Skeletal Report LICO 11 Lincoln College 2011 for Allen Archaeology

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Summary

Lincoln College site in Lincoln revealed 40 contexts (and 1 unstratified) containing human bone. Of these, 27 were articulated and 13 were disarticulated (plus one unstratified). All the articulated burials are considered to be Roman in date (except one medieval and one unphased) and represent a cemetery. All the burials were single internments and coffined on a general west-east alignment. There had been disturbance by later features in some cases. Of the articulated contexts, two were considered to be from the same individual (152 and 216) and the disarticulated contexts were found in the fill of later features. This resulted in 27 individuals present for analysis. These were five subadults, (under 18 years) and 22 adults. Of those whose sex could be determined 13 were male and seven were female. The youngest individual was 4-5 years and the oldest was greater than 60 years. The majority were in the 45+ years category (9). The diseases observed were each a single of case of DISH, cribra femora and cribra orbitalia, osteochondritis dessicans, ossified haematoma, rickets, sinusitis, lung infection, lower leg infection and vertebral degeneration. There was no ex-spinal osteoarthritis and a low level of dental disease.

Methodology

All skeletal material was examined and recorded in accordance with national guidelines (Hillson 1996a; Brickley and McKinley 2004; Mays *et al*. 2004).

Biological Age Assessment

Aging is a highly variable process whose causative factors and biological mechanics are not fully understood (Cox 2000). In addition, 'biological age' does not always equate to 'chronological age' or 'social age' (Lewis 2007) of which adulthood is primarily a culturally defined concept (Cox 2000, Lewis 2007). With this in mind, a multi-method approach was taken (Table 1) to provide a range of estimates. Then each indicator was weighted on reliability. Where only one (less reliable) method was available, then this individual was determined to be only Adult or Subadult. For analytical purposes the ages were split into categories (see Table 2). These categories reflect physical thresholds and the limitations of the techniques and in no way represent cultural stages.

Table 1: Macroscopic techniques used

Pubic symphysis – Brooks and Suchey 1990
Auricular surface – Lovejoy et al 1985b
Buckberry and Chamberlain 2002
Dental attrition – Miles 1963
Cranial suture closure – Meindl and Lovejoy 1985
Sternal Rib ends – Işcan & Loth 1986
Epiphyseal fusion – McKern and Stewart 1957 and Webb and Suchey 1985
Dental eruption – Moorees, Fanning and Hunt 1963
Long bone length (subadults) – Maresh 1970

Table 2: Age categories

Foetal - <38 weeks gestation
Newborn – 38 weeks – 1 month
1 month – 1 year
1.1 year – 3 years
3.1 years – 5 years
5.1 years – 7 years
7.1 years - 10 years
10.1 years – 13 years
13.1 years -16 years
16.1 years -20 years
20 years – 25 years
25 years – 35 years
35 years – 45 years
45+ years
60+ years
80+ years
Adult – over 20 years
Subadult – under 20 years

Sex Estimation

The biological sex of all adult skeletons was based on examination of standard characteristics of the skull and pelvis (Ferembach *et al*. 1980; Schwartz 1995), with greater emphasis on features of the latter as they are known to be more reliable (Cox and Mays 2000). Measurements of the femoral and humeral heads were employed as secondary indicators (Giles 1970). Adult skeletons were recorded as male, female, probable male (male?), probable female (female?), or indeterminate depending on the degree of sexual dimorphism of features. No attempt was made to sex subadults defined as individuals below 20 years of age for whom there are no accepted methods (Cox 2000), with the exception of adolescent skeletons whose innominate bones had fused and where preservation was adequate.

Skeletal condition and completeness

The completeness of each skeleton was classified as a percentage of the whole and divided in to four groups , 0-25% 25-50% 50-75% and 75+%. The condition of the bone surface of each skeleton was recorded in detail with reference to different anatomical areas (skull, arms, hands, legs and feet) after McKinley (2004, 16) and given an overall summary score.

Metrics

Where possible, adult stature was estimated by taking the maximum length of the femur with preference for the left (where the right was used it is noted in the catalogue) and applying it to the appropriate regression formula devised by Trotter (1970). Due to the fragmentary nature of the assemblage, other limbs were used which are known to be less accurate and have a greater standard deviation. Stature could not be calculated for adults of unknown sex. All possible males and possible females were, however, included in the measured sample.

Measurements of other long bones and skulls were taken (where appropriate) and used in the calculation of indices to explore variation in the physical attributes of the population.

Nonmetric

The presence or absence of frequently recorded non-metrical cranial and post-cranial traits were scored (Berry and Berry 1967; Schwartz 1995; Hillson 1996).

Dental

Dentition was recorded using the Palmer notation. Caries were graded into small (<1mm), medium (2-4 mm) and large (>4 mm). Abscesses were recorded with reference to Dias and Tayles (1997). Periodontal disease and dental enamel hypoplasia were graded using Ogden 2008. Calculus was graded per tooth (flecks, slight, medium, heavy after Brothwell 1981) and recorded as sub and supra gingival.

Pathology

Skeletal pathology and/or bony abnormality was described and differential diagnoses explored with reference to standard texts (Ortner and Putschar 1981; Resnick 1995; Aufderheide and Rodriguez-Martin 1998). Where it was considered appropriate the extent and range of pathology was explored by calculating crude prevalence rates (the number of individuals with a condition out of the total number of individuals observed) and true prevalence rates (the number of elements or teeth with a particular condition out of the number of elements or teeth observed).

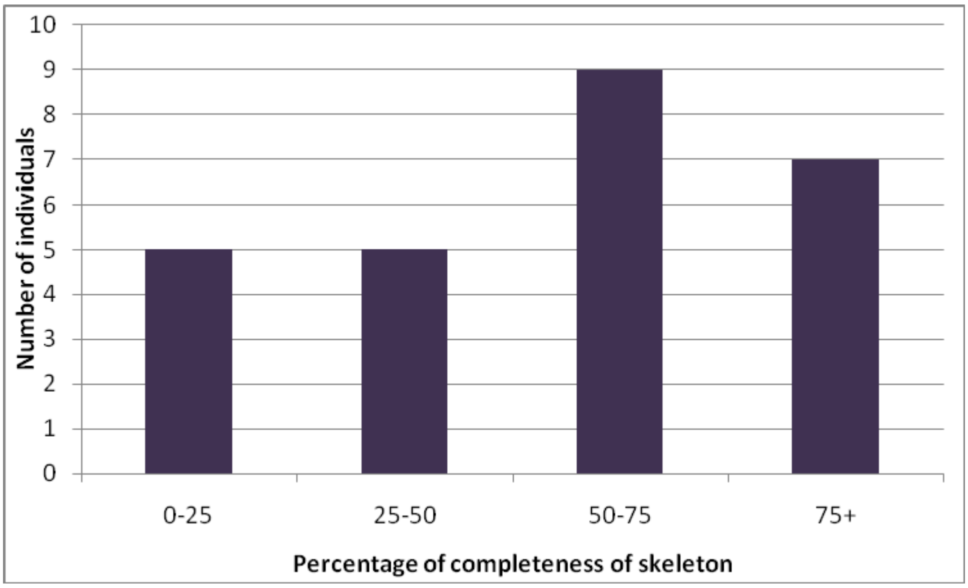
Results

All the Roman phased skeletons are discussed together (including the unphased skeleton), and the medieval individual is reported on separately. As this assemblage is part of a much larger cemetery, any apparent statistical inferences from the demographic data must be considered with this caveat. In addition, the assemblage is small in number and therefore percentages can over-inflate the true prevalence.

