The human bones from Bainesse Farm, Catterick

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The human bones from this site comprised a number of discrete skeletons in various states of preservation and some additional disarticulated material. The bones were generally in a poor condition and had suffered a great deal of damage after burial; there were many post-mortem breaks and some of the bone surfaces had become severely eroded. The site showed signs of having been disturbed and there was a considerable amount of intrusive animal bone (see Table 1) and one burial (686) contained some intrusive human bones.

There were 23 skeletons which were sufficiently complete to be regarded as separate individuals; the disarticulated bones came from 34 contexts and these, with the intrusive bones in 686, represent a minimum of 40 individuals. Therefore, there are at the site not less than 63 individuals in total. The remains are catalogued in Appendix 1.

Copper staining

Bones from three of the skeletons (and one bone from amongst the

disarticulated material) were copper stained (Table 2). In the three burials the pattern of staining suggested that the skeletons had been buried wearing necklaces; in one case, it seems likely that the body had been buried wearing one or more bracelets and perhaps a ring on the little finger. How the disarticulated head of a femur from amongst the disarticulated bone came to be stained with copper is less easy to explain; it is unlikely to have been caused by anything which was on the body when it was buried and so was presumably due to copper leaching from an object which, by chance, was close to it.

Demography

Age and sex

The age and sex of the skeletons were determined using standard anthropological techniques (see, for example, Stewart, 1970). Nine of the skeletons were considered to be male and seven female; the remaining seven were too immature to be sexed. The age distribution of the burials is shown in Table 3. The proportion of infants and juveniles is relatively high, but in general the small numbers preclude any firm inferences to be drawn as to the significance of this.

Wherever possible, the height of the adults was derived from the formulae published by Trotter in 1970; the results are shown in Table 4. As expected the males are generally taller than the

females but, once more, the numbers are too small to draw any valid conclusions from these results.

Of the disarticulated material it was possible securely to ascribe sex only to two bones, one male and one female. Approximately a fifth of the individuals represented were under 15 years of age and four were between 15 and 20 to judge from the epiphyseal fusion. The sex and age distributions of the disarticulated bone are shown in Table 5.

Platymeria and platycnemia

There were 9 skeletons only on which the femoral shaft and 5 only on which the tibial shaft indices could be determined. Eight of the nine femoral indices were in the platymeric range (that is, less than 85); all the tibial shaft indices were in the mesocnemic range (greater than 63).

Non-metric traits

The bones were generally too fragmentary to allow for a complete assessment of the prevalence of non-metric traits. Nevertheless, two traits appeared commonly. Metopism was present in 3 of the 9 skulls which were complete enough for study and almost three quarters of the extant taluses (8/13) has a double anterior inferior articular surface. The significance of these findings is difficult to assess, however, in view of the small numbers.

Dental health

There were seventeen skeletons from which complete adult dentition would have been expected but in only 14 had any teeth survived. Few of the skeletons had anything like the complete set of teeth and of the 544 teeth expected, only 229 were present. There were a further 37 empty sockets from which teeth had been lost post-mortem so that approximately half (48.9%) of the teeth and sockets were remaining. Only one individual had dental caries although seven had lost teeth during life, most likely as the result of dental disease. The total number of teeth diseased or missing was 31 giving a DM (diseased/missing) index of 11.7.

The dental disease in the one skeleton with caries (282) had developed in relation to two dental anomalies. An accessory, rudimentary tooth was present between his right upper second and third molars and between his left lower first and second molars. The pressure exerted by these accessory teeth appeared to have eroded the adjacent surfaces of the normal teeth and this had, in turn led to the development of caries. He had also lost his right upper 6 during life, probably also as the result of caries.

One skeleton (948) had a dental abscess in the root of his left lower first incisor; he had also lost five teeth ante-mortem so that, although there was no caries in the remaining teeth, his mouth had obviously been severely diseased.

Pathology

In addition to the signs of dental disease, nine skeletons showed some other pathological changes; there was none in the disarticulated bones. These changes are categorised in Table 6 and summarised in Appendix 2. In five cases, the skeletons were sufficiently complete to be sure that no pathology was present but in the remaining nine, the preservation was too poor to allow a proper assessment. Of the five skeletons which were free of pathological change, two were juveniles.

