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TRAUMATIC INJURIES IN OSTEOARCHAEOLOGICAL SAMPLES

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Abstract

Traumatic lesions are common in human skeletal remains from most archaeological periods. The site, degree and morphological characteristics of these injuries often indicate the cause and clinical severity. Trauma occurs as a result of inter- and intra-specific conflicts and violent encounters with environmental hazards.

Traumatic and paleopathological lesions from 7th-8th (N=1250) and 10th-11th (N=629) century Hungarian samples were studied using metric, radiographic and gross morphological observation.

The purpose of the present study is to add special cases of traumatic injury to the paleopathological literature: dislocation in the shoulder joint accompanied by severe arthritis; healed compound fracture in a femur complicated by infection, hypertrophic bone development due to traumatic myositis ossificans; osteosclerosis in maxillary bones with flattened nasal bones caused by mid-face fracture; and large holes in frontal and parietal bones due to surgical removal of depressed fracture fragments. Secondary pathosis of these changes and differential diagnoses (arthritis, osteotuberculosis, and developmental anomalies) are emphasized.

Key words: traumatic injuries, osteoarcheological samples, dislocation, fractures, myositis ossificans, trepanation

Introduction

Traumatic lesions are very common in human skeletal remains from most archaeological periods. Trauma occurs as a result of inter- and intraspecific conflicts and violent encounters with environmental hazards. The site, degree and morphological characteristics of these injuries often indicate the cause and clinical severity.

In paleopathology there are many attempts to categorize traumatic lesions. STEINBOCK (1976) divided the lesions into five groups, ORTNER and PUTSCHAR (1981) made use of eight categories, ZIMMERMAN and KELLEY's classification (1982) included more than eight groups, LOVRINČEVIČ and MIKIČ (1989) divided them as fractures, luxations, amputations and cuts.

The purpose of the present study is to add special cases of traumatic injury to the paleopathological literature: dislocation in the shoulder joint accompanied by severe

arthritis; healed compound fracture in a femur complicated by infection; hypertrophic bone development due to traumatic myositis ossificans; osteosclerosis in maxillary bones with flattened nasal bone caused by mid-face fracture; and large holes in frontal and parietal bones due to surgical removal of depressed fracture fragments. Secondary pathosis of these changes and differential diagnoses (arthritis, osteotuberculosis and developmental anomalies) are emphasized.

Materials and methods

The skeletal collections of the Department of Anthropology, József Attila University, Szeged, Hungary, served as a source of material for the study of traumatic and other paleopathological lesions.

The samples are derived from the territory of present-day Hungary and are dated from the 7th-8th century (n=654) and the 10th-11th century (n=629).

The paleopathological investigation has been carried out using gross observation supported by radiographic and metric methods.

Special cases on traumatic injuries

Dislocation

site: Szeged-Makkoserdő
specimen number: 241/1480
age: Adult (35-45)
sex: male
date: AD 700-800

Archaeological and anthropological background: The adult, male skeleton in this report was excavated by F. MÓRA and D. CSALLÁNY (in 1930 and 1940) from the Makkoserdő area of Szeged, Hungary. The archaeological remains indicate that this skeleton belonged to the late Avar Period (AD 700-800). Of the 152 skeletons, 41 were infant or juvenile, 57 were adult male, 45 were adult female and 9 were indeterminate (VÁMOS, 1973). Many individuals suffered lesions of the bones and teeth, mostly osteoarthritis, fractures, osteotuberculosis, porotic hyperostosis, congenital anomalies, caries lesions or enamel hypoplasia (MARCSIK, 1978; MARCSIK and BAGLYAS, 1987).

One skeleton, that of a 35-45 year old male (grave no. 241), was especially pathological and showed a unique traumatic lesion.

Gross morphological condition: The following bones are missing for 241/1480: left clavicle, vertebrae C1, C3-C5, the bones of both hands, both naviculare, cuboids, and three cuneiforms in each foot. Of special interest are right scapula and humerus which show an anterior dislocation of the right shoulder. The proximal humerus articulates with a new joint on the anterior surface of the scapula, directly adjacent and medial to the glenoid fossa. A secondary joint is also located on the humerus at the location of the inferior posterior portion of the greater tuberosity. Each of these new

joint display a porous surface with extensive arthritic degeneration, including marked eburnation on both scapula and humerus (Fig. 1).

