Osteological Assessment
Kirkham Priory
Kirkham
North Yorkshire

Site Code: 04-01-06
NGR: SE 7385 6575

Report No 0506
April 2006

Prepared for

MAP Archaeological Consultancy Ltd
Showfield Lane
Malton
North Yorkshire
YO17 6BT

Prepared by

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

Reviewed by Niki Gilding

TABLE OF CONTENTS

Plates

Appendices

Summary

York Osteoarchaeology Ltd was commissioned by MAP Archaeological Consultancy Ltd to carry out the osteological analysis of four assemblages of disarticulated human remains in March 2006. The skeletal remains were recovered during an archaeological watching brief in March 2006 at Kirkham Priory, Kirkham, North Yorkshire (NGR SE 7385 6575).

Kirkham Priory was an Augustinian monastery, founded in the early twelfth century. The skeletons were already disarticulated upon discovery, but the date of their original disturbance is not known.

Osteological analysis revealed that the skeletons represented a mixed group, including at least four children, aged between infancy and adolescence. There was a minimum of five adults, including four females and one male.

The adult skeletons showed evidence of degenerative joint disease, inflammation of the shins and load-bearing strain to the spines. The dental health of the population was generally good, with moderate dental plaque, and no cavities or dental abscesses.

Acknowledgements

York Osteoarchaeology Ltd would like to thank Anne Finney and Paula Ware of MAP Archaeological Consultancy Ltd for their help and support. We would like to thank English Heritage for funding this project.

1.0 INTRODUCTION

In March 2006 York Osteoarchaeology Ltd was commissioned by MAP Archaeological Consultancy Ltd to carry out the osteological analysis of four assemblages of disarticulated human bone. The skeletal remains had been recovered from Kirkham Priory, Kirkham, North Yorkshire (NGR SE 7385 6575) during the excavation of thirteen drainage trenches.

Kirkham Priory was an Augustinian monastery, founded in the early twelfth century. The skeletons were already disarticulated upon discovery. It is not certain when they were disturbed, but it is possible that this was either during the post-dissolution period during landscaping of the area, or during the relatively recent construction of a revetment wall. The period the skeletons date to is not known, but it is assumed that they are contemporary with the priory.

A number of animal bone fragments were found amongst the skeletal remains and are thought to have been residual.

1.1 AIMS AND OBJECTIVES

The aim of the skeletal analysis was to determine the age and sex of the skeletons, as well as to record and diagnose any skeletal manifestations of disease and trauma. It was aimed to calculate the minimum number of individuals buried at the site from the disarticulated remains.

1.2 METHODOLOGY

The disarticulated remains were analysed in detail, assessing the preservation and completeness, calculating the minimum number of individuals present as well as determining the age and sex of the individuals (Appendix A). 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 gender dimorphism in occupation, lifestyle and diet, as well as the role of different age groups in society.

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. Preservation of human skeletal remains is assessed subjectively, depending upon the severity of bone surface erosion and post-mortem breaks, but disregarding completeness.

Preservation was assessed using a grading system of five categories: very poor, poor, moderate, good and excellent. Excellent preservation implied no bone surface erosion and very few or no breaks, whereas very poor preservation indicated complete or almost complete loss of the bone surface due to erosion and severe fragmentation.

The condition of the skeletons was variable. The majority of skeletal remains were well-preserved. They had suffered from few post-mortem breaks and little surface erosion. However, a small number of bones were in a poor condition; the bones had suffered from considerable erosion and fragmentation. These bones appeared as if they had been weathered through exposure. The assemblage consisted mostly of long bone and pelvis fragments, as well as occasional vertebrae (Appendix A).

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.

It was found that at least ten individuals were represented. A MNI of five adults, including four adult females (one mature adult, one young adult, a young middle adult and an old middle adult) and one male (young middle adult), as well as two juveniles, two adolescents and one infant were present at the site.

