

Human Skeletal Remains from St. Saviour's Hospital, Bury St. Edmunds, Suffolk

Sue Anderson, © November 1990.

Introduction

St. Saviour's Hospital, Bury St. Edmunds, was founded in 1180 and was a relatively rich establishment which continued until the Dissolution. It was originally intended for retired monks and nuns, although later it served monks only.

The human remains which were analysed consisted of two small groups. The first was from the Abbeyford site (within 10m of the chapel), excavated by workmen in the 1960s, and included six skulls, one left ulna and a fragment of pelvis. The second group, excavated from within the chapel itself in 1989, was made up of seven numbered skeletons, although in fact they represent the remains of eight individuals. Presumably those individuals buried within the chapel were the elite, and this is perhaps confirmed by the fact that one skeleton (0103) was in possession of a chalice and paten.

Method

Measurements were taken using the methods described by Brothwell (1981), together with a few from Bass (1971). Sexing and ageing techniques follow Brothwell, and the Workshop of European Anthropologists (1980). Sciatic notch angles were measured, where possible, using the method described by Dawes (1980, p.22).

Stature was estimated according to the regression formulae of Trotter and Gleser (Trotter, 1970).

A full catalogue of skeletons, measurements and non-metric traits is held in the archive at Suffolk C.C. Archaeological Service, Bury St. Edmunds.

Condition of Material

All of the material from the Abbeyford site was in good or very good condition. Of the seven numbered skeletons from the 1989 excavation, three were judged to be in good condition, two were poor-fair and two were fair-good. It was possible to provide a full list of measurements for most bones.

Demographic Analysis

All the remains studied here were of adult individuals, and all but one were male or probably male. The exception was the very gracile skull No. 3 from the Abbeyford site, although in all cases where sexing is based entirely on cranial characteristics the conclusions cannot be as certain as those based on the whole skeleton, and in particular the pelvis.

Probably the most reliable method of ageing the skeleton in general usage is the amount of attrition on the teeth. However, since only limited comparison can be made in a small assemblage, and since there is a lack of juvenile teeth in this group on which to form a baseline, it is difficult to be certain of the accuracy of this method as it has been used here. For this reason, the skeletons have been aged in three categories (young, middle-aged or old, or categories between these where the ageing was less certain) based primarily on their tooth wear, but also on the amount of biological degeneration which has occurred. No attempt has been made to age those individuals whose remains consisted of the skull only,

except where teeth were present. Table 1 shows the distribution of age at death in this small group.

Age Group	Male	Female
Young (under 30)	1	
Young-MA	1	
Middle-aged	4	
MA-Old	1	
Old (over 50?)	3	1?
Adult	3	

Table 1. Age at death

This shows that the majority of individuals were middle-aged or old when they died. The presence of one individual who appeared to be a young adult might suggest that people other than retired monks and nuns were being buried in the cemetery outside the chapel. Such a distribution is unusual in a population of this date, so the suggested high life expectancy in this group implies some kind of biasing factor. The fact that these individuals come from the cemetery of a hospital might indicate that the care they received as inmates gave them a greater chance of surviving into old age. In the case of those individuals thought to belong to the religious hierarchy, it is possible that the type of life style imposed by medieval monasticism was compatible with long life. However, the fact that this group is rather small, and probably unrepresentative of either the contemporary population of Bury or of the hospital itself, should be taken into account before any conclusions are made about the way of life of these people.

Metrical and Morphological Analysis

The results of the osteometric analysis are recorded in the appendix.

Stature could be calculated for seven male individuals, giving a mean of 172cm (c.5' 8") and a range of 162-183cm (5' 4" - 6'), which is quite normal for a group of this period.

The cranial index could be calculated for eight males and one female. These individuals were distributed as shown in Table 2.

Class	Range	Male	Female
Dolichocranial	x - 74.9	1	1
Mesocranial	75 - 79.9	2	-
Brachycranial	80 - x	5	-

Table 2. Cranial index distribution

The majority fall into the brachycranial or 'broad-headed' category, which is usually expected of a post-Saxon group. However, it may be unwise to compare this group with contemporary populations since, apart from its small size, it is unlikely to represent a homogeneous assemblage as the hospital is liable to have had a wide catchment area.

