth present (all loose), all probably erupted; 4 permanent teeth present (RI^1, LI^1, LM^1, & RM_1?), all unerupted	

	Right Dentition					Left Dentition				
Present	P	-	-	-	-	-	-	-	-	P?
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	1	-	-	-	-	-	-	-	-	1
Maxilla	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Mandible	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Present	-	-	-	-	-	-	-	-	1	1
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	P	P

Skeleton Number	**098**
Period	Post-Medieval
Preservation	Poor (Grade 4), moderate fragmentation
Completeness	50-60%; cranium, mandible & maxilla; vertebrae – atlas, axis, spinous process C7/T1?, arch T1/2, R arch mid thoracic, T10-12, L1-5, S1-2; 11 right ribs, 8 left ribs, unsided rib frags; shoulders; arms; hands (1 right carpal, 1 left carpal, RMC1-2, LMC1-5, 5 proximal & 1 intermediate phalanx); right os coxa, small part left ilium; legs; feet (2 right tarsals, 2 left tarsals, RMT1, LMT1, 1 proximal & 1 distal phalanx)
Age	18+ years (adult)
Sex	Female?
Stature	161.8cm ±3.72 (femur)
Non-Metric Traits	Parietal foramen (L); extrasutural mastoid foramen (L); posterior condylar canal open (R); double anterior condylar canal (L); incomplete foramen ovale (R) Lateral talar extension (L)
Pathology	Schmorl's node T11 Maxillary sinusitis in left sinus – cobweb of lamellar bone spicules and thin plaques of lamellar bone; right side lost pm Thick deposits of lamellar bone on internal occipital along the superior branch of the cruciform eminence (sagittal sulcus) and extending into right transverse sulcus, with thinner deposit in left transverse sulcus. Bone is rounded and swollen-looking, with scattered fine porosity & linear vessel grooves. Lamellar bone extends onto squama on either side of sagittal sulcus, and onto sigmoid sulcus of right temporal. Woven bone on the visceral surface of one left rib, on the shaft just distal to the angle. The deposit is focussed along the edge of a post-mortem break and would look like a healing fracture except that the deposit is only on the visceral surface (not on the superior, inferior or external surfaces). The rest of the shaft is lost post-mortem More subtle deposit of woven bone on visceral surface of one right rib, again just distal to angle. Porous, slightly raised nodules of bone, irregular – possibly transitional to lamellar Right tibia has striated lamellar bone on the medial midshaft, plus small subtle deposits of woven bone transitional to lamellar on the medial mid third of the shaft – irregular outline, some raised rounded nodules, blends well into surrounding bone. The left tibia has striated lamellar bone on the medial midshaft Border shift at lumbo-sacral border. Only S1 & S2 are present from the sacrum. Both are heavily eroded at the anterior bodies, but seems likely that sacral promontory is at S2 not S1. The left ala is lost post-mortem. On the right side there is a pseudoarthrosis between the alae of S1 and S2, with the ala of S1 angled inferiorly, and the S2 ala angled superiorly. They meet at an irregular elongated and roughened contact area. The apophyseal facets are not fused, and seems unlikely that the anterior bodies were fused (though damaged post-mortem so cannot tell). Five lumbar vertebrae are present, L1 is typical L1-shape and L5 is typical L5-shape. Unfortunately most of the rest of the spine has been lost post-mortem. T10-12 are present, and T12 is typical T12-shape. Possible partial lumbarisation of S1, but could be sacralisation of an additional lumbar vertebra
Dental Health	24 tooth positions; 24 teeth (5 of which loose); 3/24 lost AM; 2 third molars not present or unerupted 11/24 teeth with caries, 19 lesions; calculus (flecks to heavy); DEH; slight periodontal disease; abscess at LM^2 – buccal roots exposed with hollow around apices of roots, surrounding alveolar bone densely porous and speculated RM_1 has probably been lost AM – alveolar bone is thin & covered in small nodules, RM_2 is leaning mesially and has possibly drifted mesially as well. RM_3 is in the process of erupting – crown tips level with CEJ of RM_2. Possible that the tilting and movement of RM_2 has provided space for M_3 to erupt LM_3 probably not present as alveolar bone distal to LM_2 very thin and ramus very thin; crowns of molars are wider so unlikely there is an unerupted molar present Virtually no alveolar bone distal to LM^2 & very little area available where an unerupted LM^3 could be, so seems likely that not present

	Right Dentition								Left Dentition							
Present	-	-	P?	P?	P	P	P	-	P	P	P	P	P	AM	P	NP
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	L	-	L	-	-	L	L	-	L	-	-	-
Caries	-	-	La	La	Mm	-	-	-	-	-	Sd	La	Sd	-	La	-

													Sm			
Wear	-	-	-	-	1	2	1	-	2	1	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(E)	P	AM	P	P	P	P	P	P	P	P	P	P	AM	P	NP/U
Calculus	-	-	-	S d	S l	H l	M lb	S lm	S ml	S l	F l	-	-	-	-	-
DEH	-	-	-	-	-	L	P	L	-	-	L	-	-	-	-	-
Caries	-	La	-	-	-	-	-	-	-	-	-	Sd	Sm	-	La	-
Wear	1	-	-	1	1	2	2	2	3	2	2	1	1	-	-	-

Skeleton Number	**101**	
Name	Roman[d?] Marjerrison (coffin plate)	
Date of Death	4th December 1895 (coffin plate)	
Preservation	Moderate (Grade 3), slight fragmentation	
Completeness	50-60%; cranium, mandible (R) & maxilla, ear ossicle (incus x1); vertebrae – fragments of 11 thoracic arches, L1-5, 1 sacral arch (R); 12 left ribs, 11 right ribs; shoulders, humeri; pelvis (ilia, ischia, L pubis); femora	
Age	Osteological: 7-11 months	Coffin plate: 10 months
Sex	Osteological: -	Coffin plate: male
Stature	-	
Non-Metric Traits	Parietal foramen (R); accessory supraorbital foramen (R)	
Pathology	Small (7 x 4mm), thin, triangular patch of woven bone in the centre of the right orbital roof; surrounding area, especially the anterior margin of the orbit, has fine scattered porosity and deposits of what look like thin layers of lamellar bone. The left orbit has fine pinprick foramina along the anterior margin of the orbit, which may be cribra orbitalia (or possibly porosity in remodelled lamellar bone). Lamellar bone on the endocranial surface of the frontal bone – thicker and more porous deposits along the frontal crest and coronal sutures, thinner and more patchy areas with faint 'capillary impressions' scattered around squama. Much clearer when viewed under magnification, as some quite subtle. Bands and areas of thin lamellar bone occupying much of the endocranial surfaces of the parietals; again some areas more porous and others showing faint capillary impressions. Porous lamellar bone extending into the right parietal foramen. Thicker area of pale beige & porous woven bone on endocranial surface of occipital, on superior ridge of cruciform eminence, surrounded by thin layers of lamellar bone extending onto much of squama superior to transverse sulci (no bone formation evident inside the sulci, although comes right up to superior margins). Woven bone also present on inferior end of occipital crest, just posterior to the foramen magnum. Small plaque of lamellar bone on the endocranial surface of the right temporal squama. Woven/lamellar bone covering most of lesser wings of sphenoid (superior and inferior surfaces), lamellar bone surrounding foramen rotundum and ovale on greater wings (internal surface) with small patches on greater wings. External cranium: dense, fine porosity on posterior part of parietals along lambdoid sutures, which in places looks like thin layers of lamellar bone laid down on the bone surface. Much of the occipital squama covered in dense & fine porosity, especially along the lambdoid sutures, becoming denser along parts adjacent to occipitomastoid sutures. External surfaces of greater wings of sphenoid densely porous (L side has large area of post-mortem damage, but some porosity still visible around the margins of this); inferior body of sphenoid also covered in dense fine porosity. Lamellar bone present on internal surfaces of vomer. Dense fine porosity occupying much of the posterior maxillary alveolar bone (external), extending up onto posterior external wall of sinus, also surrounding and entering inferior orbital foramen & extending onto frontal process of maxilla. Palate covered in fine dense porosity, especially around the alveolar bone. Changes all bilateral. Mandible damaged post-mortem and left side lost, but porosity evident on internal surface of right coronoid process & internal ramus. Scapulae – fine porosity in supraspinous fossae (both sides), especially towards the lateral ends. Humeri – both have thick area of markedly porous and expanded bone in bicipital grooves, towards the inferior ends. The left humerus has striated lamellar bone along the medial mid and distal shaft, also on posterior distal third of shaft superior to olecranon fossa & extending up	

	towards midshaft (area of post-mortem damage obscures extent). Apparently similar lamellar bone on posterior distal third of right humerus, but much of area lost due to post-mortem damage. Ilia – fine layer of pale coloured lamellar bone on posterior surfaces									
Dental Health	7 deciduous teeth present, all unerupted; 2 permanent teeth present (LI^1 and RM_1), both unerupted									
	Right Dentition					Left Dentition				
Present	P(U)	P(U)	P(U)	PM	PM	PM	PM	PM	P(U)	P(U)
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-
Maxilla	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Mandible	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Present	P(U)	P(U)	PM	PM	PM	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**110**	
Period	Post-Medieval	
Preservation	Moderate (Grade 3), extreme fragmentation	
Completeness	<10%; partial cranium (petrous temporals); midshaft right? femur; unidentifiable small fragments	
Age	9-12 years (juvenile)	
Sex	-	
Stature	-	
Non-Metric Traits	-	
Pathology	-	
Dental Health	3 deciduous teeth present, erupted; 21 permanent teeth present, of which 16 erupted, 2 probably unerupted (RM_2 & LM_2) and 5 unerupted (LP^2, RM_3, RP_2, LP_2, LM_3) Calculus (flecks); DEH	

	Right Dentition								Left Dentition							
Present	-	-	-	P	P	P	P	P	P	P	P	P?	P	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	1	1	1	1	1	1	1	1	1	2	-	-	-
Maxilla	**-**	**-**	**-**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**e**	**-**	**-**	**-**
Mandible	**8**	**7**	**6**	**e**	**4**	**3**	**-**	**-**	**-**	**-**	**3**	**-**	**e**	**6**	**7**	**8**
Present	P(U)	P(U?)	P	P	P	P	-	-	-	-	P	-	P	P	P(U?)	P(U)
Calculus	-	-	F l	-	-	-	-	-	-	-	-	-	-	F l	-	-
DEH	-	-	L	-	-	-	-	-	-	-	-	-	-	L	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	1	1	1	1	1	-	-	-	-	1	-	1	1	1	-

Skeleton Number	**113**
Period	Post-Medieval
Preservation	Moderate (Grade 3), severe fragmentation
Completeness	20-30%; right radius & ulna shaft fragments; fragments pelvis; right femur & fibula (shafts only); left femur, tibia & fibula (shafts only); feet (right talus, RMT1-5, LMT1-5, 3 proximal phalanges)
Age	18+ years? (adult?) (definitely 16+ years)
Sex	Female??
Stature	-
Non-Metric Traits	-
Pathology	Both femora have pronounced vertical bars running the length of the posterior shaft with the result that the femur is much deeper antero-posteriorally than it is wide medio-laterally (R femur midshaft measures 39.41mm A-P, and 26.49mm M-L. Pilasterism
Dental Health	0 tooth positions, 0 teeth

Skeleton Number	**116**
Period	Post-Medieval
Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	40-50%; partial cranium (posterior & inferior vault), mandible, part right maxilla; Vertebrae – 2 cervical (1 body, 1 body + arch), T1-2, T12, plus 2 thoracic arch fragments, L1-5 (arches), part right arch S1; 5 right ribs, unsided rib fragments; right clavicle, left shoulder; arms; hands (2 unidentified metacarpals); pelvis (ilia, right ischium); legs; feet (5 right tarsals, 2 left tarsals, RMT2-4, plus 2 unidentified MTs)
Age	10-12 years (juvenile)
Sex	-
Stature	-
Non-Metric Traits	Ossicle at lambda; ossicles in lambdoid (bilateral); ossicle in sagittal suture (not scored systematically); posterior condylar canal open (L) Hypotrochanteric fossae (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facet (right)
Pathology	Femoral shafts flattened medio-laterally, and especially flat on the medial side of the midshaft.
Dental Health	1 deciduous tooth present (Rdm^2); 21 permanent teeth present, of which 17 fully erupted, 2 lower second molars nearly erupted & RC^1 possibly partially erupted, & RP^2 partially erupted beneath Rdm^2 1/1 deciduous teeth with caries; 2/21 permanent teeth with caries; calculus (flecks to slight); DEH Both upper first molars have square crowns and four roots (2 mesial and 2 distal) – essentially the lingual root has partially divided into two, giving the teeth the appearance of lower molars. RM^1 has an enamel pearl between the mesiobuccal and lingual root. Gaps (diastema) on either side of RP_1 and distal to LP_2. R & L lower second premolars rotated lingual to distal. Rdm^2 – mesial roots resorbed and inferior crown resorbed, but distal roots still present & fully formed to apices (although very flat mesio-distally). RP^2 erupting beneath Rdm^2, with the tips of the cusps past the CEJ of RM^1. RC^1 possibly also only partially erupted, but socket too damaged to ascertain whether it is or not.

	Right Dentition								Left Dentition							
Present	-	-	P	P	P	P(E?)	P	P	-	-	-	-	-	P	-	-
Calculus	-	-	Fd	-	Fd	-	Broken	-	-	-	-	-	-	-	-	-
DEH	-	-	L	-	L	-		-	-	-	-	-	-	L	-	-
Caries	-	-	-	Md So	-	-		-	-	-	-	-	-	-	-	-
Wear	-	-	1	2	2	1		1	-	-	-	-	-	1	-	-
Maxilla	**-**	**-**	**6**	**e**	**4**	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**6**	**-**	**-**
Mandible	**-**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**1**	**2**	**3**	**4**	**5**	**3**	**7**	**-**
Present	-	P(E)	P	P	P	P	P	P	P	P	P	P	P	P	P(E)	-

Calculus	-	-	S dm	S d	S d	S b	-	F l	F l	F l	-	-	F l	-	-	-
DEH	-	-	-	-	-	-	-	-	L	-	P	-	-	-	-	-
Caries	-	-	Lo	-	-	-	-	-	-	-	-	-	-	Lo	-	-
Wear	-	1	-	1	1	1	2	3	3	2	2	1	2	-	1	-

Skeleton Number	**119**	
Name	Matthew Marjerrison	
Date of Death	25th February 1890	
Preservation	Moderate (Grade 3), slight fragmentation	
Completeness	90%+; cranium, mandible & partial maxilla, ear ossicles (incus x1, malleus x1, stapes x1), hyoid (body); sternum & xiphoid; vertebrae – C1-7, T1-13; L1-5, S1-5, Cx1; 13 right ribs, 10 left ribs; shoulders; arms; hands (7 right carpals, 2 left carpals, RMC1-5, LMC1-4, 6 proximal, 2 intermediate & 1 distal phalanx); pelvis; legs; feet (5 right tarsals, 4 left tarsals, RMT1-5, LMT1, 3-5, 5 proximal & 2 distal phalanges, 1 foot sesamoid)	
Age	Osteological: 26-35 years (young middle adult)	Coffin plate: 38 years
Sex	Osteological: Male	Coffin plate: Male
Stature	175.2cm ±2.99 (femur & tibia)	
Non-Metric Traits	Ossicles in lambdoid (R); parietal foramina (bilateral); extrasutural mastoid foramen (L); sutural mastoid foramen (R); posterior condylar canal open (R); double anterior condylar canal (R); bridging of supraorbital notch (L) Sternal foramen; Poirier's facet (R); plaque (bilateral); third trochanters (bilateral); lateral tibial squatting facets (bilateral); peroneal tubercles (bilateral); double inferior talar facet (L); medial talar facet (L); lateral talar extensions (bilateral)	
Pathology	Schmorl's nodes T6-13 Bilateral maxillary sinusitis. Right side has spicules and plaques of lamellar bone on posterior and lateral sinus walls & some transitional woven-lamellar bone, with two perforations in the posterior wall (rounded edges). Left side has porosity only. Probable additional thoracic vertebra (or border shifts at thoraco-lumbar, lumbo-sacral and sacro-coccygeal borders): C1-3 intact, C4-7 damaged but each essentially complete. T1 – spinous process only (rest lost pm), T2-3 – spinous process + R transverse process, T4 – arch, T5 – arch + inferior body, T6-13 intact. L1-5 intact. Sacrum in many fragments but largely complete. All 7 cervical vertebrae are present, and 13 thoracic vertebrae are present. Unfortunately cannot observe the shape of T1, but C7 is fairly typical morphology for C7. T12 is typical T11 morphology, and T13 is typical T12 morphology (i.e. flat superior facets, curved inferior facets & costal facets on pedicles, although right facet smaller than normal for T12). All five lumbar vertebrae typical shape for their position, and L5 as expected (no pedicles, large body, wide & rectangular when viewed from posterior). Damage to sacrum makes shape difficult to assess, but promontory at the superior border of S1. Five body fragments fused together & hiatus level with S3-4. S5 possibly slightly coccygeal in shape, and cornua seem to arc superiorly to fuse with cornua of S5, but difficult to evaluate due to amount of damage. Right ribs far better preserved than left – most are complete, or nearly so, & some are intact. Left side represented by heads and necks only, with most of shafts lost pm. Can only identify a minimum of 10 left ribs (left Rib 1 lost pm). 13 right ribs present. R rib 1 – head and sternal end lost pm, shaft possibly more of a sharp right-angle than normal but otherwise normal. R rib 2 – damaged and sternal end lost, but normal in shape. Ribs 11-13 – articulate with vertebral bodies at head only, and have no facets on the tubercles. Rib 13 – small head and shaft compared to Rib 12, possibly only 36mm long (but sternal end damaged). RMC5 – proximal end expanded, particularly on lateral side. Viewed dorsally the shaft seems to twist more than usual, so the head is rotated medially. Two large & rounded nodules of bone are located on the lateral half of the dorsal surface at the proximal end. The proximal joint surface has a vertical ridge of osteophytes down the centre, running from dorsal to palmar. The lateral joint surfaces (for MC4) are covered in slightly roughened surface osteophytes, with a similar appearance to the corresponding facets on MC4, where the facet outlines are indistinct. No visible changes to the hamate facets for MC4 or 5, except for a thin fringe of osteophytes along the medial joint surface for MC5. Possibly a fracture at the proximal end of MC5, but the medial side shows no visible alteration in shape – maybe a partial fracture, or damage to soft tissues in the area?	
Dental Health	17 tooth positions; 20 teeth (of which 9 loose); 2/17 lost AM; 1/17 lost PM; 3 NP/U; amount of pm damage to mandible and maxilla, combined with destruction of tooth crowns by caries (to leave only roots) makes it difficult to identify specific teeth	

	12/20 teeth with caries, 16 lesions; calculus (flecks to slight); DEH; 2 abscesses (LM^1 & RP^1) Pipe-smoking wear – LC_1 and LP_1 have smooth crescent-shaped wear spanning the distal half of the incisive surface of the canine and the mesial half of the occlusal surface of the premolar. The wear facet is sloped from lingual down to buccal, as if pipe held at an angle (downwards). LC^1 does not have crescent-shaped wear, but the lingual surface is heavily worn and polished, with dentine exposed at the cingulum; LP^1 not present. RC_1 – heavy wear and enamel polishing on lingual surface. RP^1 – heavy wear on occlusal surface, with steeply angled wear running from mid-occlusal crown to below the CEJ on the lingual side. Has partial crescent on mesial side of occlusal surface. RC^1 – has no partial crescent to match that on RP^1, but does have enamel polishing on the buccal side (mesial half of buccal surface flattened and polished). No unusual wear on RP2. Socket for RC1 only partially there, so can't work out what position the tooth was in, & whether or not it was rotated or angled to explain the strange wear pattern

	Right Dentition								Left Dentition							
Present	P	-	P	P	P	P	-	-	-	P?	P	-	AM	P?	P?	NP/U
Calculus	-	-	F b	F bl	F m	F b	-	-	-	-	F d	-	-	-	-	-
DEH	L	-	L	-	L	L	-	-	-	-	L	-	-	-	-	-
Caries	Sm So So	-	-	Sm Sd	Sd	-	-	-	-	La	-	-	-	La	La	-
Wear	1	-	2	1	6	2	-	-	-	7	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	AM	P?	PM	P	P	P	-	P	P	P	P	P	P	P	NP/U
Calculus	-	-	-	-	-	F m	S m	-	S mdl	S blm	F bd	F ld	F ml	-	F dl	-
DEH	-	-	-	-	-	L	-	-	-	-	-	L	-	-	-	-
Caries	-	-	La	-	La	Mb	-	-	-	-	-	-	Sd	La	So So	-
Wear	-	-	-	-	-	2	2	-	3	3	4	3	2	-	2	-

Skeleton Number	**122**	
Name	John(?) Marjerrison (partly illegible coffin plate)	
Date of Death	27th February	
Preservation	Poor (Grade 4), slight fragmentation	
Completeness	90%+; cranium (largely intact), mandible; sternum fragment; vertebrae – C2-7, T1-12; L1-6, S1-2; 10 right ribs, 12 left ribs, unsided rib frags; shoulders; arms; hands (7 right carpals, 7 left carpals, RMC1-5, LMC1-5, 8 proximal, 1 intermediate & 2 distal phalanges); pelvis; legs; feet (6 right tarsals, 3 left tarsals, RMT1-4, LMT1, 4 & 1 unidentified MT)	
Age	Osteological: 46+ years (mature adult)	Coffin plate: illegible
Sex	Osteological: Female	Coffin plate: Male? (partially illegible)
Stature	163.6cm ±3.55 (femur & tibia)	
Non-Metric Traits	Ossicle at lambda; parietal foramina (bilateral); sutural mastoid foramen (R); posterior condylar canals open (bilateral); precondylar tubercle; open foramen spinosum (L) Bipartite transverse foramina (1/3 R, 1/4 L); circumflex sulcus (L); acetabular crease (L); plaque (L); exostosis in trochanteric fossae (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral)	
Pathology	T7-9 fused together at bodies. The anterior and sides of the bodies are solidly fused with vertical, smooth osteophytes leaving little evidence for the location of contact points between the vertebrae (only a gentle swelling and some pm damage along the contact point). The posterior bodies are unfused, with a small gap visible between them – possible that joint space narrowed. Possibly also some osteophytes on the body surfaces contributing to the fusion. The posterior bodies are damaged pm, especially on the right side, with loss of the right posterior bodies and all of the pedicles. The arch fragments present generally show no signs of fusion (except for one osteophyte on the superior	

	margin and joint surface of an inferior left apophyseal facet, possibly an attempt at fusion), but can't determine to which vertebra they belong as too fragmented. The anterior bodies of T5 (inferior) T6 (superior & inferior), T7 (superior), T9 (inferior), and T10 (superior) are enlarged by a slim crescent of osteophytes, the body surface of which is very porous and lytic. The porosity is restricted to these crescents, and is not found on the rest of the body surfaces. These crescents are also angled on a slight slope compared to the rest of the body surfaces, the superior body with an inferior slope, and the inferior body with a superior slope. DJD bodies C6-7. OA apophyseal facets T3-6, & 2 unidentified thoracic facets (probably T7, 8 or 9) OA left TMJ, both hips The anterior body of the foramen magnum is occupied by large osteophytes forming a crescent-shaped facet. The osteophytes project c. 6mm inferiorly from the anterior rim, and extend for c. 13mm medio-laterally across the anterior border. The facet faces posteriorally, is concave, and measures 11mm wide (medio-laterally) and 6mm deep (superio-inferiorly), and stands c. 2-3mm proud of the anterior border of the foramen magnum. It forms a contact area for the dens of the axis. There is a lytic area occupying the superior half of the dens of the axis, with destruction of most of the original facet, and some osteophytes are present along the tip of the dens, projecting superiorly. Initially this lytic area was thought to be post-mortem damage, but it may be pathological. Unfortunately, the atlas has been lost post-mortem so it is impossible to evaluate how the vertebrae & occipital articulated. The occipital condyles are damaged post-mortem, but both clearly normal shape for occipital condyles (i.e. elongated and convex); so not occpitalisation of the atlas. Ribs – very eroded & friable, but mostly intact for the proximal half of the shafts. The curve of the upper ribs tends to be flattened medio-laterally, so do not curve out as far as would expect laterally. Instead they seem flat and straight, projecting anteriorly. They have sharp inferior borders & tend to be small supero-inferiorly. The lower ribs show a tendency to angle inferiorly & taper markedly towards the sternal ends. Possibly due to corsetry. Six lumbar vertebrae present, but all damaged and incomplete. L1 – body & left arch; L2 – body & most arch; L3 – superior body & arch; L4 – arch, pedicles & corner L posterior body; L5 – arch (in 2 parts), R pedicle & small part R posterior body; L6 – body & part pedicles (the arch of L5 and body of L6 cannot be the same vertebra as both have right pedicles). Six cervical vertebrae present (axis, C3-7), 12 thoracic vertebrae present. T12 looks typical shape for T12 (flat superior facets, curved inferior facets, large costal facets on pedicles). L1 looks typical lumbar shape. What is present of L6 looks typical for L5 (i.e. lack of pedicles & broad attachment where arch meets body). Very little of sacrum surviving. S1 body (superior) – looks like promontory probably at superior body S1. Osteophytes along R side superior body angled superiorly towards body of L6, which has corresponding laterally angled osteophytes. Were probably in contact but had not fused. Could be an additional lumbar vertebra, but cannot rule out a border shift at lumbo-sacral border. Both tibiae are slightly bowed, and the distal ends of the shafts curve inwards (medially). Viewed from the side, they seem fairly straight, except for a posterior bulge in the proximal third of the shaft in the region of the soleal line. The fibulae are too damaged to observe the shape. The femora seem normal except for possible anterior bowing at the junction of the proximal and mid thirds (could be normal). Arms seem fairly normal.
Dental Health	16 tooth positions; 0 teeth; 16/16 lost AM