The most commonly represented bone was the pelvis, which aided in sex and age determination (discussed below).

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 as over the age of seventeen).

It was not possible to establish age in the majority of disarticulated bone fragments. However, most of the bones belonged to adults. Using the surviving pelvis fragments, it was possible to suggest that one female was represented for every adult age category (one young adult, a young middle adult, an old middle adult and a mature adult). There may have been another old middle adult female. At least one middle aged male was present, but it is possible that in fact there was a young middle adult and an old middle adult male.

The children included one adolescent, who was represented by almost the entire upper half of the skeleton except the skull. Another adolescent was represented by fewer bone fragments. One young juvenile, aged about two years was recovered, as well as an older child. At least one newborn or infant was also found.

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.

Almost no skull fragments survived, which meant that sex determination was based on the pelvis in all cases. In all the pelvises recovered, sexing characteristics were either clearly male or female. This suggested that at least one male and four females were represented in the assemblage.

It was not possible to determine sex in the immature individuals.

2.5 METRIC ANALYSIS AND NON-METRIC TRAITS

Stature depends on two main factors, heredity and environment. However, stature 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. The bone is measured on an osteometric board, and stature is then calculated using a regression formula developed upon individuals of known stature.

In this instance, no complete long bones survived, making stature measurements impossible.

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).

Non-metric traits were not observed.

2.6 CONCLUSION

Osteological analysis of the skeletal remains established that this was a mixed cemetery, containing children and adults. Unlike most monastic cemeteries where males tend to dominate skeletal assemblages, there was a predominance of children and females in this group. One of the males, whose bones could not be measured, was of unusually robust build.

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.

3.1 CONGENITAL ANOMALIES

Heredity and environment can predispose an individual to congenital anomalies. Congenital malformations are commonly observed in archaeological populations. Most congenital conditions observed in skeletons are simple anomalies, which do not affect the person exhibiting the defect. *Spondylolysis* refers to a condition which is characterised by the separation of a vertebra into two parts, the vertebral body and the spinous process (Merbs 1996). This occurs mostly in the lumbar vertebrae and is the result of genetic predisposition and repetitive stress or fatigue fracturing, often caused by mechanical loading of the spine. It may also be congenital in origin, but in this case it tends to affect the cervical vertebrae. The condition may cause pain (Albanese and Pizzutillo 1982, 499). A fifth lumbar vertebra from Context (4003) had *spondylolysis* (Plate 1). The spinous process was separated entirely from the vertebral body. The occurrence of the condition in the lower part of the spine suggests that in this instance, it was activity-related.

Plate 1 *Spondylolysis* of 5th lumbar vertebra from Context (4003)

3.2 INFECTION

Evidence for infection was observed in a tibia and femur from Context (5003). The infection was characterised by superficial inflammatory lesions on all the bone surfaces. Tibiae are the most likely bones to show evidence for inflammation because they are more vulnerable to knocks than other parts of the body. The type of skeletal lesion (lamellar bone) on the skeletons' shin bones suggested that the inflammation was receding.

Inflammatory lesions on human bones can be indicative of infectious diseases, such as leprosy and syphilis, and of non-specific localised infection, such as varicose veins, leg ulcers or trauma to the shins. However, the lesions only form in the bone if the inflammation is chronic and long-standing (Roberts and Manchester 1995, 125). Evidence for infection was common before the introduction of antibiotics and is therefore frequently observed in populations derived from archaeological contexts.

3.3 DEGENERATIVE 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.

3.3.1 DJD

The most common type of joint disease observed tends to be degenerative joint disease (DJD). DJD is characterised by both bone formation (osteophytes) and bone resorption (porosity) at and around the articular surfaces of the joints, which can cause great discomfort and disability (Rogers 2001).