Fig. 1. Szeged-Makkoserdő, no. 241/1480. Dislocation in the right shoulder.

Diagnosis and discussion: The mass of bone inferior to the false joint on the humerus is due to osteophytic invasion (myositis ossificans traumatica) of the tendon (and muscle) of the muscles latissimus dorsi and pectoralis major, especially the anterior lamina, as a result of the traumatic severance of these muscles at this location. A traumatic origin is further suggested by the fact that the humerus is rotated laterally approximately 90° such that the new humeral joint is located on the greater tuberosity and not on the head. This lateral rotation would be the natural action after severing the muscles responsible for medial rotation at the shoulder joint. This is in contrast to a similar condition described by ORTNER and PUTSCHAR (1981). Their case shows less medial displacement and medial rather than the lateral rotation of the humerus as displayed in our case. Similarly, WELLS (1982) described two cases with clear evidence of dislocation in the shoulder joint accompanied by severe arthritis, remodelling of the bones and development of a false joint in a Cirencester skeleton.

In our case the traumatic origin is suggested on the basis of the above mentioned facts rather than a tuberculous infection supposed earlier (MARCSIK and PÁLFI ,1993).

Traumatic myositis ossificans
site: Kiskőrös -Városalatt
specimen number: 81/2654
age: adult
sex: male
date: AD 700-800

Archaeological and anthropological background: The skeletal material is published by LIPTÁK (1983). The archaeological publication of this cemetery was due to HORVÁTH (1935), the material was revised by LÁSZLÓ using his own methods (in LIPTÁK, 1983). The anthropological material studies consists of 49 male and 53 female, 16 juvenile and infants, and 2 indeterminate. In paleopathological aspect the skeletal material is poor. There are no serious cases (slight osteoarthritis, vertebral osteophytosis and porotic hyperostosis (MARCSIK, 1978; 1984). One skeleton has an interesting traumatic lesion: myositis ossificans.

Gross morphological condition: This skeleton is well preserved without any pathological alterations except of the right femur. On the femur there is an exuberant growth of bone on the posterio-lateral aspect of the femur shaft extendings from the insertion of the adductor muscles. The extent and the shape of the bony mass suggests ossification in muscle tissue rather than callus formation. The length of the bony mass is about 15 cm. This type of ectopic bone can be attached or develop in muscle tissue quite apart form the parent bone (Fig. 2).

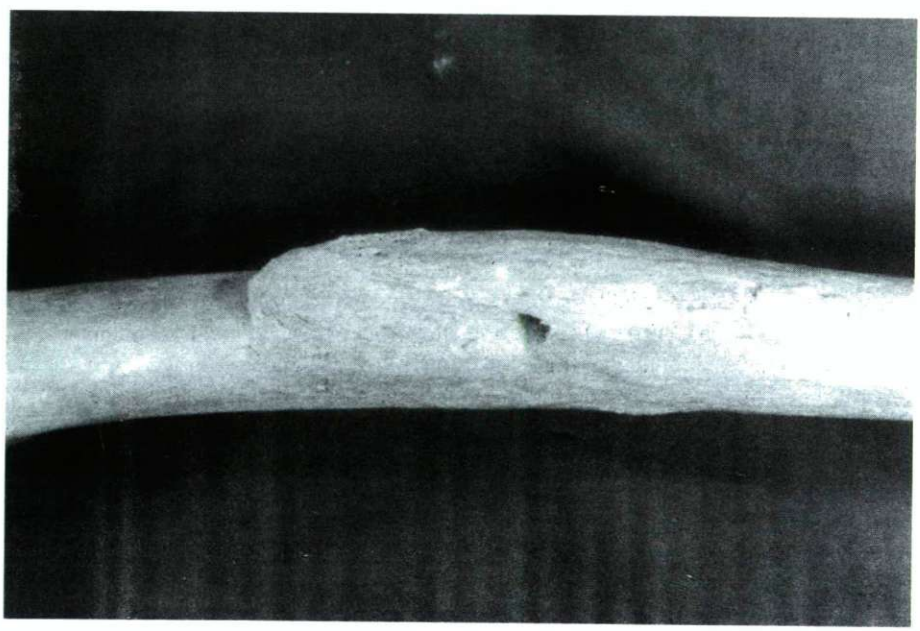

Fig. 2. Kiskőrös-Városalatt, no. 81/2654. Traumatic myositis ossificans on the right femur.