Spinal pathology

Amongst the spinal changes present were Schmorl's nodes, osteophytosis and osteoarthritis; in addition one skeleton had spondylolysis.

Schmorl's nodes: Three skeletons (282, 940 and 1427) had Schmorl's nodes in the thoracic or lumbar vertebrae.

Osteophytosis: Each of the three skeletons with Schmorl's nodes also had vertebral osteophytosis. In 282 it was extensive, affecting the cervical, thoracic and lumbar vertebrae. Only a single lumbar vertebra was affected in 1427 whereas both lumbar and thoracic regions were affected in 940. Three other skeletons (530, 686 and 2174) had osteophytosis, in the first and last cases, only one lumbar vertebra showing a change. In 2174, fragments of three thoracic vertebra only survived but all had rather

extensive osteophytes around their margins. (I refer to this skeleton in more detail below.)

Osteoarthritis: There was one instance only of osteoarthritis in the spine; this was in 282. The diagnosis requires evidence not only of proliferation but also of eburnation of the joint surfaces. In this skeleton, these changes were present in the facet joint between the second and third cervical vertebrae on the left hand side. There were no signs of osteoarthritis elsewhere in the skeleton, however.

Spondylolysis: One female skeleton (686) had spondylolisthesis of the pars interarticularis type.

Extra-spinal hyperostosis

In five cases (282, 710, 940, 948 and 2530), the pathological changes were of extra-spinal hyperostosis. The changes ranged from, at one extreme, calcification arising solely from the superior margin of the laminae of several thoracic vertebrae into the ligamentum flavum to, at the other extreme, extensive hyperostosis around both glenoids, both acetabula, along the left linea aspera and iliac crest, the proximal end of the right fibula and the insertion of the subscapularis into the right humerus (282). In none of these cases was there any evidence of spinal hyperostosis so that none could be said to have disseminated idiopathic skeletal hyperostosis (DISH) and the cause of

the extra-spinal changes cannot be determined.

Extra-spinal osteoarthritis

The only instance of extraspinal osteoarthritis occurred in the left wrist of 941 . There was marked eburnation on some of the articular surfaces of the trapezoid and capitate and on the proximal joint surfaces of the second and fourth metacarpals. None of the other extant carpal bones was affected and there were no arthritic changes elsewhere in the skeleton. There was no obvious cause for these changes; none of the bones had been fractured and there was no evidence of infection.

Trauma

Two skeletons (282 and 2174) had fractures. There was a fracture in the distal third of the right fibula of skeleton 282 which had healed in good allignment, and a fracture of the right tibia and fibula of 2174 which has also healed well. In addition, one of the three vertebrae which survived from 2174 was considerably flattened and radiography suggested that it had suffered a crush fracture.

A case of proliferative arthropathy

Skeleton 2174, a female of 35 - 45 years of age, showed signs of a proliferative arthropathy which appeared asymetrical and affected the hands and the feet. The bones were extremely porous and

there was a fracture through the right tibia and fibula which has already been noted. The assessment of the changes was complicated by the fact that many of the bones of the hands were missing and those which had survived had suffered severe post-mortem damage principally affecting their distal and proximal ends, producing, in effect, pseudo-erosion. On the left side, however, the remnants of the trapezoid bone were fused to the second metacarpal and the left scaphoid showed some eburnation on its trapezoid surface; the tarsal joints appeared normal. The skeleton was very badly damaged and far from complete so that a full survey of the large joints was impossible. The distal end of the left radius had suffered post-mortem damage to produce pseudo-erosive changes; the right elbow joint was normal, however, and there was no pathology of either femoral head. The knee joints had not been preserved nor had the sacroiliac or temporomandibular joints. Only three vertebral fragments had been preserved and on each of these (including the one which had been crushed) there was rather extensive osteophytosis.

Comment

This group of skeletal material suffers from the limitations of size which affect the remains from so many sites; the numbers involved are simply too small to allow for any useful epidemiological or statistical analysis. The relatively high number of juveniles present - about 20% - is interesting but would be significant only in a much larger group.