Skeletal preservation and completeness

All the individuals were assessed for bone surface preservation (which affects observations of pathology) and completeness (how much of the possible whole skeleton had been recovered).

Figure 1: Completeness of skeletons



Completeness varied considerably. This was in most part due to truncation of the graves, as more than half the graves had suffered truncation to some extent. There were no intercutting graves, truncation was caused by later features and modern disturbance. Completeness was also affected by the highly fragmented nature of the bone. The clay soil, with repeated wet and dry action, had resulted in bone which was fragmented in many places and the spongy areas suffered the worst. Epiphyses and large flat areas of bone had often fragmented beyond recognition.

In contrast, the bone surface was good and in two cases excellently preserved. Nearly all the skeletons were grade 1 bone surface condition, which meant there was slight and patchy post-mortem damage. This meant that pathologies could be easily observed.

Table 4: bone surface grade

Bone surface Grade	Number of individuals
0	0
1	24
2	2
3	0
4	0
5	0
5+	0

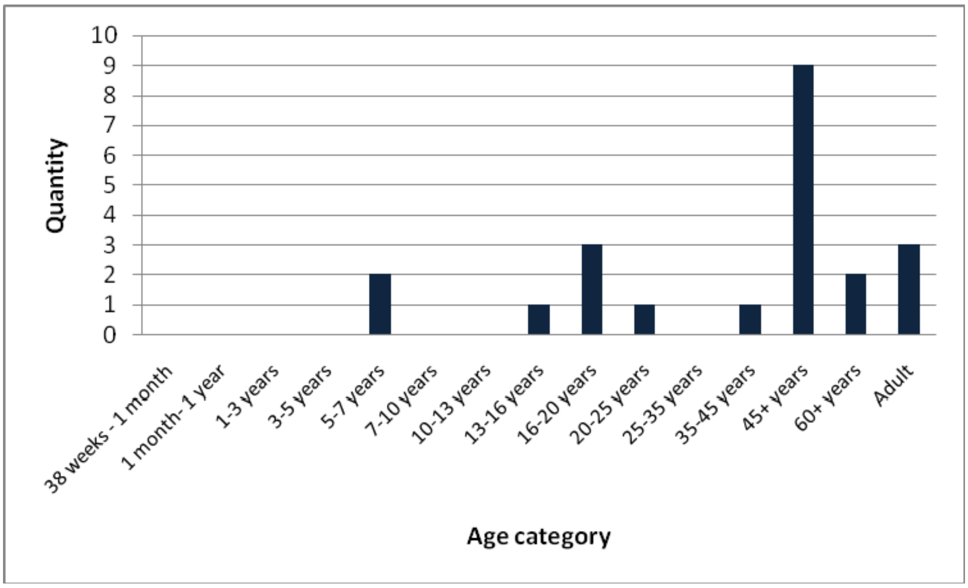
Demographic composition

There were 26 individuals available to examine for age and sex. Of these 5 were subadult (below 20 years) and 21 were adult. Of the adults, 17 were assessed for sex and 2 of the subadults pelves were sufficiently fused to attempt an estimation. There were 12 males and 7 females (4 adults could not be ascertained).

The ages ranged from 4-5 years to 60+ years. The obvious omission is from the under 4 age group. This is not unusual in Roman cemeteries, where the absence of neonates and infants has been frequently noted (Lewis 2007, 86). The majority of adults were in the 45+ (and 60+) category (see Figure 2). Due to the low numbers, the age categories have not been divided by sex, but it is interesting to note that three out of the four sexed individuals from 16- 21 years are male. Commonly the younger adults are predominantly female often attributed to the hazards of childbirth.

The Assemblage from Ancaster (Cox 1989), which is a Roman cemetery in Lincolnshire and therefore directly comparable, had a sex ratio of 2:3 females to males. There were 84 subadults (25%) and 243 adults. Of the subadults there were more in the neonate and 3-4 year old groups and the majority of adults were in the middle-aged category, with females dominating the youngest and oldest categories. This is in direct contrast to Lincoln College assemblage. The sizes of the assemblages may go a long way to explain these differences.

Figure 2 : Number of Individuals per age category



Physical appearance of the population

Stature

Due to the fragmentary nature of the remains (see condition and completeness section), it was possible to gain a stature estimate from only 9 individuals. Of these, 3 were using the humerus, which is a much less accurate method. There was also a mix of left and right limbs used. The results are therefore a rough estimation of stature and not directly comparable with other sites.

Table 5: Stature estimation

Skeleton number	Age and Sex	Stature (cm)	Notes L or R femur
109	Male 18-20y	166	Right used
112	?Male 18-21y	159	Right used
353	Male 35-45y	171	Left used
459	Male 45+	161	Left used
415	Male 45+	169	Left used
421	Male 60+	178	Left used
394	Female 21-23y	156	Right humerus used
424	?Female 45+	163	Right humerus used
431	?Female 45+	160	Right humerus used

The results range from 156 cm (5 feet 1 inches) to 178 cm (5 feet 8 inches), average 167.3 cm males, 159.6 cm females. The average in the Roman period (Roberts and Cox 2003, 163) was Male 169 cm and female 159 cm. Compared to other sites from the UK the stature from this assemblage for males and females sits comfortably within the range and averages.

Table 6 : Average heights in the Roman period

	Males		Females		
Site	**Mean**	**Range**	**Mean**	**Range**	**Source**
Horcott southern Late R-B	168.9	158-183	156.2	147-162	Clough and Boyle in press
Lankhills Late R-B	169	157-187	157	148-172	Clough 2010
Cirencester Late R-B Ancaster	169 169	160-182 156-180	158 157	148-170 144-169	Wells 1982 Cox 1989

Meric index

It was possible to calculate the meric index for 8 males and 4 females. The meric index is used to measure the degree of anterior-posterior (front to back) flattening of the femur and they fall into one of three ranges: platymeric (X-84.9 – broad or flattened); eurymeric (moderate- 85.0-99.9) and stenomeric (rounded- 100.0-X). Bones which fall into the stenomeric range are usually associated with pathology (Bass 1987, 214). The following results are all taken from the left femur.

