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Ancient Monuments Laboratory
Report 110/88

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Summary

Bones of 12 individuals (3 adult males, 2 adult females and 7 adolescents/ children) were excavated from the Beaker period round barrow at Octon Wold.

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THE HUMAN BONES FROM OCTON WOLD, HUMBERSIDE (EXCAVATED 1966, 1968)

Introduction to the site

Octon Wold round barrow (Grid ref. TA 0045/6906) is located in the parish of Thwing, to the west of the deserted Mediaeval village of Octon. It is one of a series of round barrows which survive as surface features or cropmark sites. The mound was trial trenched in 1867, but these excavations failed to locate the burials.

The barrow is approximately 60 feet in diameter and 7 feet high. The extreme south-east portion has suffered destruction by road building. The barrow consists of an inner mound of chalk rubble under an earthen covering.

Two crouched burials, one (Grave 3) cut into the ancient ground surface and covered by a small cairn of stones and gravel and one (Grave 5) laid on the surface and covered by a similar cairn, were located within a circular enclosure of stakes. The inner mound was erected over these burials.

Prior of the construction of the earth covering graves 1 and 2 were dug into the inner mound, to some extent disturbing graves 3 and 5. Graves 1 and 2 were re-opened through the top of the inner mound: bones were removed from Grave 1, but it was not used for further burials, whereas there was evidence for successive interments, with removal of some bones of previous burials, in Grave 2.

Grave 4, containing the crouched inhumations of two infants, was cut into the ancient land surface at the edge of the inner mound.

When all the interments had taken place the earthen covering was constructed (probably with a timber revetment around the perimeter); the weathered state of the inner mound shows that there was a considerable delay before the building of the earth covering.

Pottery evidence dates the use of the site to the Beaker period.

The human remains

Preservation of the material

Preservation was scored as good, moderate or poor on the basis of visual inspection of the remains. The results are shown, in tabular form, below.

Determination of age and sex

Sex: this was determined using the morphology of the skull and pelvis (Workshop of European Anthropologists 1980). Although sexual dimorphism has long been recognised in the bones of children, there are considerable difficulties in applying this observation such that reliable determinations of sex can be made

from skeletal remains. No attempt was made to determine the sex of child burials (for the present purposes those thought to be aged under 17 were classed as children, those 17 or over were considered adults).

Age: dental development was used to estimate age in children, using the chart reproduced in Ubelaker (1978: Fig. 62)

In the absence of dental evidence longbone length was used to give an approximate estimate of age in children, with reference to the study of Stloukhal & Hanakova (1978).

For individuals over the age of 15 years dental development is of little help in age determination. For adolescents and young adults epiphysial fusion was the main technique used to estimate age; use was made of Workshop of European Anthropologists (1980: Fig. 6).

Dental attrition (tooth wear) was used as an age indicator in adults. Age was estimated using the chart of Brothwell (1981: Fig. 3.9). The state of closure of the skull sutures was also taken into account using the work of Perizonius (1984). The results are shown below.

Context	Material	Preservation	Sex	Age
Grave 1	Sparse remains of one adult	Moderate	Male	35-45
Grave 2	Partially commingled bones of: two adults	Good	Male	50-60
		Moderate	Female	17-25
	four children	Moderate	-	7-8
		Moderate	-	4
		Moderate	-	2.5
		Good	-	neonate
	Bones of one adult (final burial)	Good	Male	25-35
Grave 3	Bones of one adult	Moderate	Female	21-25
Grave 4	Bones of two children	Moderate	-	1.5
		Poor	-	2-4
Grave 5	Bones of one child	Moderate	Prob. Female	About 15

Mean age at death

Whole-sample (N=12)	Adults (N=5)
16.9	33.8

Stature

Adult stature was calculated from longbone measurements using the regression formulae of Trotter & Gleser for the white races (reproduced in Brothwell 1981: Table 5). Using these formulae two male individuals were found to have statures of 181cm and 166cm, and one female had a stature of 161cm.

Non-metric variation

Non-metric traits take the form of minor variations in skeletal form such as presence or absence of bony spurs or foramina. For at least some variants there is evidence that they are to some extent inherited, although the causation of many remains obscure. Thirty-one cranial and twenty postcranial traits were scored for. The cranial traits are mainly from those defined by Berry & Berry (1967), and the postcranial traits are mainly from those defined by Finnegan (1978). In children the presence of many traits is age correlated, hence most workers omit these individuals in population studies, a strategy pursued in the present work. Traits with the scope for bilateral expression were scored separately for left and right sides, however, in order to present bilateral trait frequencies in terms of occurrences per number of individuals, a trait was scored as present in an individual if it occurred on one or both sides. If only one side was observable then the missing or damaged side was assumed to be concordant with the observable side. The results are shown below.