The most interesting skeleton from the palaeopathological point of view is that of 2174, a youngish female who showed signs of multiple pathology and some well-marked pseudo-pathology. Her remains exemplify the difficulties which palaeopathologists face all too often in the course of their work. As can be seen in figure 1, the skeleton had survived very badly and the bones which remained extremely porous and, on this account, had been damaged post-mortem. A few of the small bones of the hands and feet showed evidence of a proliferative arthropathy with fusion and eburnation in the left wrist. It was impossible to say how extensive the proliferative changes were, however, because so many of the bones of the hands and feet were missing. Many of the key elements which one would have liked to help with a differential diagnosis - the sacro-iliac joints and most of the vertebra - were also lacking. In addition, the phalanges of the hands had been badly eroded during burial as had the metatarsal heads producing an appearance rather like the erosive changes which might be produced by rheumatoid arthritis, for example. There were no changes on x-ray, however, which were at all consistent with an erosive arthropathy.

With a skeleton in this condition, it is almost impossible to make a definitive diagnosis, and indeed, the fashion for diagnosis is losing support amongst some palaeopathologists. It is notable, however, that this lady had fractured her right leg and sustained a crush fracture of at least one vertebra and one might speculate how much of the arthropathy was secondary to trauma.

The osteophytosis in the vertebrae could well have resulted from such a cause and so might the changes in the left wrist.

References

T.D. Stewart (1979), Essentials of forensic anthropology, C.C. Thomas, Springfield.

M. Trotter (1970), Estimation of stature from intact long limb bones, In: Personal identification in mass disasters (Ed T.D. Stewart), Smithsonian Institution, Washington, pp 71 - 83.