Table 7: Meric index

Skeleton Number	Sex	Platymeric index	Range
109	Male	75	Platymeric
112	?Male	79	Platymeric
353	Male	72	Platymeric
387	Male	83	Platymeric
391	Female	72	Platymeric
394	Female	104	Stenomeric
415	Male	74	Platymeric
421	Male	74	Platymeric
424	?Female	74	Platymeric
431	?Female	70	Platymeric
434	Male	77	Platymeric
459	Male	96	Eurymeric

Various authors have claimed that playtmeria is more common in females than in males and that there is a tendency for it to be more pronounced in the left femur than the right (Brothwell 1981, 89). The results here indicate that males and females from this site all exhibited flattening of the femur except two. The female 394, which was stenomeric, had no skeletal pathology as suggested by Bass (1987). It could instead be suggested that the two individuals with more rounded femurs were from a different hereditary background and environment. Compared to the individuals from Ancaster where there was an average (mean) of 80.96, this assemblage has a mean of 79.16.

Cnemic index

It was possible to calculate the cnemic index for 4 males and 3 females and 2 indeterminates. The cnemic index is used to measure the degree to which the proximal part of the tibia is flattened in an anteroposterior direction. Bones fall into one of four ranges: hyperplatycnemic (extremely flat -X-54.9); platycnemic (very flat -55.0-62.9); mesocnemic (moderately flat- 63.0-69.9) and eurycnemic (broad and wide- 70.0-X).

Table 8: Cnemic Index for assemblage

Skeleton Number	Sex	Index	Range
109	Male	71	Eurycnemic
212	Indeterminate	77	Eurycnemic
353	Male	61	Platycnemic
383	Indeterminate	83	Eurycnemic
391	Female	58	Platycnemic
394	Female	77	Eurycnemic
415	Male	63	Mesocnemic
424	?Female	65	Mesocnemic
459	Male	70	Eurycnemic

The etiology of a flat platycnemic index relates to functional, rather than genetic causes (Lovejoy, Burnstein, and Heiple 1976). Precisely what functions contribute to the tibial shape is unknown. There is a range of flattening in this small population, which suggests variable functions (not all doing the same activities) amongst the individuals.

Nonmetrical Traits

Cranial traits have been noted for their tendency to run in families (Pinter-Bellows 1993, 65), the metopic suture in particular. In this assemblage there was a single instance of metopism, which does not allow for familial relations to be purported. Maxillary and mandibular tori have a functional aetiology rather than genetic. There was a single instance of each in two separate skeletons. The low level of observable crania has resulted in over-inflated prevalence rates for the nonmetrical traits.

Table 9: Cranial nonmetrical traits

	Number present			Number observable			Percentage		
Trait	Unsided	Left	Right	unsided	Left	Right	Unsided	Left	Right
Metopic suture	1			8			12.5		
Ossicle at Lambda	0			3			0		
Lambdoid ossicle		2	1		5	5		40	20
Asterion ossicle		0	0		2	2		0	0
Parietal foramen absent		2	2		5	5		40	40
Maxilla torus		1	0		5	5		20	0
Acc. Super-orbital foramen		0	0		6	6		0	0
Sagittal ossicle	0			5			0		
Parietal notch		0	0		3	3		0	0
Bregmatic ossicle		0	0		3	3		0	0
Mastoid foramen		0	0		6	6		0	0
Epiteric bone		0	0		3	3		0	0
Coronal ossicle		0	0		4	4		0	0
Palantine torus	0			4			0		
Auditory exotosis	0			10			0		

At Ancaster (Cox 1989) they had a large number of ossicles (or wormian bones) in the lambdoid suture 42%.

Table 10: Postcranial nonmetrical traits

	Number present		Number observable		Percentage	
	Left	Right	Left	Right	Left	Right
Scapula notch	0	1	0	1	0	100
Acc. Transverse foramen	1	0	2	2	50	0
Femur third trochanter	1	1	8	8	12.5	12.5
Femoral exotoses	1	0	8	7	12.5	0
Tibia squatting facet	1	1	7	6	14.3	16.6
Calcaneal double facet	3	4	8	6	37.5	66.6

Thirteen postcranial nonmetrical traits were scored for presence or absence. Of these six were present in the assemblage (Table 10). As for cranial traits, postcranial traits had low observations which have over inflated prevalence rates. The most observed trait was the double facet on the calcaneus. This trait has been considered to be genetically determined (Bunning and Barnett 1965) and the double facet was significantly more frequent in Europeans than the single. Other traits may have a functional aetiology rather than genetic (activity related).

Dentition

A total of 228 teeth from 17 adult (which includes the dentition of the adolescent individuals as these were all permanent dentition) individuals survived from Lincoln College assemblage (8 males, 7 females and 2 Indeterminates). Due to the low numbers these have not been divided into male and female.

Table 11: Permanent dentition results and pathology

	Total adults
Number of teeth	228
Number of sockets	237
Lost antemortem	28
Caries	6/ 228 2.63%
Calculus (number of teeth affected)	74/228 32.45%
Enamel hypoplasia (number of teeth affected)	8/228 3.50%
Periodontal disease (number of sockets affected)	42/237 17.72%
Abscess	0/237 0%

The results reveal a low number of caries and abscesses. Antemortem tooth loss appears to be nearly one eighth of the alveolar, but close inspection of the results places half of these with SK 417 (16). Taking out this result leaves 0.7 teeth lost before death per person. In a similar way calculus (dental tartar or plaque) results are inflated by one individual. Of the two subadults with deciduous teeth present for examination (total 30 teeth) a single tooth had a carious lesion and two teeth had a small quantity of calculus.

Dental nonmetrical traits were limited to slight crowding of teeth and absence of third molar (not confirmed).

The dentition of the assemblage was generally healthy, typical of a pre-sugar population. Interestingly at Ancaster the population had high levels of caries where 57% of the adults had a caries compared to Cirencester (Wells 1982) where it was 39%. These results may suggest dietary differences between sites.

Pathology

Trauma

Osteochondritis dessicans

While congenital abnormalities have been implicated in its aetiopathogenesis, the tendency for osteochondritis dessicans to be common among athletes has led to the suggestion that it is caused by repetitive low-grade chronic trauma or microtrauma. It is also a failure of circulation leading to restricted blood supply to the ends of convex joint surfaces and necrosis of the bone and so can be categorised as a circulatory disorder. Epidemiological features of this condition include a predisposition among males between the ages of 10 and 25 years (Aufderheide and Rodríguez-Martin 1998).

Skeleton 109, an 18-20 year old probable male, had rounded lesions to the left and right distal femoral condyles. The sex and age of this individual are typical of the condition.

The same skeleton also exhibited further lesions of probable traumatic origin. These were in the lumbar vertebrae 2 and 3. The vertebral bodies had a large lesion in the anterior portion not affecting the annular ring. There are several differential diagnoses for the lesions, including Brucellosis, Fungal infection, Tuberculosis, but the criteria for diagnosis are not present in this case. Instead, Traumatic Disc Herniation, is the preferred explanation, especially combined with the osteochondritis dessicans in the knees and accompanying Schmorl's nodes (see joint disease section), which are both possibly traumatic in origin.