	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	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**130**

Name	George Lister	
Date of Death	19th July 1882	
Preservation	Moderate (Grade 3), minimal fragmentation	
Completeness	95%+; cranium (intact), mandible, hyoid body, ossified cartilage; manubrium & sternum; vertebrae – C1-7, T1-12; L1-5, S1-5; Cx 1; 12 right ribs, 12 left ribs, unsided rib frags; shoulders; arms; hands (7 right carpals, 5 left carpals, RMC1-5, LMC1-5, 10 proximal, 8 intermediate & 4 distal phalanges); pelvis; legs; feet (7 right tarsals, 6 left tarsals, RMT1-5, LMT-5, 4 proximal phalanges, 1 sesamoid bone)	
Age	Osteological: 46+ years (mature adult)	Coffin plate: 66 years
Sex	Osteological: Male	Coffin plate: Male
Stature	188.8cm ±2.99 (femur & tibia)	
Non-Metric Traits	Ossicle in lambdoid (R); ossicle at asterion (L); sutural mastoid foramina (bilateral); posterior condylar canal open (L); accessory lesser palatine foramina (bilateral); maxillary torus (R); mandibular torus (R); bridging of supraorbital notch (L); extrasutural anterior ethmoid foramina (bilateral) Accessory sacral facets (bilateral); acetabular creases (bilateral); hypotrochanteric fossae (bilateral); exostosis in trochanteric fossa (L); lateral talar extensions (bilateral)	
Pathology	Schmorl's node (L2) DJD vertebral bodies – C5-7, T10, T12, L2, S1; OA dens axis + large osteophytes on atlas facet; OA facets C2-3, T1, L2-3, L4-5; OA costal facets. OA right elbow, distal right ulna, proximal end of one proximal hand phalanx The olecranon fossa of the right humerus is almost filled with thick osteophytes, which also continue around the posterior, medial and lateral margins of the trochlea, and to a lesser extent along the anterior margins. The radial and coronoid fossae on the anterior humerus are also full of osteophytes, which have created a thick rim around the superior margins of these fossae. The inferior surface of the capitulum is covered in eburnation & fine porosity, and there is also some eburnation on the trochlea. The head of the right radius is massively enlarged by thick osteophytes all around the head, overlapping the neck. There is a crescent of eburnation along the anterior margin of the head. There are large osteophytes surrounding the posterior half of the of the proximal ulna joint surface, and also on the medial part of the anterior joint surface. There is a small area of eburnation on the posterior medial quarter of the joint surface, close to the superior margin. The proliferation of osteophytes would have reduced the range of movement possible, limiting flexion and extension of the elbow. The right and left nasal bones do not meet at the inferior third, and there is a 3mm cleft between them. The right nasal bone has a diagonal cleft which penetrates right through the thickness of the bone and which runs from the inferior medial corner superiorly and laterally to a point halfway along the suture between the nasal and maxilla. The cleft has fairly sharp edges, and is bridged close to the superior end and half way along by spicules of bone. The surface of the bone immediately superior and medial to the cleft is rugged. The tip of the acromion process of the right scapula was absent, and the part of the acromion that was present terminated laterally in a flat straight surface covered in porosity and slight osteophytes, which was the same colour as the surrounding bone. This surface was angled to face laterally, and no facet for the clavicle was present on the anterior border of the acromion. Os acromiale. Left side normal. Both clavicles are straight, but the acromial end of the right clavicle is enlarged by a thin, flat, triangular flange of bone along the posterior margin (attachment for trapezius). The conoid tubercle is also enlarged on the inferior surface, with a bridge of bone forming a canal on the posterior third of the inferior surface. Possible soft tissue trauma. There was an oblique fracture in the ninth right rib through a point just distal to the angle. Very slight internal displacement of sternal end, but otherwise well aligned. The callus is smooth and well remodelled, with minimal callus evident on the external surface. The internal surface is slightly raised. There is a fairly pronounced nodule of lamellar bone on the superior margin, with a less pronounced nodule on the inferior margin. The left calcaneus has a small shallow crescent 'bitten' out of the anterior talar facet, at the medial margin of the joint for the cuboid. The surface of the crescent it roughened and irregular, and there is a pronounced enthesophyte lateral to the anterior talar facet and along the superior lateral margin of the joint for the cuboid that projects antero-medially. The right calcaneus also has a jagged and roughened area along the medial margin of the anterior talar facet, but lacks the pronounced enthesophyte seen on the left side. Possible trauma to bifurcate ligaments, or could be developmental anomaly? The inferior tuberosity of both cuboids is covered with enthesophytes, which are thin and flattened on the lateral margin & are angled proximally. The effect is to create a more pronounced groove for	

	the tendon of peroneus longus (involved in plantar-flexion and inversion of the foot). These changes are more pronounced on the left side, with enthesophytes also on the anterior medial end and superior margin of the groove The patellar surfaces of both femora are deeper and more concave than normal. The patellae also seem narrow (medio-laterally) but since both are fairly heavily eroded it is difficult to be certain of the shape. Ossified ligamentum flavum T4-L1, especially pronounced T7-11. Pronounced enthesophyte next to the head of RMT4, on the lateral side (left side normal). Bilateral hook shaped enthesophytes on the temporal ridges of the frontal bones, just superior to the zygomatic process, angled laterally and inferiorly. A fragment of unidentified ossified cartilage(?) was present, measuring 28 x 19mm, and 4mm thick (tapering to 1.5mm thick). It was generally fairly flat, with a slight curve. One edge is thicker, almost like a bar, with two thinner curved segments projecting from it (on the same side). These segments are separated from each other by a gap of c. 4mm. Ossified cartilage present, including part of thyroid cartilage, and some rib cartilage attached to the manubrium & first right rib (associated with possible trauma to right shoulder?)
Dental Health	32 tooth positions; 29 teeth; 3/32 lost AM 8/29 teeth with caries; calculus (flecks to slight); DEH; slight periodontal disease Pipe-smoking wear – LC^1 and LP^1 have a shallow smooth & even crescent of wear across the contact point between the two teeth (distal half of canine & mesial half of premolar). There is a corresponding crescent on LC_1 and LP_1. No wear observed on right side. RM^2 – strip of enamel lost from mesio-buccal corner of tooth, extending from the crown occlusal surface down to the cement-enamel junction; probable ante-mortem fracture Slight crowding of anterior mandible (incisors and canines) Very slight crowding of anterior maxilla (LI^2)

	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	P	P	P	P	P	P	P	P	AM	AM
Calculus	S ldb	S ldbm	S bldm	F bd	F dl	S md	F bdl	F md	S md	S blm	S l	S ld	F d	F mldb	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	Mm	Md	Sd	Md	Md	Mm	-	-	-	-	-
Wear	2	2	5	3	3	3	3	4	4	2	3	2	2	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	AM
Calculus	S l		F md	F d	F d	F m	F mb	F bd	F bm	F b	F m	F lb	-	-	F d	-
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	Md	-	So	-
Wear	2	2	4	3	2	3	4	4	4	3	3	2	2	3	2	-

Skeleton Number	**138A**	
Name	Elizabeth Dibb(?) (partly illegible monument)	
Date of Death	Monument illegible, Post-Medieval?	
Preservation	Moderate (Grade 3), moderate fragmentation	
Completeness	60-70%; cranium (largely intact), mandible, hyoid body & greater horn; sternum fragments; vertebrae – C1-4, C7 + 2 R arches, T1-7 + 1 arch; 4 lumbar arches; 3 right ribs, 8 left ribs, unsided rib frags; shoulders; arms; hands (LMC1-5); 6 proximal phalanges & 1 intermediate phalanx that could belong to either Sk 138A or Sk 138B; left os coxa; legs (tibiae only tentatively identified as this individual – could have been Sk 138B); feet (5 right tarsals, 4 left tarsals, RMT2-5, LMT1-5); 1 MT shaft & 2 proximal phalanges that could have belonged to Sk 138A or Sk 138B	
Age	Osteological: 18+ years (adult); (possibly 46+ years (mature adult))	Monument: illegible
Sex	Osteological: Female	Monument: Female
Stature	160.6cm ±4.24 (radius)	

Non-Metric Traits	Ossicle in lambdoid (L); parietal foramen (L); ossicle at parietal notch (L); posterior condylar canal open (L); mandibular tori (bilateral); accessory infraorbital foramen (R); accessory supraorbital foramen (L); extrasutural anterior ethmoid foramina (bilateral) Plaque (L); exostosis in trochanteric fossa (L); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral)
Pathology	DJD vertebral bodies – C2-4 (with eburnation of bodies C2-3); OA facet for dens on atlas; OA facets C4, T6 OA lateral right clavicle, distal left radius (lunate facet), distal left ulna (eburnation of styloid process tip & distal surface) The cranium has been cut in half on a transverse plane, with the cut running around 24mm superior to the orbits, passing just superior to the squamous sutures on both sides & superior to the external occipital protuberance. The superior half has been completely detached. The outer surfaces of the cut all the way around the cranium are smooth & linear, but the inner half is rough and jagged, and bone projects above the line of the cut (on the lower half of the cranium). In places it can be seen that the cut was approached from different angles, e.g. at the midpoint of the right lambdoid suture one cut can be seen coming in from the right, with another on a slightly different angle approaching from behind. Looks like a cut part-way through the table was made all the way around & then the last part was broken rather than cut through. The vault seems to be of fairly normal thickness (3-6mm, at varying points around the circumference, avoiding the midline). Some porosity clustered on and around the internal occipital protuberance (cruciform eminence, transverse & sagittal sulci). The holes are all <1mm & mostly sharp edged. Also present on the superior occipital squama & posterior part of both parietals (internal surfaces). Could be post-mortem damage? Also fine micro-porosity on the internal central frontal bone and larger porosity along the meningeal grooves on both parietals (possibly arachnoid granulations on the left side). Arachnoid granulations on internal surface of frontal. External surfaces of vault heavily eroded and all detail lost. Occasional porosity (sharp-edged, c 1mm or smaller on inferior greater wings of sphenoid (external surface) The sternum consists of two thin strips of bone from the lateral sides of the body. The medial borders look uneven & slightly irregular. The right occipital condyle has a small area of damage traversing the centre, roughly linear but the area has suffered post-mortem damage. Corresponds with possible cut on right side of atlas, which has a vertical 'cut' just posterior to the apophyseal facets (just cutting through the posterior margin of the superior facet). This 'cut' is roughly linear & moderately smooth, but the texture of the surface is slightly roughened. Similar cuts through the arch of C2, through the right superior facet & left lamina posterior to the inferior facet – again broadly linear but the texture of the exposed surface is a little rough. C3 has a similar 'cut' vertically through the laminae, just posterior to the right facets & near the spinous process on the left side. To other cervical vertebra fragments have broadly vertical linear 'cuts' with roughened surfaces. The lateral posterior surface of the right mandibular condyle is removed, again linear, leaving a roughened surface. Not clear whether these 'cuts' are genuine, or relate to post-mortem damage. All surviving left ribs (except Ribs 1 & 2) have diagonal and fairly linear 'cuts' through the shafts, running from the superior proximal margin to the inferior distal margin. These 'cuts' line up when the ribs are held in anatomical position. Although linear, the exposed surfaces are roughened, not smooth. Possible cuts through the ribs to access chest during autopsy? Or post-mortem damage? Right ribs not well enough preserved to observe. The pelvis is poorly preserved. The right side has been lost post-mortem, and the left ilium is partially preserved. Linear bevelled 'cut' through the lateral blade of the left ilium, from the AIIS to the iliac tubercle. Again roughened surface. Related to autopsy? Or post-mortem damage? Linear 'cut' through dorsal surface of the proximal ends of MC3 & 4, removing a sliver of the surface. Exposed surface roughened – probably post-mortem damage. One right rib has a pronounced rounded nodule of lamellar bone on the visceral shaft, quite localised. Could be healed lung infection, or possibly a callus from a healed fracture. Unfortunately the bone is broken just distal to this nodule & the external surface is damaged post-mortem. No obvious evidence for change in angulation, but possibly slight internal displacement of sternal part of shaft Striated lamellar bone on the posterior lateral shafts of both femora, well remodelled and healed. Sharp ridge of bone projecting 3-4mm along the interosseous crest of the left tibia – possibly soft tissue trauma Cribra orbitalia,bilateral (Grade 2); scattered subtle fine porosity.
Dental Health	26 tooth positions; 5 teeth; 20/26 lost AM; 1/26 lost PM 2/5 teeth with caries, 4 lesions; moderate periodontal disease LC1 rotated 90º so is lying with long axis parallel to the direction of the alveolar bone, mesial side facing buccal and distal side facing lingual – possibly happened after AMTL, or could have been original position of the tooth

	Right Dentition								Left Dentition							
Present	AM	AM	AM	AM	P	AM	AM	AM	AM	AM	P	AM	AM	AM	AM	-
Calculus	-	-	-	-	Broken	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-		-	-	-	-	-	La	-	-	-	-	-
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	AM	P	AM	AM	AM	P	PM	-	-	-	P	-	-	AM	AM	AM
Calculus	-	-	-	-	-	S ld	-	-	-	-	F ld	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	Mb Ml/o Sm	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	4	-	-	-	3	-	-	-	-	5	-	-	-	-	-

Skeleton Number	**138B**	
Name	James Dibb(?) (partly illegible monument)	
Date of Death	Monument illegible	
Preservation	Good (Grade 2), slight fragmentation	
Completeness	80-90%; cranium (intact), mandible; manubrium; vertebrae – C1-7, T1-12; L1-5, S1-4; 12 right ribs, 12 left ribs, unsided rib frag; shoulders; arms; hands (1 right carpal, 5 left carpals, RMC3-4, LMC2-3, 2 proximal & 1 intermediate phalanges); 6 proximal phalanges & 1 intermediate phalanx that could belong to either Sk 138A or Sk 138B; pelvis; legs (tibiae only tentatively identified as this individual – could have been Sk 138A); feet (1 right tarsal, 6 left tarsals, RMT3, LMT1, 4-5); 1 MT shaft & 2 proximal phalanges that could have belonged to Sk 138A or Sk 138B	
Age	Osteological: 46+ years (mature adult)	Monument: illegible
Sex	Osteological: Male	Monument: Male
Stature	178.6cm ±4.05 (humerus)	
Non-Metric Traits	Ossicle in lambdoid (R); parietal foramina (bilateral); ossicle at asterion (R); extrasutural mastoid foramina (bilateral); posterior condylar canals open (bilateral); double condylar facets (bilateral); accessory lesser palatine foramen (R); maxillary tori (bilateral); bridging of supraorbital notch (L) Bipartite transverse foramina (2/5 R, 1/5 L); circumflex sulcus (L); acetabular crease (L); double inferior talar facet (L)	
Pathology	Schmorl's nodes T6-L3 DJD vertebral bodies – C3-7 (with eburnation of bodies C3-5), T6-8 (with eburnation of bodies T6-7), T10-L3, L5-S1; OA facet for dens on atlas; OA facets C2-4, T1-7, L2-5, S1; the osteophytes on the inferior body of C5 extend so far laterally that they partially obscure the transverse foramina Small pseudoarthrosis between the right side of the spine of T5 (just inferior to the right inferior apophyseal facet) & the spine of T6 (on lamina, just inferior to the right superior apophyseal facet). This pseudoarthrosis has osteophytes, porosity and eburnation. OA both TMJs, manubrium (R sternal facet), lateral left clavicle, right scapula glenoid, both hips The os coxae are both damaged post-mortem. Much of the cortex has been removed from the right iliac fossa, and there is a hole perforating through to the acetabulum. The left side has a small piece removed from the iliac crest, and the superior pubic ramus is separate. Both os coxae feel heavy, which is particularly noticeable for the left superior pubic ramus (this is freshly broken and has no soil inside the trabeculae). The texture of both os coxae is unusual. Where post-mortem breaks and loss of the surface cortex have exposed the inner trabecular bone it can be seen that the bone is granular, disorganised structure, looking almost fluffy in places. Seems that much of the area usually occupied by a honeycomb of trabecular bone has been filled in with this granular/ fluffy bone instead. The outer cortex layer is better preserved on the left side. The iliac fossa has three areas of porosity (irregular, angular holes, of varying sizes, with sharp margins). The posterior of the blade has a slightly swollen appearance in the central area, and this area is occupied by fine porosity (again with a more focal area of lytic activity towards the centre). All of the section between the greater sciatic notch and the iliac crest has lytic activity organised in strips, leaving an impression of bars of solid	

	bone, almost a sunburst pattern. The right os coxa has similar lytic activity in the iliac fossa, but no 'starburst' effect on the posterior blade. However, this surface is irregular (rounded nodules & some scattered fine porosity). The area superior and posterior to the acetabulum has large formations of irregular lamellar bone spicules, possibly associated with joint disease of the hip. The outer cortex of the medial half of the iliac crest has been lost post-mortem. The area close to the centre has a moderate sized lytic area, base and sides rounded, with an irregular roughly oval outline. The texture of the bone on the floor and sides of this hollow is granular. The vertebral bodies of T11 and 12 have a slightly unusual texture, as if the bone is slightly granular or fluffy; however, the anterior halves of all lumbar vertebrae have been lost post-mortem and the bone looks fairly normal. The skull is intact. It feels heavy, but can't see the structure of the bone itself. Most of the outer layer of the cortex (where preserved) looks normal. One large proximal hand phalanx (and therefore likely to belong to Sk 138B rather than 138A) has been damaged at the proximal end. This shows slightly fluffy, dense bone with no real trabecular structure apparent. Seven cervical, 12 thoracic & five lumbar vertebrae; T12 = typical T12 morphology, L1 = typical L1 morphology; L5 = typical L5 morphology. Sacrum has four segments, but lowest segment has suffered post-mortem damage; however clear that at least one more segment was present. The sacral promontory was at the superior body of the second sacral segment, and the first and second segments were not fused at the anterior body (fused at lateral margins of body and alae, but alae damaged post-mortem so can't assess appearance of these). Second segment large and comparable with normal S1 morphology. Possible that an additional vertebra in the lumbar spine that has partially sacralised (or could be lumbarisation of S1). Possible that left ilium and sacrum were fused along the superior auricular surface. There is a ridge of lamellar bone on the left ilium along the superior margin of the auricular surface superior demiface, which is flattened along the 'contact point' (presumably where in contact with sacrum, but equivalent area of sacrum has been lost post-mortem and right side is too damaged to observe). Small circular lytic lesion (sharp margins, floor and walls smooth) measuring 2.5 x 3mm in medial head of left MT1, immediately adjacent to joint surface. Hallux valgus? (unlikely to be gout as margins not hook-like) Distal joint of left humerus has a section removed from the anterior as if sliced off, leaving a flat linear surface behind, with a rough texture. Probably post-mortem damage. Could suggest some of the linear damage seen in Sk 138A was also post-mortem. Ligamentum flavum ossified – T4-L1, particularly T5-7 where the bones are interlocked but not fused. Large projection of ossified costal cartilage on the right side of the manubrium, measuring 13-20mm long. Both first ribs have pronounced ossified cartilage & the left rib has a spur of ossified cartilage at the sternal end measuring 22mm. Both radial tuberosities covered in enthesophytes, also left femur (junction between spiral and pectineal lines, linea aspera), and rib tuberosities Cribra orbitalia, bilateral (Grade 1 in right orbit, Grade 2 in left orbit) Maxillary sinusitis in right sinus (cobweb of lamellar bone on sinus floor); left sinus intact
Dental Health	32 tooth positions; 3 teeth; 29/32 lost AM 2/3 teeth with caries, 3 lesions; dental abscess (RP_1); considerable periodontal disease The maxillary alveolar bone at the positions of RI^1 and I^2 has a marked curve towards the nasal aperture, with resorption at the location of those two sockets. Similar (but shallower) curve around positions of LC^1 and P^1. When the mandible is placed in articulation these curves correspond with the positions of the surviving teeth (RI_1 and LP_2 – the gross carious lesions in RP_2 have destroyed the crown). Presumably pressure from the occlusal surface of these two teeth has led to the resorption of the alveolar bone on the opposing jaw

	Right Dentition								Left Dentition							
Present	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM
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	AM	AM	AM	AM	P	AM	AM	P	AM	AM	AM	AM	P	AM	AM	AM
Calculus	-	-	-	-	F bd	-	-	S d	-	-	-	-	F bd	-	-	-

DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	La	-	-	-	-	-	-	-	Sm Sd	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**147**	
Period	Post-Medieval	
Preservation	Poor (Grade 4), moderate fragmentation	
Completeness	20-30%; cranium (largely intact, but face lost post-mortem), mandible, maxilla fragments, hyoid body; Vertebrae – C1-7, T1; right shoulder, left scapula fragment; right arm; pelvis (fragments right ilium & left ischium); legs (femora, right tibia, proximal left tibia)	
Age	18+ years (adult) (possibly mature adult?)	
Sex	Female	
Stature	-	
Non-Metric Traits	Parietal foramina (bilateral); metopic suture; extrasutural mastoid foramina (bilateral); posterior condylar canals open (bilateral); accessory lesser palatine foramina (bilateral); bridging of supraorbital notch (L)	
Pathology	DJD vertebral body C4; OA facet C2 OA both TMJs Left femur badly damaged post-mortem, with all of anterior and lateral shaft of distal half lost and deep erosion to areas of proximal half (anterior and lateral). The medial posterior surface shows almost no erosion. The shaft seems to have a pronounced curve medio-laterally in the area of the proximal-mid third junction and the midshaft, with the proximal end angled more laterally. The right femur is much straighter. Possible the curve is the result of the preservation, with loss of bone down one side of the shaft allowing it to bend due to soil pressure etc. Maxillary sinusitis – fine cobweb of lamellar bone spicules on the floor & medial walls of the right sinus (only a small part of which actually present); left sinus lost post-mortem	
Dental Health	19 tooth positions; 0 teeth; 19/19 lost AM	

	Right Dentition								Left Dentition							
Present	AM	AM	-	-	-	-	-	-	-	-	-	-	-	-	-	AM
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	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**150**	
Name	Joseph Patterson (monument)	
Date of Death	10th March 1860 (monument)	
Preservation	Very poor (Grade 5), moderate fragmentation	
Completeness	20-30%; cranium (vault largely intact but face lost post-mortem), mandible, small part left; vertebrae – C1-6; unsided rib frags; right lateral clavicle, fragment of right scapula; right arm (humerus shaft, proximal ulna shaft); right leg (femur shaft, posterior tibia shaft)	
Age	Osteological: 18+ years (adult)	Monument: 82 years (not definite ID)

Sex				Osteological: Male ? (v. tentative)					Monument: Male (not definite ID)							
Stature				-												
Non-Metric Traits				Posterior condylar canals open (bilateral); accessory lesser palatine foramen (L); absent zygomaticofacial foramen (R) Bipartite transverse foramina (1/3 R, 1/3 L)												
Pathology				DJD vertebral bodies 3-6; OA facets C3, C5-6 OA right TMJ												
Dental Health				16 tooth positions; 2 teeth + 1 broken tooth; 9/16 lost AM; 4/16 lost PM 2/2 teeth with caries; DEH – multiple faint DEH lines												
	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	AM	AM	AM	B	PM	P	PM	AM	AM	AM	P	PM	PM	AM	AM	AM
Calculus	-	-	-	Broken	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-		-	L	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-		-	Sm	-	-	-	-	Mo?	-	-	-	-	-
Wear	-	-	-		-	4	-	-	-	-	8	-	-	-	-	-

Skeleton Number	**153**	
Period	Post-Medieval	
Preservation	Moderate (Grade 3), slight fragmentation	
Completeness	80-90%; cranium, mandible, maxilla; Vertebrae – C1-7, T1-12, L1-5, S1 (body); 11 right ribs, 12 left ribs, unsided rib fragments; shoulders; arms; hands (L MC2-5); pelvis (left ilium, part right ilium); legs; feet (5 right tarsals, 2 left tarsals, RMT1-5, LMT2)	
Age	46+ years (mature adult)	
Sex	Male	
Stature	179.8cm ±3.27 (femur)	
Non-Metric Traits	Extrasutural mastoid foramina (bilateral); posterior condylar canals open (bilateral); accessory lesser palatine foramen (R); maxillary tori (bilateral); accessory supraorbital foramen (L) Acetabular crease (R); exostosis in trochanteric fossae (bilateral); lateral tibial squatting facets (bilateral); peroneal tubercles (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral)	
Pathology	Schmorl's nodes T7, T9, T11 DJD vertebral bodies – C5-7 (with eburnation of bodies C5-6), L2-3, L5-S1; OA facets C4-5, C7-T1, T4-6, L1-5; C2-4 fused: at the left apophyseal facet for C2-3 and the right apophyseal facet for C3-4. The opposite facets show no visible osteophyte formation around the margins. The fused facets are surrounded by thick irregular osteophytes bulging out around the joint margins on all visible sides. The bodies are unfused and the joint spaces are preserved. There is an osteophyte on the anterior margin of the inferior body of C2 extending inferiorly towards the anterior body of C3, which has a corresponding small osteophyte. These osteophytes touch but are not fused. Posterior lateral corners of C3-4 in contact and possibly almost fused. OA both hips The area of the right supraorbital ridge covered in slightly patchy thin deposits of primarily lamellar bone with a couple of areas of woven bone in transition to lamellar. Margins tend to blend into surrounding bone & new bone is porous. Three focal shallow areas of lytic activity, of even depth, margins sharp and clear, in the centre of the new bone formation. All the walls and floors of lesions the same colour as the surrounding bone, but could be insect damage (or similar).	