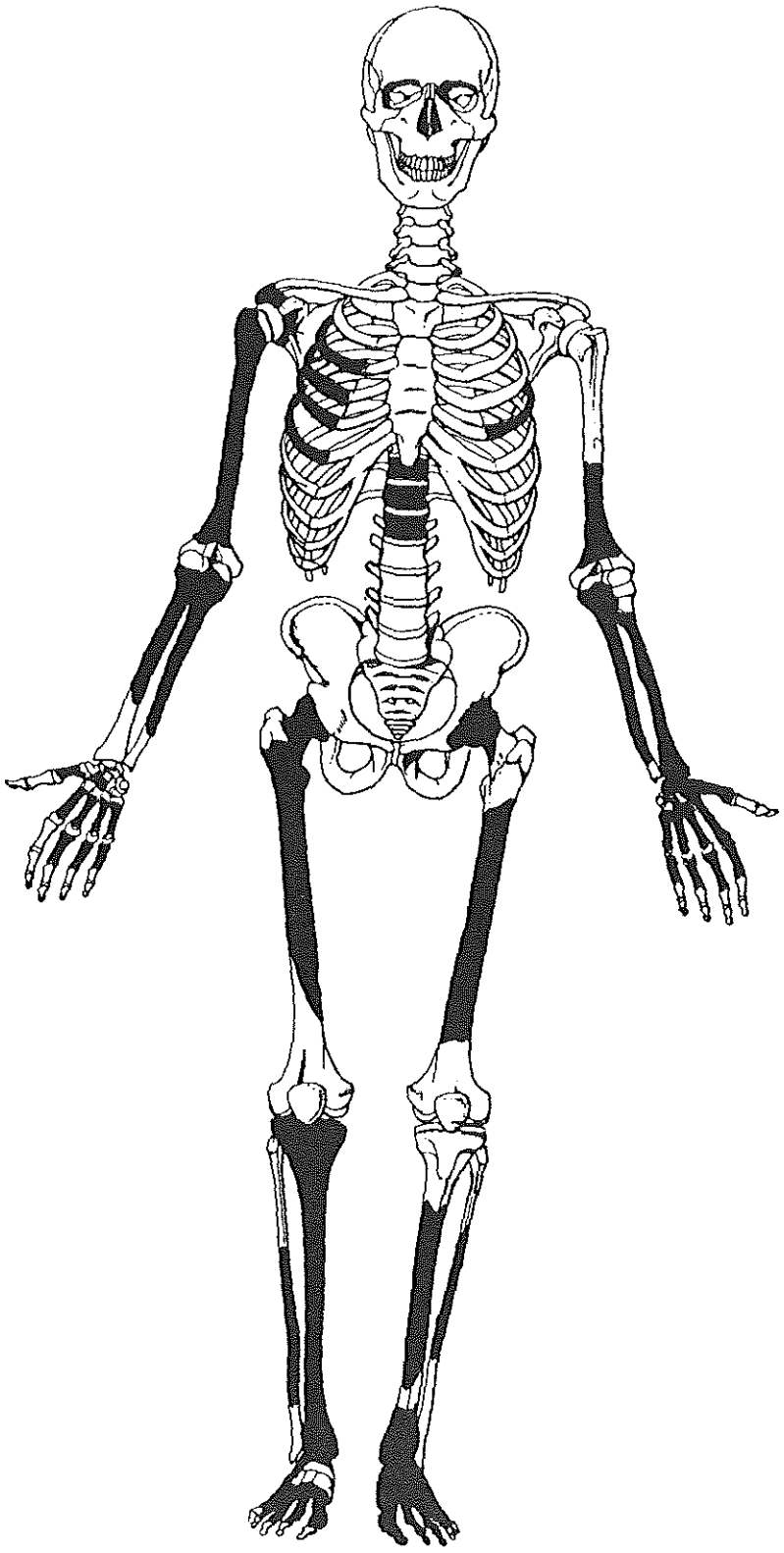

FIGURE Skeletal remains of inhumation 2174

Table 1

List of intrusive animal bone

Context	Animal bones present
686	horse tooth; cattle calcaneum
710	pig maxilla with P3,P4 & M1; two radii, unfused proximal phalanx & femoral head epiphysis of sheep
952	fragment of sheep metatarsal
1427	four cattle sized rib fragments (with cut marks); sheep sized rib fragment; proximal phalanx of sheep
2581	cattle distal phalanx
2661	metacarpal, distal phalanx, two rib fragments and fragment of mandible, all of cattle
35	cattle caudal vertebra
901	sheep radius; fragment of cattle mandible and three cattle sized rib fragments
3038	proximal phalanx of cattle; pig mandible with P2; two unidentified fragments

Table 2

List of bones with copper staining

282	left first rib	Male
686	both clavicles	Female
1427	both clavicles	Male
	sternum	
	cervical vertebrae	
	right first rib	
	right humerus	
	right distal ulna	
	right fifth metacarpal	
767	head of femur	Female

Table 3

Age and Sex Distribution of Human Burials

Age (years)	M	F	UK
Infant (<5)			1
Juvenile (5-14)			5
15 -			1
20 -	2		
25 -	1	1	
30 -			
35 -	2	2	
40 -	1		
45 +	3	2	
Adult		2	
TOTAL	9	7	7

Table 4

Distribution of heights (m) by sex

Height	M	F	UK
1.50 -		1	
1.55 -		2	
1.60 -	1	3	
1.65 -	3		
1.70 -	2		
1.75 -	1		
UK	2	1	7
TOTAL	9	7	7

Table 5

Age and sex distributions of disarticulated material

Age (years)	M	F	UK
Infant (<5)			2
Juvenile (5 - 14)			6
15 -			4
20 - 25			
40 - 45			2
Adult	1	1	24
TOTAL	1	1	38

Table 6

Number of skeletons with different aetiological categories of pathological change[1]

Congential	Infective	Trauma	Malignant
0	0	2	0

Circulatory	Metabolic[2]	Degenerative[3]
0	1	8

Dental diseases	No pathology	Pathology unknown[4]
3	9	5

[1]The numbers in the table are greater than the total number of skeletons since some skeletons had more than one category of pathological change

[2]Includes putative changes due to anaemia

[3]Includes all forms of arthropathy

[4]Skeleton too incomplete for a comprehensive assessment

Appendix 1

Catalogue of skeletal remains with sex, age and height. The comments in parenthesis refer to the methods used for the demographic assessment.

282. Robust skeleton with much post mortem damage; about two thirds present. First left rib is copper stained.

Male (pelvis); 35-45 (dental wear, cranial sutures).

Height 1.63 ± 0.0327 m (left femur).