The Meric and Cnemic indices, which measure relative antero-posterior flattening of the femur and medio-lateral flattening of the tibia respectively, could be calculated for most of the complete skeletons. The cause of these two conditions is unknown, and it is thought unlikely that there is any relationship between them. They are usually recorded simply for comparison with other groups. It is generally accepted that flatter bones occur in early populations. In the skeletons analysed here, the femora were fairly evenly distributed throughout the range of categories from hyperplatymeric (very flattened) to eumeric (broad), but the results for the tibia were more distinct, with bones being equally distributed between the medium-broad (mesocnemic) and broad (eurycnemic) categories. Any attempt at an explanation of these results would be useless given the small sample and the lack of any

rational explanation of the causes of such flattening. The calculated indices are recorded in the appendix.

Non-metric, or congenital, traits were scored both in the skull and the post-cranial skeleton, and a table of results is given in the appendix. The percentages of occurring traits seem to be fairly normal, although some may be artificially raised due to the size of the sample.

Dental Analysis

Dental remains from one female (maxilla only) and eight males (8 maxillae, 6 mandibles) were available for study. This gave a total number of possible positions of 244 for the males, although in fact 24 of these were missing/destroyed, leaving 220 which could be analysed. Twenty-four teeth had been lost post-mortem, and 44 ante-mortem, leaving 117 teeth still in position. Table 3 summarises the results of the dental pathological analysis (males only).

	Maxilla			Mandible		
	No.	Out of	%	No.	Out of	%
Ante-mortem loss	15	104	14.4	29	81	35.8
Caries	15	73	20.5	4	44	9.1
Abscesses	15	104	14.4	7	81	8.6

Table 3. Dental disease prevalences

It is interesting that most ante-mortem tooth loss has occurred in the lower jaw, and that most carious lesions and abscesses were seen in the upper jaw. This is presumably because the majority of teeth which were lost in the mandible had either or both of these conditions. From the evidence it seems probable that lesions developed earlier and/or faster in the lower jaw, perhaps because food remains were less likely to fall off the teeth in this area than in the maxilla, where gravity must have played some small part.

Carious lesions were present in five out of eight males, abscesses in six, and ante-mortem loss in six. Nine teeth were affected with both carious and periodontal lesions (in most of these cases the caries had opened the pulp cavity and was the likely cause of the abscess), and three teeth lost ante-mortem had evidence of periodontal lesions (although it is probable that many more had originally been affected). Although more lesions were seen in the molar regions of each quadrant of the dentition, as is normally expected, caries and abscesses had affected the premolars in some individuals, and most of the dentition of Sk. 0022 was affected by one or other lesion.

The actual percentages of all three conditions are quite high when compared with contemporary populations, but this may be due in part to the large proportion of old individuals at this site. Much of the caries was well developed, suggesting that it had been present in the individuals concerned for a number of years. In a number of cases it had affected teeth which had no antagonist in the opposite jaw, suggesting that it had been caused to some extent by the loss of chewing function of that particular tooth. If this is the case, then it can be inferred that there was a general lack of basic oral hygiene, since food not removed by mastication could have been dislodged if cleaning had been the norm. Despite the fact that age can be a major factor in the amount of dental pathology seen in an individual, it seems likely that this was not the only cause of the high proportions seen at this site, and it may be that a diet high in carbohydrates was partially to blame. It is certainly true that this amount of caries is not normal in old people of the post-Roman and pre-medieval period, but high levels of all three dental pathological conditions mentioned above have been seen in medieval populations, particularly those associated with rich monastic establishments.

Deposits of calculus (tartar) were observed in seven male jaws, four being categorised as 'slight' and three as 'medium'. Slight enamel hypoplasia (malformation of the enamel thought to be related to malnutrition and illness in childhood) was seen in five males, and medium hypoplasia in one. Alveolar resorption was slight in one dentition, medium in another, and heavy in two.

Pathology

Congenital anomalies

Sk. 0103 had an anomaly of the spine which was probably congenital in origin. The last lumbar vertebra was fused to the sacrum on both sacral alae, and the sacrum itself has only four segments instead of the normal five. There seems to have been an extra vertebra in the lumbar region (there are 23 complete vertebrae, apart from the sacralised one, plus the spine of one other lumbar vertebra) which presumably compensates for the loss of the last lumbar vertebra to the sacrum. Such an anomaly would have been asymptomatic in life.

