
5 HUMAN SKELETAL REMAINS *by Sue Anderson*

5.1 Introduction

Four inhumations were excavated (SK1, 2, 4, 5), all of them disturbed and incomplete. A few disarticulated remains were also collected from two contexts and as unstratified finds. A full report and catalogue are available in the site archive.

The four identified burials were all discrete individuals, but fragments of at least one other adult were collected with SK4 and SK5 and as disarticulated remains. There was at least one sub-adult, represented by only two bones. The minimum number of individuals is therefore six.

Most of the bone was in good condition, although post-depositional disturbance had affected all the graves, and many bones were fragmented. The long bones of SK2 were less well preserved than the torso and several fragments showed signs of surface erosion.

5.2 Demographic analysis

Table 2 shows the ages and sexes of the six individuals identified in the analysis. All six individuals were male or probably male. This may indicate that some kind of selection was taking place, although the group is too small to allow any definite conclusions.

5.3 Metrical and morphological analysis

Measurements were taken for each of the main adult skeletons, and stature could be calculated for all four. They ranged from 168.3cm (5' 6") to 178.3cm (5' 10"), which is relatively tall for a post-medieval population. Studies in Norwich ([Anderson 1998](#)) and elsewhere (eg [Mays 1990](#)) have shown that 17th/18th-century individuals were often shorter than earlier and later groups. The largely medieval cemetery of The Hirsell, Coldstream, produced an average male stature of 168.0cm ([Anderson forthcoming](#)).

Table 2 Age and sex of human skeletons

SK	Sex	Age
1	Male	<i>c</i> 25–30
2	Male	Middle-aged
4	Male	Middle-aged/old
5	Male	Middle-aged/old
–	Male	<i>c</i> 25–30
–	?Male	<i>c</i> 16

Three cranial indices were calculated. Two were broad-headed (brachycranial) and one was narrow-headed (dolichocranial).

Non-metric traits were scored for the bones present and these are listed in the archive. The results of this analysis produced no evidence which could confirm the presence of family relationships within the group. With the exception of bilateral fronto-temporal articulation in SK4, nothing unusual was seen. Three of the four individuals with skulls had lambdoid wormian bones, and this trait was also present in a fragment of skull from the Phase 4 midden layer (212), but it is relatively common in most archaeological populations and may be environmentally rather than genetically determined. One individual, SK1, had retained the metopic suture, the dividing line between the two halves of the frontal bone which is normally obliterated in childhood. Allen's fossa of the femur was present in SK1 and SK2, but these two individuals had no other traits in common.

5.4 Dental analysis

Dentitions of three individuals were available for study. This number is too small for any analysis of prevalences, so the three will simply be described.

SK1 had a complete maxilla and mandible. Three of his third molars were probably congenitally absent, and the fourth was partially erupted at the time of death. All other teeth were present in the jaw. There were medium-heavy calculus deposits, especially labially on all anterior teeth, and lingually on the mandibular teeth. Alveolar resorption was slight but there was no evidence for periodontal disease. Shallow U-shaped wear was seen on the upper and lower second incisors and canines; this type of wear is often associated with clay tobacco pipe use.

The maxilla of SK4 was damaged on the right side at the molar end, and it was not possible to tell whether the third molar had been present. It was congenitally absent in the mandible on both sides, but lost post mortem in the left maxilla. Two other teeth, the upper right second incisor and second premolar, had been lost post mortem. Ante-mortem loss had affected five teeth, premolars and molars, all in the maxilla. Five abscesses were present, also in the maxilla, affecting both canines, the left first premolar, and the right second premolar and first molar. Six teeth were carious: the origins of the lesions were interstitial cervical on the upper right second molar, buccal cervical on the lower right second molar and lower left first and second molars, and also lingual cervical on the lower left

first molar. The crowns of the upper canines and the left first premolar had all been lost, and on the evidence of the lower left first molar it seems likely that carious lesions on both sides of the tooth at the cementum–enamel junction had eventually taken enough of the root for the crown to break off. There was slight–medium calculus on the remaining teeth, and considerable alveolar resorption, particularly of the mandible, with signs of infection in the maxilla.

The complete dentition was present in SK5. The upper right third molar was congenitally absent, but was present on the right, and had been lost in the lower right position; the lower left position was uncertain. The lower right second molar was also lost. Both this and the third molar had enlarged alveoli with pitted floors and abscesses and it is unclear whether they were lost ante or post mortem. The lower left second molar was lost ante mortem. All other teeth were present. Calculus was generally slight, but heavy on the labial surfaces of the anterior mandibular teeth. There was moderate alveolar resorption. Possible clay pipe wear was observed on the lower right canine and first premolar (illus 10).

A high level of dental pathology is often found in early post-medieval groups and has been attributed to an increase in sugar consumption, but generally this would occur at a later date than has been determined for these individuals. In Edinburgh and in Leith itself, the sugar-refining industry was founded in the mid 18th century (Grant 1882, ch 26, 235), and sugar was probably not widely available to the masses until the following century.