Ossified haematoma

Tendons and muscle attachments to the bones may occasionally ossify as a result of trauma, for example where a haematoma has been generated in the proximity of the injured periosteum (Aufderheide and Rodriguez-Martin 1998, 26). The resulting mass of woven bone is known as myositis ossificans traumatica. It may occur without obvious skeletal injury and after only minor muscle trauma.

Skeleton 421, 60+ years Male, had a bony protrusion from the right distal fibula interpreted as an ossified haematoma. The ankle joint is a vulnerable area to minor injury.

Healed Injury
Skeleton 434, 45+ years male, left tibia distal shaft lateral surface, irregular new bone laid down and adherent bony nodules. On posterior side a smooth sulcus. Interpreted as a healed injury, perhaps involving some infection or soft tissue damage.

Depression fracture
A fracture is defined as a complete or partial break in the continuity of bone (Roberts 1991, 226). Fractures may result from underlying pathology, repeated stress or acute injury (Roberts and Manchester 2005, 88-91). The majority of fractures that are observed in archaeological human bone are healed. Certain types of fracture are indicative of inter-personal violence, others are the result of accidents (Crawford Adams 1983; Galloway 1999). Furthermore, the alignment of a fracture and evidence for secondary pathology (among other changes) may indicate quality of diet and treatment (Grauer and Roberts 1996).

Skeleton 174, 4-5 year old child, the occipital (back of skull) bone in the upper left central area has a possible compression fracture. A sub-circular depression (21 x 16 mm) with a further central area slightly deeper does not penetrate the inner table of the cranium. There is no sign of infection or active healing. The edges were smooth and round, suggesting it had occurred sometime before death.

A subadult with a fracture is rare, as the long bones bend or result in 'greenstick', which may heal with no evidence. Cranial fractures are usually associated with interpersonal violence in adults, but the location of this fracture, very low on the back of the head, could suggest an accidental cause.

Infection

Non-specific
Non-specific infections include periostitis, osteitis and osteomyelitis. Periostitis refers to a new layer of bone that is laid down under an inflamed periosteum (the fibrous sheath that covers bone in life). It is identified on the surface of dry bone as porous, layered, new bone. When the cortical bone (bone just below the surface) becomes inflamed, the condition is referred to as osteitis.

Periostitis and osteitis may arise not only as a consequence of non-specific infection, but also from other conditions of a metabolic, neoplastic or traumatic nature (Resnick and Niwayama 1995). Diagnosing osteitis in dry bone involves demonstrating the involvement of the cortical bone and thus radiology is required for this. For the present analysis routine radiography was not undertaken and therefore lesions were classified as periostitis, unless a sinus was identified, in which case osteomyelitis was diagnosed.

There were two skeletons with periostitis. SK 459, 45+ year male, left and right tibiae medial surfaces had lamellar bone (healed periostitis) mid shaft right side and entire shaft left side. The fibulae were also involved. The lower legs are the most common site for non-specific infection as the bone is close to the skin and the limbs prone to knocks and falls. Poor circulation can also result in low grade infection and the lower legs are prone to this.

SK 112, 18-21 year Male, had periostitis to the left ribs. The infection was active and healed on the internal surface of 9 heads and 12 rib shaft fragments. This suggests involvement of the entire left rib cage. Broken fragments reveal that the new bone sits on the surface of the ribs. In two instances there was an erosive lesion located within the periosteal reactive area on the shaft. This is a long-standing infection and as the individual is young male then the infection may have been acquired whilst a child/adolescent. It possibly indicates a chronic lung infection, which may have been caused by tuberculosis or brucellosis. In addition the individual had slight cribra orbitalia in the left orbit (discussed separately).

Sinusitis is an infection of the maxillary sinus which is characterised by new bone laid down in a 'web-like' manner within the sinus cavity. Causal factors can include; smoke, environmental pollution, dust allergies and upper respiratory tract infections (Aufderheide and Rodriguez-Martin 1998; Roberts and Manchester 2005, 175-6). Congenital predisposition can also play a role, as can pregnancy, malnutrition and a wide variety of infections. The condition is classed as chronic (when seen on bone) if it lasts more than three months. Symptoms can include facial pain, fever and generalised malady.

Skeleton 417, 45+ years Female, had sinusitis in the left and right maxillary sinus. This individual also had button osteomas on the frontal bone and Hyperostosis Frontalis Interna (HFI) on the endocranial surface of the frontal bone (discussed separately).

Metabolic disease

Cribra Orbitalia

Cribra Orbitalia are the lesions seen in the orbit roof, it is not a disease in itself. It has been purported to be a symptom of iron deficiency anaemia, but there is increasing research that this may be only one possible cause (Walker et al. 2009). It is therefore regarded as a general indicator of metabolic disease and very often seen in conjunction with other indicators.

Cribra was seen in two individuals, SK387 and 171. One Adult male and one child of 6 years. The child (171) had the lesions and indicators of vitamin D deficiency (see below).

Cribra Femora

This lesion, most commonly seen on subadults, is located on the anterior of the femoral neck just inferior to the head. It is very similar to cribra orbitalia in appearance. It is suggested that cribra femora is due to a deficiency of magnesium (Miquel-Feuchet *et al.* 1999) which is needed for cartilage growth (ibid.). This lesion may be a result of malnutrition, and there may be a link to cribra orbitalia, which can be indicative of B12 deficiency (Walker et al 2009).

This lesion was seen on the left and right femoral neck of Skeleton 353, 35-45 year old Male. The orbits were not available for observation. As this was a mature individual it is more unusual as the lesions are most commonly seen in adolescents and young adults.

Vitamin D deficiency (Rickets)

Rickets is a childhood disease caused principally by a lack of vitamin D but it may also be due to lack of calcium and there are, in addition, three hereditary forms. Lack of vitamin D, severe enough to cause rickets, prevents osteoid being mineralized and the bone formed is soft and may bend if the disease occurs during the time the child is weight bearing (Waldron 2009). Rickets predisposes towards the development of pneumonia, which may have been a cause of death in children who present with rickets.

Skeleton 171, a 6 year old child presented with tibia and fibula (left and right) which bowed anterior-posterior in the upper third shaft region. The Femora were slightly bowed anterior-posterior also, but to a lesser degree. This individual also had cribra orbital grade 1 in the left and right orbits. The bowing of the lower limb bones are interpreted as caused by vitamin D deficiency (Rickets).