	Area of fine porosity & small well-remodelled deposit of lamellar bone on left supraorbital ridge, focussed around accessory supraorbital foramen Both femora have a tendency towards pilasterism, with vertical bar of bone along posterior shafts The left femur has rugged pronounced enthesophytes along the length of the intertrochanteric line (on the anterior proximal femur) projecting 8-9mm from the bone surface at the lateral/ superior end, covering a band c 10-15mm wide. Lamellar bone spicules are present along the inferior margin of the trochanteric line. Enthesophytes continue onto the superior surface of the greater trochanter. The right femur has a normal intertrochanteric line lacking pronounced enthesophytes. Possible trauma, or could be associated with OA of left hip (or OA of hip associated with trauma?) Left ilium – the area immediately above the acetabulum is covered in rough and irregular bone spicules (associated with trauma to left hip?) Subtle striated lamellar bone faintly visible on the lateral-posterior midshaft of the right femur. Two left ribs have nodules of lamellar bone on the visceral surfaces of the necks. The nodules are relatively small (10 x 3mm and 14 x 4mm) and are fairly well defined, particularly along the superior margins Maxillary sinusitis – left sinus has pitting over all of anterior half of sinus floor; right sinus intact
Dental Health	27 tooth positions; 3 teeth; 21/27 lost AM; 3/27 lost PM Calculus on occlusal surface RM2 & very little wear; moderate periodontal disease?

	Right Dentition								Left Dentition							
Present	AM	P	AM	AM	AM	AM	PM	AM	PM	PM	AM	P	AM	AM	AM	AM
Calculus	-	S a	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	-	-	-	-	-	-	-	-	-	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	AM	AM	AM	AM	AM	P	AM	AM	-	-	-	-	-	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	L	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**156**	
Name	Christiana Patterson (monument)	
Date of Death	23rd October 1854 (monument)	
Preservation	Poor (Grade 4), moderate fragmentation	
Completeness	40-50%; cranium (vault intact but face damaged post-mortem), mandible, maxilla; vertebrae – C1-2, 4 thoracic arches (including T1/2 & 1 tiny body fragment, S2? body; 2 right ribs, 5 left ribs, unsided rib frags; shoulders (incomplete); arms (left radius lost pm); pelvis (part right ilium); legs (femora and tibia, part right fibula); feet (1 left tarsal)	
Age	Osteological: 18+ years (adult)	Monument: 66 years (possible ID)
Sex	Osteological: Female?	Monument: Female (possible ID)
Stature	169.9cm ±4.45 (humerus)	
Non-Metric Traits	Extrasutural mastoid foramina (bilateral); posterior condylar canal open (R); accessory lesser palatine foramen (R) Posterior atlas bridging (L); hypotrochanteric fossae (bilateral)	
Pathology	OA apophyseal facet C2, + 3 thoracic facets OA left TMJ, proximal right humerus, proximal right radius, distal left femur Maxillary sinusitis – lamellar bone spicules & slight porosity in both sinuses Two left ribs have elongated oval areas of lamellar bone on the visceral necks. The area is only very slightly raised from the surrounding bone surface & is smooth and well remodelled.	

	Both femora have vertical bars of bone running along the length of their posterior shafts – pilasterism. The linea aspera has been slightly offset towards medial, and femur shafts appear slightly bowed laterally. However, difficult to assess due to incomplete nature of the bones and amount of surface damage and erosion. Tibiae too damaged to assess shape.
Dental Health	25 tooth positions; 16 teeth (of which 2 loose); 6/25 lost AM; 5/25 lost PM 6/16 teeth with caries, 7 lesions (damage to lower anterior teeth makes it difficult to assess presence/ absence of caries); DEH – definite lines in several teeth; moderate periodontal disease Slight crowding of anterior teeth

	Right Dentition								Left Dentition							
Present	AM	AM	P	P	P	P	-	P	-	-	-	-	P	AM	P	PM
Calculus	-	-	S bml	F d	F m	F b	-	F dm	-	-	-	-	S bld	-	S ml	-
DEH	-	-	L	L	L	L	-	-	-	-	-	-	L	-	L	-
Caries	-	-	-	Sm	Sd	Lm	-	Sd	-	-	-	-	Sm	-	-	-
Wear	-	-	6	3	5	5	-	5	-	-	-	-	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	PM	AM	P	P	P	P	PM	PM	P	P	P	P	PM	AM	AM
Calculus	Broken	-	-	-	F m	S dm	S bd	-	-	F db	-	F lb	F lb	-	-	-
DEH		-	-	L	L	L	-	-	-	-	L	L	L	-	-	-
Caries		-	-	-	-	-	-	-	-	-	-	-	Sm Md	-	-	-
Wear		-	-	3	2	4	5	-	-	5	4	3	4	-	-	-

Skeleton Number	**159**
Period	Post-Medieval
Preservation	Poor (Grade 4), moderate fragmentation
Completeness	40-50%; partial cranium, mandible, maxilla; Vertebrae – 1 cervical body fragment?, L5 (arch), S1-3; unsided rib fragments; arms (incomplete); hands (RMC4-5, LMC4, 1 unidentified metacarpal, 5 proximal, 2 intermediate and 1 distal hand phalanx); pelvis (parts ilia); legs (fibulae lost pm); feet (2 right tarsals, 2 left tarsals)
Age	46+ years (mature adult)
Sex	Female
Stature	-
Non-Metric Traits	Maxillary tori (bilateral) Acetabular crease (R); plaque (R); exostosis in trochanteric fossa (R); peroneal tubercle (L); double anterior calcaneal facets (bilateral); double inferior talar facet (R)
Pathology	Enthesophytes on right radial tuberosity (proximal and dorsal margin) Smooth, rounded small nodules of lamellar bone on the dorsal shafts of all five proximal hand phalanges Maxillary sinusitis – plaques and nodules of lamellar bone on medial walls both sinuses
Dental Health	27 tooth positions; 3 teeth; 17/27 lost AM; 7/27 lost PM 3/3 teeth with caries, 5 lesions; LC1 has one lesion wrapped around the neck of the tooth (buccal, mesial and distal) and the crown only attached to the root at the lingual side; moderate periodontal disease Area of fine pitting on the anterior external surface of the mandible, around the sockets of RI_1 & RI_2, RC_1, RP_1, plus lamellar bone. Probably related to AMTL

	Right Dentition								Left Dentition							
Present	AM	AM	AM	PM	PM	-	-	-	-	PM	-	PM	PM	P	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	F d	-	-

DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	Mm Sl Sd	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	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	AM	AM	AM	AM	AM	PM	AM	AM	AM	PM	P	AM	P	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	F d	-	F d	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	La	-	Sb	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-

Skeleton Number	**162**	
Period	Post-Medieval	
Preservation	Good (Grade 2), moderate fragmentation	
Completeness	<5% - DISARTICULATED PROXIMAL LEFT HUMERUS	
Age	18+ years (adult)	
Sex	Unsexed	

Skeleton Number	**165**	
Period	Post-Medieval	
Preservation	Moderate (Grade 3), severe fragmentation	
Completeness	<80-90%; cranium (face intact, vault partially intact), mandible, maxilla, ear ossicles (incus x1, malleus x1); sternum & manubrium; vertebrae – C1-7, T1-2, T11-12 + 11 fragments (4 bodies & min 4 arches), L5 (+ 23 frags, min 3 vertebrae), S1-3 (bodies); 10 right ribs, 4 left ribs, unsided rib fragments; shoulders; arms; hands (RMC1-5, LMC1-5, 6 proximal, 6 intermediate & 3 distal hand phalanges); pelvis; legs; feet (5 right tarsals, 6 left tarsals, RMT1-5, LMT1-5, 8 proximal phalanges)	
Age	46+ years? (mature adult?)	
Sex	Male?	
Stature	-	
Non-Metric Traits	Ossicle at lambda; parietal foramen (R); posterior condylar canal open (L); double anterior condylar canal (L); bridging of supraorbital notch (R); extrasutural anterior ethmoid foramen Bipartite transverse foramina (3/5 R, 0/4 L); accessory sacral facet (R); acetabular creases (bilateral); hypotrochanteric fossae (bilateral); exostosis in trochanteric fossa (L); vastus fossa (L); lateral tibial squatting facet (L); peroneal tubercles (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral)	
Pathology	Schmorl's node T11 DJD vertebral bodies – C3-4, C6-7 (with eburnation of body C3), T11-12, 1 unidentified thoracic body; OA facets S1, & 1 unidentified thoracic facet OA both TMJs, both shoulders (glenoid fossae), proximal left radius, both hips, both ankles, joints between right talus and calcaneus, right cuboid (eburnation on lateral plantar surface), left thumb The right humerus head is ringed by a small fringe of osteophytes. The greater tubercle is covered in osteophytes and a small number of holes c. 1mm in diameter, which appear to open onto larger cavities beneath. Surface is irregular and uneven, and tubercle almost looks eroded (attachment for infraspinatus – possible trauma to rotator cuff?) The right scapula acromion tip is missing, with the lateral border of the acromion rough and irregular, covered in spicules of lamellar bone and some porosity. This surface faces laterally and there is no facet for the clavicle on the anterior margin. Os acromiale. There is a large cyst occupying the posterior margin of the inferior lateral corner of the acromion – large lytic lesion, smooth-walled round cavity opening onto the posterior acromion. Margins of	

	opening sharp edged and broadly round. Cavity larger than opening, & opening measures 7.7 x 5.5 mm. Possibly associated with changes to right humerus. Left humerus and acromion lost post-mortem Right hamate has a small vestigial hook – a small nodule extending just over 4mm. Developmental anomaly. One distal hand phalanx (of the three present) has a flattened distal end, which is porous on the dorsal surface (small fine foramina) The right ilium has a depression in the posterior surface, about level with the edge of the superior demiface of the auricular surface. Measures 12.5 x 12 mm, with a more oval (12 x 8mm) depression c. 5mm deep within the shallower overall depression. Edges rounded and not clearly defined, blending well into surrounding bone. Floor and walls of similar texture to the surrounding cortex. The left pubic symphysis is incomplete, and only a part of the superior and dorsal surface is present. This is covered by solid flat nodules of lamellar bone, obscuring all surface detail. Does not look like any of the degenerative changes usually seen. The right side has been lost post-mortem The sacrum is damaged and incomplete, just part of the bodies of S1 (with anterior surface badly eroded), S2 & S3 (both fused together). The inferior half of the body of S3 has been lost post-mortem. What is present of S3 has a sharp curve anteriorly, approaching 90º. However, difficult to assess true shape due to post-mortem damage The left femur has a pronounced ridge of lamellar bone 104 mm long, 9-10mm wide, along the mid section of the linea aspera, projecting c. 12mm posteriorally. This ridge is fairly rounded in texture, but somewhat undulating and uneven and is angled slightly laterally. Slight striated lamellar bone on the lateral-posterior midshaft & on the posterior mid-distal third of the shaft below the linea aspera. Possible soft tissue trauma to adductor longus (& also part adductor magnus). Left linea aspera normal. Both tibiae and fibulae are thick and expanded, especially at the distal ends. All probably affected by osteitis. Right tibia – proximal quarter & distal two-thirds present, proximal-mid third junction shattered. Distal third of shaft swollen and enlarged, covered in thick lamellar bone on all surfaces. Mostly well remodelled and smooth undulating texture, but some scattered porosity & occasional striations. Around junction of mid & distal thirds of shaft the shaft bulges out slightly, most noticeable on the posterior side & there may be a slight change in angulation here with the distal half of the shaft angled anteriorly (but subtle & needs radiograph). Swollen lamellar bone deposits continue up the midshaft onto the proximal third of the shaft on all surfaces. The proximal quarter of the shaft is much less affected, with some lamellar bone on the lateral and posterior surface (but less pronounced) Right fibula – shaft in five fragments & distal end incomplete. Distal and mid third of the shaft swollen and enlarged, florid lamellar bone deposits over all surfaces but most pronounced on medial side. Difficult to judge whether any changes in angulation of shaft etc due to post-mortem damage. Left tibia – as with right side. Distal third swollen and enlarged, covered in lamellar bone which is generally fairly smooth and undulating on the anterior, medial and posterior borders, but is more speculated and florid on the lateral side where the tibia articulates with the fibula. Lamellar bone continues onto mid third of shaft (thickest on posterior and lateral surfaces – smooth undulating bone on the posterior & florid and speculated on the lateral). Continues onto proximal third of shaft, where peters out distal to the proximal joint surface. Again possible change in angulation just proximal to the distal third of the shaft and distal third possibly displaced slightly laterally & angled slightly medially & anteriorly. Slight bulge in cortex on posterior surface & on lateral surface slightly to distal of the posterior bulge – possible oblique fracture? (again radiograph required) Left fibula – distal third massively expanded – must be at least twice normal size, and larger than right side. Covered in thick nodules of lamellar bone on medial surface, & flatter smoother lamellar bone on lateral surface. At junction of mid & distal thirds the shaft seems to change angle with the distal end angled anteriorly & slightly laterally. Corresponds with fairly pronounced ridge of bone along the anterior surface, a slight bulge on the posterior surface & intense area of speculated lamellar bone. Located just distal to the possible tibia fracture and could be a fracture – the most convincing of the potential fractures. Thick swollen lamellar bone continues onto mid third of shaft, florid deposits along posterior, smoother rounded deposits on lateral. Lamellar bone deposits start to peter out as approach proximal third of shaft, but still striated thin deposits and occasional thick deposits along anterior and medial, continuing right up to neck There is also lamellar bone on the lateral and medial surfaces of both calcanei, smoothly undulating with some porosity. Right ankle – shows signs that probably dislocated. Right talus - has a large area of eburnation & porosity occupying most of the anterior surface of

	the trochlea. The lateral joint surface for the fibula is bounded by thick osteophytes along the anterior and inferior margins. These continue along the posterior border of the trochlea. Right distal tibia – anterior and lateral joint surface enlarged by osteophytes by c. 11mm. Anterior half of joint occupied by eburnation & porosity, both extending onto the osteophyte enlargement. Small ridge of osteophytes along the medial edge (just the anterior part, lateral to the medial malleolus). This prevents the medial surface of the talus from achieving normal articulation with the medial malleolus. However, surfaces of the medial malleolus and talus seem normal (though damaged post-mortem). Right distal fibula – large osteophytes along the tip of the distal fibula, especially on the anterior side. Combined with the osteophytes on the talus these prevent the distal fibula from attaining any kind of normal articulation with the talus. Left ankle – osteophytes along the anterior lateral corner of the distal tibia joint surface, but concave anteriorly in the manner of a squatting facet. Distal left fibula lacks osteophyte formation along the distal tip seen in the right fibula. The talus lacks the pronounced osteophyte formation seen on the right side, although some minor osteophyte formation along the anterior superior margin of the lateral facet (for the fibula). Posterior half of this margin flattened and has irregular crescent shaped lytic area removed from it. The floor of the lesion is irregular and slightly porous & the margins are clear and irregular (c. 14 x 6mm). Probably traumatic. No eburnation between the talus and the tibia. The joint between the right talus and calcaneus may also have been disrupted as they no longer sit comfortably together. There is a band of osteophytes along the posterior inferior joint surface of the talus & along the lateral border. Similar osteophytes are present around the posterior calcaneus joint surface & there are some osteophytes on the joint surface itself, towards the anterior lateral part. The right cuboid has an extension of bone on the lateral-plantar surface, just proximal to the joint for the right MT5. This terminates in a flattened area 15 x 10mm. The surface of this area has a band of porosity across it, with eburnation. Normally no bone would be lateral/plantar to the cuboid, but it could be that the avulsed portion of the 5rg metatarsal was in contact with the cuboid. The left cuboid is normal. R MT5 – the styloid process is not present. Instead the proximal surface lateral to the joint is angled antero-laterally. The surface is uneven and porous, with one deep larger hole towards the anterior margin. Avulsion fracture of styloid process. There is finely porous lamellar bone along the dorsal surface of the shaft, and well remodelled lamellar bone on the medial shafts of right MT 2-3. L MT5 – styloid process also not present, proximal surface angled antero-laterally. Surface rough with spicules of lamellar bone & porosity. Avulsions fracture of styloid process. There is a second fracture in the shaft just distal to the medial joint surface (for MT4). The distal three-quarters of the shaft is angled markedly towards medial, with a pronounced angle visible on the medial side. The medial side has a clear line visible running from dorsal to plantar; the dorsal, lateral and plantar surfaces are covered by a rounded callus – clearly visible but well remodelled lamellar bone. Porous lamellar bone is present on the dorsal shaft. The medial angulation of the shaft has resulted in it lying dorsal to the fourth metatarsal, which shows some modification of the lateral facet for MT5 to accommodate this change in position. L MT1 – has a large circular lytic lesion (12 x 9mm) occupying almost the entire inferior half of the proximal facet. The margins are sharp and the floor of the lesion is rugged and porous, apparently consisting largely of exposed trabecular bone. Osteochondritis dissecans likely. Corresponding nodules of osteophytes on the inferior half of the distal facet of the left medial cuneiform. Small oval lytic lesion on the superior half of the proximal facet for L MT1 (5 x 3 mm) – again floor irregular, but much less porous. Margins fairly well defined. Could be a second osteochondritis dissecans lesion, or a cortical defect.
Dental Health	25 tooth positions; 12 teeth; 4/25 lost AM; 7/25 lost PM; 2 NP/U 3/25 teeth with caries; calculus (flecks to moderate); DEH; moderate periodontal disease; dental abscess – RP^1, surrounding alveolar bone porous Porous alveolar bone around posterior maxilla on both sides, on the buccal surface extending to posterior. RC_1 slight displaced buccally Left side of mandible covered in extensive thin layer of grey, porous woven bone with an even texture and clear margins. Covering most of internal and external corpus from a point just anterior to the mental foramen posteriorally towards the ramus, and also extending up the ramus on both surfaces – patchy woven bone on the external ramus, confined to the lower half of the internal ramus (level with the mandibular foramen and below). Also woven bone in extramolar sulcus & extending into mandibular foramen. Some porosity on the inner and outer corpus of the mandible has penetrated through to the tooth sockets. Woven bone extends anteriorly on the inner surface of the corpus to cover the surface beneath the incisors. Also slight tongue of woven bone extending onto right corpus beneath the incisors and canine.

	Right Dentition								Left Dentition							
Present	NP/U	P	AM	P	P	P	PM	P	P	PM	P	-	AM	P	PM	NP/U
Calculus	-	F l	-	F b	F b	F d	-	F d	F b	-	S b	-	-	M bmld	-	-
DEH	-	-	-	L	L	L	-	L	L	-	L	-	-	-	-	-
Caries	-	-	-	Sd	Ld	-	-	-	-	-	-	-	-	Sd	-	-
Wear	-	2	-	3	4	4	-	5	6	-	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	AM	AM	P	P	P	P	-	-	-	-	PM	PM	PM	PM	-	-
Calculus	-	-	F m	S l	M lm	S bl	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	L	L	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	4	3	4	3	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**177**
Period	Post-Medieval
Preservation	Moderate (Grade 3), slight fragmentation
Completeness	90%+; cranium (vault largely intact), mandible, maxilla, ear ossicle (incus x1); sternum & manubrium); vertebrae – C1-7, T1-12, L1-5, S1-2; 11 right ribs, 11 left ribs, unsided rib fragments; shoulders; arms; hands (2 right carpals, 8 left carpals, RMC1-5, LMC1-5, 5 proximal & 1 intermediate phalanx); pelvis; legs; feet (5 right tarsals, 6 left tarsals, RMT1-5, LMT1-5, 4 proximal & 2 distal phalanges)
Age	26-35 years (young middle adult)
Sex	Female
Stature	165.8cm ±3.55 (femur & tibia)
Non-Metric Traits	Ossicle at lambda; parietal foramina (bilateral); posterior condylar canals open (bilateral); accessory lesser palatine foramina (bilateral); mandibular torus (L); bridging of supraorbital notch (bilateral); accessory infraorbital foramen (R); anterior ethmoid foramina extrasutural (bilateral); posterior ethmoid foramina extrasutural (bilateral) Bipartite transverse foramen (1/5 R); circumflex sulcus (L); acetabular creases (bilateral); plaque (bilateral); hypotrochanteric fossae (bilateral); lateral tibial squatting facet (R); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral)
Pathology	Schmorl's nodes T7-8, T12-L1 OA facets T4-6 OA right TMJ? - Clearly defined, moderately thick bands of densely porous lamellar bone deposited in the right TMJ – one band along the anterior margin of the eminence and the other along the anterior wall of the fossa (at the deepest point) & curving up along the medial margin Ossified ligamentum flavum T2-L5, especially pronounced T10-L1, which actually lock together; would have restricted movement Cranium seems small. Mandible appears narrow, but there is a vertical post-mortem crack in the anterior body and the two halves may have been pushed together slightly Both humeri have a marked anterior curve at the junction of the proximal and mid thirds of the shaft, such that the posterior surface of the shaft is c, 20mm above the bench surface and only the head and distal joint are in contact with the bench. The distal end of the greater tubercular crest is pronounced Right radius – curved anteriorly at midshaft, but damaged post-mortem and curvature could be an illusion caused by pm damage. Ulnae and left radius seem reasonably normal. Femora and tibiae also seem straight/ normal Deposits of lamellar bone covering the medial and lateral midshafts of both tibiae, generally striated, but some porous areas and areas of rounded nodules creating an uneven surface. Fibula surfaces badly eroded and flaking, so can't tell whether affected, except small patch of possible lamellar bone on slightly less eroded part of right fibula Left calcaneus – has a small crescent removed from the anterior-medial margin of the anterior

	talar facet/ superior medial margin of the cuboid facet. Surface of crescent slightly irregular and porous. Right calcaneus – slight flattened area in the region of the anterior-medial margin of the anterior talar facet (where crescent is located on the left side). Trauma to bifurcate ligament? Or developmental? The right navicular has enthesophytes along the dorsal margin of the facet for the intermediate cuneiform. There are also enthesophytes on the dorsal surface of the proximal right MT2, extending vertically & proximally. Unfortunately, the intermediate cuneiform has been lost pm The left navicular has been lost pm. There are enthesophytes on the left cuboid at the superior margin of the facet for the lateral cuneiform, and on the lateral cuneiform (on superior margin of the facet for the cuboid). Also on the intermediate cuneiform, on the dorsal margin of the distal joint surface (for MT2), and on the medial cuneiform dorsal surface and lateral superior margin of the facet for MT1. Small enthesophytes on the dorsal proximal surface of LMT2. Cribra orbitalia – left orbit (right unaffected)
Dental Health	32 tooth positions; 20 teeth; 9/32 lost AM; 3/32 lost PM 13/20 teeth with caries; flecks-slight calculus; slight-moderate periodontal disease; 6 dental abscesses – RP^2 (small opening in buccal alveolar bone at apex root, sharp margins, surrounding alveolar bone porous), RC^1 (small sharp-edged opening superior to RP^2 but actually contiguous with root socket of RC^1), LI^2 (large opening exposing distal half buccal root I^2, margins sharp, surrounding bone very porous, abscess penetrates right through to lingual side, so second aperture on lingual alveolar bone exposing root tip, abscess also expanded mesially so internal hollow also encompasses root of LI^1), LP^1 (small opening at buccal root, sharp edges), LP^2 (circular opening at buccal root), RP_2 (small circular sharp edged opening exposing buccal side root, surrounded by subtle deposit of lamellar bone) Much of alveolar bone in the upper left quadrant is very porous, especially surrounding the abscesses Deposit of lamellar bone surrounding abscess opening at the root of RP_2, and subtle deposit of lamellar bone in the right mental foramen Slight crowding of anterior mandible

	Right Dentition								Left Dentition							
Present	AM	AM	AM	P	PM	PM	P	P	PM	P	P	P	P	P	P	P
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	La	-	-	La	La	-	La	La	La	La	La	La	Mm
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	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	AM	AM	AM	P	P	P	P	P	P	P	P	P	P	AM	AM	AM
Calculus	-	-	-	S dm	S bm	S dmb	S lm	S ldm	S mbd	S lmd	S ld	F l	F md	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	La	Md	-	-	-	-	-	-	-	Sd	-	-	-
Wear	-	-	-	-	2	2	2	3	3	2	2	2	2	-	-	-

Skeleton Number	**186**
Period	Post-Medieval
Preservation	Good (Grade 2), moderate fragmentation
Completeness	90%+; cranium (vault intact, face separated and partially intact), maxilla, ear ossicle (incus x1); sternum & manubrium; vertebrae – C1-2 & C7 plus three cervical bodies & 10 arch fragments from at least 4 vertebrae, T1-5 (bodies only), T9-12, plus 2 body frags & 21 arch fragments, L1-5, S1-5, Cx1; 12 right ribs, 10 left ribs, unsided rib fragments; shoulders; arms; hands (8 right carpals, 8 left carpals, RMT1-5, LMT1-5, 10 proximal, 7 intermediate & 5 distal phalanges); pelvis; legs; feet (7 right tarsals, 6 left tarsals, RMT1-5, LMT1-5, 10 proximal, 1 intermediate & 5 distal phalanges)
Age	46+ years (mature adult)
Sex	Male