5.5 Skeletal pathology

5.5.1 Congenital and developmental anomalies

The sacrum of SK1 was damaged, but a few fragments showed that there was either sacralisation of the last lumbar vertebra or incomplete lumbarisation of the first sacral segment. As there appeared to be only four sacral segments, and there were five lumbar vertebrae, the latter seems most likely. A similar defect was noted in SK2, although in this case there was lumbarisation of the twelfth thoracic vertebra. Both individuals also had cleft defects of the neural arch at the sacral fourth and fifth segments only.

5.5.2 Deficiency disease

Cribrra orbitalia was present in one of three individuals for whom the condition was assessable. The single example (SK1) was porotic and very minor. This condition is associated with iron deficiency anaemia.

Pitting, striation and thickening of the upper part of the cranial vault was noted in three of the



Illus 10 Probable clay pipe wear on the mandibular canine and first premolar of SK5, also showing heavy calculus deposits on the anterior teeth

four articulated individuals and in a disarticulated fragment of parietal bone. This may be healed porotic hyperostosis, another condition which has been associated with iron deficiency anaemia, but which may also occur in other deficiency diseases such as scurvy and rickets. However, an inflammatory response such as this could also be the result of a scalp infection.

5.5.3 Degenerative disease

Three individuals, SK2, 4 and 5, showed degenerative changes to the skeleton. These were mild in SK2, consisting of slight osteophytes on the lower thoracic vertebrae.

SK5 also had slight osteophytes on the lower thoracic and lumbar spine, as well as larger examples in the neck, particularly between the fifth and sixth cervical vertebrae. New bone growth and lipping also occurred in the left elbow (ulna trochlea borders) and the big toe joints (first metatarsal heads, right proximal hallucial phalanx). Calcified thyroid cartilage was present, and calcification of the costal cartilage at the anterior rib ends had also begun. Small periarticular cysts and new bone growth were noted in the left wrist (lunate) and right thumb (proximal pollicial phalanx), but there was no other evidence to suggest one of the less common forms of arthropathy.

Osteophytes were present in the lower thoracic and lumbar vertebrae of SK5, but in this case some of the vertebral facets were also affected, and at least one facet for a rib head (ninth thoracic vertebra). Large rounded exostoses on the right side of the first to third lumbar vertebrae were typical of the type seen in ankylosing hyperostosis, but had not fused by the time of death. Osteophytes were also present on the lateral side of the right ulna at the joint with the radius head.



Illus 11 Two well-healed and remodelled fractures in a right mid rib of SK5

5.5.4 Trauma and evidence of physical stress

Schmorl's nodes of the vertebral bodies were present in the mid to lower thoracic area of SK1, the mid thoracic to mid lumbar of SK2, the lower thoracic of SK4, and the mid thoracic to first sacral of SK5. These lesions are common in most skeletal populations and indicate physical stress affecting the back.

SK2 had slight anterior epiphyseal dysplasia on the superior edge of the 11th thoracic vertebra. This is an avascular necrosis of the bone, probably caused by a lack of blood supply to the affected area. It is likely to be related to physical stress on the spine.

SK1 showed numerous lesions which were probably associated with habitual movements, and therefore perhaps occupational in origin. A shallow pit (c 7mm diameter) had formed at the centre of the right humerus head, corresponding with a slightly raised area in the centre of the scapula glenoid, probably the beginnings of an osteochondritic lesion. There were two vertical, parallel exostoses c 20mm long on the distal posterior surface of the right femur at the insertion for the medial head of the *gastrocnemius* muscle. A similar exostosis, c 16mm long, had formed on the medial supra-condylar line of the left femur, to which the *adductor magnus* is attached. Smaller, more rounded exostoses had formed on the medial side of the proximal tibia at the attachment for the *semimembranosus*. The principal actions of these muscles are to flex the knee and ankle and to rotate the leg slightly. A small oval exostosis, 6mm by 3mm, had also formed at the proximal end of the left femur *linea aspera* just below the third trochanter. Pitting and slight new bone growth was observed at the proximal ends of both ulnae at the insertion of the *triceps*.

Several small exostoses at the inion suggested tearing of the muscle attachments between the neck and the back of the skull of SK5. A torn muscle may also have caused the slight pitting, suggestive



Illus 12 Depressed fracture on the right side of the frontal bone of SK5

of an inflammatory response, at the right radial tuberosity.

SK5 also showed evidence of several injuries which may have been the result of direct violence. There were well-healed and remodelled fractures of at least three right ribs, two in two places (*illus 11*). The fractures occurred at the back, side and front of the torso. A well-healed fracture of the second metatarsal midshaft was also substantially remodelled and showed only slight evidence of inflammatory response in the form of pitting. On the right side of the frontal bone there was a small oval lesion, 13mm by 5mm and shallow with a pitted floor, which was probably a depressed fracture (*illus 12*).

5.5.5 Infectious disease

Sinusitis was present in all three maxillary sinuses, generally consisting of porosity and slight thickening on the floor of the sinus. New bone growth was

present in the left maxillary sinus of SK5, and this individual was also affected in the frontal sinuses.