Compound fracture
site: Szeged-Fehértó-A
specimen number: 1772
age: adult
sex: male
date: AD 700-800

Archaeological and anthropological background: The Szeged-Fehértó-A cemetery was excavated by F. MÓRA with K. SEBESTYÉN in 1929-1932. On the basis of the archaeological finds, this skeletal material dated to AD 700-800. Ninety-one male, 88 female, 2 undeterminable adults, and 25 infant and juveniles made up this sample (LIPTÁK and VÁMOS, 1969). Pathology and developmental anomalies abound: craniostosis (scaphocephaly), Stafne idiopathic bone defect, traumatic injuries (parry fractures), porotic hyperostosis, osteoarthritis, and diffuse osteoporosis (MARCSIK, 1978, 1984; FINNEGAN and MARCSIK, 1980, 1981).

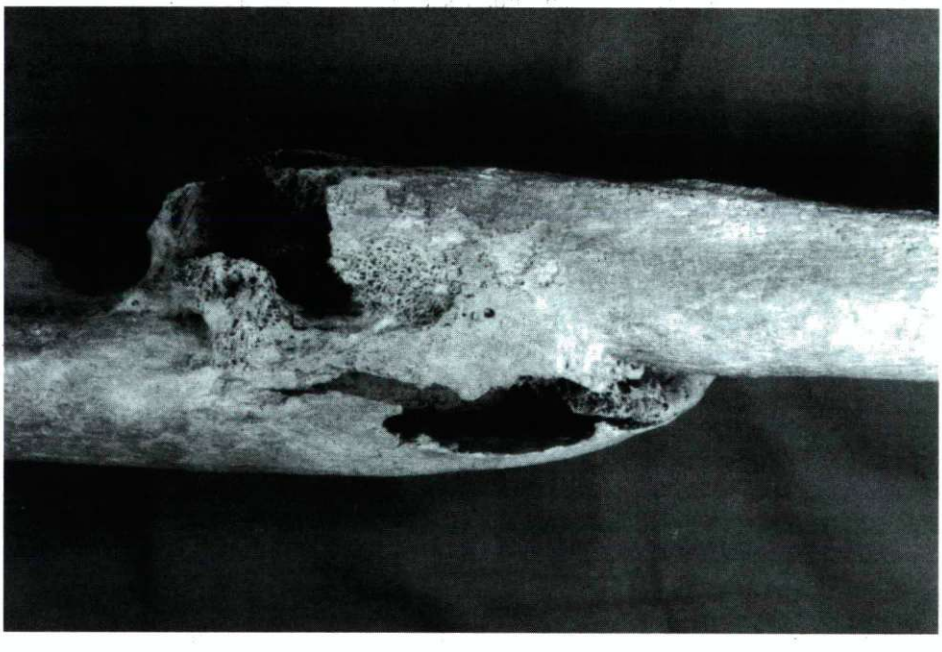

Fig. 3. Szeged-Fehértó-A, no. 1772. Healed compound fracture in the right femur.

One femur of an adult male (no. 1772) showed the trace of a healed compound fracture.

Gross morphological condition: this femur has been separated from the other bones of this individual during the postmortem interval. A compound fracture of this isolated femoral shaft is replete with a large draining sinus. The infected fracture shows

considerable disturbance during the healing process, including the development of periostitis and osteomyelitis. The resorption of necrotic bone and the development of new bone are retarded or may not occur at all. The final outcome of the compound fracture depends on the duration of the infection and on the amount of bone lost at the site of fracture. Infections of long duration or involving excessive amounts of bone loss may present bony union. A large sinus tract with a drainage opening indicates that infection was present at the time of death (Fig. 3).

Healed mid-face and nasal fracture
site: Püspökladány-Eperjesvölgy
specimen number: 621/85. 542. 1.
age: juvenile (18-20)
sex: female
dated: AD 1000-1100

Archaeological and anthropological background: This juvenile female skeleton is one of 368 adults, 43 juveniles, 206 infants and 12 indeterminate skeletons excavated from the cemetery at Püspökladány-Eperjesvölgy (eastern part of Hungary) by I. NEPPER between 1977 and 1982 (SZATHMÁRY and HÜSE, in press; PAUDITZ, 1995). Many paleopathological lesions were observed in this skeletal material (PAUDITZ, 1995): sacral spina bifida, sacralization as a developmental anomaly, non-specific infections (mastoiditis, periostitis), osteotuberculosis (?), signs of hematogenous and metabolic diseases, arthritis in many specimens and benign tumor. Traumatic lesions are seen as, fractures in 6 individuals, symbolic trepanation on 5 skulls, and surgical trepanations followed by cutting in three cases. One specimen (grave 621) is very special for mid-face and nasal injuries.

