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OSTEOLOGICAL ANALYSIS OF A MEDIEVAL SHAMAN BURIAL FROM KUUSAMO IN NORTH-EASTERN FINLAND

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INTRODUCTION

A human skeleton was found in Lehtoniemi, Virrankylä, Kuusamo in July the 3rd 1970 and reported to the police as a possible homicide victim. Later examination by the police led to the conclusion that this was a much earlier burial. This was mostly based on the artifacts found together with the skeleton.

Skeletal remains were analyzed by professor Hirvonen, MD., in 1976 (Hirvonen 1976). He identified the skeleton as male based on the following features: narrow pelvis, wide mandible and large muscle attachment sites. He estimated the stature from the length of the left femur and concluded that the living stature of this individual was probably 158–168 cm. This person was not elderly based on his dental wear. Hirvonen found three separate perforations in the crania which he interpreted as possible bullet holes indicating possibly a violent death.

After the burial was considered rather old, the site was reported to the National Board of Antiquities and archaeological excavations were conducted (Kopisto 1971). Burial practices and associated artifacts (e.g., shaman drum stick) indicated a Sámi burial suggesting that person buried in this grave was a shaman (Kopisto 1971). This skeleton is currently part of a permanent exhibition at the Northern Ostrobothnia Museum.

As this skeleton was originally analyzed by a forensic medical expert, we wanted to perform re-examination from an osteoarchaeological point of view. The skeleton has gone through different taphonomic processes which can effect interpretations. We were especially interested in skeletal proportions, signs of physical activity, evidence of pathologies and any further information we could extrapolate from the skeleton.

COMPLETENESS, PRESERVATION AND DEMOGRAPHIC CHARACTERISTICS

The skeleton was relatively complete but many of the smaller and more delicate bones had been degraded or completely destroyed through post-mortem decay processes. In addition the facial and basicranial region of the skeleton had been subject to burning caused by the emplacement of a hearth within deposits immediately overlying the skeleton (Fig. 1). The upper jaws and teeth were missing but the mandible was largely intact with the crowns of the posterior teeth preserved. Much of the postcranial skeleton was present but many of the smaller and more delicate bones including the sternum, hand bones, patellae and most of the foot bones were absent.

The individual was assessed as an adult on the basis of closure of all secondary growth centres and eruption of the third molars. Age at death was estimated from dental wear (Miles 1962) and the morphological appearance of the auricular surface of the ilium (Lovejoy et al. 1985). The first and second molars showed extremely heavy occlusal wear with complete removal of surface enamel and exposure of the secondary dentine infilling the pulp cavity – as this pattern of wear may have been induced by non-dietary use of the teeth; these teeth were not used for estimation of age at death. The occlusal wear on the left third molar was consistent with an estimated age of around 40 years. The auricular surface showed residual striae, coarse granularity and slight microporosity and thickening of the apical margin. This appearance matched Stage 4 in the Lovejoy et al. (1985) ageing scheme, corresponding to an age at death of 35 to 39 years. Taken together with the lack of any degenerative joint disease or other age-related pathological conditions we

Fig. 1. Skull of the shaman illustrating perforation on the left parietal bone (arrow) due to weathering. Damages to the skull and cervical vertebrae are due to a more recent camp fire.

concluded that the individual was aged around 40 years old at time of death.

The sex of individual was assessed as male, on the basis of sex-specific morphological features documented by Buikstra and Ubelaker (1994) including the overall shape of the pelvis, the proportions of the sacrum, the mandibular angle and chin, the mastoid process and supra-mastoid crest, and the prominent development of the nuchal muscle attachments on the occipital bone.

STATURE, BODY SIZE AND MUSCULOSKELETAL MARKERS

Stature was estimated at 156.1 cm by the revised Fully technique (Raxter et al. 2006). This method incorporates measurements of the cranium, vertebral column and lower limb: the dimensions of missing skeletal elements (two cervical vertebrae, two thoracic vertebrae and talo-calcaneal height) were estimated by substituting mean values from a Swedish medieval sample from Westerhus (Gejvall 1960). The measurement of bi-iliac breadth was 25.0 cms, and body mass was estimated from stature and body breadth using the equation of Ruff et al. (2005). This morphometric method resulted in an estimated body mass of 51 kg.

Musculoskeletal markers were scored at the radial tuberosity, a site where the biceps brachii muscle attaches to the radius. The left and right radial tuberosities exhibited heavy ruggedness and severe stress lesions (Hawkey & Merbs 1995). The prominence of muscle attachment sites is influenced by the age and the body size of the individual (Niinimäki 2009). Considering the relatively young age and small skeletal size of this individual we can deduce that he must have been engaged in heavy physical activities during life. Some additional skeletal features reflected the strong muscular development, including the overall robustness of the skeleton and the presence of large, prominent ridges on the bones.