Stature	177.5cm ±4.05 (humerus)
Non-Metric Traits	Ossicles in lambdoid (bilateral); parietal foramen (L); metopic suture; ossicles at asterion (bilateral); extrasutural mastoid foramina (bilateral); posterior condylar canals open (bilateral); accessory lesser palatine foramen (L); bridging of supraorbital notch (R); accessory supraorbital foramina (bilateral) Circumflex sulcus (R); septal aperture (R); acetabular creases (bilateral); Poirier's facet (L); exostosis in trochanteric fossae (bilateral); vastus notch (R); vastus fossa (R); double anterior calcaneal facet (R); double inferior talar facets (bilateral)
Pathology	Schmorl's nodes T11-12, L3 DJD vertebral bodies – C7, T10, L4; OA atlas facet for dens; OA facets C2, & 1 unidentified cervical facet OA both hips There is a deposit of woven bone in the right TMJ –the mandibular fossa has a small mound of densely porous woven bone c. 6 x 5mm on the lateral part of the joint surface. The left side is normal. The right mandibular condyle (and most of the rest of the mandible except the left condyle & coronoid) has been lost pm The cranium is deformed. The frontal protrudes anteriorly on the right side, the frontal boss is more pronounced and the supraorbital ridge is noticeably heavier and more pronounced on the right side. The coronal suture angles anteriorly on the right side more than on the left. The anterior third of the cranium looks twisted, as if the anterior third has been attached to the rest at an angle. The occipital protrudes posteriorally on the left side, with a pronounced bulge in the left occipital squama. The left superior nuchal line is located more superiorly than the right, and the region posterior to the foramen magnum is convex on the left side, but concave on the right. The right mastoid process appears to be set further forwards than the left. The anterior margin of the left mastoid process is level with the midpoint of the left occipital condyle, but the right mastoid process anterior margin is level with the anterior border of the right occipital condyle. The external occipital protuberance is off-set to the right. The medial half of the right lambdoid suture is completely smoothed over and shows no sign of a suture ever having been present. The lateral half of the right lambdoid suture is almost entirely occupied by ossicles, which are c. 20mm in size (anterior to posterior). There is a cluster of multiple ossicles around asterion and along the parietomastoid suture. The medial half of the left lambdoid suture is partially obliterated, but traces of the suture lines are still visible. There is one medium sized ossicle at the midpoint of the suture, again measuring c. 20mm anterior to posterior. The rest of this suture is open and clearly visible. There is another cluster of intensive suture lines in the superior mastoid area The sagittal suture is partially obliterated, especially at the anterior third and part of the posterior third in the area of the parietal foramen. Apparently a segment of the right lambdoid suture fused prematurely, or was absent, causing compensatory growth elsewhere in the cranium. Would explain the asymmetry and pattern of deformity seen, and also the ossicles in the lambdoid sutures. Unfortunately the spine and ribs are fragmented and impossible to piece together or place in order – so can't ID specific ribs and vertebrae. C1, 2 and five left and 5 right cervical arches are present (one of these right arches attached to a body). Don't know which specific cervical vertebrae these are, but it seems all are present. There seems to be some asymmetry in the thickness of the laminae. The left and right halves of one arch could be pieced together: the right lamina is 5mm thick just superior to the right inferior apophyseal facet, but the left arch is 1mm thick. Two other left laminae are around 1mm thick, and two are thicker. One right lamina is c. 1mm thick, and two are thicker (the last one is unobservable). The uppermost right rib is tightly curved, and the angle forms a right angle. The mid third of the shaft is narrow (8-11mm) but the sternal end is wider (19.5 mm) and also much thicker (11.8mm vertically) than usual. There is a flattened oval facet with a roughened irregular surface on the lateral side of the sternal third of the shaft; the sternal part of this facet has been lost pm. Presumably this was in contact with the rib beneath. This rib is incomplete, but the neck, angle and part of the shaft are present. In many ways it looks more like rib 1 normally looks, rather than like rib 2. It is very flat and broad, and has a sharp angle. Unfortunately the sternal end is missing so can't tell how long it was. The sternal/ mid part of the shaft is very wide – at least 34mm (both sides damaged pm). This part of the shaft actually curves inwards markedly. The lateral part of the shaft is damaged pm – has no obvious facet but could have been lost. Possible that uppermost rib is a cervical rib and the rib beneath was rib 1. Condition of vertebrae too poor to determine whether there was any border shifting. The transverse process of C7 is too damaged to observe. What is present of left ribs 1 and 2 look normal. The lower left ribs look like they are slightly tapered and angled inferiorly, with a sharp inferior border and a particularly pronounced enlargement of the inferior border just distal to the angle. The upper left ribs are flattened superior-inferior so they are triangular in cross-section and as wide as they are tall. Not enough survives of the right ribs to examine shape.

	Two healed rib fractures: 1) in an unsequenced right rib – tubercle and small part of shaft present. Diagonal pm break through healed fracture. Slight bulge on internal surface of rib running diagonally across the surface from the superior proximal to inferior distal, just distal to the angle. Blends well into surrounding bone, well remodelled lamellar bone. Small lamellar bone spicules on the inferior shaft, projecting inferiorly at the point where the bulge reaches the inferior margin. External surface lost pm. 2) possible right rib shaft fragment, again a pm break through a diagonal healed fracture. The shaft bulges out on the internal and external surfaces, the inferior shaft has an irregular texture and is covered in uneven lamellar bone. Subtle striated lamellar bone on the medial proximal to mid third of the left femur shaft, and the lateral mid shaft of the right femur. Both 4th metatarsals have thin flat shafts, sharp along inferior margins and almost verging on knife-edged. RMT3 is similar but not as pronounced.
Dental Health	12 tooth positions; 0 teeth; 12/12 lost AM

	Right Dentition								Left Dentition							
Present	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	-	-	-	-	AM	AM
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**192**
Period	Post-Medieval
Preservation	Moderate (Grade 3), moderate fragmentation
Completeness	80-90%; cranium (vault partially intact), mandible, maxilla; sternum (fragment of body); vertebrae – C1-7, T1-3 plus 6 body frags & 22 arch frags (min 7 vertebrae), 5 lumbar body fragments & 12 arch fragments (min 6 vertebrae, but one set of inferior facets could be T12), body S1/2; 8 right ribs, 5 left ribs, unsided rib fragments; shoulders; arms; hands (2 right carpals, 5 left carpals, RMC1, 3-5, LMC1-3, 6 proximal, 6 intermediate and 4 distal phalanges); pelvis (fragments ilia & ischia); legs; feet (5 right tarsals, 7 left tarsals, RMT1-4, LMT 1-4, 5 proximal phalanges)
Age	18-25 years (young adult)
Sex	Male?
Stature	178.7cm ±3.37 (tibia)
Non-Metric Traits	Ossicles in lambdoid (bilateral); parietal foramen (R); extrasutural mastoid foramina (bilateral); posterior condylar canal open (R); double anterior condylar canal (L); palatine torus; maxillary tori (bilateral) Acetabular creases (bilateral); Allen's fossa (R); peroneal tubercles (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral)
Pathology	The axis has a broad and robust spinous process 27.5mm wide at the broadest point The right calcaneus has a small enthesophyte projecting c. 2mm from the medial corner of the superior margin of the cuboid facet. Left side slightly damaged pm. Small enthesophytes on the superior distal margin of the right medial cuneiform at the superior tip of the distal facet for MT1. Also osteophytes on the lateral superior margin of the same facet. Left side – facet margins are all damaged, no enthesophyte formation visible on superior surface RMT1 – dorsal half of head has a rim of tidy marginal osteophytes, flattened and extending the area of the joint surface dorsally. On proximal side blends smoothly into bone shaft. The right proximal first foot phalanx has marginal osteophytes along the plantar and dorsal margins of the proximal joint surface, with an especially pronounced projection on the dorso-lateral corner. Articulates in a more dorsal position than normal – hyperextension? Possible trauma?

	LMT1 and proximal phalanx less well preserved but look more normal Cribra orbitalia – left orbit (Grade 2) Maxillary sinusitis – right sinus (see dental abscesses below)
Dental Health	30 tooth positions; 31 teeth (of which 2 loose & 1 still erupting); 1/30 lost AM 13/31 teeth with caries; DEH; flecks-slight calculus; slight periodontal disease; abscesses – LM^1 (circular hole in alveolar bone at tip distobuccal root and exposing mesiobuccal root LM^2, superior & posterior borders rounded, anterior & inferior margins sharp, associated with large carious lesion in LM^1), possible second abscess – sinus cavity of right maxilla has a cobweb-like cluster of lamellar bone spicules superior to the roots of RM^1 which has a large carious lesion, other spicules also extend posteriorally and up the sides of the walls RM^3 only partially erupted – crown barely past CEJ of RM^2. All other third molars erupted. No evidence for impaction as tooth is angled occlusally and slightly towards buccal. Slight crowding of anterior right mandible – RP_1 and C_1 twisted slightly mesial to buccal & positioned slightly to buccal of dental arcade Smooth crescent of wear between LP1 and P2 (distal half of P_1 & mesial half of P_2). Corresponding crescent between LC^1 and P^1. Pipe-smoking wear. Occurs on side with less caries – R upper premolars affected and RP^1 crown completely destroyed by carious lesion

	Right Dentition								Left Dentition							
Present	P(E)	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	-	S bmdl	-	S bdl	-	S blmd	S bdlm	F md	F m	F bm	F m	F l	F l	-	S ml	F mb
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	Lo	La	Mm	La	-	-	-	-	Sd	-	Md	Sm	La	-	So
Wear	1	2	-	2	-	2	2	2	2	2	2	2	2	-	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	AM	P	P
Calculus	F d	S bmd	S bmd	S bmld	S md	F md	F md	F m	F lm	F d	F d	F m	-	-	-	F l
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-
Caries	-	So	So	-	-	-	-	-	-	-	-	Sm	-	-	So	-
Wear	1	2	2	2	2	2	2	2	2	2	2	2	2	-	2	1

Skeleton Number	**198**	
Name	Hannah Holmes? (monument)	
Date of Death	-	
Preservation	Moderate (Grade 3), moderate fragmentation	
Completeness	<10%; legs (lower tibiae & left fibula); feet (3 right tarsals, 3 left tarsals, LMT2-3, 1 proximal phalanx?)	
Age	Osteological: 18+ years (adult)	Monument: 29 years?
Sex	Osteological: Unsexed	Monument: Female?
Stature	-	
Non-Metric Traits	Absent anterior calcaneal facets (bilateral); double inferior talar facets (bilateral); lateral talar extensions (bilateral)	
Pathology	Striated lamellar bone on the posterior midshaft of the right tibia with slightly thickened, raised deposit at the midpoint of the posterior shaft. Gentle swelling, margins blend well into surroundings & the focus of the most obvious striations (although the proximal third of the posterior shaft has had the cortex stripped by pm erosion) Striated lamellar bone on the posterior left tibia, but no obvious swelling of the shaft. Cortex peeling and flaking more severe, so some detail lost.	
Dental Health	0 tooth positions & 0 teeth	

Skeleton Number	**226**

Name	David Lister	
Date of Death	16th April 1888	
Preservation	Moderate (Grade 3), slight fragmentation	
Completeness	80-90%; cranium (largely intact), mandible, maxilla, hyoid body & greater horn, thyroid cartilage; manubrium & sternum fragments; vertebrae – C1-7, T1-12; L1-5, S1-2; 10 right ribs, 2 left ribs, unsided rib frags; shoulders; arms; right hand (7 right carpals, RMC1-5, 3 proximal & 1 distal phalanx); pelvis; legs; feet (7 right tarsals, 6 left tarsals, RMT1-5, LMT1-5, 8 proximal & 1 distal phalanx)	
Age	Osteological: 46+ years (mature adult)	Coffin plate: 84 years
Sex	Osteological: Male	Coffin plate: Male
Stature	183.4cm ±2.99 (femur & tibia)	
Non-Metric Traits	Foramen of Huschke (L); extrasutural mastoid foramen (R); accessory lesser palatine foramen (L); palatine torus; mandibular torus (L); extrasutural anterior ethmoid foramen (L) Bipartite transverse foramen (1/5 R, 0/3 L); acetabular crease (L); Allen's fossa (R); plaque (R); exostosis in trochanteric fossae (bilateral); vastus fossa (R); double anterior calcaneal facets (bilateral); double inferior talar facet (R)	
Pathology	Schmorl's nodes T9-10 DJD vertebral bodies – C2-3, C5-T1 (with eburnation of bodies C2-3 & C5-6), T7, T9-10, L1, L3-S1; OA atlas fact for dens and dens of axis with eburnation of both, axis also has scooped out lesion on the left side of the dens, edges sharp and clear, floor of lesion smooth; OA facets C4-6, T1-3, L3-5 C3-4 fused together – compact vertical osteophytes at either side of the body adjacent to the pedicles. The anterior and posterior body surfaces are unfused and the joint space is preserved. Also fused at the apophyseal facets – large bulbous osteophytes around the joint margins, especially on left side. PM damage on right side, but in undamaged areas the osteophytes are less pronounced and traces of the joint margins can still be seen The body of C6 looks slightly compressed in comparison to the bodies of C5 and C7, especially on the left side and anterior. Not sure if this is solely due to joint changes or if there is some underlying trauma OA right TMJ, both shoulders, proximal left ulna, right wrist (distal right radius, lunate and scaphoid), both hips, inferior right talus & superior right calcaneus, MCP joint (RMT2-proximal hand phalanx) Right wrist: Scaphoid – joint surface for radius has a large lytic area occupying the posterior half of the surface, the edges of the lesion are slightly scalloped and irregular, floor undulating and uneven & porous (small, even sized holes, moderately dense), probably 2-3mm deep, edges clear, very little bone formation. The anterior half of the joint surface has some porosity and eburnation of most of the surface. The joint surface for the lunate is covered in small osteophytes and scattered foramina. Lunate – joint surface for radius has small area of eburnation on the posterior medial quarter, with large osteophytes along the posterior margin and rounded osteophytes along the lateral margin. The joint surface for the scaphoid is covered in surface osteophytes and fine porosity, and bounded by rounded osteophytes along the margin between the radius and scaphoid surfaces. Distal radius – joint surface for scaphoid contour has changed, with a deep gently curved area worn away and set at a different level to the surface for the lunate. This area of the surface is eburnated and porous. There are osteophytes along the posterior lateral margin. The joint surface for the lunate has osteophytes along the anterior and posterior margins. The joint surface for the ulna has osteophytes along the anterior and posterior margins. There is a round, deep lytic area on the anterior surface of the styloid process near the scaphoid facet, and a shallower crescent shaped lytic lesion adjacent to the margin of the scaphoid facet. There is also a lytic area adjacent to the posterior surface of the joint margin, creating a 'U' shaped undulation in the joint margin. Distal ulna – styloid process lost pm, margins of distal joint damaged. Shallow lytic area occupying much of the anterior joint surface similar in character to that on the scaphoid but much shallower and although the margins are fairly sharp the lesion is less obvious as a result. The floor of the lesion is covered in fine porosity Possible rheumatoid arthritis – erosive lesions in right wrist, eburnation of cervical vertebra bodies, erosive lesion + eburnation of dens of axis. Both hips have severe OA with large prolific osteophytes around the femoral heads overhanging the necks by c. 10mm in places. Almost the entire head of the femora are covered in eburnation and porosity (some of which seem to open onto cysts), heads flattened on superior aspects. Right acetabulum almost circular with osteophytes deepening the socket and spanning the gap at the anterior margin (this area damaged pm). The anterior parts of the surface covered in fine layer of irregular osteophytes creating a roughened texture. The posterior part of the surface is occupied by porosity of varying sizes, some cysts, and eburnation. Spicules of lamellar bone on the posterior	

	ilium surround the acetabulum, and there is one large cyst at the anterior margin. The left acetabulum is less well preserved, but shows similar changes to the right side. Fractured right fibula – The distal tip of the fibula has been lost pm and the medial malleolus of the tibia has been detached pm from the rest of the tibia. There is an oblique ridge of bone running from the superior-lateral to inferior-medial distal fibula (inferior end level with the distal tibia joint surface and the superior end 30mm superior to this just inferior to the proximal end of the fibrous joint surface). The callus is mostly smooth lamellar bone, but there is some irregular lamellar bone present. The distal end of the fibula has been displaced laterally. The right distal fibula and tibia are fused together along the posterior margin of the fibrous joint. There is a large rounded bulge of bone (10mm thick & 10mm wide) on the posterior tibia running along the margin of the fibrous joint, but a gap of c. 2mm separates this from the fibula. Bone bridging the gap can be seen inside this fissure. There is a small bridge of bone extending from the anterior distal fibula superiorly towards the anterior distal tibia, approaching a spicule of bone on the anterior margin of the joint surface, but not quite meeting. When viewed from beneath there is a c. 5mm gap between the tibia and fibula for much of the fibrous joint. There is a strip of irregular lamellar bone c. 25mm long on the distal third of the lateral tibia c. 30mm superior to the proximal end of the fibrous joint – could be due to soft tissue trauma Enthesophytes on the right olecranon process Seven cervical, 12 thoracic and 5 lumbar vertebrae are present. The sacrum is damaged and incomplete, but the uppermost body is only partially fused at the right side (bridge of rounded osteophytes), and posterior side (left side damaged). There are also small bridges of bone between the transverse processes and alae. The sacral promontory is located at the join between these two vertebrae. Possible additional lumbar vertebra partially sacralised (or could be lumbarisation S1).
Dental Health	32 tooth positions; 4 teeth; 23/32 lost AM; 5/32 lost PM 4/4 teeth with caries; DEH; Possible abscess – socket RP_2 enlarged around inferior end of root, walls and floor of socket very porous, had probably penetrated external mandible; socket RC_1 similar in appearance LP2 has very asymmetric wear – in the distal part of the crown the enamel is still present on the occlusal surface, but on the mesial half of the crown the tooth is worn on a sharp slope down below the CEJ. Could be associated with AMTL and associated changes in occlusion. Wear was flat not curved, so seems unlikely to be pipe-smoking

	Right Dentition								Left Dentition							
Present	AM	AM	PM?	AM	AM	AM	P	PM	AM	AM	AM	AM	P	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	L	-	-	-
Caries	-	-	-	-	-	-	La	-	-	-	-	-	Sb	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-
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	AM	AM	AM	P	AM	AM	AM	AM	AM	AM	P	PM	AM	AM	AM	PM?
Calculus	-	-	-	La	-	-	-	-	-	-	La	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**235**	
Name	Thomas Patterson? (monument)	
Date of Death	31st January 1865? (monument)	
Preservation	Poor (Grade 4), moderate fragmentation	
Completeness	20-30%; partial cranium (frontal squama + superior-medial parietals); arms (distal humeri, proximal right ulna); legs; feet (2 right tarsals, 2 left tarsals	
Age	Osteological: 18+ years (adult)	Monument: 70 years?
Sex	Osteological: Unsexed (but some female traits)	Monument: Male?
Stature	-	
Non-Metric Traits	-	

Pathology	The sagittal suture undulates medio-laterally rather than running in a straight line. The anterior quarter is straight, but the mid section deviates to the left then to the right, and back to the left before returning to the midline.
Dental Health	0 tooth positions; 0 teeth

Skeleton Number	**238**	
Name	"[Eliza?]beth [D?]emaine"	
Date of Death	? April 1888	
Preservation	Moderate (Grade 3), moderate fragmentation	
Completeness	70-80%; cranium (largely intact), mandible, maxilla; sternum body; vertebrae – C1-5, T5-12 (plus 3 spinous processes & 2 body fragments), L1-5, S1-2; 3 right ribs, 10 left ribs, unsided rib frags; right clavicle, left shoulder; arms; hands (5 right carpals, 1 left carpal, RMC1-5, 3 unidentified left MCs, 4 proximal, 4 intermediate & 1 distal phalanx); pelvis (right os coxa very incomplete); legs	
Age	Osteological: 36-45 years (old middle adult)	Coffin plate: 49 years
Sex	Osteological: Female	Coffin plate: Female?
Stature	-	
Non-Metric Traits	Metopic suture; sutural mastoid foramina (bilateral); posterior condylar canal open (L); extrasutural anterior ethmoid foramina (bilateral) Circumflex sulcus (L)	
Pathology	Schmorl's nodes T7, T10-11 OA left hip, proximal RMC2 Pronounced ossification of ligamentum flavum T5-L5 (i.e. all surviving thoracic and lumbar vertebrae) T12 superior ligament is so ossified that there is no longer a gap between the two superior apophyseal facets. T5-7 actually lock tightly together due to the level of ossification & the left apophyseal facets between T6-7 had been fused (since broken pm). Range of movement must have been reduced. The sternum body is almost intact (a small part of the left proximal end has been lost pm). The proximal end is narrow, flaring out to a wider distal end. The body has a marked anterior curve, with a slight angle at the junction of the first and second segment. The ribs are mostly too damaged to observe shape, but a couple of left ribs have a fairly normal curvature (no lateral flattening of curve), are not reduced in height and do not taper. Sacrum – the superior body is normal. There are lamellar bone spicules on the left side of the body of S1 adjacent to the superior body surface. L5 - There is lytic activity in the superior surface of the body, giving it a moth-eaten appearance. These lytic areas are focussed around the right half of the superior body and along the anterior margin. They are of variable depth, and have ragged margins with minimal remodelling. The floor and walls of the lesions are spongy. The right side of the body is covered in lamellar bone, with disorganised rough spicules projecting laterally from the midpoint between the superior and inferior body. The bone in this area and extending onto the pedicle is porous and roughened. There is further lytic activity inferior to the spicules, creating irregular scooped-out areas with roughened floors (trabecular in appearance). These lesions extend onto the inferior right surface of the body (the rest of the body is normal in appearance). There is porosity visible on the posterior body, just inferior and medial to where the pedicle emerges. Aside from the ossified ligamentum flavum, the arch looks reasonably normal. L4 – the inferior body mirrors the appearance of L5 – the surface is rough and irregular, with pronounced lytic activity in a band along the right anterior body margins and some small and irregular cobweb-like osteophytes over the surface. The lytic margins are irregular and disorganised, looking moth-eaten, with minimal remodelling. Again there is lamellar bone on the right side of the body, with large spicules extending laterally in a thick band immediately superior to the lytic areas on the right inferior body. There are further (smaller) deposits of lamellar bone on the left side of the body, again irregular and speculated, and the surrounding cortex is slightly porous. The left pedicle and posterior left corner of the body have been lost pm. The superior body surface is normal. The body surfaces of T9-L3 all look normal. The superior body of T8 has small surface osteophytes in the centre and some pinprick porosity. The inferior surface of T7 has an elongated depression with clear margins, a porous floor and some porosity about the anterior margin (probably a Schmorl's node, but porosity around the margin is unusual). The superior body has a further cluster of porosity, but most of the edges of this surface have been lost pm. L3 – small spicules of lamellar bone & porosity on the right side of the vertebral body. The porous area is very slightly depressed compared to the surroundings L2 – slight porosity on both sides of the body. Deposit of lamellar bone (smooth and rounded, occasional small porosity with well rounded margins) on right lamina and surrounding the posterior	

	border of the right inferior apophyseal facet L1 – slight porosity on both sides of the body, no lamellar bone. Some lamellar bone on the left lamina and left transverse process, similar in character to that on L2 T12 – slight porosity on both sides of the body & some strands and spicules of lamellar bone (subtle). Both laminae and what present of spinous processes have lamellar bone – thickened and rounded on the spinous process with thinner strands and more irregular spicules on the laminae. T11 – again porosity and slight shallow lytic areas on the right side of the body, with lytic areas surrounded by thin ridge of lamellar bone. Texture within lytic areas roughened, irregular and slightly spongy. Arch not involved. Some porosity on the left side of the body T10 – porosity and small irregular bone spicules on the right side of the body and to a lesser extent on the left side. Arch not involved T9 – porosity and bone spicules (irregular and varied size) on the right side of the body. Arch not involved T8 & 7 – look fairly normal on all sides, except pm damage makes them harder to observe All ribs were examined, but none had new bone formation. However, few of the right ribs survived and the left ribs were missing large parts of the shafts and sternal ends. The right sides of the vertebrae on the whole showed more changes than the left side, so possible that the right ribs would have been more likely to be affected. Left ulna – has an expanded area of bone occupying the distal end of the medial and posterior shaft. The bone in this area seems swollen, composed of lamellar bone blending well into the surroundings. The centre of the raised area has a cluster of fine porosity, otherwise the lesion is rather featureless. Difficult to measure as the margins are ill-defined, but around 30mm long (prox-dist) and 12mm wide (although wraps around the shaft). Further lamellar bone is deposited on the posterior midshaft – thin deposits, slightly porous in places, very indistinct margins. Clusters of porosity on the proximal end of the ulna, around the lateral margin and posterior surface of the olecranon process Unfortunately both left and right ulnae are broken pm, and parts are missing making it difficult to measure them. When held next to each other with the coronoid processes level the left ulna is noticeably shorter than the right, probably by around 5mm. Right radius – cluster of porosity on the lateral anterior surface of the distal end, wrapping around onto the lateral and posterior surfaces. Most of the porosity is distinct and the margins are fairly rounded, but on the styloid process the porosity starts to merge and the margins become sharper and more irregular. The left side looks more normal, but is damaged pm. RMC1 – has lamellar bone deposits on the palmar surface of the shaft and some areas of transitional woven to lamellar bone. Much of the palmar shaft is occupied by these deposits, which are generally fairly rounded and blend into surroundings. There is some fine porosity present, and spicules of lamellar bone towards the distal end of the palmar surface of the shaft Further subtle lamellar bone on the dorsal and sides of the proximal shaft of RMC4. Nothing visible on RMC2-3 or 5. The left hand is mostly lost pm, but the surviving metacarpal shafts look normal. Sternum – posterior body has lytic activity accompanied by irregular thin spicules of lamellar bone on the distal half on the right side. The area affected seems roughened and slightly spongy and porous. The margins of the affected area are indistinct, but measures c. 26 x 14mm. The porous area is slightly depressed compared to its surroundings. Left femur – shaft broad and flattened (A-P) the whole length of the shaft (not just at the proximal end). The right femur was similar but had suffered more pm damage. Cribra orbitalia – bilateral (Grade 2)
Dental Health	14 tooth positions; 7 teeth (of which 5 loose) + 1 unidentified ectopic tooth; 12/14 lost AM 6/7 teeth with caries, 7 lesions; DEH; slight-moderate calculus RP^1 – angular very smooth wear, crown sloping down from mesial part of occlusal surface to half-way down the crown on the distal surface RI_1 & RI_2 – both have heavy wear of the crowns. RI1 has straight flat wear from the mesial corner down to the distal side, and similar wear on RI2 except from distal corner down to mesial. Together they create a V shaped notch. Could be pipe-smoking, but seems too angular The crown of an unidentified tooth is visible partially erupted through the anterior margin of the nasal aperture, just to the left of the midline. The tip of the crown is quite pointy, and the crown looks bulbous and possibly quite small – could be a deciduous canine, or a supernumerary tooth. Although it is above the socket for LI^1, it does not look like a permanent central incisor. The tip of the crown is pointing superiorly and slightly posteriorally. Looks like it is completely inverted. Has been partially exposed by post-mortem damage, but the tip of the crown probably protruded into the floor of the nasal aperture

