AN ANGLO-SAXON CASE OF HYPEROSTOSIS FRONTALIS INTERNA

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INTRODUCTION

During the summer of 1990 the Trust for Thanet Archaeology carried out a rescue evaluation within the Anglo-Saxon cemetery at Sarre, Kent. A total of 18 burials, dating to the fifth and sixth centuries were excavated. The graves were cut into natural chalk and were filled with chalky loam. Bone preservation, however, was surprisingly poor, in most cases only badly eroded cranial and diaphyseal fragments were recovered. It is possible that disturbance in antiquity has led to a deterioration in bone quality (Perkins, *pers. comm.*). A site report and brief analysis of the remains has been published (Perkins, 1991, 1992). The purpose of this paper is to examine in greater detail the skeleton from Grave 286, which displays osteological and radiological alterations typical of hyperostosis frontalis interna (HFI).

THE MATERIAL

The skeleton in question, dated to mid or late sixth century, is poorly preserved, apart from the skull fragments discussed below; it consists of a fragmented left humerus, and badly eroded femoral and tibial diaphyses (Perkins, 1991: Fig. 3). All the bones, especially the legs, are eroded, friable and unmeasurable. The skull vault is represented by an incomplete frontal bone; a left parietal; and a small occipital fragment. The facial area consists of a left zygomatic; a fragmentary maxilla and a small fragment of the mandible. Based on the morphology of the frontal bone the remains are clearly female. An accurate age assessment is more difficult since little evidence is available. The coronal suture is still visible and with the exception of the first left maxillary molar, there is little wear on the fifteen available teeth. This supports an age determination of 30–40 years. The grave had been

robbed in antiquity, but the remaining grave goods suggest a high status burial (Perkins, 1991: 147).

The only evidence of pathology was confined to the internal surface of the frontal bone (Plate I). Most of the left side is present and displays smooth-surfaced nodular swellings, the most advanced overgrowth occurs at the broken edge, just lateral to the mid-line. Only a fragment of the right frontal bone was recovered, there is a slight swelling visible, suggesting that the condition was bilateral. The bone is heavier than normal. The mid-line and falx have been spared; the external surface is normal. There is no sign of hyperostosis on the other cranial fragments. The available elements of the post-cranial skeleton appear normal. An incidental finding is bilateral short root anomaly of both maxillary central incisors (Plate II).

DIAGNOSIS

The dry bone evidence, bilateral internal bone overgrowth localised to the frontal bone in a female, is highly suggestive of hyperostosis frontalis interna (Resnick and Niwayama, 1981: 3006). The radiographic appearance, showing bone expansion confined to the inner table supports this diagnosis (Plate III). The estimated age of the skeleton (30–40 years) is rather young for a diagnosis of HFI, a condition which predominantly involves post-menopausal women. However, cases are known to occur before the age of thirty (Eldridge and Holm, 1940; Moore, 1955: 155).[1] Also, in earlier societies, it is possible that the menopause occurred at a younger age.

DIFFERENTIAL DIAGNOSIS

Other conditions which may result in cranial hyperostosis include acromegaly; Paget's disease; fibrous dysplasia; Van Buchem's disease; Caffey's hyperostosis and neoplasm. Acromegaly and Paget's disease cause generalised cranial overgrowth and would not be restricted to the frontal bone. The latter would also be an unlikely diagnosis, based on the sex and age of the individual. The lack of post-cranial involvement does not support a diagnosis of fibrous dysplasia nor Van Buchem's

[1] In Eldridge and Holm's sample of 200 females with mental disease, 50 displayed HFI: 72% of which were over the age of fifty, but 12% (n6) were under thirty. In Moore's sample of 278 females aged 16–30 years, 14% displayed HFI.

PLATE I

SK 17: Internal surface of the frontal bone displaying hyperostosis. (Scale in cm.)
[Source: Andrew Savage, Canterbury Archaeological Trust.]

disease. Caffey's hyperostosis is a disease of childhood, which would also present with long-bone alterations. The radiographic appearance does not equate with bone neoplasm.

DISCUSSION

In modern medicine hyperostosis frontalis interna (HFI) is a well-known condition which predominantly affects post-menopausal women (Resnick and Niwayama, 1981: 3006). The aetiology is uncertain, although endocrinal imbalance is strongly implicated. In certain cases HFI has been associated with virilism, obesity and mental impairment, the so-called Morgagni-Stewart-Morel syndrome (Henschen, 1949; Putnam, 1974; Rowlands and Das, 1967; Stewart, 1928, 1941). Several authors have noted a link between HFI, obesity and diabetes mellitus

PLATE II

SK 17: Radiograph of the right maxilla. Bilateral short root anomaly of the central incisors.
[Source: Stuart Capel, Dept. of Radiography, Christ Church College, Canterbury.]

(Forgacs *et al.* 1972; Lengyel and Horváth, 1978; Pawlikowski and Komorowski, 1983; Putnam 1974; Verdy *et al.* 1978) and possibly hyperphosphatasemia (Gegick *et al.* 1973). In the majority of cases, however, HFI occurs as an isolated finding. It has been estimated that between 2.5 and12.2 per cent of the population may be affected (Pawlikowski and Komorowski, 1983; Salmi *et al.* 1962). The fact that the condition is largely sub-clinical means that its true prevalence is under-represented in modern medicine. Radiographic examination has shown that up to 62 per cent of asymptomatic post-menopausal females will display a mild degree of hyperostosis (Gershon-Cohen *et al.* 1955).

PALAEOPATHOLOGICAL EVIDENCE

A review of the palaeopathological literature suggests that HFI is a rare finding in archaeological skeletal material. Apparently only three cases have been published: A forty-year-old Nubian female dated to A.D.

PLATE III

SK 17: Radiograph of the frontal bone displaying bone overgrowth, restricted to the inner surface.
[Source: Stuart Capel, Dept. of Radiography, Christ Church College, Canterbury.]

300. (Armelagos and Chrisman, 1988); an elderly female from the Oseberg Viking ship burial (Moore, 1955: 175) and an elderly female from Poland (Gladykowska-Rzeczycka, 1988).

Since examination of skeletal material will permit recognition of even the mildest forms of hyperostosis the paucity of reported cases is rather surprising. As the condition is predominantly found in older females the rarity can be partially explained by the shorter life expectancy in earlier societies. However, the true incidence of the condition is probably under-represented in skeletal samples. Due to financial considerations outwardly normal skulls would not be subject to radiographic examination and consequently several cases will not have been detected.

CONCLUSION

Osteological and radiological examination of an Anglo-Saxon adult female skeleton from Sarre, Kent, dated to the sixth century, has revealed osseous overgrowth restricted to the internal surface of the

frontal bone. The favoured diagnosis of such changes in a female is hyperostosis frontalis interna. This appears to be the first published archaeological case from Great Britain. The condition is well-known in modern medicine, possibly affecting 2.5–12.2 per cent of the population. The apparent rarity in archaeological remains may, in part, be explained by the shorter life expectancy of earlier societies.

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