Circulatory disease

Pseudo osteochondritis dessicans (OD)

This condition is a defect in the cortex which is simply a normal variant. The cortex can be followed into the hole and the floor of the defect is smooth (when it can be seen). It is called ‘pseudo OD’ as it is easily confused with this condition, but the aetiology is different. It is classified here under circulatory disease as it may indicate areas of poor circulation. The most common sites for these anomalies are the glenoid (Scapula) and the proximal surface of the first phalanx of first metatarsal.

Skeleton 212, an indeterminate adult, had pseudo OD on the left tibia distal epiphyses, left talus calcaneal articular surface and right talus navicular articular surface. In addition, the right first head of the metatarsal plantar surface had a separate extension of the articular surface. Possibly a sesmoid may become attached. These small indicators all suggest heavy wear of the ankles and feet.

Skeleton 415 in addition had pseudo OD on the right first metatarsal proximal joint surface.

Musculo-skeletal stress markers

Hawkey and Merbs (1995) distinguished between robusticity markers caused by ''normal reaction of the skeleton to habitual muscle use and [which] reflect daily activities that produce rugged markings at the musculoskeletal site of attachments'' and stress lesions, ''a pitting or furrow into the cortex to the degree that it superficially resembles a lytic lesion.'' It was suggested that the differences in appearance reflected a continuous response to overload (Hawkey and Merbs, 1995).

Specific muscle insertion sites were scored in the assemblage in order to examine any possible patterns. Development of sites was generally low, but Skeleton 415 had moderately developed enthesophytes in the pelvis and femoral areas. The calcaneal spur (Achilles tendon) was particularly prominent with marked exotosis over 5 mm. Lower limb MSM is usually not indicative of a particular repeated action or occupation. These muscles are used for many different activities.

Joint disease - Spinal

Osteoarthritis

Osteoarthritis is the most commonly reported pathology in archaeological bone. It is a chronic and progressive non-inflammatory disease process of the synovial joints (Aufderheide and Rodríguez-Martín 1998, 93). In severe cases, degradation of the joint cartilage may progress to the stage where bone-on-bone contact occurs (eburnation). Eburnation is considered the most diagnostic of all bony changes associated with osteoarthritis (Rogers and Waldron 1995, 43-5). While osteoarthritic changes can occur at any synovial joint, areas most commonly affected comprise the facet joints of the vertebrae, the hands, the hip and knee joints, the acromio-clavicular joint, and the first metatarsophalangeal joints of the feet (Rogers 2000, 166). There is a positive correlation with age and females are more likely to suffer from the disease at a younger age than males (Rogers and Waldron 1995, 32).

Spondylosis deformans

Spondylosis deformans is degeneration of the intervertebral disc, which in turn affects the intervertebral space between the bodies of opposing vertebrae. It is usually associated with increasing age (Kahl and Smith 2000, 433). Osteophytosis (new bone growth) usually occurs as a response to this process on the margins of the superior and inferior surfaces of the vertebral bodies. Reactive new bone formation and pitting on the vertebral body surfaces is also typical (Ortner 2003, 555). Osteoarchaeological literature suggests that prolonged labour-intensive physical activities may cause the onset of the condition (Jurmain 1977, 353-6; Lovell 1994).

Cases of marginal osteophytosis occurring alone, without pitting and densification of the vertebral body surface, were considered separately for the purposes of this report, but may indicate an early stage of spondylosis deformans.

Schmorl’s nodes

Schmorl’s nodes are identified as small lesions in the vertebral end plates. These lesions are ‘pressure defects’ arising after intervertebral disc herniation (‘slipped disc’). Schmorl’s nodes are most commonly identified in archaeological bone in the lower back region.

The spinal afflictions amongst the assemblage were low. The most commonly observed were Schmorl’s nodes, which is the case amongst most skeletal assemblages (Aufdeheide and Rodríguez-Martin 1998, 97). The cervical vertebrae were more affected by osteoarthritis and spondylosis deformans than the thoracic. Although the rates given here are crude rates (true prevalence not calculated due to the low numbers) they may not give a true reflection. It is possible though that there was a local practice (weight bearing on the head) which contributed to the incidence. Joint degeneration is a combination of genetic inclination, health and lifestyle and activity. All the skeletons with spinal disease were over 45 years (where age could be ascertained) and afflicted males and females equally.

Table 12: Spinal Joint disease

Number of vertebrae affected by number of individuals	**OA on facets**	**Porosity on body/spondylosis deformans**	**Osteophytosis**	**Schmorl’s nodes**
Cervical	5 (vertebrae) / 3 (sks)	10/4	5/2	0
Thoracic	8/2	8/2	1/1	22/6
Lumbar	5/2	4/2	0	5/3

Skeletons with spinal joint disease 391, 397, 417, 421, 424, 434, 459, 494

What is unusual, is that there were no observations of joint disease on any other joints. Skeleton 424 had porosity on the left mid clavicle and right acromion, which indicates initial joint degeneration. in The assemblage from Ancaster, of the 209 Adults with at least one joint present, 61.2% have osteoarthritis of varying degrees affecting one or more joint of the extraspinal skeleton.

DISH

Diffuse idiopathic skeletal hyperostosis (DISH), is characterised by ossification of the anterior longitudinal ligament, which fuses the vertebral bodies together but retains the intervertebral disc space. It is a disease normally occurring in elderly individuals (Rogers and Waldron 1995, 51-2) and has been linked to obesity and type 2 diabetes (and frequently found in skeletons from monastic settings).

Skeleton 459, 45+ male, had DISH on the right side of the central thoracic vertebrae. There was extensive osteophytic lipping superior and inferior, but no fusion on the mid and lower thoracic vertebral bodies (8 bodies in all). In addition, some of these vertebrae had Schmorl's nodes (6). This individual also had periostitis on the lower legs and the right metatarsals (3 and 4) had an additional facet, created by repetitive friction between the two. These altogether create a picture of an individual with long term health problems, possibly caused by excessive weight and poor diet.

Disarticulated human bone

Three contexts containing human bone were considered to be disarticulated in nature and not from an articulated burial. These bones are likely to be from disturbed graves from later interventions.