Gross morphological condition: a portion of the maxilla, near the nasal cavity, is sclerotic. Consequent to injury, the nasal cavity is narrowed, the nasal bones are partially fused, very flat, and do not protrude. Inside the nasal cavity there are signs of periostitis, the ridge of the nasal cavity is rough and uneven, and an incisive suture can be seen. There is a partial absence of the premaxilla region, total absence of the upper incisors, and an abnormal communication between nasal and oral cavities. The palatal dental arch is narrower than in the normal case. The upper incisors were probably protruded (not alveolar prognathism) based on the direction of the sockets of the upper canines. A blow to the nasal region could have affected the nasal bones above and the maxillae below causing a radiating fracture (Fig. 4) with subsequent fracturing and resorption of the adjacent alveolar process of the intermaxilla. The results of the post-traumatic inflammation (probably with infection) are seen in fused nasal bones and a narrowed nasal cavity (a 10 mm breadth where normal breadth is 25 mm).

Discussion and diagnosis: this bilateral healed mid-face fracture extends across the anterior facial region. There is no evidence of osteomyelitis (only periostitis) in the nasal cavity. The fracture lines are indicated on x-ray picture by the visible radiolucent area surrounded by thickened bone (MARCSIK and KOCSIS, in press). Based on the degree of healing and remodeling, the injury (blow?) occurred quite some time before death.

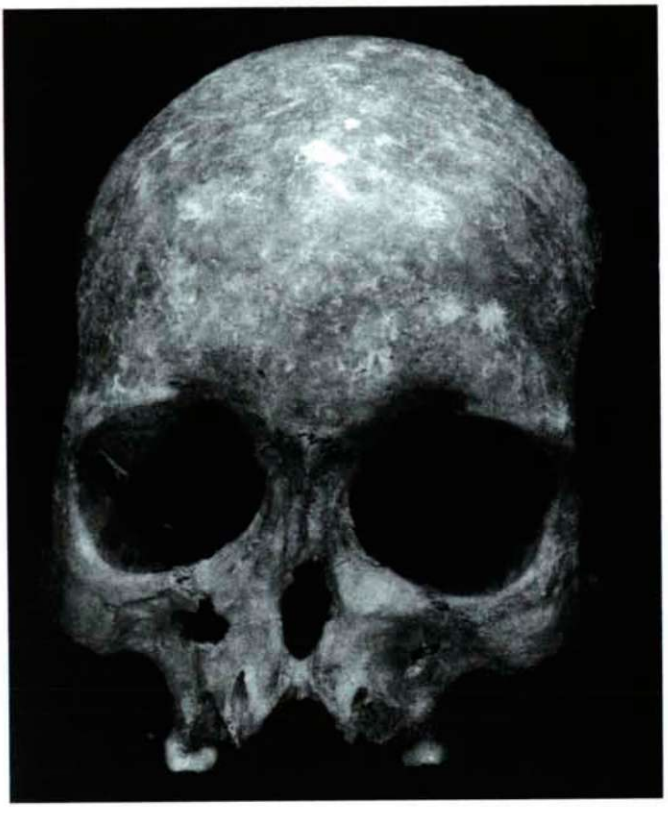

Fig. 4. Püspökladány-Eperjesvölgy, no. 621/85. 542. 1. Healed mid-face and nasal fracture.

Removal of fractured fragments surgery trephination
site: Püspökladány-Eperjesvölgy
specimens number: 147/85. 112. 1, 299/85. 236. 1, and 26/85. 24. 1.
age and sex: no. 147 a mature male; no. 299 an adult female; no. 26 an adult male (see the case above for cemetery demographics)

Grave no. 147: the lesion is confined to the frontal bone. There is a large hole which is probably due to a removal of depressed fracture fragment(s) during surgery (Fig. 5). There is evidence of significant healing, indicating that the patient had not died during or immediately after trephination. (Grave no. 26: the lesion is similar to no. 147).