686. Poorly preserved skeleton with much surface erosion; about two thirds present. Both clavicles stained green. Intrusive animal bone.

Female (pelvis); 45+ (dental wear).

Height 1.60 ± 0.0405 m (left humerus).

709. Very poorly preserved skeleton; less than 1/4 present.

Probably male (glenoid fossa diameter); 25-30 (dental wear).

710. Gracile skeleton with much post mortem damage and surface erosion; about 2/3. Intrusive animal bone.

Female (pelvis); 35-39 (pubic symphysis).

Height 1.61 ± 0.0445 m (left humerus).

940. Axial skeleton, right limb bones and left first metatarsal only preserved.

Female (femoral head diameter; glenoid fossa diameter and clavicular length); adult (epiphyseal fusion).

Height 1.57 ± 0.0445 m (right humerus).

941. Robust, heavy skeleton but with much post mortem damage; about 2/3.

Male (femoral head diameter); 40-45 (dental wear).

Height 1.67 ± 0.0327 m (both femora).

948. Well preserved robust skeleton; 3/4.

Male (pelvis); 45-50 (pubic symphysis).

Height 1.78 ± 0.0405 m (right humerus).

952. Poorly preserved skeleton with much surface erosion and post mortem damage. Pelvis and left limb bones missing. Intrusive animal bone.

Male (skull; femoral head diameter; glenoid fossa diameter); 20-25 (dental wear; cranial sutures).

Height 1.70 ± 0.0432 m (right radius).

1033. Light, gracile bones but with poor preservation; ca 2/5.

Female (skull; femoral head diameter); 45+ (dental wear; cranial sutures).

Height 1.55 ± 0.0372 m (left femur).

1359. Juvenile skeleton entirely lacking pelvis and lower limbs; axial skeleton represented by a few fragments only.

1602. Well preserved juvenile skeleton with some surface erosion on occipital bone and both petrous temporals; ca 3/4.

1427. Fragmentary skeleton with post mortem damage and some surface erosion; ca 1/2. Copper staining on mandible, both clavicles, sternum, cervical vertebrae, right first rib, right humerus, right ulna and right 5th metacarpal. Intrusive animal bone.

Male (skull; femoral head diameter); 20-23 (epiphyseal fusion).

Height 1.74 ± 0.0405 m (right humerus).

1732. Very fragmentary skeleton; ca 1/5.

Sex undertermined; 15-18 (femoral head epiphysis; dental wear).

1742. Well preserved virtually intact juvenile.

12-15 (dental development; long bone length; absence of epiphyseal union).

1864. Juvenile skeleton with much post mortem damage and surface erosion. Axial skeleton and most of pelvis absent.

6-8 (dental development).

2119. Poorly preserved juvenile skeleton; skull more or less intact (although in fragments); few limb and rib fragments.

4-6 (dental development).

2159. Poorly preserved juvenile represented by teeth, skull fragments and some limb fragments only.

<5 (dental development).

2174. Poorly preserved skeleton with much post mortem damage; ca 2/5. Bones extremely light and porous.

Female (femoral head diameter); 35+ (dental wear).

2183. Robust skeleton but with much post mortem damage and surface erosion.

Male (pelvis); 45+ (dental wear).

Height 1.66 $\pm$ 0.0432 m (right radius).

2530. Well preserved, robust skeleton; virtually intact.

Male (pelvis, skull); 45+ (dental wear).

Height 1.67 $\pm$ 0.0405 m (left humerus).

2581. Poorly preserved skeleton with much post mortem damage and much surface erosion; ca 1/3.

Female (pelvis); 25-30 (dental wear; cranial sutures).

Height 1.50 $\pm$ 0.0372 m (right femur).

2661. Poorly preserved skeleton with considerable post mortem damage; ca 2/3. Intrusive animal bone.

Male (pelvis); 35+ (cranial sutures).

3520. Poorly preserved gracile skeleton; ca 2/3.

Female (skull; femoral head diameter); adult (epiphyseal fusion).

Height 1.64 ± 0.0424 m (left radius).

Disarticulated bones

35. Skull fragment and animal bones only.

174. Several pelvic framents (age 39-44 from pubic symphysis); left calcaneum; 1st and 2nd left metacarpals; fragment of 1st metatarsal; fragments of fibula and tibia.