Table 13: disarticulated human bone

CoContext Number	Bone element	Side	Notes
7	Calcaneus	Right	
	Radial shaft fragment		
	Femur upper 1/3 shaft x2 frags	Right	
133	Patella	Right	slight notch
205	distal femur epiphyses lateral condyle		
369	Femur, prox head absent	Right	very robust and long

	calcaneus, lateral half absent	Right	
	tibia, mid & dist 1/3 & dist epiphyses	Right	lateral periostitis
	ulna, prox head & 1/3	Right	
	Femur, prox 1/3 & med 1/3	Right	small thin & very flat
	femur, dist 1/3 & dist epiphyses	left	small and thin
	fibula, shaft prox,mid & dist 1/3s	unsided	
	Rib, shaft x2	unsided	
	fibula, shaft frags x4	unsided	
	Metatarsal, 3	left	
	metatarsal, 5	left	
339	mid shaft fragments of humerus	unsided	
340	upper third femoral shaft fragments	Right	
	Fragment of acetabulum	unsided	
351	3x rib shaft fragments	unsided	
	upper third shaft ulna	right	same individual
	upper third shaft radius	right	same individual
363	femur proximal two thirds and epiphyses articulating surfaces	left	child (3-9 years)
	Rib shaft fragments	unsided	child
	distal two thirds radial shaft	unsided	child
382	femoral shaft	right	complete no epiphyses
	(smaller) femoral shaft frag distal third		
405	distal hand phalanx		
408	humeral shaft phalanx		
413	8x cranial fragments (parietal)		
	Occipital condyle	Left	
449	femoral shaft fragment mid third		
	tibial shaft fragment mid third		
unstratified	clavicle lateral third	left	
	scapula acromion fragment		
	humerus distal third shaft fragment	?right	
	radial shaft fragment		
	5th metatarsal	left	

	3x proximal hand phalanges		
	2x medial hand phalanges		
	1x rib shaft fragment		
	pelvic crest fragment		
	partial acetabulum and ischium	left	
	4x femoral shaft fragments (small)		
	6x cranial fragments		
	mandibular condyle		
	chin' of mandible		
	mandible gonial and partial ramus, third molar in alveolar, M2 healed over	left	?male
	mastoid and auditory meatus	left	?male
	3x fibulae shaft fragments		
	1 distal fibula epiphyses		
	3x demi condyle femoral		
	tibial proximal epiphyses partial		
	vertebral condyle		
	femoral head		eburnation on proximal circumference of head

The majority of the disarticulated bone comes from later features which may have disturbed graves and the contents then re-interred in the feature. Although context 369 is a skeleton number, these bones did not belong to the individual. Of interest are the child bones, suggesting further subadult graves in this area which have been disturbed by later development. Context 351 appears to all be from the same individual in the right elbow area.

Due to the fragmentary nature and small quantity of bone it is not possible to comment further on the bones from these contexts.

Skeleton 209

This skeleton has been archaeologically dated to the 13th-15th century, it is from a truncated grave leaving only 20% of the skeleton represented by the skull and small portion of upper torso. It has been determined to be male and aged to adult only due to the absence of more accurate elements. 17 out of 21 teeth present, 3 lost ante-mortem and 2 caries, 3 abscesses, 17 with calculus on the left side, suggesting this side of the mouth was not in use, perhaps due to the abscess and caries also on this side.

The left and right orbits have small capillary indicating stage 1 of cribra orbitalia (after Stuart-Macadam 1989), which was thought to indicate iron-deficiency anaemia, but current research has thrown this into doubt. This individual had extensive calculus on the teeth and abscesses, it may be that they had an inadequate diet due to the dental problems, therefore leading to insufficient intake of vital vitamins and minerals. There was also slight 'orange peel' effect on the parietal and frontal central area of the skull, aetiology is unknown but may be age-related or indicative of mineral deficiency.

Conclusions

This assemblage represents a small selection of a larger cemetery. This window into the population suggests they were generally healthy, many living into older age. The low level of pathology suggests low risk occupations and a good environment with plenty of food and nutrition. The absence of young children is not unusual in a cemetery of this date, and only partially excavated. The cemetery at Ancaster found that the juveniles and infants were congregated together, so it is possible that the ones from Lincoln are located elsewhere. The full range of adult age groups are represented as are both males and females, which implies this is a municipal cemetery. The average stature of the individuals corresponds with those found elsewhere in the UK. The low level of dental disease is more unusual, and perhaps suggests a diet different to that found in other parts of the UK. The absence of joint disease (extra-spinal) is interesting, although the low numbers present for observation may contribute to this, it may also reflect a population with a low genetic tendency towards osteoarthritis and lifestyle which does not expose the joints to extreme wear.

Bibliography

Aufdeheide, A, C and Rodríguez-Martin, C, 1998 *The Cambridge Encyclopaedia of Human Palaeopathology*, Cambridge

Berry, R and Berry, A, 1967 Epigenetic variation in human cranium *Journal of Anatomy* **101**: 361-379

Brickley M and McKinley, M 2004 Guidelines to the standards for recording of human remains; *IFA Paper* No 7

Brooks, S and Suchey, J.M. 1990 Skeletal age determination based on the os pubis: a comparison of the Acsádi-Nemeskéri and Suchey-Brooks method. *Human Evolution* **5**, 227-238

Brothwell, DR, 1981 *Digging up bones*, Oxford University Press , Oxford

Buckberry, JL, and Chamberlain, AT, 2002 Age estimation from the auricular surface of the ilium: a revised method, *Amer J Physical Anthropol*, **119**, 231-9

Buikstra, J.E. and Ubelaker, D.H. 1994 *Standards for data collection from human skeletal remains*, Arkansas

Bunning, PSC and Barnett, CH. 1965. A comparison of adult and foetal talocalcaneal articulations. *Journal of Anatomy* **99**(1):71–76 4.

Cox, M. 1989 The Human Bones from Ancaster AML Report 93/89 English Heritage

Cox, M and Mays ,S. 2000. Human osteology in Archaeology and forensic science. Greenwich medical media. London

Crawford Adams, J 1983 *Outline of Fractures* Churchill Livingstone, Edinburgh and London

Ferembach, D, Schwidetzky, I & Stloukal, M 1980 Recommendations for age and sex diagnoses of skeletons. *Journal of Human Evolution* **9**: 517-549

Galloway, A, 1999 *Broken Bones: Anthropological analysis of blunt force trauma*, Illinois

Giles, E 1970 Discriminant function sexing of the human skeleton. *In Personal Identification in mass disasters*, edited by T.D. Stewart. Washington

Grauer, A. & Roberts, C. A. 1996. Palaeoepidemiology, healing and possible treatment of trauma in the Medieval cemetery population of St. Helen-on-the-Walls *American Journal of Physical Anthropology* **100**(4): 531-544.

Hawkey D.E., and Merbs, C.F. 1995 Activity-induced musculo-skeletal stress markers (MSM) and subsistence strategy changes among ancient Hudson Bay Eskimo. *International Journal of Osteoarchaeology Vol* **5:** 324-338

Hillson, S 1996: *Dental Anthropology*. Cambridge University Press

Hoppa, R D 1992 Evaluating human skeletal growth: an Anglo-Saxon example *International Journal of Osteoarchaeology* **2** 275- 288

Iscan, MY and Loth, SR 1984 Determination of age from the sternal rib in white males; *Journal of Forensic Sciences* **31** 122-132

Iscan, MY, Loth, SR and Scheuerman, EH 1985 Determination of age from the sternal rib in white females, *Journal of Forensic Sciences* **31**, 990-999

Jurmain, R, 1977 Stress and the etiology of osteoarthritis, *Amer J Physical Anthropol*, **46**, 353-66

Lewis, M, 2007 *The bioarchaeology of children: perspectives from biological and forensic anthropology,* Cambridge

