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Trephined skulls from ancient populations in Hungary

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Two kinds of trephinations, surgical and symbolic, are found on the osteological remains of ancient populations. In both cases a bony portion of the cranial vault is removed from the skull. Surgical trephination creates communication between the cranial cavity and the environment; it is mainly done for medical purposes. When a trephination is symbolic, only the externel cortical layer (maybe together with the spongious part) of the vault is removed; the reason of this intervention is always cultical. The practice of trephining is known since very early times. Successful surgical trepanations showing definite evidence of healing were found in Bronze Age sediments in present-day Hungary and frequently occurred till modern times. Symbolic trephination can be regarded as special pagan Hungarian custom in the Carpathian Basin, as it was introduced to the area at the age of the Hungarian Conquest (896 A.D.). Its frequency rapidly decreased with the spreading of Christianity and disappeared at the beginning of the 12th century. **Materials and methods**. Literature survey and macroscopic analysis of osteological materials. Results. Five new cases of trephination deriving from 10–11th century Hungarian populations are described. **Discussion and conclusions**. On the basis of these data we propose a new interpretation of techniques used for trephinations with irregular appearance. In connection with this, we also present a possible explanation of the high frequency of survival among the trephined Hungarians during the era of the Conquest.

Key words: 10–11th century, symbolic and surgical trephination, Hungary

INTRODUCTION

One of the most extraordinary traumatic lesions of paleopathology is trephination. The history of the phenomenon is dated back to the Neolithic Age (1–3). There is a lot of evidence of this practice all over the world. Basically, it is the artificial removal of the cranial bone carried out in different ways and for different purposes (3). In case of surgical trepanation, a bony piece of the cranial vault is cut out from the skull of living subjects in order to cure aftermaths of cranial fractures and wounds, headaches, mental retardation, brain tumors or other diseases. Trephination-like holes were also made on corpses in order to obtain bony fragments with magic properties or for other purposes (3). These are the so-called cultical trephinations. The third type, the custom of symbolic trephination, was cultivated by a great number of peoples in Eastern Europe (1, 2). Creating this lesion, only the upper compact and the spongious parts were removed in a distinct spot of the calvaria; no connection between the endocranial space and the outer world was established. The object of the latter is unknown, ritual-medical reasons are as possible as religious causes or higher social status.

The early Hungarians, after conquering the Carpathian Basin (896 A.D.), tried to continue their old traditional way of life in the 10th century (2). Many of their pagan rites of eastern origin, just like trepanning, were kept alive during the next century (4–8). The prevalence of symbolic trephination cases decreased through the 11th century after Christianity had been introduced, and diminished in the 12th century (2, 4).

Symbolic trephination was performed only on adults; no subjuvenile evidence has been recovered yet. More males were trepanned than females (2). Trephination may occur as a single or a multiple lesion; in the latter case it is often located symmetrically. In the majority of cases the trephination is around the bregma, less frequently around the vertex, or along the sagittal and coronal sutures. The shape is often round or oval, rarely elliptic or resembles the form of a plum-seed. Considering the method of preparation, skin was first cut and folded aside, then a circular engravement was made following the desired shape, and finally the central round bone piece was stroken out (Fig. 1). As indicated by Nemeskéri et al. (2), the process can be completed by using a simple, sharp and strong knife.

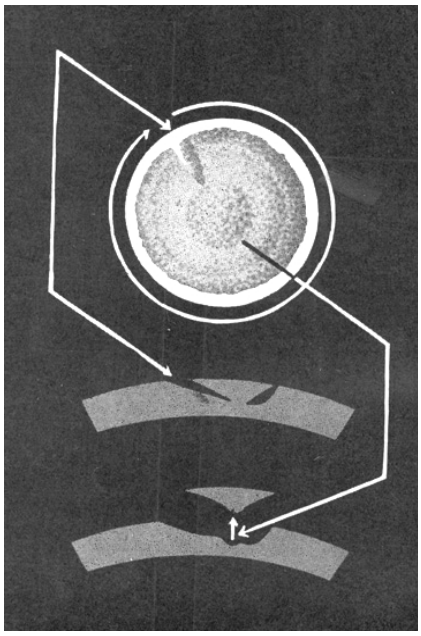

Fig. 1. Method of preparation for symbolic trephinations (Nemeskéri et al., 1960)

We studied the relevant literature on the subject and found a few new cases of trephination in the 10–11th century skeletal populations deriving from the area of today-Hungary. In this paper, we would like to present these new, unusual cases of surgical and symbolic trephination. On the basis of these data, we propose a new interpretation of the method used to perform some uncommon elliptic trephinations. In connection with this, we also propose a possible explanation of the high frequency of survivals among the trephined Hungarians during the era of the Conquest.