Cranial traits

Trait	Frequency
Metopic suture	1/4
Ossicle at lambda	1/3
Lambdoid ossicle	2/3
Inca bone	0/3
Sagittal ossicle	0/3
Ossicle at bregma	0/4
Coronal ossicle	0/4
Squamo-parietal ossicle	0/2
Parietal notch bone	0/4
Auditory torus	0/4
Foramen of Hushke	0/4
Ossicle at asterion	1/3
Clinoid bridging	1/1
Palatine torus	0/3
Maxillary torus	0/4
Mastoid foramen extra-sutural	4/4
Mastoid foramen absent	0/4
Double condylar facet on occipital	0/3
Parietal foramen	0/4
Accessory infra-orbital foramen	0/1
Zygomatic facial foramen	3/4
Divided hypoglossal canal	0/3
Posterior condylar canal patent	1/1
Precondylar tubercle	0/3
Foramen ovale incomplete	0/1
Accessory lesser palatine foramen	1/1
Supra-orbital foramen complete	2/4
Maxillary M3 absent	0/5
Mandibular M3 absent	0/3
Mandibular torus	0/3
Mylohyoid bridging	0/3

Postcranial traits

Trait	Frequency
Fossa of Allen	1/3
Poirer's facet	0/2
Plaque formation	0/2
Exostosis in trochanteric fossa	0/2
Supra-condyloid process	0/3
Septal aperture	1/3
Acetabular crease	0/3
Accessory sacral facets on ilium	1/3
Spina bifida	0/1
Sacralisation of L5	0/2
Acromial articular facet	0/3
Supra-scapular foramen	0/1
Vastus notch	0/2
Vastus fossa	0/2
Emarginate patella	0/2
Anterior calcaneal facet double	0/2
Anterior calcaneal facet absent	0/2
Atlas facet double	0/4
Posterior atlas bridging	1/4
Lateral atlas bridging	0/4

A trait often considered an aspect of non-metric varation is shovel shaped incisors. Of 3 individuals for whom permanent incisors were present, 1 (Grave 5, adolescent (probably female) aged about 15) showed shovelling of a maxillary lateral incisor. It seems probable that this trait is to some extent under genetic control (Dahlberg et al. 1982), although its precise aetiology is obscure. The individual from Grave 5 also had a bifid root on the right mandibular canine.

The fragmentary nature of the remains precluded any skull measurements.

Pathologies

Dental

At Octon Wold no child showed ante-mortem tooth loss, alveolar abcesses or dental calculus; the frequencies given for these pathologies are for adults only. Of the 5 adults for whom teeth were present (a total of 98 teeth) no individual showed dental caries.

(a) Ante-mortem tooth loss

Ante-mortem tooth loss was scored on a presence-absence basis for each tooth position. The results are shown below as number of tooth positions displaying signs of ante-mortem tooth loss over number of tooth positions observable, and as number of individuals with one or more teeth lost ante-mortem over total number of individuals for whom observations could be made.

Dental caries and periodontal disease are major causes of ante-mortem tooth loss. Tooth loss tends to be correlated with individual age; older individuals have been longer exposed to the agents causing tooth loss.

Results:

Total tooth positions	Individuals
1/115	1/5

(b) Alveolar abcess

Alveolar abcesses were scored in terms of affected tooth positions, in an analogous way to ante-mortem tooth loss.

Results:

Total tooth positions	Individuals
4/115	2/5

Alveolar abcesses are generally a consequence of infection of the pulp chamber of the tooth. This occurs as a result of exposure of the pulp cavity to the oral environment, as might occur as a result of dental caries, trauma or excessive attrition of the teeth. Impacted food material can also lead to abcess formation via infection of the periodontal tissues.

Two abcess cavities (originating from the apices of the left maxillary first and second molars) have led to the formation of two radicular cysts in the maxillary sinus of an individual from Grave 2 (male aged 50-60). Radicular cysts are fluid filled cavities which arise as a result of periapical inflammation, although once formed they grow independently of that inflammation. They are not uncommon sequelae to periapical inflammation and are generally asymptomatic (Shafer et al. 1983: 493f).