Four individuals showed evidence for DJD (Table 1). Degeneration was observed in the three lower thoracic vertebrae from Context (4003) and was mild. The intervertebral discs are the 'shock absorbers' of the spine, but these can degenerate as a result of gradual desiccation, which then causes transmission of the stress from the vertebral discs to the articular facets and ligaments (Hirsh 1983, 123). Spinal osteophytes (outgrowths of bone) form in response to the constant stress that is placed on the spine as a result of human posture (Roberts and Manchester 1995, 106) to compensate. Increasing stress or activity can therefore lead to increased size and prevalence of osteophytes (*ibid*).

3.3.2 Schmorl's Nodes

A different condition which affects the spine is Schmorl's nodes. Schmorl's nodes are indentations in the upper and lower surfaces of the vertebral bodies, most commonly in the lower thoracic vertebrae (Hilton *et al* 1976). Schmorl's nodes can result from damage to the intervertebral discs, which then impinge onto the vertebral body surface (Rogers 2001), and may cause necrosis (death) of the surrounding tissue. Rupture of the discs only occurs if sufficient axial compressive forces are causing pressure on the central part of the discs; frequent lifting or carrying of heavy loads can cause this.

Schmorl's nodes were observed in the two lower thoracic vertebrae from Context (5003), which might be attributed to physical stress.

3.4 TRAUMA

Occasionally, it is possible to infer trauma to the soft tissue on the bones, in the form of ligamentous or muscular trauma. This is expressed through the formation of bony processes (*enthesopathies*) at the site of ligament attachments. Additionally, it is possible to observe bone defects at the site of muscle insertions, which are the result of constant micro-trauma and are usually activity-related (Hawkey and Merbs 1995, 334).

Context (4003) and Context (8003) contained right femora with a large *enthesopathies* at the attachment sites for *gluteus maximus* (extends trunk and hip, laterally rotates hip).

3.5 CONCLUSION

The skeletal evidence suggests that some of the adults suffered from degenerative disease, which was seen in the spine and is thought to have been activity-related. The inflammatory lesions might have been caused by activity-related bumps and falls.

The children did not display any evidence for disease, which is not uncommon. Children usually die so quickly that skeletal lesions cannot develop.

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. Many of the jaws were incomplete as a result of post-depositional factors.

Two incomplete mandibles and one partial maxilla were recovered. One of the mandibles (4003) belonged to a two year old child and contained one right deciduous first molar that was fully formed, but no other teeth. This tooth showed little dental wear and no pathology.

The second mandible (4003) was more complete and belonged to a young middle adult, possibly a male. Ten permanent teeth were recovered, including all the teeth from the right side and the two left incisors. The mandibular teeth were crowded, suggesting that there was not enough room for the teeth in the jaw bone.

The maxilla (7003) belonged to a mature adult. It was almost complete, with the exception of the part of the jaw bone that holds the right second and third molars. The left second and third molars had been lost post-mortem.

Dental wear tends to be more common and severe in archaeological populations than in modern teeth. Severity of the dental wear was assessed using a chart developed by Smith (1984). Each tooth was scored using a grading system ranging from 1 (no wear) to 8 (severe attrition of the whole tooth crown). Dental wear was moderate in the mandible (4003) and severe in the maxilla (7003) (Plate 2).

Plate 2 Dental wear in maxilla from Context (7003)

Calculus (dental plaque) is commonly observed in archaeological populations whose dental hygiene was not a rigorous as it is today. Calculus mineralises and forms concretions on the tooth crowns, along the line of the gums. Heavy calculus deposits were observed around the anterior teeth of the mandible (4003), but not on the maxillary teeth (7003).

Plate 3 *Dental enamel hypoplasia* lines on teeth from Context (7003)

Dental enamel hypoplasia (DEH) was observed in the incisors and canines in a maxilla from Context (7003) (Plate 3). DEH is the manifestation of lines, grooves or pits on the crown surface of the teeth, which represent the cessation of crown formation. The defects are caused by periods of severe stress during the first to seventh year of childhood, including malnutrition or disease. The number of lines in this individual, each indicative a period of stress, was unusual. Seven lines could be counted, suggesting that this individual must have suffered a period of stress during every year of tooth formation.