MATERIALS AND METHOD

The skeletal material derives from two 10–11th century cemeteries in southern Hungary. The first four cases were recovered at Hódmezõvásárhely-Nagysziget. The excavations were completed in several periods supervised by the late Gyula Gazdapusztai, László Révész and Katalin B. Nagy from 1957 to 1992 (9–15). The series consisted of 135 graves; the anthropological examination of the remains of 131 individuals was possible. Most cases derive from the southern, 10th century part of the cemetery, though, on the basis of archeological data, their exact historical age cannot be determined. The calvaria of 59 individuals were suitable for investigation. Among them, 2 surgical and 2 symbolic trephinations were found.

The fifth case, a symbolic trephination, derives from the skeletal material excavated at Sarkadkeresztúr-Csaphãti legelö under the supervision of Pãl Medgyesi from 1989 to 1991 (16). This cemetery consisted of 133 graves, from which the study of 104 individuals was possible.

Fig. 2. Hódmezövãsãrhely-Nagysziget, grave no. 55, mature female: surgical trephination

Fig. 3. Hódmezövãsãrhely-Nagysziget, grave no. 55, mature female: porotic zones around the surgical trephination

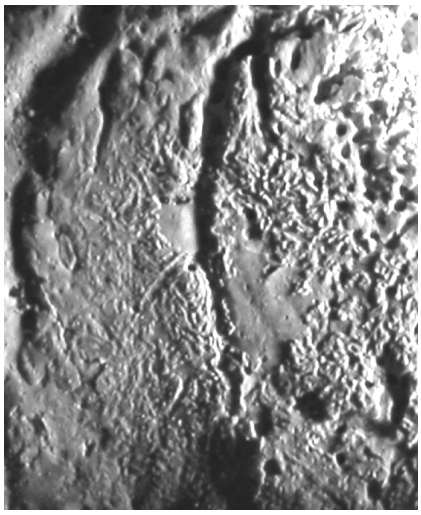

Fig. 4. Hódmezövãsãrhely-Nagysziget, grave no. 55, mature female: endocranial view of the edge of trephination

Sex and age at death were determined applying the methods of Éry et al. and Acsãdi-Harsãnyi-Nemeskéri (17). The archeological evaluations of the cemeteries are incomplete; some of the data utilized here were obtained from oral communications of the archeologists. The skeletal material is housed at the Department of Anthropology, University of Szeged, Hungary.

RESULTS - SURGICAL TREPHINATIONS

Hódmezövãsãrhely-Nagysziget, Grave no. 55, mature (40–50) female

An almond-shaped hole is seen in the right parietal bone (Fig. 2). The hole is 4 cm long, 3 cm wide and is situated 2 cm above the right temporal bone. The edges are surrounded by porotic and lacunar zones (Fig. 3). Both cranial surfaces are hypervascularised; the endocranial surface is covered by a new periosteal bone layer (Fig. 4). The most possible explanation of the alterations is that the surgical trepanation after being prepared became infected (3). The induced inflammation may have played a role in the death of the individual, who, however, must have survived the operation for some time (18).

A hole in the cranial vault surrounded by porotic areas could be regarded as the sign of metastatic carcinoma, infectious disease (*e. g.*, skeletal tuberculosis) or many other illnesses (3). These etiologies are doubtful because of the fact that no other similar lesion has been observed on the skeleton. X-ray pictures did not show any alterations in the spongious layer either (Fig. 5). Thus, the diagnosis of surgical trephination seems to be the most likely.

Hódmezövãsãrhely-Nagysziget, Grave no. 76, adult (35–42) male

A 6 × 6 cm circular hole can be seen in the middle of the right parietal bone (Fig. 6). The edges are almost horizontal; all three layers of the bone can be observed, except for a 1cm long section where a slight cortical layer covers the exposed spongious tissue (Fig. 7). Below the circular absence an additional hole of irregular shape run in the direction of the temporal bone, which is missing. The lesion is most likely the aftermath of a glancing sword-cut. The circular hole is caused by the flat of the sword, the additional fractures below probably occurred when the weapon was pulled out of the wound. To dress the wound, the help of a surgeon was needed: splinters have been removed, edges were evened. The traits of surgical intervention are still visible for the broken edges are smooth-rubbed in a 3–4 mm wide band (Fig. 7). The low level of healing indicates that the man did not die immediately after the injury and the operation, but only survived for a short time (3, 19).