(c) Dental calculus

This takes the form of a concretion on the teeth consisting of calcium salts and, in life, organic material in which flourish numerous bacteria. It may be considered as mineralised dental plaque and is associated with poor oral hygiene.

Dental calculus was scored on the scale of Dobney & Brothwell (1987); the results are shown below.

None	Grade I	Grade II	Grade III	Grade IV
2	1	1	1	0

(d) Other pathology of jaws and teeth

The maxilla and mandible of the individual from Grave 3 (male aged 35-45) show marked porotic changes in the interdental septa, together with alveolar recession (to Brothwell's (1981: Fig. 6.14A) 'slight' grade). These changes are characteristic of periodontal disease (Costa 1982). Periodontal disease is an inflammation of the gums and other periodontal tissues, and is associated with poor oral hygiene.

Degenerative joint disease

Degenerative joint disease is generally divided into two categories: that affecting the vertebral bodies is termed osteophytosis and that affecting the other joints is termed

osteoarthritis (Collins 1949). Degenerative joint disease is related to mechanical stress on the joints, the most usual cause being repeated minor traumata as might result from day to day activities (although it may follow traumatic injury to a joint - see below). These repeated minor traumata lead to degeneration of the intervertebral disc or joint cartilage with subsequent bony changes, including lipping and joint surface irregularities, at the joints involved. As it is related to general 'wear and tear' on the joints the incidence of degenerative joint disease varies with age, body weight and the amount of hard physical labour undertaken in life. Osteophytosis may well be symptomless, but when symptoms are present they consist of pain and stiffness of the joint which is worse after rest. In cases of osteoarthritis in which bony changes are present symptoms, of a similar nature to the above, are generally present. In modern populations slight osteophytosis may be present as early as the fifth decade of life and osteoarthritis in the fourth decade; the latter seems to be present to some degree in about 50% of people aged over 50.

Degenerative joint disease was distinguished from other arthropathies using criteria described by Steinbock (1976), Ortner & Putschar (1985) and Rodgers et al. (1987).

Osteophytosis was scored (for the cervical, thoracic and lumbar vertebrae) as slight, medium or considerable after the scheme of Brothwell (1981: Fig. 6.9, Pl. 6.9). Osteoarthritis was scored as slight, medium or considerable using criteria derived from Brothwell (1981: Fig. 6.9). The results (adults only) are presented below.

(a) Osteophytosis

Total vertebrae:

	None	Slight	Medium	Considerable
Cervical	12	1	1	0
Thoracic	15	1	0	0
Lumbar	10	2	0	0

Individuals:

Maximum severity

	None	Slight	Medium	Considerable
Cervical	2	1	1	0
Thoracic	2	1	0	0
Lumbar	2	1	0	0

Presence-absence (whole spine)

Present	Absent
2	2

(b) Osteoarthritis

(I) Spinal

Total vertebrae:

	None	Slight	Medium	Considerable
Cervical	19	2	1	0
Thoracic	18	1	0	0
Lumbar	14	0	0	0

Individuals:

Maximum severity

	None	Slight	Medium	Considerable
Cervical	3	0	1	0
Thoracic	3	1	0	0
Lumbar	4	0	0	0

Presence-absence (whole spine)

Present	Absent
3	2

(II) Rest of skeleton

Individuals:

Maximum severity

None	Slight	Medium	Considerable
4	0	0	1

Distribution in the skeleton

Slight

Left distal first metatarsal, 3 right ribs.

Considerable

Distal left radius and ulna (probably sequential to trauma - see text).

(III) All skeleton

Individuals:

Maximum severity

None	Slight	Medium	Considerable
3	0	1	1

Other pathologies

Grave 1 (male aged 35-45). The axis and third cervical vertebrae show bony fusion. Ankylosis at the posterior and lateral borders of the centra is complete, however separation between the bones persists at the anterior border and also in the central part of the vertebral bodies, but there is some irregular bone formation on the central part of the superior surface of the body of C3. Complete bony union has occurred at the apophysial joints: post mortem damage reveals trabecular continuity across the joints. There is also some ankylosis of the neural arches, but post-mortem damage renders it impossible to assess the full extent of changes here. There is medium grade osteophytosis of the distal part of the body, and medium grade osteoarthritis of the distal facet joints, of C3. This may be a consequence of increased stress on the joints between C4 and C3 due to the immobility of the C3-axis joint, and suggests that the fusion of the vertebrae may have been a long standing condition.