PATHOLOGICAL CONDITIONS

There were compression fractures of the bodies of the L2 and T11 vertebrae (Fig. 2). These fractures had caused marked anterior wedging of the vertebral bodies and would have caused some minor anterior curvature of the spine. Given the absence of any evidence of metabolic disease or of degenerative joint diseases in the spine it is most likely that these compression fractures were acquired as a result of one or more episodes of acute trauma involving vertical compressive loading of the spinal column. No other pathological conditions, such as degenerative joint disease, trauma or infection were observed on the skeleton.

We measured the femoral neck length (FNL) from the tip of the femoral head to the lateral aspect of femur along the neck axis. We also measured the neck-shaft angle between the long axes of the oblique femoral neck and the femoral shaft. These measurements were done directly from the bone with standard sliding calipers and protractor. The femoral neck was relatively short on both sides. The preservation was better on the left side and according to our measurements FNL was 89.4 mm. This value is relatively low compared to the mean value of 97 mm for male individuals in large cadaveric skeletal collection housed in the Anatomy department in Helsinki (Kamula 2009) that we used as a reference. Also the neck-shaft angles (left 132.5º, right 134º) differed clearly from the mean values in Helsinki sample (left 126 ± 6.3º, right 125.7 ± 5.7º). High values of the neck-shaft angle are typically associated with long femoral neck (Sievänen et al. 2007) but in this case the femoral neck was relatively short. This could indicate some abnormality in his habitual locomotion pattern.

There was a hole in the left parietal bone (Fig. 1), which had been interpreted previously as a bullet exit wound. However, with this inspection of the skeleton no other corroborating evidence supporting this theory was found on the skull. When dealing with perforations in bones, three possibilities needs to be considered: post-mortem damage to the bone, peri-mortem traumatic injuries, and ante-mortem lytic lesions due to infection or neoplastic disease (Kaufman et al. 1997). The cranial lesion shows no signs of bone remodeling and hence is not likely to have been caused by infection or neoplastic disease. Peri-mortem injury by a projectile can be excluded because the lesion does not show the pattern of bevelling or radiating fractures typically associated with such injuries. Trepanation is also unlikely because there is no evidence of healing or of features corresponding to scraping or cutmarks. The external surface of the cranial vault in the region of the lesion has been damaged by weathering that has caused substantial exfoliation of the bone surface. The hole is continuous with this broader region of erosion and the lesion is therefore attributable to natural post-mortem damage.

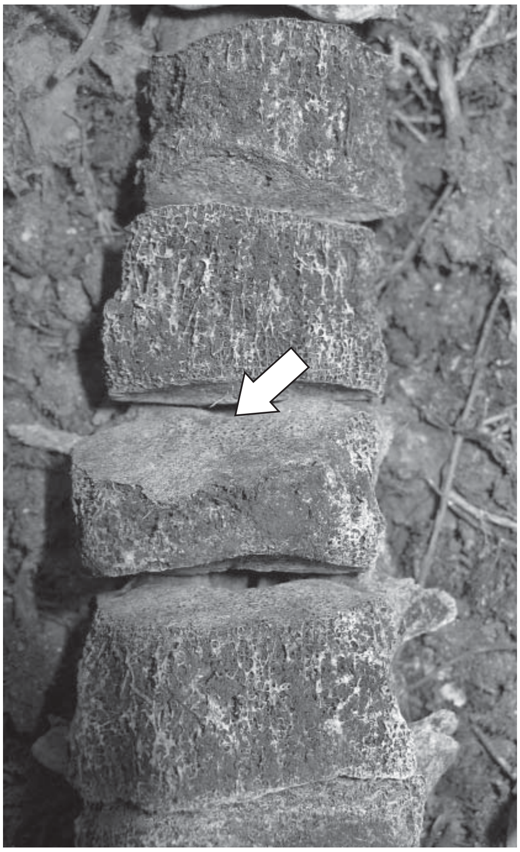

Fig. 2. Pathological condition of the vertebral body exhibiting anterior wedging (arrow).

DISCUSSION

Our basic osteological analysis of the age and sex coincided with the previous analysis. The subject was an adult male, probably between the ages of 35 and 45. We reconstructed the stature using a more accurate anatomical method, and our estimation was somewhat shorter than that of Hirvonen's. As limb lengths can vary according to nutrition and labor intensity, stature based on regressed long bone lengths are always less reliable and more population-dependent than stature-estimations acquired through anatomical method.

The previous interpretations of the skull perforations as bullet holes were not supported by our analysis. Based on the shape of the margins around the hole and the lack of bevelling we would conclude that these holes are the result of post-mortem taphonomic process on the bone. The only clear pathological lesions in this skeleton were found in two vertebral bodies, which exhibited compression fractures. The nature and occurrence of these fractures could have resulted from sharp vertical compression, for example from falling from a tree, slipping on ice, or lifting heavy load.

We could extract some new information from this skeleton using updated methods, such as assessment of body weight. We also could look at muscle attachment sites from a point of view of physical activity. This person was likely to have engaged in heavy physical activities during his life, as compared to skeletal material from 20th century Finns (Niinimäki 2009). This suggests that his status as a shaman did not exclude him from undertaking strenuous physical labor, either before or during his social role as a shaman.

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