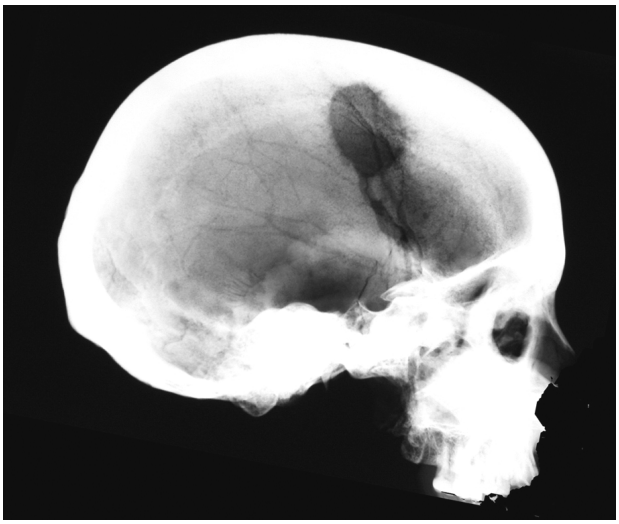

Fig. 5. Hódmezövãsãrhely-Nagysziget, grave no. 55, mature female: X-ray photo of the skull

Fig. 6. Hódmezövãsãrhely-Nagysziget, grave no. 76, adult male: surgical trephination

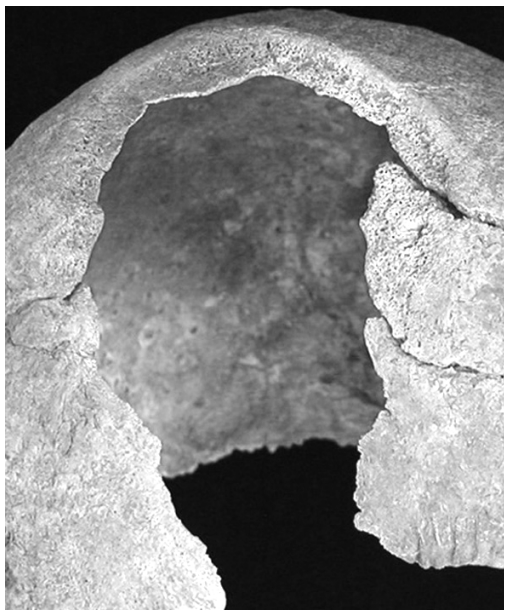

Fig. 7. Hódmezövãsãrhely-Nagysziget, grave no. 76, adult male: magnified view

RESULTS - SYMBOLIC TREPHINATIONS

Hódmezövãsãrhely-Nagysziget, Grave no. 20, senile (60–65) male

Along the sagittal suture, an approximately 4 × 2.5 cm sharp and thin elliptic scar can be observed on the left parietal bone. The line is incomplete at a 2 cm left-dorsal section. The scar could be regarded as a *post mortem* fracture of the cranium, but all real *post mortem* fissures of the skull are completely different (Fig. 8). The regular elliptic shape, indeed, must be in connection with some intentional human intervention. We presume that the lesion is a discontinued case of an uncommon elliptic symbolic trephination. Some of the plum-seed-shaped and ellipic trephinations were only engraved along the desired shape and their center would not be stroken out (4, 7, 20). When starting the preparation of this special engraved trephination case, the process was disrupted, and the 'surgeon' could only carve the shape into the bone. Later, the skull suffered *post mortem* fractures in the soil, which enhanced some sections of the elliptic scar.

Symbolic trephinations occur most frequently around the bregma and along the coronal or sagittal sutures (2, 4, 8). The present case was found in the latter location.

Fig. 8. Hódmezövãsãrhely-Nagysziget, grave no. 20, senile male: symbolic trephination

Hódmezövãsãrhely-Nagysziget,
Grave no. 65, senile (60–70) female

A 3 × 2 cm depression is observed on the left parietal bone near the bregma. The margin of the lesion involves the sagittal suture (Fig. 9). The surface of the depression is uneven but not rough, the edges cannot be defined due to advanced remodeling. The lesion is a healed symbolic trephination, made several years before the death of the individual. The possible method of preparation is the most common one mentioned in Introduction (2, 21).