Grave no. 299: extensive trephination: this large lesion lies primarily between the frontal and parietal bone (Fig. 6). As seen by the considerable bone remodeling, this individual survived the trephination for an extended period of time.

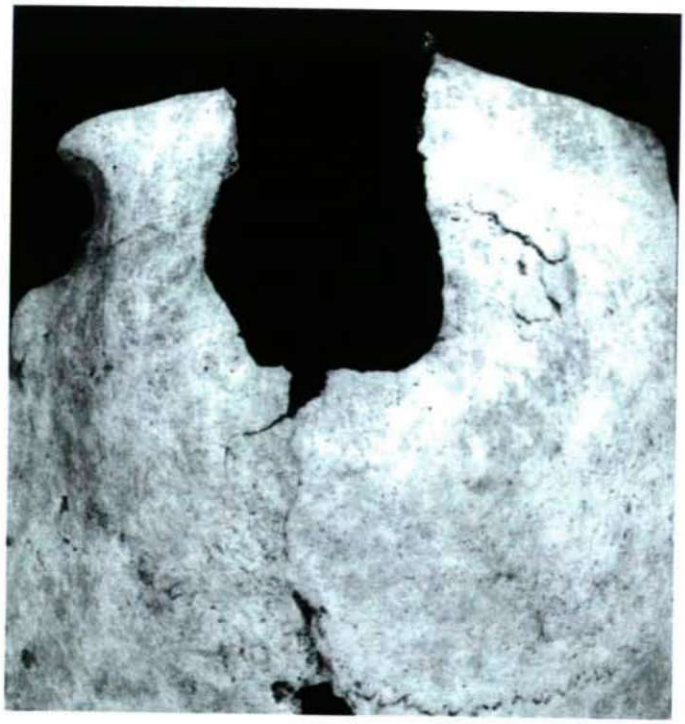

Fig. 5. Püspökladány-Eperjesvölgy, no. 147/85. 112. 1. Removal of fractured fragments surgery trephination.

Summary

The specimens reported here showing dislocated shoulder, mid-face fracture, myositis ossificans traumatica and the surgical trephination of fractured fragments, are interesting traumatic/pathological cases found in a series of over 3000 skeletons studied from southern and eastern Hungary representing the Late Avar period (7th and 8th century) and the Hungarian Conquest period and early Arpadian age (10th century and 11th century).

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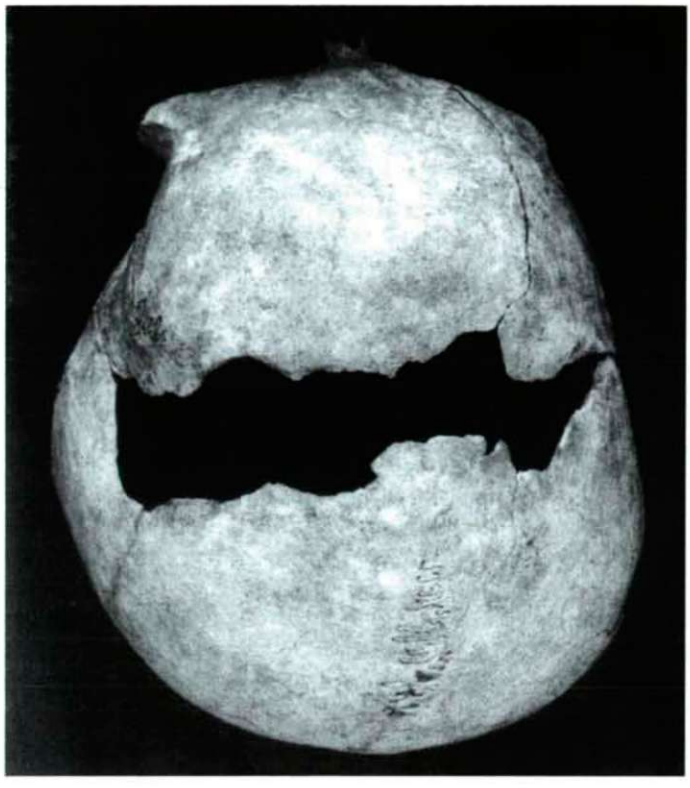

Fig. 6. Püspökladány-Eperjesvölgy, no. 299/85. 236. 1. Removal of fractured fragments surgery trephination.

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