328. Several skull fragments; mid-shaft fragment of humerus; proximal fragments of left ulna.

338. Left patella; fragments of tibia.

348. Fragment of right lower 4.

361. Several fragments of sacrum

394. Fragment of unfused distal end of humerus.

396. Proximal fragment of right 2nd metatarsal.

423. Skull fragment.

458. Skull fragments.

516. Skull fragments; right rib.

598. Unfused right ulna.

642. Left upper 5; proximal phalanx of foot.

682. Fragments of left calcaneum; left and right 1st and 5th metatarsals; right 2nd and 3rd metatarsals; distal fragment of left 5th metatarsal; right cuboid; left 1st proximal phalanx of foot; proximal phalanx of foot; left and right distal ends of unfused humerus (not a pair); proximal fragment of unfused left

ulna; several juvenile rib fragments.

732. Right upper 8.

733. Skull fragment.

767. Part of proximal end of right femur (diameter 41.0 mm). Bone has been cleanly chopped through, presumably when grave was disturbed.

901. Fragments of (probably male) skull; fragment of right hand side of atlas. Intrusive animal bone.

947. Proximal fragment of left 2nd metatarsal.

979. Fragment of juvenile limb bone.

1216. Juvenile limb bone fragments.

1358. Right humerus; left and right femur; left and right tibia; all infant.

1366. Skull fragments.

1380. Skull fragments.

1816. Fragment of unfused limb bone.

1819. Two rib fragments.

2258. Fragments of unfused right femur from an infant.

2521. Left medial cuneiform; fragments of juvenile left acetabulum and pelvis; right navicular; fragment of proximal phalanx of hand; metacarpal fragment; right 1st proximal phalanx of foot; right upper 1, 2 & 3.

2565. Mid shaft fragment of left femur.

2568. Two tooth fragments.

2660. Skull fragments; fragment of medial condyle of right femur.

3038 (previously 1714). Fragments of juvenile skull; right lower iii and v; two adult rib fragments; left and right zygoma; right

mandible with first seven teeth (age 35+ from dental wear). Intrusive animal bone.

3675. Proximal phalanx of foot.

4443. Mid shaft fragment of right humerus.

Appendix 2

Summary of pathological findings

282. Hyperostosis affecting both glenoids and acetabula and one costo-transverse joint on each side; the right c/t joint is also slightly eburnated. The proximal end of the right fibula, the humeral insertion of the right subscapularis muscle, the left linea aspera and iliac crest and the intervertebral joints are also affected. The vertebrae show some osteophytosis and Schmorl's nodes are present. There are osteoarthritic changes in the left facet joints between C2 and C3. There is a well healed fracture in the distal 1/3 of the right fibula. Porotic hyperostosis is present in both orbits and dental caries is present resulting from the presence of supernumary teeth.

686. Spondylolysis of the pars interarticularis type and slight osteophytosis on L5.

710. Hyperostosis of T6-T10 affecting insertion of ligamentum flavum.

940. Slight hyperostosis along lateral margin of trochlea of right humerus and around margins of greater and lesser sigmoid cavities. Many vertebrae show osteophytosis and Schmorl's nodes and there is calcification along the origin of the ligamentum flavum of T3 and T8.

941. Eburnation of left trapezoid, capitate and proximal ends of 2nd and 4th metacarpals.

948. Hyperostosis affecting right and left patellae; both

acetabulae and glenoid fossae; left linea aspera and spiral line and margins of knee joint; distal ends of both fibulae and distal end of right tibia; ligaments of left calcaneum and talus and anterior wall of left obturator foramen. Dental abscess at root of left lower 1.

1427. Schmorl's nodes of lower thoracic and lumbar vertebrae; osteophytosis of L3.

2174. Proliferative arthropathy affecting some of the small bones of the hands and feet. Well healed fracture of right tibia and fibula with a crush injury of one vertebra. All extant vertebral fragments (3) show signs of osteophytosis.

2530. Hyperostosis affecting odontoid peg, triceps insertion into left ulna and bicipital insertion into right radius. Osteophytosis of L3. Dental disease.