Lovejoy, C.O., Meindl, R.S., Pryzbeck, T.R. and Mensforth, R.P. 1985 Chronological metamorphosis of the auricular surface of the illium: a new method for determination of adult skeletal age-at-death. *American Journal of Physical Anthropology* **68**,15-28

Lovejoy C. Owen, Burstein, Albert H and Heiple Kingsbury G 1976 The biomechanical analysis of bone strength: A method and its application to platycnemia *American Journal of Physical Anthropology* Volume **44**, Issue 3, pages 489–505

Lovell, N, 1994 Spinal arthritis and physical stress at Bronze Age Harappa, *Amer J Physical Anthropol*, **93**, 149-64

Maresh, MM 1970 *Human growth and development* CC Thomas: Springfield

Mays, S, Brickley, M, and Dodwell, N, 2004 *Human bones from archaeological sites - Guidelines for producing assessment documents and analytical reports*, English Heritage

McKinley, J 2004. Compiling a skeletal inventory: disarticulated and co-mingled remains. In *Guidelines to the standards for recording human remains*. IFA paper No **7**. Eds Brickley, M and McKinley, J .

Meindl, R.S. and Lovejoy, C.O. 1985 Ectocranial suture closure: A revised method for the determination of skeletal age at death based on the lateral-anterior sutures. *American Journal of Physical Anthropology **68**, 29-45*

Miles, A, 1962 Assessment of age of a population of Anglo-Saxons from their dentition. *Proceedings of the Royal Society of Medicine* **55**, 881-886.

Miquel-Feuchet M.J, Polo-Cerdá, M and Villalaín-Blanco, JD 1999 El Síndrome Criboso:Cribra Femoral Vs Cribra Orbitaria In Sánchez Sánchez, JA *Sistematizacíon metodológica en paleopatología*. Actas del V Congreso Nacional AEP, Alcalá la Real, Spain pp 221-237

Moorees, C F A, Fanning E A, and Hunt, E E, 1963 Age variation of formation stages for ten permanent teeth *Journal of Dental Research* **42** 1490-1502

Ogden, A, 2008 Advances in the palaeopathology of teeth and jaws, in R Pinhasi and S Mays (eds), *Advances in Human Palaeopathology*, London, 283-307

Ortner, D J, and Putchar, W G J, 1981 *Identification of pathological conditions in human skeletal remains* Smithsonian Institute Press

Rogers, J and Waldron, T 1995 *A Field Guide to Joint Disease in Archaeology* Wiley

Resnick, D, 1995 *Diagnosis of Bone and Joint Disorders.* 3rd. ed. 6 vols. W.B. Saunders Company, London

Resnick, D, and Niwayama, G, 1988 *Diagnosis of bone and joint disorders*, 2nd edn, New York

Roberts, C and Cox, M 2003 *Health and disease in Britain*; Sutton Publishing UK

Roberts C. 1991 Trauma and treatment in the British Isles in the Historic Period: A design for multidisciplinary research. In DJ Ortner and AC Aufderheide (eds.): *Human Paleopathology: Current Syntheses and Future Options.* Washington, DC: Smithsonian Institution Press, pp 225–240.

Roberts, C, and Manchester, K, 2005 *The archaeology of disease*, 3rd edn, UK

Saunders, S,R, 1989 Nonmetric skeletal variation. In Iscan M,Y, and Kennedy K,A,R, (eds) *Reconstruction of Life from the Skeleton* Alan R. Liss, Inc., New York, 95-108.

Schwartz, J H, 1995, *Skeleton Keys: An introduction to human skeletal morphology, development, and analysis*, Oxford University Press, USA

Stuart-Macadam, PL 1991 Anaemia in Roman Britain, in Bush, H and Zvelebil, M (eds) *Health in Past Societies* BAR International Series 567, Tempus Repartum, Oxford, 101-113

Tayles, N and Dias G 1997 'Abscess cavity'—a misnomer. *International Journal of Osteoarchaeolog*y Volume **7**, Issue 5, pages 548–554

Trotter M, Gleser GC. 1958 A re-evaluation of estimation of stature based on measurements of stature taken during life and of long bones after death. *Am J Phys Anthropol*. **16**(1):79–123.

Waldron, T, 2009 *Palaeopathology*, Cambridge

Walker, P.L., Bathurst, R.R., Richman, R., Gjerdrum, T., Andrushko, V.A. 2009. The Causes of Porotic Hyperostosis and Cribra Orbitalia: a reappraisal of the Iron-Deficiency-Anaemia Hypothesis. *American Journal of Physical Anthropology* **139**: 109-125

Webb, P A. Owings and Suchey, J M 1985 Epiphyseal union of the anterior iliac crest and medial clavicle in a modern multiracial sample of American males and females. *American Journal of Physical Anthropology Volume **68**, Issue 4,* pages 457–466

Skeleton Catalogue - Lincoln College, Lincoln LICO11

Skeleton Number: 003
Sex: N/A
Age: Adult
Height: N/A
Preservation:
Completeness: Recorded as disarticulated, as parts appear unrelated
Condition: (McKinley 2004) grade 1
Pathologies: none
Dental: no dentition

Skeleton Number: 007
Sex: N/A
Age: Adult
Height: N/A
Preservation:
Completeness: Recorded as disarticulated
Condition: (McKinley 2004) grade 1
Pathologies: None
Dental: no dentition

Skeleton Number: 010
Sex: Indeterminate (but with male traits)
Age: 14-16 years -Adolescent
Height: N/A
Preservation:
Completeness: 60%
Condition: (McKinley 2004) grade 1
Pathologies: none
Dental: 2/1
Notes: Green stain lower left arm, suggests close proximity of copper alloy object.

Skeleton Number: 103
Sex: ??Male
Age: 16-18 years – Young Adult
Height: N/A
Preservation:
Completeness: 20%
Condition: (McKinley 2004) grade 1
Pathologies: none
Dental: no dentition

Skeleton Number: 109
Sex: Male
Age: 18-20 years – Young Adult
Height: 166 cm +- 3.27
Preservation:
Completeness: 90%
Condition: (McKinley 2004) grade 1
Pathologies: 2x lumbar vertebrae necrosis of body, Schmorl's nodes 3x lumber. Left and right distal femoral condyles osteochondritis dissecans.
Dental: 32/22. Calculus 2. DEH 6/32.

Skeleton Number: 112
Sex: ?Male
Age: 18-21 years – Young Adult
Height: 159 cm =-3.27
Preservation:
Completeness: 60%
Condition: (McKinley 2004) grade 1
Pathologies: Left rib periostitis, lung infection.
Dental: 28/22. Calculus 1. DEH 2. AMTL 2.