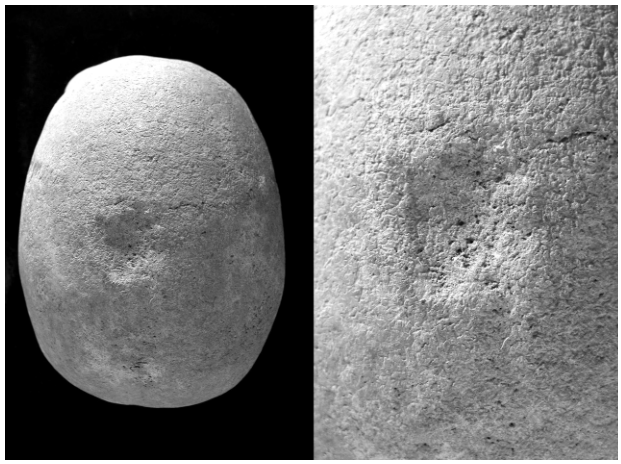

Fig. 9. Hódmezövãsãrhely-Nagysziget, grave no. 65, senile female: symbolic trephination

Sarkadkeresztúr-Csaphãti legelö
Grave no. 85, senile female

'A 2.5 × 2 cm oval depression is seen in the middle of the sagittal suture right on the vertex (Fig. 10). The surface is 3–4 mm deep and completely smooth. No other similar lesions were observed on the skeleton and there is no sign of any disease that could possibly cause such alterations. The lesion seems to be a well-healed symbolic trepanation that occurs in a less frequent but well-known location. The method of preparation is similar to the case before.

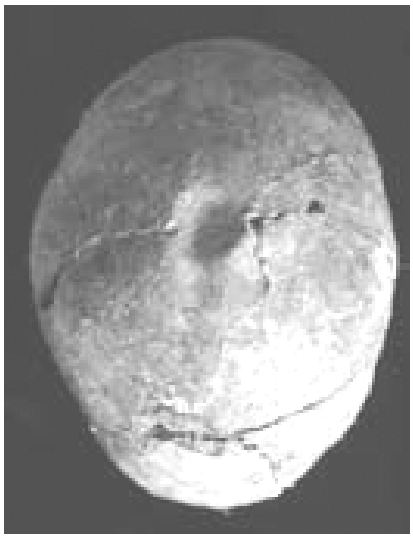

Fig. 10. Sarkadkeresztsr-Csaphãti legelö, grave no. 85, senile female: symbolic trephination

DISCUSSION

Since only a few cemeteries from the 10–11th century have been studied by anthropologists so far, the most important results of our study in connection with the five new cases are the new data on the incidence of surgical and symbolic trephination. The 'postoperati-

ve inflammation' and sword-cut cases give further information on the preparation and consequences of surgical trephination. Among the symbolic cases, the first one requires most attention. This oval scar has hardly any comparisons in literature. The shape resembles the very rare oval and plum-seed-shaped trephinations, which are only engraved in the bone, and their central portion is not stroken out. In our case, such a trephination could have been the possible desire of the 'surgeon', but the intervention was disrupted and only the initial scars were made on the bone. It seems to be quite possible, however, that all symbolic trephinations in general, even though made in different shapes, may have had similar initial steps.

As trephination was quite common among the early Hungarians and almost each cemetery contains surgically and/or symbolically trephined skulls, there are grounds to suppose that the trepanning method they used was more effective and safer than any other known before. The usual high-level healing of trephinations refers to reliable medical experiences among their medicine men.

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TREPANUOTOS KAUKOLËS SENOSIOSE VENGRIJOS POPULIACIJOSE

Santrauka

Traumos yra viena ið daþniausiai pëdsakus kauluose paliekanèiø patologiniø procesø rûðiø. Be daugelio kitø, trauminiams paþeidimams priskiriamos ir trepanacijos. Senøjø populiacijø osteologinëje medþiagoje aptinkamos dviejø rûðiø trepanacijos – chirurginës ir simbolinës. Abiem atvejais paðalinama dalis kaukolës skliauto. Chirurginës trepanacijos pasekmë yra atviras susisiekimas tarp kaukolës ertmës ir aplinkos; jos daugiausia atliekamos gydymo tikslams. Simbolinës trepanacijos atveju paðalinama tik iðorinë kaulinë plokðtelë (galbût kartu su akytàja medþiaga); tokios intervencijos tikslas visada yra religinis. Trepanacijos þinomos nuo seniausiø laikø. Dabartinës Vengrijos teritorijoje randami sëkmingø trepanacijø atvejai su akivaizdþiais gijimo pëdsakais nuo bronzos laikotarpio iki dabartiniø laikø. Simbolinës trepanacijos gali bûti laikomos specifiniu pagoniðku paproèiu, paplitusiu Karpatø þemumoje Vengrijos Nukariavimo metu (896). Tokiø trepanacijø plintant krikðèionybei sparèiai maþëjo, o XII a. pradþioje jos visiðkai iðnyko. Straipsnyje apraðomi penki nauji trepanacijø atvejai, nustatyti tarp X–XI a. Vengrijos gyventojø. Remiantis ðiais duomenimis, siûloma nauja trepanaciniø angø nelygiu pavirðiumi interpretacija, pateikiamas galimas aukðto iðgyvenamumo procento po trepanacijø Nukariavimo epochoje aiðkinimas.