SK1 had a slight periosteal new bone deposit on the midshaft of the left fibula with pitting and slight thickening close to the broken end, and there was also slight graining and rounded new bone growth with enlargement of the bone at the anterior distal third of the left tibia. The right tibia was also affected with graining, enlargement and pitting midshaft on the anterior medial surfaces.

Fragments of SK5's right tibia show graining and thickening medially and similar new bone growth was present on the posterior surface of the right fibula shaft. The left tibia shaft was enlarged with thick new bone, generally smooth with slight pitting at the proximal end, graining at the soleal line and to the posterior of the medial side. There was rough disorganised new bone growth just medial and inferior to the anterior tubercle and at the proximal end of the interosseous line. Deep venous impressions were present on the lateral surface. The left fibula was also affected, with deep graining and new bone growth, particularly on the interosseous surface but also some laterally midshaft. No venous bridging or lytic lesions which might suggest syphilis were present, and there were no cloacae to suggest osteomyelitis, so these lesions can only be classified as non-specific periostitis.

5.5.6 Miscellaneous

Both coronoid fossae of the humeri of SK1 had circular holes which revealed the trabecular bone beneath (right 8mm diameter, left 7mm diameter). These could be incomplete septal apertures, or possibly developmental defects due to occupational use. A thick area of new bone, a kind of *torus*, had formed above the left. A similar thick *torus* of new bone had formed above the right coronoid fossa of SK4.

5.6 Summary and discussion

At least six individuals were identified in this assemblage. All were probably male, and only one was younger than 18 years of age. Two individuals were probably below 30, and two were identified as middle-aged or old, perhaps in the range 40–60 years.

In terms of physical appearance, the group was too small to make any useful generalisations, although it is noticeable that all four individuals for whom stature could be estimated had above-average heights when compared with other contemporary groups. Non-metric traits and congenital anomalies were noted, but there was no evidence for any familial relationships between these individuals.

One individual in this group had been particularly badly affected by dental caries, and this had

resulted in abscess formation and subsequent tooth loss. The abscesses which formed in the jaw of a second individual were not periapical and were more likely to have been related to gingivitis and poor dental hygiene. A high degree of dental disease is normal for early post-medieval groups, but susceptibility also increases with age, and both individuals affected in this group were probably over 40.

For such a small group, there was a relatively high degree of bone disease. The usual degenerative changes were observed in the spines and some other joints of the middle-aged and older individuals. Four of the five skulls in the assemblage showed evidence for either deficiency disease or a scalp infection. Stress lesions were common, particularly in the spine, and may have been occupationally induced in at least one individual. One of the older men showed evidence for at least one violent incident which had left him with several broken bones and a mild cranial lesion. All three individuals for whom the maxillary sinuses were present had been affected by sinusitis, and this may be connected with living or working in a smoky atmosphere. Two individuals had periostitis of the shin bones, one of them chronic, but this is a relatively common pathology in most groups. Whilst it can be related to specific infections such as syphilis, leprosy and osteomyelitis, there was no evidence for the cause in these examples. It can also be related to varicose vein formation, or even to infections in the soft tissue in other areas of the body.

Radiocarbon dating has shown these individuals to be of early post-medieval date, with stratigraphic evidence suggesting that they belonged to the 16th or early 17th centuries. Dental analysis has provided corroboration, as two of the four main inhumations showed signs of clay pipe attrition on the anterior teeth. This would indicate a date later than the mid 16th century. Other skeletal remains have been found in the area on the opposite side of Constitution Street, in the vicinity of Wellington Street and on Leith Links, and these have been attributed to the plague in 1645 (Russell 1922). This post-dates the construction of Balmerino House, so it seems unlikely that these individuals were buried here as a result of that incident. The Siege of Leith in 1560 also resulted in a large number of deaths. However, the presence of disarticulated bone within the fill of two of the graves would appear to indicate further burials, and therefore a long-term cemetery rather than a temporary solution to a crisis.

The approximate north–south alignment of the graves is unusual in Christian churchyards generally, and could perhaps indicate a burial place for executed criminals. At Oxford Castle the bodies of executed criminals of the 16th–18th centuries were discovered buried with little care, some face down and many aligned north to south (Poore 2004). The churchyard of St Margaret in Combusto, Norwich, was the burial place of locally hanged felons, and several burials excavated here were orientated north–south or south–north (Stirland 2009).

It is thought that the intention was to deny these criminals a proper Christian burial. Whilst none of the Leith men showed any evidence of hanging, it is very unusual for such evidence to survive in skeletal material. Fracture of the hyoid bone, once thought to be a good indicator of hanging as cause of death, is actually found to occur only rarely (Naik & Patil 2005). The Leith Tolbooth, not far from here

in Tolbooth Wynd, was built in 1564 and if this area was open land at the time it is possible that this was the closest ground available for the purposes of burial of executed prisoners.

However, the burials may originally have lain within the boundary of a much larger parish churchyard than now exists, and possible reasons for their burial on this site are discussed further below.