The nature of the bony union between the vertebrae in the present case is suggestive of a sero-negative spondylo-arthropathy. In this group of diseases bony ankylosis of the vertebral bodies occurs initially by ossification of the peripheral part of the intervertebral disc, and ankylosis of the facet joints and spinal ligaments is also a typical feature (Steinbock 1976: 294f; Rodgers et al. 1987).

Sero-negative spondylo-arthropathies are a group of joint diseases sharing several common factors, including absence of a rheumatoid factor and a tendency to spinal involvement (Rodgers et al. 1987). Their causes are obscure, however in some instances there seems to be a genetic predisposition, and they may be precipitated by venereal or gastro-intestinal infections.

The distinction between the various sero-negative spondylo-arthropathies (e.g. ankylosing spondylitis, Reiter's disease and psoriatic arthropathy) rests mainly on the distribution of the lesions in the skeleton; in this case the first 4 cervical vertebrae are the only ones present, and the remainder of the postcranial skeleton is very sparse, hence differential diagnosis is not possible.

Grave 2 (male aged 50-60). The distal joint surface of the left radius is bumpy and irregular, and is pitted in its central portion; the largest of these pits proved to be about 4mm deep on examination with a probe. A small area of the joint surface is eburnated and there is marked spurring and lipping of the joint margins. The distal joint surface of the left ulna likewise bears an eburnated area and is heavily lipped. A radiograph showed the existence of cystic defects in the subchondral bone. All other joints of the skeleton were normal (except for slight osteoarthritis), however the left carpals were missing.

The most likely diagnosis is severe osteoarthritis. Since only the distal left radius and ulna show severe changes it is likely that the condition is secondary to trauma of the left wrist, however no fracture to either radius or ulna was evident on X-ray.

Grave 2, final bural (male 25-35). Two non-adjacent thoracic vertebrae show Schmorl's nodes. These are shallow depressions in the vertebral bodies. An intervertebral disc is consists of a tough outer layer (the annulus fibrosus) surrounding a core (nucleus pulposus), which, up to early adulthood, is composed of semi-gelatinous material. In younger individuals excessive compression of the spine (as might occur, for example, through heavy lifting) may result in extrusion of material from the nucleus pulposus into the adjacent vertebral body. The bony manifestation of this is the Schmorl's node (Schmorl & Junghanns 1971: 158-168).

Grave 3 (female aged 21-25). The third lumbar vertebra displays a lytic area (approximately 30mm x 14mm and a maximum of 7mm deep) on the anterior part of the superior surface of the centrum. The surface of the lesion is rough and irregular. The trabeculae on the borders of the lytic area are highly sclerotic and the lesion appears in profile as a triangular area of

radiodensity on X-ray. There are no pathological changes in the neural arch or spinous processes, nor in any other vertebrae or elsewhere in the skeleton (which is fairly complete although it lacks foot bones). The inferior surface of the body of L2 is slightly convex in the area adjacent to the lesion in L3.

A wide variety of conditions may give rise to lytic areas on the vertebral bodies and differential diagnosis is frequently problematic in the dry specimen.

It is possible that this represents an avascular aseptic necrosis of the bone (i.e. death of bone through deficient blood supply). The marked sclerosis of the borders, the rough surface and the triangular profile of the lesion are all characteristic of aseptic necrosis (Paul & Juhl 1972: 172f; Ortner & Putschar 1985: 235f).

In palaeopathology the finding of lytic areas on the vertebral bodies often prompts a diagnosis of spinal tuberculosis (Pott's disease). Although such a diagnosis cannot be definitely excluded here, it is perhaps unlikely: in spinal tuberculosis the lytic area, although frequently irregular in outline, generally has a fairly smooth surface and the borders of the lesion are not generally as markedly sclerotic as in the present case.

Grave 4 (infant aged 18 months). The right tibia and both femora display depositions of woven bone on their surfaces, most notably on the posterior surfaces of the femora and the anterior surface of the tibia. These lesions represent periostitis, the subperiosteal deposition of new bone upon the intact cortex. Generalised periostitis of this type is a not infrequent finding in archaeological material in the skeletons of infants and young children. It may be a response to a variety of insults, particularly infectious disease (Mensforth et al. 1978).

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Location of archive: HBMC, London.
Location of bones: British Museum, London.