	Right Dentition								Left Dentition							
Present	-	-	-	-	P	P	-	-	AM	AM	AM	AM	AM	AM	AM	AM

Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	L	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	Sm	Sm Sd	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	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	AM	AM	AM	AM	-
Calculus	-	-	-	-	-	-	M md	S l	S l	M lm	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	L	L	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	Mm	Sm	Sd	La	-	-	-	-	-
Wear	-	-	-	-	-	-	6	5	4	3	-	-	-	-	-	-

Skeleton Number	**241**
Period	Post-Medieval
Preservation	Good (Grade 2), moderate fragmentation
Completeness	80-90%; cranium, mandible, left maxilla, ear ossicles (incus x1, malleus x2), hyoid body & greater horns; vertebrae – C1-7, T1-12 (heavily fragmented), 6 lumbar body fragments + 12 arch fragments; 9 right ribs, 7 left ribs, unsided rib fragments; shoulders; arms; hands (RMC2-3, LMC1-3, 1unidentified metacarpal, 1 proximal and 1 distal phalanx); pelvis (fragments both ilia); legs; feet (3 right tarsals, 4 left tarsals, RMT1-5, LMT1-4, 5 proximal & 1 intermediate phalanx, sesamoid bone)
Age	46+ years? (mature adult?)
Sex	Male
Stature	178.4cm ±3.37 (tibia)
Non-Metric Traits	Highest nuchal lines (bilateral); parietal foramina (bilateral); extrasutural mastoid foramen (R); posterior condylar canal open (R); accessory lesser palatine foramen (L); absent zygomaticofacial foramen (R) Circumflex sulcus (R); exostosis in the trochanteric fossa (R); lateral tibial squatting facets (bilateral); peroneal tubercles (bilateral); double anterior calcaneal facet (L); double inferior talar facet (L); lateral talar extensions (lateral)
Pathology	DJD vertebral bodies – C2-3, C4-5 (with eburnation of bodies C2-3); OA facet T3 C3-4 fused – bodies fused at the sides & posterior (very smooth, no bulging osteophytes) & part of anterior (slightly fibrous looking vertical osteophytes, minimal) leaving a thin line of unfused bone at the anterior bodies (no visible joint space). Both apophyseal facets solidly fused, with a slight bugle around the posterior and lateral margins but very flat and smooth anterior and medial margins. Also fused along posterior mid section of laminae. Spinous processes completely separate. Likely to be congenital fusion/ failure to separate C2 has a moderate osteophyte projecting posteriorally c.5mm into the vertebral foramen on the right side of the inferior body, with a smaller osteophyte on the left side. Corresponding large osteophyte on the right side of the superior body of C3. Surface of the body in the area of this osteophyte porous and also some eburnation. OA right proximal MT2 (facet for intermediate cuneiform) Small (14 x 6mm) deposit of lamellar bone on endocranial surface of occipital in left transverse sulcus, blends well into surrounding bone, slightly porous. Further (similar) lamellar bone on the occipital part of the sagittal sinus. Small are of porous woven bone on the sigmoid sinus of the left temporal bone Ossification of ligamentum flavum T4-12. Large amount of costal cartilage ossified on R rib 1 (sternal end of left side lost pm), Enthesophytes on rib tuberosities Faint striated lamellar bone on the medial midshafts of both tibiae The right tibia has a piece of coffin wood(?) attached to the posterior proximal end, just lateral to the soleal line
Dental Health	24 tooth positions; 20 teeth (of which 4 loose); 3/24 lost AM; 2/24 lost AM; 3 NP/U 2/20 teeth with caries; DEH; flecks-slight calculus; abscess – RM_2; moderate periodontal disease

	Well remodelled lamellar bone on external and internal mandibular corpus below the socket for RM_2. Pinprick porosity, deposits blend well into surrounding. The occlusal level of LM_2 is higher than that of the other left teeth by 1-2mm – possibly supererupted following loss RM^2? Deep semicircular smooth crescent of wear between LI_2 and LC_1, occupying most of the crown of I_2. Shallower crescent of wear between RI_2 and RC_1 (again mostly on incisor). Most of the anterior upper dentition lost pm. LC^1 and P^1 show some flattening of the cusps (possibly slightly curved), but not forming an obvious crescent

	Right Dentition								Left Dentition							
Present	-	P	P	P	-	-	-	P	P	PM	P	P	P	P	AM	NP/U
Calculus	-	S bdml	S bdml	F bl	-	-	-	S mdlb	F md	-	F l	F mdl	S mdlb	S mdlb	-	-
DEH	-	L	-	-	-	-	-	-	-	-	L	-	-	L	-	-
Caries	-	So	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	3	2	-	-	-	5	4	-	5	3	2	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	AM	P	P	P	P	P	PM	AM	P	P	P	P	P	P	NP/U
Calculus	-	-	S mdlb	S mdlb	F d	S mldb	S mldb	-	-	S bl	S bml	S blmd	S blmd	S blmd	S bmdl	-
DEH	-	-	-	L	-	-	-	-	-	-	-	L	L	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Mb	-
Wear	-	-	2	2	1	4	5	-	-	6	5	3	2	3	2	-

Skeleton Number	**283**	
Name	Mary Ann Lister? (monument, very tentative)	
Date of Death	15th February 1877? (monument, very tentative)	
Preservation	Poor (Grade 4), severe fragmentation	
Completeness	30-40%; cranium, right mandible, right maxilla, ear ossicle (incus x1); vertebrae – C1-2; part right shoulder; arms (right humerus, left humerus, radius and ulna midshafts); hands; legs; feet (6 right tarsals, 4 left tarsals, RMT1, 3-5, LMT1, 4-5 & 2 unidentified MT shafts, 1 proximal phalanx)	
Age	Osteological: 18-25 years (young adult)	Monument: 20 years? (v. tentative)
Sex	Osteological: Female	Monument: Female? (v. tentative)
Stature	-	
Non-Metric Traits	Ossicle in lambdoid (R) parietal foramen (L); metopic suture; ossicle at parietal notch (R); posterior condylar canals open (bilateral) Hypotrochanteric fossa (L); absent anterior calcaneal facet (L); medial talar facet (L)	
Pathology	Cribra orbitalia – R orbit (Grade 3); left orbit unaffected Metatarsals thin and flattened, but the skeleton is small and gracile The left talus has a ridge of bone along the superior lateral head and the neck has a small deposit of lamellar bone. Head and neck of right talus lost post-mortem	
Dental Health	24 tooth positions; 27 teeth (of which 6 loose & 4 in process of erupting) + 3 broken and unidentified tooth roots; 1/24 lost AM; 2 teeth not present 1/27 teeth with caries; DEH; flecks-moderate calculus Both upper lateral incisors are not present or unerupted. The canines are positioned right next to the central incisors with only a tiny gap between them (1mm on right side, 0mm on left side). On the left side the alveolar bone is broken and damaged – the tips of the sockets for LI^1 and LC^1 are present and there is no sign of LI^2 in the jaw. All remaining teeth fit snugly into the dental arcade and is likely would have been crowded if the lateral incisors were present	

	Right Dentition								Left Dentition							
Present	P(E)	P	P	P	P	P	NP	P	P	NP	P	P	P	P	P	P(E)
Calculus	-	S	S	S	S	F	-	F	-	-	-	-	F	F	F	-

		bmd	bmd	blmd	blmd	bm		m					l	l	l	
DEH	-	-	L	L	L	L	-	L	L	-	L	L	-	-	-	-
Caries	-	-	So	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	2	2	2	2	-	2	2	-	2	1	1	2	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(E)	P	AM	P	P	P	P	P	P	P	P	P	-	-	P	P(E)
Calculus	-	F l	-	S lmd	S lmd	M lmbd	S blmd	M blmd	M blmd	S lmd	S lm	F lm	-	-	F l	-
DEH	-	-	-	L	-	L	-	-	-	-	G	L	-	-	-	L
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	-	2	2	2	2	3	2	2	1	1	-	-	2	1

Skeleton Number	**289**	
Period	Post-Medieval	
Preservation	Poor (Grade 4), severe fragmentation	
Completeness	50-60%; cranium (vault partially intact), mandible, maxilla; vertebrae – C1-7, T1-3, plus 7 bodies, 14 fragments of at least 5 lumbar vertebrae, plus 6 fragments of thoracic or lumbar vertebrae; 2 right ribs, unsided rib fragment; shoulders; arms; hands (4 right carpals, RMC1-3, LMC2-4, 5 proximal phalanges); pelvis; legs	
Age	36-45 years (old middle adult)	
Sex	Indeterminate (possibly female?)	
Stature	-	
Non-Metric Traits	Parietal foramen (L); extrasutural mastoid foramen (R); sutural mastoid foramen (L); palatine torus Bipartite transverse foramen (1/2 L); septal aperture (R); acetabular crease (R) hypotrochanteric fossa (R)	
Pathology	Schmorl's node on unidentified thoracic/ lumbar body fragment DJD vertebral bodies – C5-7; OA atlas facet for dens; OA facets C3-4, T1-3, plus 6 unidentified thoracic facets OA both TMJs, right hip The right side of the mandible has a rounded nodule of bone on the internal ramus on the posterior side of the mandibular foramen. The nodule extends towards the lingual and makes contact along the inferior margin. The margins of the nodule are unclear as they blend into the surrounding bone. Left side normal. C7-T1: C7 has a defined lytic area 8 x 5mm on the inferior body at the posterior margin, slightly lobulated and the floor of the lesion irregular. Corresponding nodule on the surface of the superior body of T1, at the posterior central border. The nodule is irregular and uneven in texture (5.5 x 4.5 mm, protrudes c. 3mm). Similar nodule on the inferior body of an unidentified vertebra Unfortunately much of the spine is too fragmented to reconstruct, or identify which vertebrae are which. Three unidentified thoracic vertebrae has uneven sized pedicles: 1) L 3.5mm thick, R 1.5mm thick, left side of body straighter, right side more concave; 2) L 2mm thick, R 3mm thick, left side of body possibly slightly more concave; 3) L 2.5mm thick, R unmeasurable, left pedicle angled to face more laterally than posteriorally, right pedicle angled posteriorally, both pedicles slanted from inferior lateral to superior medial when viewed from behind, left side of the body concave (right side unobservable). Possible scoliosis, but too damaged to really tell. Ribs also too damaged and too few surviving Maxillary sinusitis – porosity on floor of right sinus	
Dental Health	12 tooth positions; 1 tooth (loose); 10/12 lost AM; 2/12 lost PM 1/1 tooth with caries LI[1] anterior surface of the root from the CEJ down to near the tip is concave and the margin of this area relatively sharp. Erosion due to tooth cleaning or pm damage?	

	Right Dentition								Left Dentition							
Present	-	-	AM	-	-	-	-	-	P	-	-	-	-	-	-	AM

Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	Sm	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	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	AM	AM	AM	AM	AM	PM	PM	-	-	-	-	-	-	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**292**	
Period	Post-Medieval	
Preservation	Very poor (Grade 5), severe fragmentation	
Completeness	10-20%; part right arm (distal humerus, ulna and radius shafts); part right leg (femur and tibia shaft fragments); feet (2 right tarsals, RMT1? & 3, plus 2 unidentified MTs, 3 proximal & 1 intermediate phalanx)	
Age	18+ years (adult)	
Sex	Unsexed	
Stature	-	
Non-Metric Traits	Double inferior talar facet (R)	
Pathology	-	
Dental Health	0 tooth positions; 0 teeth	

Skeleton Number	**300**	
Name	Mary Darnbrook?	
Date of Death	7th September 1870?	
Preservation	Poor (Grade 4), moderate fragmentation	
Completeness	50-60%; cranium (largely intact), mandible, maxilla, ear ossicles (malleus x2, incus x1); vertebrae – L2-5, S1-5; unsided rib frag; arms; right hands (3 carpals, RMC2-5, 2 proximal & 2 intermediate phalanges); pelvis; legs; feet (4 right tarsals, 3 left tarsals, RMT3-5)	
Age	Osteological: 46+ years (mature adult)	Monument: 78 years?
Sex	Osteological: Female	Monument: Female?
Stature	162.2cm ±3.55 (femur & tibia)	
Non-Metric Traits	Ossicle in lambdoid (L) parietal foramina (bilateral); extrasutural mastoid foramen (R); sutural mastoid foramen (L); accessory lesser palatine foramina (bilateral); bridging of supraorbital notch (R) Acetabular creases (bilateral); hypotrochanteric fossa (L); exostosis in trochanteric fossae (bilateral); double anterior calcaneal facets (bilateral)	
Pathology	DJD vertebral bodies – L5-S1; OA facets L3-S1 OA both hips, one intermediate hand phalanx (proximal end) Pronounced enthesophytes on olecranon processes of both ulnae & on right ischial tuberosity (left side damaged pm) CX1 possibly fused to sacrum – the area looks 'squashed' with a ridge of lamellar bone on the anterior surface. There are two enthesophytes projecting anteriorly at either side of the anterior inferior body. However sacrum damaged pm and hard to assess appearance.	
Dental Health	32 tooth positions; 0 teeth; 30/32 lost AM; 2/32 lost PM Almost edentulous – anterior part of maxillary alveolar bone very resorbed, not much distance between palate and base of nasal aperture (although some pm damage and erosion)	
	Right Dentition	Left Dentition

Present	AM	AM	AM	AM	AM	PM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM
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	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	PM	AM	AM	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**307**	
Name	Joseph Darnbrook?	
Date of Death	7th March 1869?	
Preservation	Poor (Grade 4), slight fragmentation	
Completeness	70-80%; cranium (vault largely intact), mandible, maxilla; vertebrae – C4-7, T1, T11-12 (plus 4 arches), L1, S2-5; 6 right ribs, 5 left ribs, unsided rib frags; shoulders (scapulae); arms; hands (5 right carpals, 8 left carpals, RMC1-5, LMC1-5, 10 proximal, 8 intermediate & 7 distal phalanges); pelvis; legs; feet (6 right tarsals, 8 left tarsals, RMT1-2, 3, LMT1-5, 1 proximal phalanx)	
Age	Osteological: 18+ years (adult) (possibly mature)	Monument: 78 years?
Sex	Osteological: Male?	Monument: Male?
Stature	167.4cm ±2.99 (femur & tibia)	
Non-Metric Traits	Ossicles at pterion (bilateral); extrasutural mastoid foramen (R); sutural mastoid foramen (L); accessory lesser palatine foramen (L); bridging of supraorbital notch (R) Circumflex sulcus (R); acetabular creases (bilateral); exostosis in trochanteric fossae (bilateral); vastus notch (R); vastus fossa (R); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral)	
Pathology	DJD bodies C6-7. OA apophyseal facets C4-6, T11-12, plus unidentified thoracic facets OA both TMJs, medial left clavicle, right shoulder, both hips, left navicular (facet for lateral cuneiform), left intermediate cuneiform (facet for MT2), left lateral cuneiform (joint for navicular), right cuneiform (joint for MT3), both thumbs, LMC2 (proximal) Lesser tubercle of right humerus covered in osteophytes & some porosity resulting in irregular surface – possible trauma to subscapularis. Probable 'bone former' – several enthesophytes (ischial tuberosity, proximal femur, distal fibula, posterior calcaneus, pronounces exostosis in trochanteric fossae) & muscle attachments generally well defined and pronounced. Fragment of first rib with ossified cartilage at sternal end & isolated fragment of possible ossified cartilage Unsided rib fragment has a linear band of raised woven bone in transition to lamellar on the internal surface, traversing the bone from superior to inferior. Raised nodules visible on the superior and inferior margins of the rib. Flat area of well remodelled lamellar bone extending in a band across the external surface. Healed/ healing rib fracture. Ribs are poorly preserved, papery and fragile. Those that survive have very sharp inferior borders with pronounced costal grooves. The superior borders are also fairly sharp, and the inner surface is pronounced (almost as if there is a ridge running along the length of the shaft) creating a more triangular cross-section. Only the proximal ends survive, so difficult to gauge how unusual the rib shape is Small lytic lesion adjacent to the distal joint of RMT1 on the medial-dorsal side. Measures 4mm in diameter. Some of surrounding area damaged pm so difficult to evaluate appearance of margins	
Dental Health	32 tooth positions; 3 teeth; 25/32 lost AM; 4/32 lost PM 3/3 teeth with caries – RC_1 (entire crown destroyed), RI^1 (lesion in buccal CEJ wraps round tooth to distal side CEJ), LI^1 (medium lesion on buccal CEJ + small lesion at mesial CEJ – not joined as they are on right side); DEH Bone on the anterior mandible irregular with hollows and ridges in the alveolar bone, suggesting was	

				in the process of remodelling. One large hollow occupying the position of the root tips of the central incisors could have been an abscess, but difficult to tell												
	Right Dentition								Left Dentition							
Present	AM	AM	AM	AM	AM	AM	PM	P	P	PM	PM	AM	AM	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	L	L	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	L b-d	Mb Sd	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	6	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	AM	AM	AM	AM	AM	P	AM	AM	AM	AM	AM	AM	PM	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	La	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**310**	
Name	Mary Dickinson	
Date of Death	6th Mach 1888	
Preservation	Moderate (Grade 3), minimal fragmentation	
Completeness	40-50%; vertebrae – T6-12; L1-5, S1-2; 5 right ribs, 6 left ribs, unsided rib frags; arms; hands (5 right carpals, 6 left carpals, RMC1-4, LMC1-5, 9 proximal, 3 intermediate & 3 distal phalanges); pelvis; legs; feet (6 right tarsals, 6 left tarsals, RMT1-5, LMT1-5, 6 proximal phalanges)	
Age	Osteological: 18+ years (adult)	Coffin plate: 66 years
Sex	Osteological: Unsexed	Coffin plate: Female
Stature	154.3cm ±3.55 (femur & tibia)	
Non-Metric Traits	Acetabular creases (bilateral); Allen's fossa (R); plaque (bilateral); exostosis in trochanteric fossae (bilateral); vastus notch (R); vastus fossa (R); double anterior calcaneal facet (L); lateral talar extension (R)	
Pathology	DJD body L4; OA apophyseal facets L4-5 OA right knee, right thumb, right MC3 (head) Shallow lytic area on left scaphoid (6 x 6mm) occupying most of distal joint surface for capitate. Floor of lesion roughened but not porous; head of capitate normal Radial tuberosities have enthesophytes along medial border, and some porosity on the tuberosities themselves. Large enthesophyte on olecranon process of right ulna. Osteophyte on lateral border of right patellar joint surface, occupying 11mm of the joint margin and projecting 5mm laterally. Immediately inferior to this osteophyte there is a small (4mm) gap before a smaller osteophyte continues along the lateral-inferior margin. Possibly associated with OA of knee? Or traumatic? Right calcaneus – anterior border of systentaculum tali looks as if a chunk has been removed from a point just anterior to the middle talar facet to a point half-way along the superior border of the cuboid facet, leaving a shallow concave crescent. The anterior surface of the crescent is irregular with two deep lytic lesions (one 3 x 6mm adjacent to the anterior border of the middle talar facet, undercutting it; the second smaller (3mm diameter) & lateral to the first lesion). Both lytic lesions have moderately rounded margins. Possible avulsion fracture, or could be developmental. Left side normal. Left navicular has a fourth facet for articulation with the cuboid, although the right navicular has been lost pm the shape of the cuboid joint surfaces suggest this also occurred on the right side	
Dental Health	0 tooth positions; 0 teeth	

Skeleton Number	**319**
Name	Sarah Darnbrook
Date of Death	26th May 1854

Preservation	Good (Grade 2), severe fragmentation	
Completeness	60-70%; cranium, mandible, maxilla; sternum fragments; vertebrae – C1-7, T1 plus 5 body & 16 arch fragments, L5? Body plus 7 body & 3 arch frags, S1, plus 9 unidentified body fragments; 7 right ribs, unsided rib frags; shoulders; arms; hands (RMC2-4, LMC5, 3? Proximal & 2 intermediate? phalanges); pelvis; legs; feet (7 right tarsals, 3 left tarsals, RMT1-5, LMT1-2, & 1 unidentified MT head, 2 proximal phalanges)	
Age	Osteological: 18-25 years (young adult)	Monument: 23 years (or 22?)
Sex	Osteological: Female	Monument: Female
Stature	-	
Non-Metric Traits	Ossicle at lambda; ossicles in lambdoid (bilateral); extrasutural mastoid foramen (L); posterior condylar canal open (R); accessory lesser palatine foramen (L) Circumflex sulcus (R); acetabular creases (bilateral); Allen's fossae (bilateral); exostosis in trochanteric fossa (R); vastus fossa (L); lateral tibial squatting facet (R); absent anterior calcaneal facet (R); double inferior talar facets (bilateral); medial talar facets (bilateral)	
Pathology	Striated lamellar bone on the lateral mid third of the right tibia, fairly subtle. Possible also present on left tibia, but pm erosion to outer cortex. Further subtle striated lamellar bone on both femoral midshafts (lateral surfaces) Metatarsals thin and flattened medio-laterally, especially the second metatarsals. Cortex in cross section looks reasonably normal. Probably normal variation Ribs severely fragmented and much lost pm. Several fragments of shaft seem small (superior-inferior), but cannot assess rib shape	
Dental Health	30 tooth positions; 29 teeth (of which 1 loose); 1/30 lost AM; 1/30 lost PM; 2 in process of erupting 4/29 teeth with caries; DEH; flecks-moderate calculus Both lower third molars partially erupted (in early stages of eruption). On the right side the entire crown is exposed and the cusps are protruding above the alveolar bone. On the left side there is only a small aperture in the alveolar bone over M_3 and the cusps are still well below the level of the alveolar bone LM^3 erupted, or nearly completed eruption; RM^3 lost pm Upper second incisors small and slightly peg-shaped Slight crowding of anterior mandible LC^1 slightly rotated lingual to mesial & possibly not quite fully erupted into occlusion RM_2 – all that is present is a flake of root(?) visible in the alveolar bone which does not extend above the alveolar bone surface. The exposed surface of the root is angular and irregular, but seems to have root-like morphology. Possible AM fracture of this tooth? Has loss of this tooth on this side allowed encouraged the eruption of RM_3 to begin?	