5.0 DISCUSSION AND SUMMARY

Osteological analysis of the skeletal assemblage from Kirkham Priory has provided a glimpse into the lives of the people buried there. The small group of skeletons included four females of different ages and a middle-aged man. The population also included a minimum number of five children, comprising of two juveniles, one infant and two adolescents.

Evidence for pathology was limited in this population. Few lesions indicative of degenerative joint disease, spinal strain and inflammatory lesions were noted on the bones. The teeth showed evidence for varied dental hygiene. Notably, one mature adult had suffered from seven episodes of stress during the first seven years of life. It is remarkable that this person survived to such a good age.

Even though this is a monastic site, children were present at this cemetery. These deaths may be due to common childhood diseases, such as diarrhea or measles. The presence of *dental enamel hypoplasia* lesions in two of the adult skeletons suggests that the population was subject to episodes of malnutrition or disease between six months of age and seven years.

The excavation of this small sample of the Kirkham Priory cemetery provides an insight into medieval health in this community. The skeletal evidence suggests that young children suffered from episodes of stress, perhaps related to a childhood illnesses, weaning problems or to malnutrition, causing some children to die. Limited evidence of activity-related strain to the skeletons was observed, inflammations and degenerative joint disease were also not very common.

References

Albanese, M. and Pizzutillo, P.D. 1982. 'Family study of *spondylolysis* and *spondylolithesis*', *Journal of Pediatric Orthopedics* 2: 496-499

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

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

Hilton, R.C., Ball, J. and Benn R.T. 1976. 'Vertebral end-plate lesions (Schmorl's nodes) in the dorsolumbar spine', *Ann Rheum. Dis.* 35: 127-132

Hirsh, L. 1983. 'Cervical degenerative arthritis - possible cause of neck and arm pain', *Postgraduate Medicine* 74 (1): 1230130

Kennedy, K.A.R. 1989. 'Skeletal markers of occupational stress', in M.Y. Işcan. and K.A.R. Kennedy (eds), *Reconstruction of Life from the Skeleton* (New York):129-160

Mays, S. and Cox, M. 2000. 'Sex determination in skeletal remains', in M. Cox and S. Mays (eds), *Human Osteology in Archaeology and Forensic Science* (London): 117-130

Merbs, C.F. 1996. '*Spondylolysis* and *spondylolithesis*: a cost of being erect biped or a clever adaptation', *Yearbook of Physical Anthropology* 39: 201-228

Roberts, C.A. and Manchester, K. 1995. *The Archaeology of Disease* (Stroud)

Rogers, J. 2001. 'The palaeopathology of joint disease', in M. Cox and S. Mays (eds), *Human Osteology in Archaeology and Forensic Science* (London): 163-182

Saunders, S.R. 1989. 'Non-metric variation', in M.Y. Işcan and K.A.R. Kennedy (eds) *Reconstruction of Life from the Skeleton* (New York): 95-108

Scheuer, L. and Black, S. 2000a. 'Development and ageing of the juvenile skeleton', in M. Cox and S. Mays (eds), *Human Osteology in Archaeology and Forensic Science* (London): 9-22

Scheuer, L. and Black, S. 2000b. *Developmental Juvenile Osteology* (San Diego)

Smith, B.H. 1984. 'Patterns of molar wear in hunter-gatherers and agriculturalists', *American Journal of Physical Anthropology* 63: 39-56

Trinkhaus, E. 1978. 'Bilateral asymmetry of human skeletal non-metric traits', *American Journal of Physical Anthropology* 49: 315-318