Degenerative disease

Four major pathological processes fall into the category of degenerative disease. The first, and least noticeable in the living individual, is osteophytosis, a condition in which lips of new bone form around the articular surfaces, particularly in the spine. Six individuals were affected with some degree of osteophytosis in this group, and in most of these cases it was fairly extensive with a number of vertebrae and other bones being involved. This is probably to be expected in a group with such a high average age at death.

After osteophytosis, the most common pathological condition to be seen in most skeletal populations is osteoarthritis. Seven individuals were affected with some degree of arthritis. Sk. 3 had a small lesion on the L. glenoid fossa of the skull (joint with mandible). The cervical vertebrae of three individuals were affected (Sks. 0020, 0022, 0039), the hip socket was affected in three males (Sks. 0020, 0022, 0023), the sacro-iliac joint of Sk. 0023 showed signs of the disease, all joints of the shoulders and pectoral girdle of Sk. 0039 were affected, Sk. 0043a was affected on the head of the right first metatarsal, and the lateral end of the right clavicle of Sk. 0061 was involved. Details of all these lesions can be found in the catalogue.

Diffuse idiopathic skeletal hyperostosis (DISH) is condition involving the growth of new bone around the joints and muscle attachments of the skeleton, with calcification of cartilage. It is much more prolific than osteophytosis, and may result in fusion of the vertebral bodies (ankylosing hyperostosis) in advanced cases. It generally affects middle-aged or elderly males, and it has been suggested that it is particularly common in medieval monastic populations (Waldron, 1985). In this group it was seen at various stages in four individuals (Sks. 0103, 0022, 0020 and 0039, in order of least to greatest affected). In all cases the vertebrae were involved, those of Sk. 0020 and Sk. 0039 being ankylosed in places, and bone formation had occurred around various joints and muscle attachments.

As well as addition of new bone to the skeleton in old age, the amount of bone may be reduced, a condition known as osteoporosis. This can be difficult to diagnose in archaeological skeletons due to the possibility that loss of weight and strength in a bone may be caused by post-mortem changes rather than degenerative disease. The mandible of Sk. 0022 was very thin with enlarged mental foramina, which may be suggestive of osteoporosis. Sk. 0023 had osteoporotic bones, and his skull showed lesions endocranially which could be related to this. There were enlarged lesions, possibly granular foveolae (part of the normal anatomy of the skull), next to the bregma on both parietals. The one on the R. had almost broken through the skull, with only a thin layer of outer table remaining, but the floor of the lesion was smooth and the diploe did not show around the edges. There was an

obvious bump in both places on the ectocranial surface, and light was visible through the lesions. The cranial vault of Sk. 0039 was very thin, and widening of the granular foveolae near the bregma had also occurred in this skeleton. The phenomenon would appear to be linked with degenerative processes.

Spinal pathology

One other commonly occurring vertebral disease was seen in this population, the condition known as Schmorl's nodes. This is associated with physical stress in young adults, and presents in dry bone as a small depression in the upper or lower surface of the vertebral body where part of the contents of a ruptured vertebral disc have been forced out. In this population it was seen in the spines of 4 males (only 5 complete vertebral columns were preserved), three of which were affected in the thoracic region and all four in the lumbar.

Cribr orbitalia and porotic hyperostosis

Cribr orbitalia, a condition associated with anaemia and consisting of pitting in the roof of the orbit of the eye, was seen in one individual from this site, and was at the least developed or porotic stage (Brothwell, 1981).

Possible healed porotic hyperostosis, a lesion of the cranial vault which is also associated with anaemia, was seen in 5 skulls from the Abbeyford site. In all cases there was some pitting and thickening bilaterally on the parietals, usually close to the sagittal suture, and in three individuals there were remains of striations of the kind which often occur in the unhealed state of this condition in childhood. If all of these lesions are really healed porotic hyperostosis, then the prevalence in this area of the cemetery seems to be rather high. It is also noticeable that none of the skulls from within the chapel showed similar changes. Perhaps this is indicative of a difference in diet between various members of the monastic hierarchy.

Neoplasms

Benign neoplasms, in the form of osteomata, were seen in six individuals from this site. The majority of cases affected the skull (three individuals had osteomata on the parietals, one on the frontal bone), but a small wart-like osteoma was present on the articular surface of the distal lateral condyle of the right femur of Sk. 0022, and a similar one was present on the articular surface of the medial border of the L. patella of Sk. 0039. These would probably all have been symptomless in life.