	Right Dentition								Left Dentition							
Present	PM	P	P	P	P	P	P	-	P	P	P	P	P	P	P	P
Calculus	-	-	-	F m	F d	-	F m	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	L	L	-	L	-	-	-	-
Caries	-	So	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	2	2	2	2	2	-	2	2	2	2	2	2	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(E)	AM	P	P	P	P	P	P	P	P	P	P	P	P	P	P(E)
Calculus	-	-	-	-	-	-	S lmd	M lmd	M ldm	S m	-	-	-	S l	-	-
DEH	-	-	L	L	L	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	Md	Sd	-	-	-	-	-	-	-	-	-	-	So	-
Wear	1	-	2	2	2	1	2	3	2	2	1	1	2	2	2	-

Skeleton Number	**325**
Name	Grace Hutton
Date of Death	3rd April 1921

Preservation	Moderate (Grade 3), severe fragmentation	
Completeness	50-60%; partial cranium (mostly base and sides), mandible, maxilla; manubrium & sternum fragments; vertebrae – C1-2 plus 3 bodies, 8 thoracic body fragments, 2 lumbar body fragments & 5 arch fragments, plus 14 thoracic/lumbar body fragments, S1(?) body; 6right ribs, 1 left rib, unsided rib frags; shoulders; arms; left hand (1 left carpal, LMC2-5, 1 proximal & 1 intermediate phalanx); pelvis; legs (femur shafts, fragments tibiae & right fibula); left foot (LMT5)	
Age	Osteological: 46+ years (mature adult)	Coffin plate: 73 years
Sex	Osteological: Female	Coffin plate: Female
Stature	-	
Non-Metric Traits	Extrasutural mastoid foramen (L); bridging of supraorbital notch (R)	
Pathology	DJD bodies – 2 unidentified cervical OA both TMJs Possible osteoporosis: Cranial vault fragmented. Vault in cross section is expanded and thick in places (8-10.5mm), spongy with no real inner and outer table definition (just a thin layer of cortex). In places the spongy trabecular bone looks like it has been filled in with disorganised granular bone Right scapula – pm breaks through the spine and axillary border show the bone is spongy and no solid cortical bone is visible. Arms – bone cortex very thin and where the cortex is thicker it is spongy in texture (right humerus midshaft cortex measures 1.5-2mm thick; right radius midshaft measures 1mm thick) Os coxae – pm breaks show very spongy texture of bone, cortical bone is porous and spongy in cross section, and trabecular bone in right ilium strongly oriented in one direction Right femur – many longitudinal breaks, bone cortex along length of shaft is spongy an porous Tibiae – cortex very thin (1-2mm thick) even in midshaft areas Very little survives of vertebral bodies Cribra orbitalia? – right orbit (Grade 1?)	
Dental Health	27 tooth positions; 1 tooth (impacted); 26/27 lost AM LM_3 visible partially impacted in the alveolar bone. Cusps just protruding through the alveolar bone surface and some alveolar bone still covering the occlusal surface of the crown. Was probably at a slight angle with the crown angled mesially	

	Right Dentition								Left Dentition							
Present	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	-	-	-	-	-
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	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	P
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Impacted
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Skeleton Number	**338**	
Period	Post-Medieval	
Preservation	Moderate (Grade 3), severe fragmentation	
Completeness	20-30%; cranium, mandible, maxilla, ear ossicle (incus x1); vertebrae – C1-6, T1-2? plus 3 thoracic arch fragments; 5 right ribs, unsided rib fragments; right shoulder; right humerus	
Age	11-14 years (adolescent)	
Sex	-	
Stature	-	

Non-Metric Traits	Ossicles in lambdoid (bilateral); parietal foramen (R); foramen of Huschke (L); extrasutural mastoid foramen (R); posterior condylar canals open (bilateral) Bipartite transverse foramen (1/3 R)
Pathology	Cribra orbitalia – bilateral (Grade 2) Maxillary sinusitis – bilateral – very dense fine porosity occupying most of the right sinus, less extensive in the left sinus Many cranial bones seem puffed up and expanded as if from inside. The outer surfaces and morphology otherwise look relatively normal (i.e. extra thickness does not seem to be due to thick deposits of lamellar bone on external surfaces of cortex but due to expansion of spongy bone). Expansion of diploë – inner and outer tables of vault have lost definition and just a thin layer of cortex present. Areas particularly affected include the orbit roofs, which are 6-7mm thick in the central area on both sides, and around 11mm thick at the anterior margin of the right side (c. 10mm on left side). Sphenoid – lesser and greater wings (body and sella turcica lost pm), pterygoid plates (spongy bone visible within each plate sandwiched between outer cortex layers). Squamous part of temporal bones (2.5-4.5mm thick on left side). Inferior parietals along the squamous sutures are 7-8mm thick; near the sagittal suture the right parietal is 4.5-5mm thick. The right frontal squama is c. 4mm thick and the occipital roughly equivalent to the parietals. Occipital condyles – area supporting them seems puffed up and expanded. Both zygomas are thick and expanded (left side broken pm exposing thick layer of spongy bone inside). Mandible – body seems wide, especially towards the posterior; ramus also. On the left side the mandible is 17.1mm wide just posterior to LM_2 and the coronoid process is 5-6mm thick. The posterior bar of the atlas seems similarly enlarged as if puffed up from the inside, measures 10mm at the midline (A-P), and c. 8mm midway along the laminae. The laminae of C2 are also slightly enlarged. Other cervical arches look normal. Thin layers and patches of woven bone are distributed around the skull. The mandible is described below. The maxilla has woven bone patches on the right side, superior to RM^1, extending towards the suture with the zygoma, also on the anterior especially surrounding the infraorbital foramen. Lamellar bone and porosity superior to RP^1 and also fine porosity on the anterior maxilla. Porosity covering the posterior wall of the maxilla could be related to the development of RM^3. Further fine porosity on the nasal surface of the palate, predominantly on the walls of the sinus cavity (on the external/ nasal side). Dense porosity inside sinus. Lamellar bone extending onto internal/ nasal surface of the frontal process of the maxilla. Similar changes on the left side, but on the whole less pronounced. Patch of woven bone on the right orbit roof (c. 12 x 6.5mm) and on orbital plate of left sphenoid. Slight porosity on sphenoid greater wings (margins of holes very rounded, holes scattered). Woven bone on left sphenoid greater wing around foramen rotundum. Woven bone also on the right temporal external squama, along the anterior part of the squamous suture & more obvious deposits along the area of the suprameatal crest & superior border of the external auditory meatus. On the left temporal there is a subtle area of woven bone on the suprameatal crest, extending onto the zygomatic arch; also on the posterior mastoid process. The only endocranial bone observed was on the internal occipital, focussed on sulci and cruciform eminence; mix of woven and lamellar bone with faint capillary structure visible. The only postcranial new bone formation occurred on the right clavicle, where a small thin deposit of woven bone was found on the inferior surface of the sternal end. However, very little of the postcranial remains survive so don't know what other bones may have been involved
Dental Health	32 tooth positions; 31 teeth (including 4 unerupted); 1/32 lost AM DEH – at least one fairly pronounced line on most teeth + other more subtle lines; flecks-moderate calculus; slight periodontal disease Socket for RM_1 has rounded margins and no division into mesial and distal root spaces. Buccal side of socket (external mandible) surrounded by woven bone which extends beneath the sockets for RP_2 & M_2 & also in extramolar sulcus. Lamellar bone & porosity beneath RP1 (subtle). Patches of woven bone on the external mandibular corpus inferior to the molar region, with larger patches on the external ramus covering much of the surface. Small patches of woven bone on the internal ramus & posterior body, anterior/superior to the mylohyoid line. All deposits thin, some blending into lamellar bone

	Right Dentition								Left Dentition							
Present	P(U)	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P(U)
Calculus	-	-	Mb	Sb	-	-	-	-	Sb	Sb	-	-	Fb	Sb	-	-
DEH	-	-	-	-	L	L	L	-	-	L	L	L	L	-	L	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	1	2	2	2	2	2	1	1	2	2	1	1	2	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(U)	P	AM	P	P	P	P	P	P	P	P	P	P	P	P	P(U)
Calculus	-	-	-	-	-	-	F f	S lb	F l	S l	-	-	-	S md	S md	-
DEH	-	-	-	L	L	L	-	-	-	L	L	L	L	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	1	1	1	1	2	2	2	2	2	2	1	1	2	2	-

Skeleton Number	**339**	
Name	Richard Gill	
Date of Death	11th February 1884	
Preservation	Very Good (Grade 1), minimal fragmentation	
Completeness	90%+; cranium (intact), mandible, maxilla, ossified thyroid cartilage; manubrium and sternum; vertebrae – C1-7, T1-12; L1-6, S1-5; 12 right ribs, 12 left ribs, unsided rib frags; shoulders; arms; hands (1 right carpal, 3 left carpals, RMC1-3 & 5, LMC2-3 & 5, 5 proximal, 2 intermediate & 2 distal phalanges); pelvis; legs; feet (4 right tarsals, 7 left tarsals, RMT3-5, LMT1-5, 2 proximal & 1 distal phalanx)	
Age	Osteological: 36-45 years (old middle adult)	Coffin plate: 41 years
Sex	Osteological: Male	Coffin plate: Male
Stature	171.6cm ±2.99 (femur & tibia)	
Non-Metric Traits	Ossicles in lambdoid (bilateral); parietal foramina (bilateral); ossicle at asterion (L); extrasutural mastoid foramina (bilateral); sutural mastoid foramina (bilateral); accessory lesser palatine foramen (L); maxillary torus (R); bridging of the supraorbital notch (L); accessory supraorbital foramina (bilateral) Bipartite transverse foramen (1/4 R, 0/4 L); suprascapular foramen (R); plaque (R); exostosis in trochanteric fossae (bilateral); peroneal tubercles (bilateral); double anterior calcaneal facets (bilateral)	
Pathology	Schmorl's nodes T7-L4 OA apophyseal facet L3 OA left medial clavicle & manubrium Cribra orbitalia – bilateral (Grade 4) The parietals (between the sagittal suture and superior temporal line) and most of the frontal squama evenly covered in small fine shallow porosity, creating an 'orange peel' texture. Supraorbital ridges also covered in fine porosity. Numerous enthesophytes – olecranon processes both ulnae, posterior gluteal lines both os coxae, posterior iliac crests, anterior greater trochanter right femur (left femur damaged pm), both tibial tuberosities, distal fibulae (especially on right side), posterior calcanei, inferior calcanei (plantar spurs), rib tubercles Ossified costal cartilage attached to first ribs on both sides & also manubrium (first rib joints), and some rib joints on the sternum. Partly ossified thyroid cartilage present. Ossified ligamentum flavum T12-L4 L1 body wedge shaped, measuring 18mm tall at the anterior margin and 28mm at posterior margin. Inferior surface fairly featureless and of an even texture except for a shallow crescent-shaped depression the centre (one end has a deep lytic area, but could be pm damage). The superior surface is also fairly even in texture, with the exception of a deep roughly circular lytic lesion (9mm diameter) in the right posterior part of the body surface. Anterior to this there is a slight rounded ridge of bone running transversely across the body (subtle and margins blend into surroundings). Possibly developmental or could be traumatic (crush fracture). No osteophytes around the joint margins of the superior or inferior body surfaces. Border shift at lumbo-sacral border: 7 cervical, 12 thoracic & 5 lumbar vertebrae present. L5 has a slight pedicle and looks taller and squarer than normal. The uppermost sacral vertebra looks like L5 normally does – wider and shallower, lacking pedicles – but inferior body is more sacral in shape. The right transverse process has a flattened area on the inferior surface, presumably where was in contact with the ala of the sacrum. The left transverse process is enlarged and extends anteriorly and inferiorly to fuse with the ala of the sacrum (fused along anterior margin, but not fused for most of the contact area – as a result there is a deep fissure through the superior part of the auricular surface). The sacral promontory occurs at the junction between the uppermost sacral vertebra and the one	

	beneath. These two are not fused at the body or facets, only at the left ala. There are four bodies fused together in the sacrum, but pm damage to the inferior end and can't assess whether another body was fused on. Sacral hiatus level with the junction between 'S4-5'; coccyx lost pm. Could be additional lumbar vertebra partially sacralised, or a partially lumbarised sacral vertebra
Dental Health	32 tooth positions; 23 teeth; 6/32 lost AM; 3/32 lost PM 6/23 teeth with caries, 7 lesions; DEH (multiple faint lines on lower teeth); flecks-slight calculus; abscess LM_2; slight periodontal disease

	Right Dentition								Left Dentition							
Present	P	AM	AM	PM	P	P	P	PM	P	P	P	P	AM	P	P	AM
Calculus	-	-	-	-	-	S d	F b	-	S dbm	F md	F mb	F d	-	-	S lbd	-
DEH	-	-	-	-	-	-	-	-	-	-	-	L	-	-	-	-
Caries	Sm	-	-	-	Sd	-	-	-	-	-	-	Sd	-	La	Sd Sm	-
Wear	2	-	-	-	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	AM	P	AM
Calculus	-	F m	S ld	F d	S ml	S mldb	S m	S dlm	S ml	F m	S d	S md	F m	-	-	-
DEH	-	-	-	-	L	L	L	L	L	-	-	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	La	-
Wear	-	2	3	2	3	2	2	3	3	2	2	2	2	-	-	-

Skeleton Number	**342**	
Name	Bentley Darnbrook	
Date of Death	1st November 1862	
Preservation	Poor (Grade 4), severe fragmentation	
Completeness	30-40%; partial cranium, mandible, maxilla; vertebrae – C1-7, T1, 2 unidentified lumbar arch fragments; arms (shaft fragments); hands (2 unidentified MC shafts); pelvis (partial ilia); legs; feet (2 right tarsals, 1 left tarsal, RMT5)	
Age	Osteological: 18+ years (adult)	Coffin plate: 26 years
Sex	Osteological: Unsexed	Coffin plate: Male
Stature	-	
Non-Metric Traits	Ossicle in lambdoid (L); accessory lesser palatine foramen (R) Bipartite transverse foramina (2/3 R, 0/3 L); acetabular crease (L); plaque (L); hypotrochanteric fossa (R); double anterior calcaneal facets (R)	
Pathology	Cribra orbitalia – R orbit (Grade 2) Faint striated lamellar bone on the midshafts of both femora: right side on posterior-lateral-anterior midshaft; left side on posterior-medial-lateral midshaft	
Dental Health	27 tooth positions; 23 teeth (3 of which partially impacted); 1/27 lost AM; 2/27 lost PM 5/23 teeth with caries, 8 lesions; DEH; flecks-slight calculus LM_3 partially impacted – erupting at an angle into the distal surface of LM_2, where had come into contact with the distal CEJ. The occlusal surface of the crown is barely above the level of the alveolar bone. The roots of LM_3 are short – about half the length of the roots of LM_2 RM_3 – similar morphology to LM_3, with short roots. Also erupting tilted at an angle so the occlusal surface of the crown is angled slightly mesially. Has erupted further than LM_3 however, as RM_2 has been lost AM (presumably allowing impacted RM3 to continue erupting) Very little gap between distal crown of RM_1 and mesial crown of RM_3 (2-3mm), but at the CEJ the distance between them is 8mm. There is a small oval wear facet on the distal crown of RM_1 where would have been in contact with RM_2 at the IP facet. Alveolar bone at the position of RM_2 also porous LM^3 partially impacted, erupting buccally with occlusal surface angled towards buccal. The lingual cusp has erupted furthest, but even that is only just above the CEJ of LM^2	

				RM^3 – similar angle to LM3, but less extreme & has erupted further. Still 2-3mm below occlusion.												
	Right Dentition								Left Dentition							
Present	P	P	P	P	P	P	-	PM	P	PM	-	PM	P	P	P	P
Calculus	S ml	S d	S lm	S d	-	-	-	-	-	-	-	-	F d	S ld	S dm	Impacted
DEH	Impacted	-	-	-	L	L	-	-	-	-	-	-	-	-	-	
Caries		So Sb Mm	Md	Sm	Sd	-	-	-	-	-	-	-	-	-	Sb So	
Wear	1	2	1	1	2	2	-	-	4	-	-	-	1	2	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	AM	P	P	P	P	-	-	-	P	P	P	P	P	P	P
Calculus	Imp-acted	-	S ld	S ld	S l	F lmd	-	-	-	F l	-	F l	F ld	F d	F m	Impacted
DEH	P	-	-	-	-	L	-	-	-	-	L	-	-	-	-	
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Wear	1	-	2	2	2	2	-	-	-	3	2	2	2	2	2	1

Skeleton Number	**348**	
Period	Post-Medieval	
Preservation	Moderate (Grade 3), moderate fragmentation	
Completeness	70-80%; cranium, mandible, maxilla, ear ossicle (incus x1); sternum (fragments); vertebrae – C2, T7-T12 plus 4 arches, L1-6, S1-4; 10 right ribs, 9 left ribs; shoulders; arms; hands (3 right carpals, 3 left carpals, RMC1-4, LMC1-3, 6 proximal & 2 distal phalanges); pelvis; legs; feet (4 right tarsals, 3 left tarsals, RMT1-5, LMT1, 4-5, 1 proximal phalanx)	
Age	18-25 years (young adult) (possibly as young as 16-17)	
Sex	Female	
Stature	152.6cm ±3.66 (tibia)	
Non-Metric Traits	Ossicle at lambda (double ossicle); posterior condylar canals open (bilateral); mandibular torus (R); bridging of supraorbital notch (L) Acetabular creases (bilateral); Allen's fossa (L); Poirier's facet (L); plaque (R); peroneal tubercle (R); absent anterior calcaneal facets (bilateral)	
Pathology	Schmorl's nodes T9-12 OA one unidentified thoracic facet Left proximal ulna has an oval hollow (5.7 x 4.1mm, 2.6mm deep) in the posterior lateral quarter of the joint surface. The edges are sharp and clearly defined, and actually overhang the hollow on the inferior half. The floor of the lesion is slightly porous and looks a bit like exposed trabecular bone. Colour consistent with the rest of the bone Spine incomplete – six vertebrae with lumbar morphology present. Lowermost vertebra has typical L5 morphology with lack of pedicle and wide neural arch. S1 has typical S1 morphology, and the sacral promontory is at the superior border of S1. No evidence for any border shift at the lumbosacral border. The uppermost 'lumbar' vertebra lacks rib facets on the pedicles, and has curved inferior and superior facets, although the inferior facets are slightly flattened. 'T12' has rib facets on both sides of the body, flat superior facets & small inferior facets turned slightly outwards. Unfortunately the thoracic spine is incomplete and the only cervical vertebra present is the axis. Suspect border shift at thoracolumbar border with T12 taking on lumbar morphology and T11 becoming like T12. Or could be an additional lumbar vertebra. Ribs – also incomplete – at least 10 right & 9 left ribs present Cleft neural arches in S3 and S4 Tibiae possible slightly bowed anterio-medially, with distal third of shaft slightly convex at the anterior border and the proximal third (in the region of the soleal line) slightly convex in a posterior direction. However shape changes subtle The ribs are fairly fragmented & what ribs are present are mostly incomplete. Some can be pieced together and the shape can be seen. The mid and lower rib curvature is compressed	

	laterally so the neck is short & the angle tight. The proximal ends (necks and angles) are thick (c. 9-10mm). There is a marked inferior deviation of the distal two-thirds of the rib shafts, which tend to taper and become rounded in cross section. Not as much of the upper ribs present so can't assess shape. Sternum body has gentle curve, seems normal Two upper-mid right ribs have dark lamellar bone on the visceral necks, smooth and fairly well integrated with the surroundings, probably c. 50mm long. Another right rib has a smaller area of similar bone on the visceral neck (c. 10mm long). The visceral neck of a third right rib bulges out slightly so it is slightly convex – possibly well remodelled lamellar bone. Two right ribs (including the one with the small area of lamellar bone mentioned above) also have new bone formation along the sternal third of the shaft. In one this is an elongated area of lamellar bone, and in the second this is woven bone with lamellar bone around the margins (also has lamellar bone on neck). Three left ribs also have new bone on the visceral necks – one has small area of woven bone (5 x 3mm) in the centre of an area of lamellar bone; second has larger and thicker deposit of woven bone (30 x 6mm) transitional to lamellar towards the distal end & with lamellar bone surrounding the distal end of the deposit; third has small deposit of lamellar bone (8 x 5 mm) on visceral neck The left calcaneus has an extension of the posterior talar joint surface onto the neck of the calcaneus, almost like a pseudoarthrosis, occupying almost the whole area. The surface is roughened and covered in irregular osteophytes, and there are also osteophytes around the margins. Some faint porosity of the surface. The area anterior to this has enthesophytes extending beyond the anterior margin. The joint surface for the cuboid is very concave. The left talus has a large osteophyte along the superior margin of the head; the rest of the head and neck has been lost pm The right calcaneus has a similar extension of the joint surface, but smaller and not roughened, and no osteophytes or porosity (looks more developmental). Right talus also has a large osteophyte around the superior and lateral head. The inferior posterior joint surface of both tali are extended anteriorly, curving onto the inferior neck of the talus Cribra orbitalia – bilateral (Grade 2) Maxillary sinusitis – porous lamellar bone in both sinuses,
Dental Health	31 tooth positions; 27 teeth; 27/31 lost AM; 2/31 lost PM; 2 NP/U DEH; flecks-moderate calculus

	Right Dentition								Left Dentition							
Present	NP/U	P	-	P	P	P	P	P	PM	P	P	P	P	P	P	NP/U
Calculus	-	F bd	-	F b	-	F l	-	-	-	F m	F b	-	-	M bmdl	S mb	-
DEH	-	L	-	L	L	G	L	L	-	L	G	L	-	-	L	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	-	1	2	2	2	2	-	1	2	2	1	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	PM	P	P	P	P	P	P	P	P
Calculus	F b	F lm	S ldm	S l	S lm	M ld	M lm	-	S mbl	F bl	S lm	S d	M l	F lm	F l	F d
DEH	P	L	L	-	L	L	L	-	-	L	L	L	-	L	L	L
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	1	2	2	1	1	2	2	-	2	2	2	2	1	2	2	1

Skeleton Number	**351**
Name	John Dickinson? (monument)
Date of Death	18th August 1875 (?) (monument)
Preservation	Moderate (Grade 3), slight fragmentation
Completeness	80-90%; cranium (largely intact), mandible, maxilla; sternum fragment; vertebrae – C1-7, T1-12; L1-5, S1-4; 10 right ribs, 8 left ribs, unsided rib frags; shoulders; arms; hands (1 right carpal, 1 left carpal, RMC1-5, LMC2-5, 6 proximal, 4 intermediate & 1 distal phalanx); pelvis; legs; feet (6 right tarsals, 3 left tarsals, RMT1-5, LMT1-5, 9 proximal, 1 intermediate & 2 distal phalanges)

Age	Osteological: 46+ years (mature adult)	Monument: 63 years (probable ID)
Sex	Osteological: Male	Monument: Male (probable ID)
Stature	174.3cm ±2.99 (femur & tibia)	
Non-Metric Traits	Highest nuchal lines (bilateral); ossicles at asterion (bilateral); extrasutural mastoid foramen (R); maxillary torus (L); mandibular torus (R); anterior ethmoid foramina extrasutural (bilateral); posterior ethmoid foramina extrasutural (bilateral) Accessory sacral facet (L); Poirier's facet (R); plaque (L); exostosis in trochanteric fossa (L); third trochanter (L); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral); medial talar facets (bilateral)	
Pathology	Schmorl's nodes T8, T10, L1-3, plus three unidentified thoracic body fragments DJD bodies C6-7, L1-2. OA apophyseal facets T3-8, L5-S1 OA left lateral clavicle, both hips, calcaneus-talus joints (left and right) Possible erosive lesion in head of an intermediate phalanx & the proximal end of a distal phalanx, and shaft seems nipped in just before the head The cranium is quite low, and no trace can be seen on the external surface of the squamous suture or the parietomastoid suture on the right side, although these are clearly visible on the left. Likewise no trace is visible of the left occipitomastoid suture, but this is present on the right side. Possible that these sutures have been obliterated with age, but unusual asymmetry with opposite sides being present and unfused. Also odd for squamous suture to be obliterated completely. No visible asymmetry in the shape of the cranium. Atlas – has a small & subtle facet for the dens (6 x 7mm) which does not even occupy the width of the anterior arch. Axis – dens quite chunky but with a small facet for the atlas. Enthesophytes – large enthesophytes on the olecranon process of the right ulna (c. 10mm long). Slightly smaller enthesophyte on the left olecranon process. Right radial tuberosity has small enthesophytes. Large enthesophytes on the tubercles of the right and left ribs, distal fibulae. LMT5 – joint for MT4 quite concave, and the proximal end of the shaft looks bent as if the proximal joint surface is facing more medially than normal. Difficult to articulate MT5 and 4 without the shaft of MT5 crossing onto the dorsal aspect of MT4 (similar to shape of LMT5 in Sk 165). There is a small ridge running across the dorsal surface of LMT5 just distal to the joint for MT4, with a more pronounced ridge on the plantar surface – possibly a well-healed fracture. The RMT5 seems straighter, but most of the shaft is lost pm and the shaft of MT4 is heavily fragmented	
Dental Health	32 tooth positions; 22 teeth; 10/32 lost AM 5/22 teeth with caries; flecks-slight calculus; DEH; moderate periodontal disease RM_1 and LM_1 occlusal surfaces are 1-2mm above that of the premolars, possibly supererupted as opposing teeth lost AM? Slight crowding of anterior mandible	

	Right Dentition								Left Dentition							
Present	AM	P	AM	AM	P	P	P	P	AM	P	P	P	AM	AM	P	P
Calculus	-	S dmlb	-	-	S bm	S mld	F lm	F md	-	F l	S ld	-	-	-	S lbdm	S blmd
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	L	L	L	-	-	L	L	L	-	-	So	-
Wear	-	2	-	-	3	3	4	4	-	3	2	1	-	-	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	AM	AM	P	P	P	P	P	P	P	P	P	P	P	P	AM	AM
Calculus	-	-	F l	S lo	S l	S lm	S md	S md	S md	S m	S dl	S lm	S lm	S l	-	-
DEH	-	-	-	-	L	L	L	L	-	L	L	L	L	L	-	-
Caries	-	-	Ld	-	-	-	-	-	-	Md	-	-	Sd	Sm	-	-
Wear	-	-	3	2	3	3	3	4	4	3	2	2	2	3	-	-