Skeleton Number: 133
Sex: Indeterminate
Age: Adult
Height: N/A
Preservation:
Completeness: Recorded as disarticulated
Condition: (McKinley 2004) grade 1
Pathologies: Right patella slight notch (non-metric trait)
Dental: N/A

Skeleton Number: 152
Sex: Indeterminate
Age: Adult
Height:
Preservation:
Completeness: 5% - 152 is the back fill of grave 153 which contained SK 216. These bones are the absent ones from SK 216 and so will be reported on as part of it.
Condition: (McKinley 2004) grade 1
Pathologies: N/A
Dental: N/A

Skeleton Number: 161
Sex: Male
Age: 60+ Older Adult
Height:
Preservation:

Completeness: 10%
Condition: (McKinley 2004) grade 1
Pathologies: none
Dental: N/A

Skeleton Number: 171
Sex: N/A
Age: 6 years Child
Height: N/A
Preservation:
Completeness: 70%
Condition: (McKinley 2004) grade 1
Pathologies: possible Rickets
Dental:

Skeleton Number: 174
Sex: N/A
Age: 4-5 years Child
Height: N/A
Preservation:
Completeness: 90%
Condition: (McKinley 2004) grade 1
Pathologies: Blunt trauma to occipital
Dental: 12/13 (dec) Calculus 2. Caries 1

Skeleton Number: 205
Sex: Indeterminate
Age: Adult
Height: N/A
Preservation:
Completeness: Recorded as disarticulated
Condition: (McKinley 2004) grade 1
Pathologies: none
Dental: N/A

Skeleton Number: 209
Sex: Male
Age: Adult
Height: N/A
Preservation:
Completeness: 20%
Condition: (McKinley 2004) grade 1
Pathologies: cribra orbitalia.
Dental: 17/21. Caries 2. Abscess 3. Calculus 17. Periodontal 7. Extensive calculus on left side and heavy wear on front teeth suggesting they were used for mastication.

Skeleton Number: 212
Sex: Indeterminate
Age: Adult
Height: N/A
Preservation:
Completeness: 40%
Condition: (McKinley 2004) grade 1
Pathologies: Circulatory disorder in ankle resulting in pseudo osteochondritis dissecans
Dental: N/A

Skeleton Number: 216 (& 152)
Sex: Indeterminate
Age: Adult
Height: N/A
Preservation:
Completeness: 24% (includes 152)
Condition: (McKinley 2004) grade 1
Pathologies: none
Dental: N/A

Skeleton Number: 353
Sex: male
Age: 35-45
Height: 171 cm (Left used)
Preservation:
Completeness: 49%
Condition: (McKinley 2004) grade 1
Pathologies: cribra femora
Dental: N/A

Skeleton Number: 369
Sex: ?male
Age: 45-49 years
Height: N/A
Preservation:
Completeness: 60%
Condition: (McKinley 2004) grade 1
Pathologies: none
Dental: 26/26. AMTL 1. Caries 1.

Skeleton Number: 383
Sex: Indeterminate
Age: Adult

Height: N/A
Preservation:
Completeness: 20%
Condition: (McKinley 2004) grade 1
Pathologies: none
Dental: N/A

Skeleton Number: 387
Sex: Male
Age: Adult
Height: N/A
Preservation:
Completeness: 40%
Condition: (McKinley 2004) grade 1
Pathologies: cribra orbitalia
Dental: 5/3. Calculus 3.

Skeleton Number: 391
Sex: Female
Age: 45+
Height: N/A
Preservation:
Completeness: 73%
Condition: (McKinley 2004) grade 1
Pathologies: osteoarthritis in cervical vertebrae
Dental: 3/10. AMTL 3.

Skeleton Number: 394
Sex: Female
Age: 21-23 years
Height: 156 cm (Humerus)
Preservation:
Completeness: 73%
Condition: (McKinley 2004) grade 1
Pathologies: none
Dental: 28/20

Skeleton Number: 397
Sex: Male
Age: 45+
Height: N/A
Preservation:
Completeness: 45%

Condition: (McKinley 2004) grade 1
Pathologies: Thoracic vertebrae osteophytosis
Dental: 4/8. Calculus 4. Periodontal 4.

Skeleton Number: 410
Sex: Indeterminate
Age: Adult
Height: N/A
Preservation:
Completeness: 10%
Condition: (McKinley 2004) grade 1
Pathologies: none
Dental: N/A

Skeleton Number: 415
Sex: Male
Age: 45+
Height: 169 cm +-3.27
Preservation:
Completeness: 70%
Condition: (McKinley 2004) grade 1
Pathologies: right 1st MT pseudo Osteochondritis dissecans
Dental: none

Skeleton Number: 417
Sex: Female
Age: 45+
Height: N/A
Preservation:
Completeness: 20%
Condition: (McKinley 2004) grade 1
Pathologies: Osteoarthritis cervical vertebrae. Maxillary sinusitis.
Dental: 3/14. AMTL 16. Calculus 4. Periodontal 15.

Skeleton Number: 421
Sex: Male
Age: 60+
Height: 178.74 cm +-3.27
Preservation:
Completeness: 60%
Condition: (McKinley 2004) grade 1
Pathologies: Osteoarthritis Thoracic Vertebrae. Schmorls' Nodes thoracic vertebrae. Ossified haematoma right fibula
Dental: 6/8. Calculus 5.

Skeleton Number: 424
Sex: ?Female
Age: 45+
Height: 163 cm +-4.45 (humerus)
Preservation:
Completeness: 90%
Condition: (McKinley 2004) grade 1
Pathologies: Osteoarthritis on spine.
Dental: 26/31. AMTL 1. Caries 2. Calculus 25. Periodontal 17.

Skeleton Number: 431
Sex: ?Female
Age: 45+
Height: 160.11 +- 4.45 (Humerus)
Preservation:
Completeness: 76%
Condition: (McKinley 2004) grade 1
Pathologies: none
Dental: 27/29. Calculus 5. Periodontal 4. Caries 3. AMTL 2.

Skeleton Number: 434
Sex: Male
Age: 40-50
Height: N/A
Preservation:
Completeness: 65%
Condition: (McKinley 2004) grade 1
Pathologies: Schmorl's nodes. Healed injury fibula.
Dental: 20/25. Calculus 11. ATML 2. Periodontal 2.

Skeleton Number: 437
Sex: ??Female
Age: 14-15 years
Height: N/A
Preservation:
Completeness: 85%
Condition: (McKinley 2004) grade 1
Pathologies: none
Dental: 13/13. Calculus 13.

Skeleton Number: 459
Sex: Male
Age: 45+
Height: 161 cm +-3.72

Preservation:

Completeness: 76%

Condition: (McKinley 2004) grade 1

Pathologies: DISH. Periostitis left and right tibia.

Dental: none

Skeleton Number: 494

Sex: ?Female

Age: Adult

Height: N/A

Preservation:

Completeness: 45%

Condition: (McKinley 2004) grade 1

Pathologies: Lumbar vertebrae osteoarthritis.

Dental: 0/1

Disarticulated human remains are listed in the body of the report, Table 13.