Trauma

Comparatively few examples of physical trauma or injury were observed in this group. Only two healed fractures were present, both in Sk. 0020, one of the right clavicle with shortening and some distortion, and one of the left 7th? rib midshaft with slight flattening and little callus. Both these fractures could have been caused by direct violence, but they are equally likely to have been accidental. Exostoses were present on the distal end of the left fibula of Sk. 0022, the distal end of the right fibula of Sk. 0023, and the proximal articular facet (inferior border, c.17x10mm) of the R. tibia for the fibula of Sk. 0039.

Infections

Sinusitis was present in three individuals (Sks. 5, 0020, and 0061), all in the right maxillary sinus. Sk. 0103 did not appear to be affected, despite the breakthrough of an abscess into the right maxillary sinus.

The only other evidence for osseous infection in this group was the presence of small deposits of new bone (periostitis) on the medial surface of the proximal ends of the tibial shafts of Sk. 0043a, a fairly common condition of unknown cause in many archaeological populations.

Circulatory disturbances

The most common disease in this category is osteochondritis dissecans, a type of aseptic necrosis involving the "death" of a small area of bone, following which a small pit is formed in an articular surface. It often occurs in young adult males, is probably associated with physical stress or trauma, and may heal spontaneously. Two individuals were affected in this group. The proximal end of the right hallucial first phalanx of Sk. 0022 has a small pit at the centre of the articular facet, of the type which is generally thought to be caused by this disease, although it may be a developmental defect. The proximal end of the right first metatarsal of Sk. 0039 had a partly healed osteochondritic lesion (8x5mm) in the centre of the facet.

The most interesting lesion to be seen in this small group affected the left hip joint of Sk. 0039. The left acetabulum of this individual is very wide (57mm in diameter, compared with 48mm on the right side) with a sclerotic floor, eburnation on the superior surface, and very large osteophytes around the rim. The head of the left femur is surrounded by large bony outgrowths. The proximal epiphysis has slipped and is positioned, and fused, on the medio-dorsal surface of the neck, which shows no sign of fracture (although it is partly obscured by new bone growth over the anterior surface). The end of the metaphysis does not appear to have been remodelled, and the lumpy appearance normally associated with the unfused epiphysis is still present in part (although there is some post-mortem erosion). The shape of the head is deformed and curves down to a point at the inferior side. Marked eburnation has occurred on the superior surface, corresponding to that seen in the acetabulum. The proximal half of the shaft of the bone appears slightly remodelled to compensate for the obvious difficulty in walking imposed by this condition, and the bone is slightly narrower medio-laterally than antero-posteriorly. There is slight lipping of the distal condyles and linea aspera, but this is not as marked as that seen on the right femur. This has lipping of the borders of the condyles and a proliferation of bone along the linea aspera and greater and lesser trochanters. There is eburnation of the lateral condyle with corresponding lesions on the right patella, which is also lipped around the borders. The right femur appears slightly twisted, the linea aspera in the proximal half running almost along the medio-lateral border. The proximal halves of both tibiae are slightly curved towards the lateral side. The heads of all proximal phalanges of the right foot are slightly deformed, and both ends of the second middle phalanx are deformed with osteophyte formation. There is slight eburnation and pitting on the superior lateral surface of the left first metatarsal head.

All the lesions mentioned above probably occurred as a result, either direct or indirect, of the primary pathological process, a slipped femoral capital epiphysis (epiphysiolysis). This condition is rare in both archaeological and modern populations. The primary cause may be hormonal, or there may be a vitamin deficiency (A or C), followed by mechanical dislocation of the head and neck and possibly aseptic necrosis. It affects boys more than girls, and occurs most frequently in the 12-16 year age group (Cotta, 1980). Wells (1971, 1976) describes an example from Carrow Abbey, Norwich, and Ortner and Putschar (1985) give two examples, neither of which are anywhere near as deficient as the joint seen here. In the case from St. Saviour's, there has obviously been pain and difficulty in walking, with much of the weight being placed on the right leg whenever possible, resulting in the arthritic changes seen in the right knee and foot, and twisting of the femora and tibiae. Perhaps this was also the cause of the eburnation seen on the big toe of the left foot if the weight of the left leg, which would have been slightly shorter than the right, was carried on this joint whenever it was put to the ground.