Skeleton Number	**357**
Period	Post-Medieval

Preservation	Moderate (Grade 3), moderate fragmentation									
Completeness	5-10%; cranium (2 fragments of occipital, 11 vault fragments), right mandible; vertebrae – atlas (L + R arches), axis (dens, body, arch), 4 cervical arches & 3 bodies, 2 right thoracic arches									
Age	1-3 years (juvenile)									
Sex	-									
Stature	-									
Non-Metric Traits	-									
Pathology	Pinprick porosity clustered on the internal occipital protuberance and the medial part of the right transverse sulcus. Only a small fragment of the bone survives so cannot determine full extent Some pine porosity on the external surfaces of the cranial vault, with other areas showing a more normal appearance. On some fragments the porosity is distributed quite intensively along the suture margins. Unfortunately none of these fragments can be identified. Mandible – quality of the bone seems poor and the ramus area is quite porous and honeycombed on the internal and external surfaces. However, pm damage is present									
Dental Health	8 deciduous teeth present, 5 probably erupted, 3 possibly erupting; 3 permanent teeth present (LI^1, LM^1 & RM_1), all unerupted									
	Right Dentition					Left Dentition				
Present	-	P	P (E?)	-	P	P	-	P(E?)	P	-
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	-	2	-	-	1	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(E?)	P	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	-	2	-	-	-	-	-	-	-	-

Skeleton Number	**360**	
Name	Gill Wigglesworth	
Date of Death	24th April 1886	
Preservation	Moderate (Grade 3), moderate fragmentation	
Completeness	70-80%; cranium (intact), mandible, maxilla, ear ossicles (incus x1, malleus x2); sternum & manubrium; vertebrae – C1-7, T1-5, L2-5; 5 right ribs, 4 left ribs, unsided rib frags; shoulders; arms; hands (5 right carpals, 2 left carpals, RMC1-5, LMC1-5, 10 proximal, 5 intermediate & 2 distal phalanges); pelvis; legs; feet (5 right tarsals, 7 left tarsals, RMT1-5, LMT1-5, 6 proximal & 1 distal phalanx)	
Age	Osteological: 46+ years (mature adult)	Coffin plate: 67 years
Sex	Osteological: Male	Coffin plate: Male
Stature	177.4cm ±2.99 (femur & tibia)	
Non-Metric Traits	Ossicles in lambdoid (bilateral) parietal foramen (R); extrasutural mastoid foramina (bilateral); posterior condylar canals open (bilateral); palatine torus; absent zygomaticofacial foramen (L) Lateral atlas bridging; circumflex sulcus (R); hypotrochanteric fossae (bilateral); exostosis in trochanteric fossa (L)	
Pathology	DJD bodies C3, L2-5. OA apophyseal facets C2-7, L4 OA both sternal facets on manubrium & both medial clavicles, right lateral clavicle, both hips, right	

	ankle, right navicular, RMC3 head? The distal quarter of the humeral shafts curve anteriorly so the distal end is raised above the bench surface when they are laid in anatomical position The atlas has a small 'barely there' facet for the dens of the axis, which is not clearly demarcated and does not even extend to the superior and inferior borders of the anterior arch. The axis has a small and poorly defined facet for the atlas on the dens, although the dens itself seems of normal size RMC5 – has a well healed fracture of the distal third of the shaft. The distal third of the shaft is angled in a palmar direction, and the palmar, medial and lateral surfaces are covered in a callus of lamellar bone; the dorsal surface is flat and smooth. The callus is smooth and rounded, occupying the area proximal to the head. Left MC5 lost pm. A left rib shaft has a small nodule of lamellar bone on the inferior border of the shaft about a third of the way from the sternal end, and the internal surface is slightly convex (as if slightly swollen). On superior border there is a projection of lamellar bone connecting this rib to the one above, and the two had been fused (broken pm at the join with the lower rib). This spur of bone measures 19.8mm wide at the inferior end & 12.7mm wide at the superior end; it is 5.5mm thick – equivalent in thickness to the ribs above and below. The upper rib has a small nodule of lamellar bone on the superior margin opposite the bar of bone. Possibly at least one rib fracture, or even two, that have healed with a bar of bone between them. Or could be developmental. Small deposit of grey porous woven bone (c. 11 x 6mm) on the visceral surface of the lower rib, just proximal to the potential fracture Large projection of ossified cartilage at the sternal ends of seven ribs, with the longest projection measuring 37mm. Enthesophytes on the right iliac crest (left not preserved) Right scapula – tip of acromion process missing, end 'squared off' and facing laterally. Surface smooth at the anterior end of the process, but more roughened at the centre and distal parts with some porosity. Colour the same as the surrounding bone. No facet for clavicle on medial surface. Os acromiale. Left acromion lost pm.
Dental Health	32 tooth positions; 0 teeth; 32/32 lost AM

	Right Dentition								Left Dentition							
Present	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM
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	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**363**	
Name	Sarah Gill	
Date of Death	13th November 1889	
Preservation	Good (Grade 2), moderate fragmentation	
Completeness	80-90%; cranium (vault largely intact), mandible, maxilla, ear ossicles (incus x2, malleus x1); sternum & manubrium; vertebrae – C1-4, T1-5, T7-12; L1-5, S1-2; 13 right ribs, 13 left ribs, unsided rib frags; shoulders; arms; hands (1 right carpal, 1 left carpal, RMC1-5, LMC1-5, 7 proximal phalanges); pelvis; legs; feet (5 right tarsals, 2 left tarsals, RMT1-4, LMT1)	
Age	Osteological: 46+ years (mature adult)	Coffin plate: 54 years
Sex	Osteological: Female	Coffin plate: Female
Stature	165.2cm ±4.45 (humerus)	
Non-Metric Traits	Ossicle at lambda; parietal foramen (R); extrasutural mastoid foramen (L); extrasutural mastoid foramen (R); precondylar tubercle; open foramen spinosum (L); accessory lesser palatine foramen	

	(R); bridging of supraorbital notch (R) Allen's fossae (bilateral); plaque (R); hypotrochanteric fossae (bilateral) exostosis in trochanteric fossa (R); peroneal tubercle (R)
Pathology	Schmorl's nodes T8-L2, L5 OA apophyseal facets T3-5 OA left TMJ, both hips The sternum and manubrium are fused – slight bulge at the joint location but generally seems fairly continuous and normal in appearance – probably developmental Thirteen rib pairs. Thirteen left rib heads, necks and angles, 11 right rib heads, with 13 necks and angles. Most ribs almost complete. The uppermost pair fairly typical rib 1 morphology and rib 2 typical for rib 2. The lowermost pair: right rib complete and intact, fairly short (73mm long) & tapers to a fine point; left rib consists of head and proximal shaft only. The pair above are much longer and although also tapered, the right does not taper to a point but to a small 'sternal' end (left side head and neck only present). T1-5 present. The lower R apophyseal facet of T5 has degenerative changes (osteophytes around the inferior and lateral margins, porosity of the surface) not mirrored on the next vertebra down. T5 and the one below do not articulate well – the facets are slightly at the wrong angle & there is an observable difference in body size. This suggests T6 has been lost post-mortem and the next vertebra down is T7. T7-12 present. T12 has flat superior facets and curved inferior facets, and costal facets on both pedicles. L1 has curved superior & inferior facets (typical lumbar morphology) plus large facets on the sides of the pedicles (set low down on the inferior border). Suggests a caudal shift with development of lumbar ribs. Four vertebrae have full lumbar morphology, L5 has slightly more of a pedicle than usual & viewed from behind it is squarer and narrower (rather than wide and rectangular). Sacrum – uppermost vertebra – the alae slope inferiorly at an angle of 45º. Unfortunately the anterior bodies of S1 & 2 are damaged post-mortem where they meet, but from the angle of each it looks like the sacral promontory was at the join between them rather than at the superior body of S1. Two incomplete lower sacral bodies also present but not clear which ones, and the sacrum is too incomplete and damaged to determine how many segments were originally present. Shape suggests another border shift at lumbo-sacral border – possibly sacralisation of an additional lumbar vertebra (or lumbarisation of S1) Lower ribs have a marked inferior deviation just distal to the angle, and are very tapered measuring 7-8mm tall just proximal to the sternal ends. They also curve inwards noticeably. The upper ribs seem a bit more normal in shape, but again sternal ends are deviated a little inferiorly just proximal to the sternal end. Sternum seems to be normal shape. Ossified rib cartilage – first ribs; ossified ligamentum flavum Both first ribs have prominent tubercles projecting 10mm from the rest of the rib. The right rib neck & head are damaged pm, but the left rib neck tapers to a small, slightly pointed head which bears a small facet for articulation with T1 (6mm in diameter) Three right ribs have lamellar bone deposits on the visceral necks; the ribs are probably ribs 5-7. In one the deposit is fairly smoothed over with some subtle small indentations, and is primarily visible as a swelling of the visceral neck. In the other two the texture of the lamellar bone is more rugged and uneven, as if made up of numerous small spicules and nodules which have been rounded and smoothed over Three left ribs have new bone formation on the visceral necks. Rib 4 has a subtle deposit of lamellar bone with slightly rugged texture extending along the neck and onto the shaft, where patches occur until half way along the shaft. Rib 5(?) has a thick deposit of lamellar bone, some of which smoothed but parts more rugged, on the neck and thinner deposits extend along the proximal half of the shaft. The neck has broken pm showing the thickness of the new deposits (c. 2mm). Rib 6(?) also has lamellar bone on the visceral neck, but most of the central lesion is occupied by porous grey woven bone (29 x 5mm) merging with lamellar around the margins. The left tibia has moderately thick deposits of lamellar bone on the entire proximal third of the shaft, extending onto the mid third on the medial and lateral sides. The proximal area looks slightly swollen and the lamellar bone has an irregular texture. There are some smooth and some rounded spicules with scattered foramina and some striated bone. On the midshaft the bone is thickly striated. There is a small (25 x9 mm) area of woven bone on the posterior surface of the proximal third, between the interosseous crest and the soleal line. Right side damaged and proximal end lost pm; no lamellar bone visible on midshaft. Thick lamellar bone also present on the left femur popliteal surface. Generally smooth with interspersed foramina with rounded margins. The rest of the distal femur is lost pm. The proximal and mid third of the shaft seem normal. The right femur is also normal (though distal end largely lost pm). Left patella lost pm. Joints seem unaffected. Maxillary sinusitis – bilateral lamellar bone and porosity

Dental Health									29 tooth positions; 4 teeth (2 of which loose); 27/29 lost AM 2/4 teeth with caries; DEH – both canines have a moderately pronounced DEH line & possibly a couple of more subtle ones							
	Right Dentition								Left Dentition							
Present	AM	AM	AM	AM	AM	P	P	-	P	AM	P	AM	AM	AM	AM	AM
Calculus	-	-	-	-	-	F md	F l	-	F l	-	F m	-	-	-	-	-
DEH	-	-	-	-	-	L	-	-	-	-	L	-	-	-	-	-
Caries	-	-	-	-	-	-	La	-	La	-	-	-	-	-	-	-
Wear	-	-	-	-	-	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	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**366**	
Name	John Renton Newsome	
Date of Death	3rd February 1892	
Preservation	Good (Grade 2), slight fragmentation	
Completeness	90%+; cranium (vault intact), mandible, maxilla, ear ossicle (incus x1), hyoid body & horns; sternum body & xiphoid; vertebrae – C1-7, T1-12; L1-5, S1-5; 12 right ribs, 12 left ribs; shoulders; arms; hands (4 right carpals, 3 left carpals, RMC1-5, LMC1-5, 7 proximal phalanges); pelvis; legs; feet (6 right tarsals, 5 left tarsals, RMT1-5, LMT1-5, 3 proximal phalanges)	
Age	Osteological: 46+ years (mature adult)	Coffin plate: 76 years
Sex	Osteological: Male	Coffin plate: Male
Stature	174.8cm ±2.99 (femur & tibia)	
Non-Metric Traits	Ossicle in lambdoid (L); extrasutural mastoid foramen (R); sutural mastoid foramen (L); posterior condylar canal open (R); mandibular torus (L); absent zygomaticofacial foramen (L) Bipartite transverse foramina (2/5 R, 0/5 L); circumflex sulcui (bilateral); acetabular creases (bilateral); plaque (bilateral); hypotrochanteric fossa (R); exostosis in trochanteric fossae (bilateral); peroneal tubercles (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral)	
Pathology	Schmorl's nodes T5-11, L2, L4 DJD vertebral bodies – C4-5 (with eburnation of bodies C4-5), L2, S1; OA facet for dens on atlas, & dens of axis; OA facets C3-T3, T5-9, T11-L3, S1 OA lateral clavicles, left shoulder, both wrists (distal radii, scaphoids, capitates, right hamate), both hips, both knees, left ankle, right foot - facets between talus and calcaneus, calcaneus and cuboid, navicular & medial cuneiform, intermediate cuneiform & MT2, lateral cuneiform & MT3, left foot – calcaneus & cuboid, medial cuneiform & MT1, both thumbs, RMC2 head, proximal foot phalanges (distal ends) The posterior arch of the atlas has a cleft – both sides taper to a point at the inferior margins, creating a shallow V shaped cleft. There is a gap of 19mm at the superior margin & 3mm at the inferior margin. The medial borders of each arch are rugged and irregular Cleft neural arches S4-5. L5 – the inferior half of the arch is separated at the pars interarticularis. Inferior to the superior apophyseal facets the bone is rugged and irregular, covered with spicules of bone. The colour is the same as the surrounding bone. Spondylolysis (bilateral) Ossified cartilage – xiphoid ossified & fused to the sternum; many ribs have projections of ossified cartilage from the sternal ends, especially the 5th ribs where projections measure 28mm (on the right side) and 41mm (on the left side). First ribs also have large projections of ossified cartilage. There is a strip of ossified material 39mm long, 7mm wide & 1.5mm thick, with a gentle curve along the long axis. The concave surface is slightly irregular with rounded lamellar bone nodules along both sides	

	and scattered porosity. The convex surface is smoother and the lamellar bone is arranged in a more linear pattern Most rib tubercles have enthesophytes. Ligamentum flavum is ossified, particularly T10-12. There are enthesophytes on both radial tuberosities, intertrochanteric lines (both femora) & ischial tuberosities. All proximal hand phalanges present have a curve at the distal end, just proximal to the head, so the head is bent in a palmar direction. Normal variation? The left Rib 8 head has a large projection (8.5mm) of lamellar bone from the anterior margin of the superior demifacet & the adjacent area of the neck. Could be related to the general degeneration of the spine, or could be traumatic Both tibial tuberosities have an underdeveloped and poorly defined superior half, with a larger and more rugged inferior half. There is a distinct uneven ridge of bone along the junction, where there is a step from the superior to the inferior parts. This area of the inferior half is noticeably wider than the superior half. The superior half is slightly concave immediately superior to this ridge. Osgood Schlatter's disease? (bilateral) The tubercle of both naviculars is flattened & the surface is irregular with some porosity. Look like avulsion fractures (tibialis posterior insertion) RMT1 has a lytic area on the medial head adjacent to the joint surface. The lesion is an elongated, slightly crescent shaped hollow with rounded margins, 7.4 x 1mm. The left side is damaged pm. Possibly a normal variation, or hallux valgus. Gout unlikely as edges do not overhang the hollow much & the margins are so rounded and thick Cribra orbitalia – bilateral (Grade 2) Maxillary sinusitis – walls and floors of both sinuses covered in lamellar bone with some porosity. Lateral walls actually thickened with spongy bone in between the external and internal cortex (3mm thick)
Dental Health	32 tooth positions; 14 teeth; 18/16 lost AM 8/14 teeth with caries; flecks-moderate calculus; moderate to considerable periodontal disease; abscess – LM_1 Alveolar bone spongy and porous where teeth have been lost AM, possibly still in the process of remodelling Some teeth have very short stubby roots – both upper central incisors have crowns longer than or equal to the length of their roots. LP^1 & RP_2 also have short roots. Other tooth roots are normal in length (all roots visible as teeth loose). Possible pipe-smoking wear – shallow crescent formed between LI_2 and LC_1

	Right Dentition								Left Dentition							
Present	AM	AM	AM	AM	AM	AM	P	P	P	AM	AM	P	AM	AM	AM	AM
Calculus	-	-	-	-	-	-	S bm	F m	S m	-	-	S bmd	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	Sd Sm	Ld	Sd	-	-	Sd	-	-	-	-
Wear	-	-	-	-	-	-	5	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	AM	P	AM	P	P	P	P	P	P	P	P	AM	AM	P	AM	AM
Calculus	-	F dl	-	F d	S mldb	S mldb	S ldm	M bmld	M blmd	F md	S ld	-	-	F l	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	Sd	Sd	-	-	-	-	-	Sm	-	-	Lb	-	-
Wear	-	2	-	3	2	4	3	4	4	4	4	-	-	3	-	-

Skeleton Number	**378**
Name	Elina Wigglesworth
Date of Death	27th February 1895
Preservation	Good (Grade 2), minimal fragmentation

Completeness	90%+; cranium (intact), mandible, maxilla, hyoid (intact); manubrium; vertebrae – C1-7, T1-12; L1-5, S1-3; 12 right ribs, 12 left ribs; shoulders; arms; hands (5 right carpals, 4 left carpals, RMC2-5, LMC2-3, 6 proximal, 6 intermediate & 2 distal phalanges); pelvis; legs; feet (7 right tarsals, 7 left tarsals, RMT1-4, LMT1-5, 6 proximal & 1 distal phalanx)	
Age	Osteological: 26-35 years (young middle adult)	Coffin plate: 34 years
Sex	Osteological: Female	Coffin plate: Female
Stature	152.2cm ±3.55 (femur & tibia)	
Non-Metric Traits	Ossicle in lambdoid (R); metopic suture; ossicle in occipitomastoid suture (R – not scored systematically); extrasutural mastoid foramen (R); sutural mastoid foramen (L); posterior condylar canals open (bilateral); accessory lesser palatine foramen (R); palatine torus; anterior ethmoid foramen extrasutural (L) Bipartite transverse foramina (0/5 R, 2/5 L); Poirier's facet (L); vastus notch (R); vastus fossae (bilateral); lateral tibial squatting facet (R); peroneal tubercles (bilateral); double anterior calcaneal facet (L); absent anterior calcaneal facet (R); lateral talar extensions (bilateral)	
Pathology	Mix of woven and lamellar bone on the external surface of the left mandibular corpus surrounding an abscess beneath the roots of LM_1 and extending beneath the roots of LP_2 & along the extramolar sulcus. Also a deposit of woven bone on the internal right mandibular corpus in the submandibular fossa beneath RM_3, extending inferiorly from the mylohyoid line to a point 7mm from the inferior corpus, and posteriorally onto the lower part of the ramus. Small deposit of woven bone inside the mandibular foramen, on the lateral wall. Spongy and porous woven bone also surrounding the lytic lesion in the left alveolar bone at the position of LM^2, and smaller lytic lesion at distobuccal root LM^1. Extends posteriorally and superiorly onto the external posterior maxilla. A shallow lytic area extends around the opening of the abscess, most noticeable margins at the superior and posterior Faint patchy striated lamellar bone on both tibiae medial midshafts. Quite subtle. Some areas of cortex lost due to pm damage. Ribs – shape fairly normal although upper ribs have some vertical compression of the mid sections (but cross sections nor triangular & curvature not flattened laterally)	
Dental Health	32 tooth positions; 19 teeth; 3/32 lost AM; 10/32 lost PM 13/19 teeth with caries, 15 lesions; DEH; slight-moderate periodontal disease; abscesses – LM_1 (entire buccal roots exposed, margins of lesion rounded & surrounded by woven & lamellar bone), LM^2 (oval opening in alveolar bone on buccal side, sharp margins, entire surrounding bone porous & fragile, surrounded by woven bone), LM^1 (smaller lesion, similar in character to LM^2; both sockets internally very porous) LM_3 partially impacted – has partially erupted at an angle, with the crown angled lingually. The lingual side of the crown is level with the alveolar bone, and the buccal side is level with the midpoint of LM_2 crown RM^3 is small and partially erupted, the crown barely above the CEJ of RM^2. Not at an obvious angle, but where the crown is in contact with the distal side of RM^2 a carious lesion has developed and the crown of RM^3 is partially occupying it RP_1 – entire occlusal surface is devoid of enamel. The enamel is missing from the buccal, distal and lingual sides as if fractured away. A rounded dome of exposed dentine is present, possible AM fracture?	

	Right Dentition								Left Dentition							
Present	Imp-acted	P	AM	P	AM	P	PM	PM	PM	PM	P	PM	PM	PM	PM	PM
Calculus	F l	S mb	-	S d	-	F l	-	-	-	-	F bm	-	-	-	-	-
DEH	L	L	-	-	-	L	-	-	-	-	-	-	-	-	-	-
Caries	-	Md	-	La	-	Mm	-	-	-	-	La	-	-	-	-	-
Wear	1	1	-	-	-	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	PM	AM	P	P	P	P	P	P	P	P	P	P	P	P	P
Calculus	-	-	-	-	-	-	S m	M lmd	-	S lmd	S lmd	S lm	S ld	F l	F l	Impacted
DEH	-	-	-	-	-	L	L	-	-	-	-	-	-	-	-	

Caries	La	-	-	La	-	Mm	Md Sm	-	Sm Sd	-	-	La	La	Lo	Lo	
Wear	-	-	-	-	?	3	3	3	3	2	3	-	-	-	-	1

Skeleton Number	**408**	
Name	Richard Gill	
Date of Death	18th May 1883	
Preservation	Moderate (Grade 3), moderate fragmentation	
Completeness	60-70%; cranium (posterior half intact), mandible, maxilla; vertebrae – C1-2 + 5 arch fragments, T1-12 (arches); L1-5 (arches), S1; shoulders; arms; hands (2 right carpals, 2 left carpals, 6 unidentified MC shafts, 3 proximal? & 1 intermediate? phalanx); pelvis (fragments ilia); legs; feet (2 right tarsals, 2 left tarsals, RMT1 & 5, LMT1 & 6 unidentified MT shafts, 4 foot sesamoid bones, toenails)	
Age	Osteological: 18+ years (adult)	Coffin plate: 78 years
Sex	Osteological: Male?	Coffin plate: Male
Stature	-	
Non-Metric Traits	Ossicle in lambdoid (L); parietal foramen (R); extrasutural mastoid foramen (R); extrasutural mastoid foramen (L) Exostosis in trochanteric fossa (R); vastus fossa (R)	
Pathology	OA apophyseal facets T6-9, T12-L3, L5-S1, plus 3 unidentified cervical facets, & 8 unidentified thoracic facets OA right hip Right radius shaft seems slightly bowed in the opposite direction to normal curvature, so posterior shaft is slightly concave. The left shaft is not as complete, but seems to be normal. Both ulnae seem normal in shape. Could be a long healed fracture, but there is no sign of any callus or point where the shaft changes alignment. Enthesophyte on right ulna olecranon process Two proximal & 1 intermediate hand phalanges have their distal ends preserved. All have subtle lytic lesions around the joint surfaces, sharp edged, potentially erosive. Level of pm damage makes it difficult to assess whether genuine pathological lesions	
Dental Health	14 tooth positions; 3 teeth; 3/14 lost AM; 8/14 lost PM 3/3 teeth with caries; slight calculus; moderate periodontal disease	

	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	-	AM	PM	PM	PM	PM	PM	-	PM	PM	P	P	P	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	S m	S bm	S m	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	Md	Sd Sb	Sm	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	3	2	2	-	-	-

Skeleton Number	**426**
Name	Joseph Wilson? (monument – unlikely ID)
Date of Death	4th January 1871? (monument – unlikely ID)
Preservation	Good (Grade 2), slight fragmentation

Completeness	90%+; cranium, mandible, ear ossicle (incus x1), hyoid greater horn; sternum & manubrium; vertebrae – C1-7, T1-12; L1-5, S1-5; 12 right ribs, 12 left ribs, unsided rib frags; shoulders; arms; hands (4 right carpals, 5 left carpals, RMC1-5, LMC1-5, 7 proximal, 3 intermediate & 1 distal phalanx); pelvis; legs; feet (2 left tarsals, RMT2, LMT2-4, 1 distal phalanx)	
Age	Osteological: 26-35 years (young middle adult)	Monument: 25 years (unlikely ID)
Sex	Osteological: Female	Monument: Male (unlikely ID)
Stature	162.2cm ±3.55 (femur & tibia)	
Non-Metric Traits	Parietal foramen (L); extrasutural mastoid foramen (L); sutural mastoid foramen (R); absent zygomaticofacial foramen (L) Bipartite transverse foramina (1/4 R, 2/5 L); accessory acromial facets (bilateral); circumflex sulcus (L); acetabular creases (bilateral); Poirier's facet (L); exostosis in trochanteric fossa (L); vastus fossae (bilateral); lateral tibial squatting facets (bilateral); peroneal tubercle (L); medial talar facet (L)	
Pathology	Schmorl's nodes T7-11 OA apophyseal facets T8-11 (associated with destructive changes to spine) Destructive lesions in the spine: T3 – the right side of the anterior body has a cluster of lytic lesions, largest 6 x 3mm with porosity surrounding. The edges of the lesions are clear and defined, remodelled around margins but no bone formation T9 – focal area of lytic activity which has destroyed the right inferior apophyseal facet. There are minimal spurs and spicules of bone forming a slight honeycomb textured area in the location of the original facet, surfaces very rough and jagged. The inferior part of the facet location has been completely destroyed and there is a roughly oval (10 x 5mm) lytic lesion in its place. The edges of the lesion are sharp with minimal remodelling. Viewed from behind the inferior border of the right lamina has been destroyed, and the inferior margin is now concave and located more superiorly than the left side. There is minimal lamellar bone formation (very smooth) on the posterior right lamina surrounding the destroyed inferior border, and the area is covered in fine porosity (<1mm); one hole has pierced right through the lamina to the anterior side. T10 – there is a very aggressive lytic lesion in the right transverse process and pedicle, such that the section of the bone bearing the superior right apophyseal facet, part of the transverse process and the posterior part of the pedicle is completely detached from the rest of the vertebra (this piece was recovered and is present). This fragment is very porous and the surface is rough and irregular, like exposed trabecular bone (but not post-mortem damage). The margins of the superior right apophyseal facet are sharper than normal, and a small crescent has been removed from the superior right border; the margins of the facet are ragged, with slight eburnation of the facet surface. The anterior part of the right transverse process is occupied by a large scooped-out lytic lesion (19 x 11mm) leaving only a 1-3mm thickness of bone forming the posterior border of the transverse process; the detached fragment was sitting inside this lesion. The margins of the lesion are sharp and clear. Along the superior border the margin has a smooth contour, but the medial margin is more irregular. The floor of the lesion is covered in small jagged spicules, with a slight trabecular structure visible, and occasional porosity. The anterior part of the pedicle has been destroyed by lytic activity - a slightly scooped-out lytic lesion, of irregular shape, with jagged margins, and a floor covered in irregular spicules. The right side of the body has a subtle, shallow scooped-out crescent, with poorly defined margins and some lamellar bone around the inferior border and extending up the anterior and posterior margins. The right inferior apophyseal facet has been completely destroyed (as in T9). The superior part of the facet location is occupied by irregular lytic lesions & minimal bone spicules. The inferior part of the location has been completely destroyed, and the inferior border of the right lamina is concave and more superior than the left side. The posterior lamina is covered in a subtle thin layer of lamellar bone and scattered pinprick porosity, which occasionally penetrates right through to the anterior surface (connecting with the lesion in the transverse process). T11 – there is a deep focal lytic crescent around and undermining the inferior, medial and lateral borders of the superior right apophyseal facet. The lesion continues onto the superior right pedicle and curves back towards the anterior surface of the facet. The floor of the lesion is irregular and porous. The lateral and inferior margins are rounded but the posterior border is more irregular and jagged. The inferior border of the facet is also jagged; the facet is reduced in size and has irregular jagged margins and eburnation on the surface. The anterior surface of the facet is covered in lytic lesions of jagged and irregular texture, which have penetrated deep into the bone. Some fissures penetrate right through, giving the impression that little remains to hold the superior facet in place. The right superior side of the body has deep, sharp-edged lytic lesions – a small cluster of porosity merging together – anterior to the right costal facet. This porosity is located in a shallow scooped-out area in the right side of the body, which has a roughened & irregular floor texture. Minimal/no bone formation T12 – Small, deep, sharp-edged lesion on the right side of the body, just anterior to the costal facet. L4 – Small focal cluster of porosity at the inferior tip of the right inferior apophyseal facet	