APPENDIX A: OSTEOLOGICAL AND PALAEOPATHOLOGICAL CATALOGUE

DISARTICULATED HUMAN BONES

Context	Context Type	Bones	Percentage of Bone Present	Side	Age	Sex	Other
4003		Femur	100	Right	Adult	F?	All, bone excavation for gluteus maximus
		Femur	25	Right	Adult	F?	Proximal 1/4
		Femur	20	Left	Adult	F?	Proximal ¼. Paired with above
		Femur	40	Left	Adult	-	Proximal 1/3
		Femur	90	Left	Adult	-	All but head
		Femur	35	Left	Adult	-	Proximal shaft
		Femur	3	-	Adult	-	Head
		Tibia	90	Left	Adult	-	All but proximal epiphysis
		Tibia	70	Right	Adult	-	Shaft, paired with above
		Tibia	20	Right	Adult	Male	Proximal ¼, huge
		Tibia	1	-	Adult	-	Part of condyle
		Humerus	5	Left	Adult	-	Head, bone excavation on lesser tubercle
		Humerus	20	-	Adult	-	Shaft fragment
		Ulna	100	Left	Adult	F?	All, 2 fragments
		Radius	30	Left	Adult	-	Distal 1/3
		Fibula	40	Left	Adult	-	Distal 1/3
		Sacrum	100	-	Adult	-	All, 6 vertebrae, fusing between S1 and S2
		Pelvis	1	-	-	-	6 tiny ilium fragments
		Pelvis	10	-	-	-	Ilium fragment
		Pelvis	20	Right	YMA	F	Ilium fragment
		Pelvis	20	Left	OMA?	F?	Ilium
		Pelvis	25	Left	OMA?	F	Ilium
		Pelvis	20	Left	YA	F?	Pubic symphysis
		Pelvis	10	Left	-	-	Ischium
		Pelvis	15	Right	-	-	Ischium
		Pelvis	4	Left	Juvenile?	-	Pubic symphysis
		Vertebrae	-	-	Adult	-	L2-L5; L5 has *spondylolysis*,
		Vertebrae	-	-	Adult	-	T9-T12, slight DJD
		Talus	100	Right	Adult	-	All
		Ribs	-	-	Adult	-	15 shaft fragments
		Rib	50	Left	Juvenile	-	Sternal end
		Ribs	10-35	Left	Adult	-	3 heads and shafts
		Ribs	30	Right	Adult	-	2 heads and shafts
		Clavicle	30	-	Adult?	-	Central shaft
		Skull	20	Right	Adult?	-	Right parietal
		Skull	1	-	-	-	5 tiny cranial fragments
		Mandible	20	Right	2 years	-	2nd deciduous molar
		Mandible	60	Right	YMA	M?	All incisors, right canine, premolars and molars. Moderate wear, heavy calculus on incisors, crowding
		Hand	100	-	Adult	-	5 proximal phalanges
		Hand	100	-	Adult	-	2 intermediate phalanges
		Foot	100	-	Adult	-	3rd metatarsal
		Foot	100	-	Adult	-	1st proximal phalanx