One other lesion seen in this individual may have occurred as an indirect result of the primary pathology. The facet for the radius on the right scaphoid has two small patches of eburnation (there is no corresponding lesion on the radius), and there is eburnation on both surfaces of the joint between the scaphoid and the trapezoid. No other bones of the right hand or wrist were affected. Such a lesion suggests a constant twisting movement of the wrist, and might be attributable to some form of occupational stress. However, in view of the pathological deformities noted above, it seems reasonable to suggest that the continual rubbing of these two bones was caused by the habitual use of a walking stick.

Miscellaneous lesions

A number of pathological lesions could not be included under any of the headings above, and some could not be diagnosed. These are recorded below.

There were small deposits of new bone endocranially on the frontal bone of Sk. 3 from the Abbeyford site. These could be the beginnings of a condition known as hyperostosis frontalis interna, which occurs most often in older women and is related to post-menopausal hormonal changes. If the diagnosis is correct, then it lends weight to the sexing and ageing of this individual.

Sk. 0039 showed evidence of an inflammatory disease (ischial bursitis) of the left ischial tuberosity (the right was unaffected), with new bone growth over the surface giving a craggy appearance. It is a condition caused by continuous wear of the part of bone involved, and is also known as "Weaver's Bottom" due to the rocking backwards and forwards on a hard seat which this occupation necessitates. In this case, the condition is likely to be related to the other lesions affecting the hip of this man (see above, Section 6.8), which may have caused him some pain in sitting as well as walking.

The lateral end of the left clavicle of Sk. 0103 is enlarged. Apparently an extra strip of bone had formed along the inferior edge and there is osteophyte formation around the articular facet. The cause of this is unknown, but it may be developmental or traumatic in origin. A similar lesion was noted by the present author in a skeleton from Staunch Meadow, Brandon, Suffolk (Anderson, 1990).

Summary and Discussion

Given the history of this site, it was thought likely that most of the excavated skeletons would be of male individuals, and this has proved to be the case. Of the 14 individuals represented by these bones, 13 were male and one was female. Nearly all were in old age, but two were thought to be younger than 45 years of age at death. The two youngest individuals and the woman were found in the graveyard outside the chapel, as might be expected if burial in the chapel implies high status in the religious hierarchy.

Nothing unusual was noted about the metric and morphological characteristics of these people, although it was not possible to compare stature and long bone lengths between the two areas of burial. Despite this, some evidence of difference in nutrition standards between the two groups may be shown by the high prevalence of healed porotic hyperostosis in the individuals buried outside the chapel, compared with the lack of any evidence for it inside. Unfortunately a much larger group would be needed for this statement to be regarded as conclusive.

The dental analysis may also provide some evidence for a difference in diet between the two small groups. Unfortunately only two and a half maxillae survived from the Abbeyford site, but they showed far less pathology than any of the maxillae from the chapel burials. This

may be related to other factors such as sex and age, but it could also be due to consumption of different foodstuffs. If, for example, the men from the Abbeyford site were eating soft foods (stews, porridge, gruel, etc.) this might account for the small degree of attrition seen on their teeth, and they might then be older than suggested (although the lack of fusion of the cranial vault sutures of Sk. 5 would still indicate that he was quite young).

In general the pathology seen at this site is as expected for a small monastic group with a high average age at death. Most individuals were affected by some form of degenerative disease, but there is little evidence for infection or trauma, except in the sense of physical stress. The most interesting pathological condition was the slipped femoral capital epiphysis of Sk. 0039, which must have caused him so much pain in life. The fact that he seems to have reached the upper echelons of the society in which he lived may imply a greater tolerance for deformity than perhaps is generally held to be the case in the Middle Ages.

This small group of skeletons has proved to be more interesting and informative than many larger cemetery populations, mainly due to the good preservation of most of the bones. It is unfortunate that the post-cranial remains of the individuals from the Abbeyford site were not preserved, however, as this would have made their sexing and ageing more reliable and would have allowed for a comparison of stature and other osteometric data between the individuals buried inside and outside the chapel. Having said this, the conclusions which can be drawn from a small sample are limited, particularly when the sample is not random and cannot be seen as representative of the whole. If the rest of the cemetery is excavated, the skeletal remains may be of use to throw some light on the type of people who spent their final years in a medieval monastic hospital. Until then the interpretations suggested here cannot be regarded as final.

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