	Sacrum – shallow scooped out lesions on the anterior surfaces of S2-3. One large lesion spanning the inferior half of the body of S2 and superior half of the body of S3 surrounded by a small rim of lamellar bone (jagged and irregular in texture). The floor of the lesion is rough. At the superior left margin of this lesion (on S2) there is a focal area of deep porosity, and one larger lytic lesion (3 x 2.5mm). Margins are sharp, outline irregular, very deep and surrounded by irregular porosity. Further lytic lesions are present on the left side of the body of S2, extending onto S3, which are just visible through the anterior sacral foramen. There are two further shallow scooped-out lesions on the anterior body of S2, superior to the larger lesion described above. Again floors of lesions have rough texture, and small ridges of lamellar bone run around the superior margins. Right os coxa – there is a small lytic area (5 x 2.5mm) on the right retroauricular surface, with a second lytic area medial to it. These lesions are connected beneath a small bridge of bone. The margins of the lesions are sharp and irregular; no bone formation Left os coxa – there is a small shallow scooped-out concave area (8.5 x 5mm) on the superior margin of the left acetabulum. The lateral margin of the lesion is sharp, the posterior half of the medial margin is rough with two spicules of bone projecting, and the anterior half of the medial margin is rounded and vague. The floor of the lesion is slightly irregular. There are multiple rib lesions affecting almost all ribs, but more severely expressed on the right side: R rib 1 – thin band of lamellar bone on the inferior shaft extending towards the sternal end, and a thin band extending towards the neck R rib 2 – lamellar bone on the visceral neck, extending along the entire length of the surviving shaft R rib 3 – thick lamellar bone on the visceral neck, extending along the length of the shaft, with woven bone deposits on the distal half of the midshaft (sternal end lost pm) R rib 4 – mix of woven and lamellar bone on the visceral neck, with thin lamellar bone extending along the shaft R rib 5 – thick lamellar bone on the visceral neck, extending onto the shaft, where peters out after the proximal third. R rib 6 – thick woven and lamellar bone on the visceral neck, thin lamellar bone extending onto the proximal third of the shaft R rib 7 – thick woven & lamellar bone on the visceral neck, thin lamellar bone extending onto the shaft R rib 8 – thick woven & lamellar bone on the visceral neck, thin lamellar bone on the shaft R rib 9 – thin lamellar bone on the visceral neck, and patches on the midshaft R rib 10 – thick lamellar bone on the visceral neck, subtle small patches on the midshaft R rib 11 – small area of lamellar bone on visceral neck R rib 12 – too badly preserved to observe L rib 1 – no lesions L rib 2 – subtle small thin lamellar bone deposits on visceral midshaft L rib 3 – no lesions L rib 4 – small area of lamellar bone on visceral neck L rib 5 – lamellar bone on the visceral neck & small area on proximal third of shaft L rib 6 – thick lamellar & woven bone on the visceral neck, lamellar bone extending slightly onto the shaft L rib 7 – thin lamellar bone patches on the visceral neck L rib 8 – thin lamellar bone on the visceral neck L rib 9 – subtle thin lamellar bone on the visceral neck L rib 10 – subtle transitional woven-to-lamellar bone on the visceral neck L rib 11 & 12 – no lesions Subtle striated lamellar bone on both tibia midshafts, partially destroyed by poor preservation of cortex Rib shapes: most ribs tend to be fairly well preserved and intact. Curvature is flattened laterally and ribs project anteriorly. The upper ribs are compressed vertically along most of the shaft length, and they are nearly as wide as they are tall. The lower ribs tend to angle inferiorly and taper markedly, e.g. L rib 8 measures 6.7mm vertically at the sternal end T12 has curved inferior apophyseal facets and a curved superior left facet. The superior right facet is flat, and there are small rib facets on the pedicles. T11 has flat superior facets, a flat inferior right facet, and a curved inferior left facet. Both twelfth ribs are short, slender and tapered (left side 55mm long). Cranial border shift. The right distal first foot phalanx has a flattened distal end, extended anteriorly by osteophytes
Dental Health	20 tooth positions; 15 teeth (3 of which loose); 2/20 lost AM; 4/20 lost PM; 2 teeth NP/U 14/15 teeth with caries, 15 lesions; DEH; considerable periodontal disease

				RP_2 rotated slightly mesial to buccal PL_2 rotated slightly mesial to buccal Slight crowding of anterior mandible												
	Right Dentition								Left Dentition							
Present	-	P?	P?	P?	P	PM	PM	-	-	-	-	-	-	-	-	P?
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	La	La	La	Md	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	-	-	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	AM	P	P	P	PM	P	P	P	P	P	PM	P	AM	P	NP/U
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	P	-	-	-	-	-	L	-	-	-	-	-
Caries	-	-	La	La	Md	-	Md Mm	Md	Md	Mm	Sm	-	La	-	La	-
Wear	-	-	-	-	2	-	2	3	3	2	2	-	-	-	-	-

Skeleton Number	**429**	
Period	Post-Medieval	
Preservation	Good (Grade 2), moderate fragmentation	
Completeness	10-20%; cranium, mandible & maxilla, ear ossicle (malleus x1); vertebrae –atlas (L arch), axis (dens, R & L arches	
Age	1-2 years (juvenile)	
Sex	-	
Stature	-	
Non-Metric Traits	Ossicles in lambdoid (bilateral) posterior condylar canal open (L); accessory lesser palatine foramen (L), bridging of supraorbital notch (R)	
Pathology	-	
Dental Health	16 deciduous teeth present; 3 deciduous teeth lost pm; 3 permanent teeth present (LM^1, RM_1 & LM_1), all unerupted 1/16 deciduous teeth with caries	

	Right Dentition					Left Dentition				
Present	-	P	-	-	-	PM	PM	PM	P	P
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	Mo	-	-	-	-	-	-	-	-
Wear	-	1	-	-	-	-	-	-	2	1
Maxilla	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Mandible	**e**	**d**	**c**	**b**	**a**	**a**	**b**	**c**	**d**	**e**
Present	P	P	P	P	P	P	P	P	P	P
Calculus	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-
Wear	1	1	1	1	2	2	1	1	2	1

Skeleton Number	**432**	
Period	Post-Medieval	
Preservation	Poor (Grade 4), severe fragmentation	
Completeness	20-30%; partial cranium (face damaged), partial mandible; vertebrae – 3 cervical arch & body fragments; arms (proximal right ulna shaft, distal left humerus shaft); hands (1 proximal hand phalanx); pelvis (fragments ilia); legs; feet (2 right tarsals, 2 left tarsals, LMT2-3)	
Age	18+ years (adult)	
Sex	Unsexed	
Stature	-	
Non-Metric Traits	Parietal foramina (bilateral) Vastus fossa (L)	
Pathology	OA both hips Patellar whiskers on both patellae	
Dental Health	3 tooth positions; 1 tooth (loose); 3/3 lost AM	

	Right Dentition								Left Dentition							
Present	-	-	-	-	-	-	-	-	-	-	P	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	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	-	-	-	-	-	-	-	-	-	-	-	-	-	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**435**	
Period	Post-Medieval	
Preservation	Moderate (Grade 3), extreme fragmentation	
Completeness	<10%; partial cranium (base & sides vault), part mandible, part right maxilla; vertebrae – C1-2, 1 unidentified cervical vertebra, & fragments of minimum of 4 cervical vertebrae, 1 arch possibly upper thoracic	
Age	18+ years (adult)	
Sex	Male?	
Stature	-	
Non-Metric Traits	Posterior condylar canal open (L); double anterior condylar canals (bilateral) Posterior atlas bridging (L)	
Pathology	DJD unidentified cervical body OA atlas facet for dens, & dens facet; OA 2 unidentified cervical facets Cribra orbitalia – left orbit (Grade 1) Maxillary sinusitis – left sinus has cobweb of lamellar bone spicules	
Dental Health	12 tooth positions; 11 teeth (4 of which loose); 3/12 lost AM; 2/12 lost PM Flecks-heavy calculus; DEH; slight periodontal disease Very smooth slightly crescent-shaped wear in the incisive surface of LC1, with worn surface angled buccally (lingual edge high). Possibly pipe-smoking wear?	

	Right Dentition	Left Dentition

Present	-	P	P	-	-	-	-	-	-	-	-	P	PM	P	AM	-
Calculus	-	S ld	S bl	-	-	-	-	-	-	-	-	-	-	S b	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	L	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	3	4	-	-	-	-	-	-	-	-	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	P	AM	-	-	-	-	-	-	P	P	P	PM	P	P	AM	P
Calculus	S lb	-	-	-	-	-	-	-	M mdl	H mldb	M lmd	-	F lm	F l	-	F m
DEH	-	-	-	-	-	-	-	-	-	-	L	-	-	-	-	L
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	4	-	-	-	-	-	-	-	3	3	3	-	3	5	-	2

Skeleton Number	**438**
Period	Post-Medieval
Preservation	Good (Grade 2), moderate fragmentation
Completeness	40-50%; mandible; sternum fragment; vertebrae –C2-7, T1?-2?, T11-12, plus 7 thoracic arches & 2 bodies, L1-4, 1 sacrum fragment; 9 right ribs, 10 left ribs, unsided rib frags; shoulders, right arm (humerus lost pm), left arm; hand (1 intermediate phalanx); pelvis (right ilium); legs; feet (2 right tarsals, LMT4-5)
Age	15-18 years (adolescent)
Sex	-
Stature	-
Non-Metric Traits	Transverse foramen bipartite (2/2 R, 0/3 L); acetabular crease (R); Allen's fossa (R); hypotrochanteric fossae (bilateral)
Pathology	Lowest left rib short and tapered (37mm long, but some damage to sternal end), and head is small What survives of T12(?) has a very small costal facet on the right pedicle, curved inferior facets and a flat superior right facet. Possible slight border shift, but not clear in which direction as too little of the spine survives Striated lamellar bone on the medial and lateral femoral midshafts, extending proximally. Also less pronounced striated lamellar bone on the posterior and lateral tibia midshafts. One right rib (upper rib, probably c. rib 5) has a small patch of woven bone on the visceral surface of the neck One left rib has a probable deposit of lamellar bone on the visceral neck, which has an uneven and swollen appearance Two left ribs have small deposits of woven bone on the visceral necks – one very small patch, and the second more extensive and transitional to lamellar bone Ribs have normal curvature, but lower ribs are tapered. Upper right rib (probably rib 3) has inferior angulation of the sternal end, but not clear whether this is due to pm damage
Dental Health	13 tooth positions; 15 permanent teeth (2 of which loose); 1/13 lost PM; 1 unerupted (LM_3) Flecks-slight calculus; DEH RP_2 not fully erupted into occlusion, located more lingual than the rest of the teeth and also rotated (buccal to mesial). Also on a slight mesial angle – possibly slightly impacted. Part of the socket for the distal root of dm_2 is visible (too small and narrow for M_1, and socket for M_1 clearly visible distal to it); dm_2 itself is not present. Seems likely that dm_2 was retained leading to partial impaction of the premolar LP_2 also rotated so lingual cusp is in contact with mesial side M_1. Has erupted to occlusion & not at an angle or displaced. There is a small partial socket distal to the root (between the premolar and permanent first molar), probably for distal root of dm_2. Possible that dm_2 also retained on left side. Slight crowding of anterior mandible

	Right Dentition								Left Dentition							
Present	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P?	-

Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	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	PM	P	P	P	P	P	P	P	P	P	P	P	P	P(U)
Calculus	-	-	-	S m	-	-	S bl	S bl	S l	S l	S l	-	-	F m	-	-
DEH	-	L	-	-	L	-	-	-	-	-	L	L	L	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	2	-	1	1	2	2	3	3	2	2	2	2	2	2	1

Skeleton Number	**441**	
Name	Daniel Fox (monument)	
Date of Death	19th March 1884? (monument)	
Preservation	Moderate (Grade 3), slight fragmentation	
Completeness	10-20%; cranium (largely intact), maxilla, ear ossicle (incus x1)	
Age	Osteological: 18+ years (adult)	Monument: 33 years
Sex	Osteological: Male	Monument: Male
Stature	-	
Non-Metric Traits	Ossicles in lambdoid (bilateral); parietal foramen (L); metopic suture; ossicle at parietal notch (L); extrasutural mastoid foramen (L); posterior condylar canals open (bilateral); accessory lesser palatine foramina (bilateral); palatine torus; accessory supraorbital foramina (bilateral)	
Pathology	OA right TMJ (large contour change & loss of eminence) Cribra orbitalia – right orbit (Grade 2)	
Dental Health	9 tooth positions; 3 teeth; 2/9 lost AM; 4/9 lost PM 3/3 teeth with caries; DEH; flecks calculus	

	Right Dentition								Left Dentition							
Present	-	-	-	-	-	-	-	PM	PM	PM	PM	AM	P	P	P	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	F d	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	L	L	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	M lmb	Mm	Sl Sm	-
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Skeleton Number	**444**
Period	Post-Medieval
Preservation	Moderate (Grade 3), severe fragmentation
Completeness	<10%; cranium (occipital, left parietal & right temporal), ear ossicle (incus x1)

Age	6-10 years (juvenile)	
Sex	-	
Stature	-	
Non-Metric Traits	Ossicle at lambda (double ossicle, large inca bones); ossicles in lambdoid sutures (bilateral); posterior condylar canal open (R)	
Pathology	-	
Dental Health	0 tooth positions, 0 teeth	

Skeleton Number	**459**	
Period	Post-Medieval	
Preservation	Excellent (Grade 0), severe fragmentation	
Completeness	90%+; cranium; sternum & manubrium fragments; vertebrae – C1-2, fragments of min 4 cervical vertebrae, T1-12, L1-5, S1-5; 12 right ribs, 12 left ribs, unsided rib fragments; shoulders; arms; hands (5 right carpals, 6 left carpals, RMC1-5, LMC1-5, 10 proximal, 7 intermediate & 4 distal phalanges); pelvis; legs; feet (6 right tarsals, 7 left tarsals, RMT1-5, LMT1-2 &5, 8 proximal, 3 intermediate & 1 distal phalanx, sesamoid bone)	
Age	46+ years (mature adult)	
Sex	Male	
Stature	184.8cm ±2.99 (femur & tibia)	
Non-Metric Traits	Ossicles in lambdoid (bilateral); parietal foramina (bilateral); sutural mastoid foramen (R); posterior condylar canal open (R); accessory supraorbital foramen (R) Circumflex sulcus (L); Poirier's facet (L); hypotrochanteric fossa (L); exostosis in trochanteric fossae (bilateral); third trochanters (bilateral); lateral tibial squatting facets (bilateral), peroneal tubercles (bilateral); double anterior calcaneal facets (bilateral); double inferior talar facets (bilateral); medial talar facets (bilateral); os trigonum (L)	
Pathology	Schmorl's nodes T7-L2 DJD vertebral bodies – T10, L5-S1; OA facets T4-7 OA both TMJs, lateral left clavicle, both hips All surviving hand bones are in good condition and are complete RMC1 – has an oval lytic lesion (6 x 3.5mm, 2mm deep) on the lateral side, immediately adjacent to the distal joint surface. Lesion has sharp clear margins, and sides and floor consist of fairly solid lamellar bone, slightly lobulated. Further three small lytic lesions <1mm on the dorsal shaft, adjacent to the distal joint and close to the lesion on the lateral side. Osteophytes along the dorsal margin of the distal joint, extending proximally along the dorsal surface (not projecting) RMC2 – has a lytic lesion adjacent to the distal joint surface, on the dorso-lateral corner (2.5 x 1mm, c 1mm deep). Sharp margins R proximal hand phalanx, 5th digit – proximal end normal, but the distal end is flattened so the condyles are in line with the palmar surface. The condyles are elongated and more oval in shape when viewed from the side. There are small osteophytes along the dorsal and palmar joint margins, blurring the edges and making them indistinct. The dorsal half of the joint surface is not smooth, but is irregular. The distal surface of the joint has a triangular lytic lesion (5.3 x 3mm) containing two deeper circular lytic lesions. Margins sharp and clear. Some osteophyte nodules on the medial and lateral condyle heads. Unfortunately the intermediate phalanx has been lost pm. Two other proximal hand phalanges (probably right) have slight roughening of the dorsal half of the distal joint surface, with osteophytes around the condyles (on the sides of the head) One (possibly right) intermediate hand phalanx has a deep sharp edged lytic lesion (4 x 2mm, c 1mm deep) immediately adjacent to the distal joint surface at the palmar-side corner. Palmar margin has a small rim of osteophytes LMC1 & 2 – heads normal LMC3 – some osteophytes along the palmar margin of the head, flat and projecting proximally LMC4 – Lytic lesion (4.3 x 2.5mm, 2mm deep) adjacent to the distal joint surface on the lateral side. Sharp margin on the palmar side, more rounded at the proximal and distal margins, & fairly well defined on the dorsal side. Right side normal L proximal hand phalanx, 5th digit – same as on right side, condyles flattened and elongated, dorsal half of joint surface roughened and covered in small surface osteophytes, margin blurred on both palmar and dorsal sides. Although the head of the right phalanx was quite streamlined and smooth, on the left phalanx there are large nodules on the dorsal surface (at the medial and lateral	

	edges) extending onto the medial and lateral sides of the phalanx, making the head larger and flared laterally. Further osteophytes on the medial half of the palmar side extend from the joint margin down the side of the shaft. The medial condyle is covered in nodules, plus small lytic lesions (next to the joint surface on the palmar side, 1.2 x 1mm). There is a further irregular lytic area on the proximal surface of the medial condyle and a cluster of lytic lesions adjacent to the joint surface on the dorso-medial side. There is a small ridge of bone in the 'volar groove' area. Left intermediate hand phalanx, 5th digit – proximal end expanded palmar-dorsally and all normal joint surface topography has been lost. Instead the surface is slightly concave across the whole dorsal three-quarters (there is no central vertical ridge as normal) and the surface is slightly roughened and irregular. The palmar quarter of the joint surface is raised in comparison to the rest, and flattened. There are two small lytic lesions – one in the centre and one towards the margin of the joint surface. The overall shape of the facet is slightly cupped. Distal end normal Intermediate hand phalanx (possibly left) – osteophytes around the dorsal and palmar margins. Joint surface itself is slightly irregular and there are small surface osteophytes in a band along the dorsal side. There is a flattened and roughened area on the palmar side Right proximal foot phalanges – three of the four (excluding the first digit) have osteophytes on the surface of the distal joint, on the dorsal half. Most pronounced in the 2nd(?) digit, with some osteophytes at the sides of the condyles & small lytic lesions on the medial condyle (1.2 x 0.7mm). Also osteophytes on the proximal phalanx of the first digit, on the medial condyle extending onto the dorsal surface. Shallow lytic lesion (2.4mm diameter) on the medial condyle (medial side of the distal end of the proximal phalanx). Right(?) intermediate foot phalanx – deep groove between two nodules on the proximal end of the plantar surface. Further osteophytes on either side of the distal joint, which is flattened Left foot – only three proximal phalanges (including the first digit). First phalanx has osteophytes on the dorsal side of the distal joint surface & margins. The second and third phalanges also have roughened distal joints (osteophytes on the surfaces of the dorsal halves). In the second digit the osteophytes occur on either side of the dorsal half of the distal joint leaving a groove between them. Left(?) intermediate foot phalanx – osteophytes around the margins of the proximal joint. Distal joint also has osteophytes along the margin of the dorsal side. Large lytic lesion occupying the dorsal half of the distal joint surface (4.5 x 2.4mm, c 1mm deep). Margins sharp and clear, floor and walls irregular. A second intermediate phalanx has an osteophyte on the central distal joint surface. Both have pronounced grooves on the proximal halves of the plantar surfaces Striated lamellar bone occupying the medial midshafts of both tibiae, extending onto the proximal and distal thirds. Thicker striated lamellar bone on the right fibula proximal third, extending onto the mid third of the shaft on the lateral surface. Slight bulge in the shaft at the junction of the proximal and mid thirds, most evident on the posterior surface. Corresponds with the area of thickest lamellar bone on the lateral surface. Possibly a well healed fracture, but no pronounced displacement. A slight change in angle may be present, but shaft is so fragmented is difficult to assess. No lamellar bone on the left fibula RMT4 – elongated, thickened deposit of smooth lamellar bone (c. 19 x 6mm) on the lateral side of the proximal half of the shaft. Blends well into surrounding bone, but margins more obvious on plantar side. RMT3 - irregular nodules of lamellar bone on the medial midshafts. RMT2 – small nodule of lamellar bone on the medial shaft, at the junction of the proximal and mid thirds No lamellar bone visible on the left metatarsals, although MT3 and 4 are lost pm. Both patellae have a pronounced osteophyte on the medial inferior corner, projecting inferiorly and measuring c. 7mm. Both have patellar whiskers. One right rib has an elongated thin deposit of lamellar bone on the visceral surface towards the sternal end, which blends well with the surrounding cortex. Continues beyond pm break edge. No other deposits were visible on any other ribs, although the sternal thirds of the shafts tend to be lost pm. Also the deposit was subtle, so if other ribs were affected the lesions may be difficult to spot. Slight border shift – T11 has T12 morphology (flat superior facets and curved inferior facets), and T12 has essentially lumbar facet morphology but retains the facets for rib 12 on the pedicles. Sinusitis in the frontal sinus – spicules of lamellar bone and porosity Some scattered fine porosity on the external surfaces of the parietals focussed around the sagittal suture Occipital condyles very curved, making an almost 90º angle at the midpoint of the facet. The atlas facets are likewise very concave Cleft neural arches S4-5

Dental Health	0 tooth positions, 0 teeth

Skeleton Number	**460**	
Period	Post-Medieval	
Preservation	Moderate (Grade 3), moderate fragmentation	
Completeness	20-30%; cranium (largely intact), mandible, maxilla; vertebrae – C1, T11-12, L1; 2 right ribs, 2 left ribs, unsided rib fragments; left clavicle; arms (humeral shafts); pelvis (right ilium & ischium fragments); legs (proximal left femur & both tibia shafts)	
Age	18+ years (adult) (possibly mature adult?)	
Sex	Female?	
Stature	-	
Non-Metric Traits	Ossicles in lambdoid (bilateral); parietal foramen (L); ossicle in coronal (L); extrasutural mastoid foramina (bilateral); posterior condylar canals open (bilateral); double anterior condylar canal (L); accessory lesser palatine foramen (R); absent zygomaticofacial foramen (L); anterior ethmoid foramen extrasutural (L) Plaque (R); hypotrochanteric fossa (L); exostosis in trochanteric fossa (L)	
Pathology	OA right hip Maxillary sinusitis – right sinus has small spicule of lamellar bone on the posterior sinus wall	
Dental Health	31 tooth positions; 0 teeth; 28/31 lost AM; 3/31 lost PM	

	Right Dentition								Left Dentition							
Present	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM
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	AM	AM	AM	-	AM	AM	PM	AM	AM	AM	PM	PM	AM	AM	AM	AM
Calculus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DEH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wear	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

KEY:

Present - Tooth presence; am - ante-mortem tooth loss; pm - post-mortem tooth loss; p - tooth present; p (u) – tooth present but unerupted; e – erupting; - - 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