Context	Context Type	Bones	Percentage of Bone Present	Side	Age	Sex	Other
		Hand	100	Right + left	Adult	-	4th metacarpals
		Hand	70	-	Adult	-	3 metacarpals
		Hand	100	Left	Adult	-	2nd metacarpal
		Hand	80	-	Juvenile	-	metacarpal
5003		Skull	10	-	Adult	-	Parietal fragment
		Pelvis	90	Left	YA	F	All but pubic symphysis
		Pelvis	75	Left	OMA	M	Ilium
		Pelvis	20	Right	OMA	-	Ilium
		Ulna	30	Right	Adult	M?	Proximal 1/3
		Radius	80	Left	Adult	F?	Shaft
		Humerus	70	Right	Adult	Male?	Distal 2/3
		Femur	40	Left	Young juvenile	-	Proximal ½
		Femur	90	Right	Infant	-	Almost all
		Femur	10	-	Adult	-	Central shaft with lamellar bone on anterior surface
		Tibia	50	Right	Adult	-	Proximal ½, with lamellar bone on all surfaces and slight *soleus* bone excavation
		Tibia	30	Left	Adult	-	Central shaft fragment
		Ribs	30	-	MA	-	Sternal shaft fragment
		Vertebra	70	-	Adult	-	Two lower thoracic bodies with beginning Schmorl's nodes
7003		Pelvis	85	Left	Adolescent	-	Ilium
		Radius	90	Left	Adolescent	-	All
		Radius	90	Right	Adolescent	-	All
		Ulna	75	Right	Adolescent	-	Shaft
		Ulna	70	Left	Adolescent	-	shaft
		Clavicle	90	Right	Adolescent	-	Shaft
		Clavicle	90	Left	Adolescent	-	Shaft
		Humerus	80	Right	Adolescent	-	Shaft
		Humerus	40	Left	Adolescent	-	Distal shaft
		Scapula	90	Right	Adolescent	-	Almost all
		Scapula	30	Left	Adolescent	-	Spine
		Vertebrae	100	-	Adolescent	-	T6-S2
		Ribs	100	-	Adolescent	-	Whole rib cage
		Femur	35	Left	Adult	-	Proximal shaft
		Humerus	20	right	Adult	M?	Head
		Humerus	20	-	-	-	2 shaft fragments
		Clavicle	90	Right	Adult	-	Shaft
		Skull	15	-	-	-	2 parietal fragments
		Skull	8	-	MA	-	Maxilla and nasal, including all teeth except 2nd and 3rd molars. They are lost on the left PM, on right bone NP. Crowding, severe wear on both M1, severe DEH
8003		Sacrum	40	-	Adult	-	Inferior half
		Scapula	20	Right	Adult	-	Spine
		Pelvis	40	Right	MA	F	Ilium

Context	Context Type	Bones	Percentage of Bone Present	Side	Age	Sex	Other
		Pelvis	20	Left	MA	F	Ilium, paired with above
		Pelvis	15	Left	YMA	F	Pubic symphysis
		Femur	100	Left	Juvenile	-	All, 2 fragments
		Femur	30	Right	Adult	-	Proximal shaft, bone excavation for *gluteus maximus*
		Demur	50	-	Adult	-	Distal ½
		Femur	1	-	-	-	5 shaft fragments
		Fibula	85	Left	Adult	-	Distal ¾
		Fibula	-	-	-	-	Shaft fragment
		Tibia	30	Right	Adult	-	Distal 1/3
		Tibia	30	-	Adolescent	-	Distal 1/3
		Tibia	25	Right	Adolescent	-	Proximal shaft
		Tibia	10	-	Adult	-	Shaft fragment
		Tibia	5	-	-	-	Shaft fragment
		Clavicle	30	Left	Adult	-	Lateral 1/3
		Clavicle	90	Right	Adolescent	-	Medial ¾
		Clavicle	90	Left	Adolescent	-	Medial ¾, paired with above
		Humerus	75	Right	Young juvenile	-	Central shaft
		Humerus	30	Left	Young juvenile	-	Distal shaft
		Ulna	25	Right?	Adolescent?	-	Distal shaft
		Vertebra	100	-	Adult	-	L1
		Vertebra	100	-	Adult	-	T11
		Vertebra	10	-	-	-	Spinous process
		Vertebra	30	-	-	-	Part of body
		Calcaneus	100	Left	Adult	-	All
		Skull	3	-	-	-	2 parietal fragments
		Foot	100	Right	Adult	-	1st metatarsal
		Hand	100	Right	Adult	-	2nd metacarpal
		Hand	100	Right	Adult	-	4th metacarpal
		Ribs	10-30	-	Adult	-	11 rib shaft fragments
		Ribs	10	Left	Adult	-	Head and neck of rib
		Fibula	30	-	Infant	-	Distal shaft