

UNIVERSITY OF SZEGED  
FACULTY OF SCIENCE AND INFORMATICS  
PHD SCHOOL IN BIOLOGY

**THE TREPHINING TRADITIONS OF THE AVARS AS REFLECTED IN THE  
BIOARCHEOLOGICAL MATERIAL OF THE SOUTHERN GREAT PLAIN**

SUMMARY OF THE PHD THESIS

AUTHOR: ZSOLT BERECKZI

SUPERVISOR:

GYÖRGY PÁLFI PHD, ASSOCIATE PROFESSOR, HEAD OF THE DEPARTMENT

DEPARTMENT OF BIOLOGICAL ANTHROPOLOGY

UNIVERSITY OF SZEGED

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## INTRODUCTION

Trephinations or trepanations are intentional, non-violent cranial interventions where bone substance is surgically removed from the vault (Aufderheide-Rodríguez-Martín, 1998; Arnott *et al.*, 2003; Ortner, 2003). Different forms of trephination have already been practiced in the Upper Paleolithic (Dastugue, 1962; Goikhman, 1966; Lisowski, 1967; Margetts, 1967; Vlček, 1995; Marinis, 2003; Bello *et al.*, 2011). The literature of trephinations is abundant. The earliest traces of surgical interventions occur as trephinations in the bioarcheological remains (Glory-Roberts, 1947; Dastugue, 1962; Crubézy *et al.*, 2001). Cases with signs of such interventions have been reported from almost every continent and historical period. Series of trephined cases have several times been analyzed in smaller geographical or chronological units by foreign and Hungarian scholars too (Broca, 1867, 1876; Prunières, 1868; Manouvrier, 1895; Guiard, 1930; Piggott, 1940; Stewart, 1958; Nemeskéri *et al.*, 1960; Ferembach, 1962; Bartucz, 1966; Vlček, 1995; Grynaeus, 1996; Lillie, 1998; Arnott *et al.*, 2003; Fóthi-Józsa, 2007a; Zalai-Gaál, 2009; Wieczorek-Rosendahl, 2011).

The Hungarian scientific practice identifies three different forms of trephination (Nemeskéri *et al.*, 1960). In case of surgical trephinations, all three layers of the bone were cut through in the skull of a living person. In case of symbolic trephinations, the external cortical layer (sometimes with parts of the *diploe*) was removed in certain spots of the skull. Cultural trephinations were performed *post mortem* in order to open the skulls of the deceased for ritual reasons.

Examples of all three types of trephination have been recovered in the Carpathian Basin. Their research began in the 19<sup>th</sup> century, slightly ahead of the start of investigations in Western Europe (Jankovich, 1835; Érdy, 1858). Hungary is extremely rich in trephined skulls, the material is of worldwide significance. Unlike in Western Europe, trephinations in the Carpathian Basin are rare in earlier prehistory (Bartucz, 1966; Józsa-Fóthi, 2007a) and only become frequent in the Bronze Age. This may be explained by increasing mobility of populations of the Carpathian Basin observed from the Late Neolithic to the Bronze Age (Giblin *et al.*, 2013), allowing rapid occurrence of new knowledge and customs in the area. Later historical periods regularly provide trephined cases, but the Conquest Age is predominantly rich in these finds (Anda, 1951; Nemeskéri *et al.*, 1960, 1965; Bartucz, 1966; Grynaeus, 1996; Bernert *et al.*, 2006; Józsa-Fóthi, 2007a).

The international scientific community knows very little about the results of the Hungarian trephination research, since the findings are hardly ever presented in international forums or published in foreign languages. In my opinion, communication of the results to the non-scientific audience in Hungary would also be essential, and not only museums and public collections should be engaged in this task, but institutes of higher education and other academic research facilities as well.

The subjects of my thesis' investigations came from the Avar Age (6-9<sup>th</sup> c. AD) bioarcheological material of the Southern Great Plain, where all modification phenomena including the three types of trephinations known in Hungary occur in this period. The Avars played a very important role in the history of the Carpathian Basin and probably in the formation of the cultural and biological profile of the Hungarians.

My investigations are part of a larger work intended to put up a database including all cranial modification cases found in the Southern Great Plain, that I have been working on since 2005. As for the aims and scope, this project is yet unparalleled in Hungary. With my colleagues we have already published preliminary results of the construction of the modification database in several papers (Berezki-Marcsik, 2005b, 2006; Berezki *et al.*, 2007; 2010, 2013; Berezki-Mihácz-Pálfi, 2013).

## **AIMS OF THE STUDY**

The aim of my thesis is to introduce and analyze the Avar Age trephination cases of the Southern Great Plain found in the scientific literature or in the bioarcheological collection curated at the Department of Biological Anthropology, University of Szeged (Anthropological Biobank of the University of Szeged, see Hungarian Network of Strategic Research Infrastructures (SKI): <https://regiszter.nekifut.hu/ki/687>).

The aims of my thesis are as follows:

- I. To review the international and Hungarian literature of each trephination phenomenon.
- II. To collect and introduce all trephination cases found in the Southern Great Plain.
- III. To describe new cases and to put up a cadaster of finds.

IV. To analyze and evaluate the material in accordance with the literature of the certain trephination phenomenon and the Avar context.

## **MATERIAL AND METHOD**

The investigated material of my thesis derives from formerly published trephination cases from the southern Great Plain and the following excavations of Avar Age sites from the recent past.

The Szeged-Kiskundorozsma-Kettőshatár I. 26/4 (M5 Nr. 63=M43 5.) site consists of two Late Avar Age cemeteries excavated by Patrícia Mészáros, Tibor Paluch and Csaba Szalontai in 2004 as part of a series of rescue excavations along the motorway M5 (Mészáros *et al.*, 2006). The site is dated to the 7-9<sup>th</sup> centuries AD. The first cemetery at Szeged-Kiskundorozsma-Kettőshatár I. (mentioned as Kettőshatár hereafter) consisted of 298 graves dated from the end of the 7<sup>th</sup> c. to the beginning of the 9<sup>th</sup> c. AD. The second cemetery of Kettőshatár was located 60 m away from the first one and consisted of 43 inhumations dated to the end of the 8<sup>th</sup> century AD. The two graveyards together contained the remains of 360 individuals (121 infants, 239 adults (130 males, 109 females); Marcsik *et al.*, 2010). Preliminary results of the osteological investigations have already been presented in international forums (Molnár *et al.*, 2006, Marcsik *et al.*, 2009, 2010). The newly found trephination cases were published in Hungarian (Berezki *et al.*, 2007) and in English (Berezki *et al.*, 2010) in a detailed paleopathological analysis.

The Late Avar site called Bélmegyer-Csömöki-domb (MRT 10. 342-348. 3/37. lh.) was excavated by Pál Medgyesi in 1985-89 (Medgyesi, 1991). In the course of the excavations a total of 243 graves have been unearthed dated to the 8<sup>th</sup> c. AD. According to the archeologist, 48 grave contained remains of infants, the rest belonged to adults. The trephined cases of the series were mentioned in a couple of earlier MSc theses written in the department (Józsa, 1990; Medvegy, 1994; Erdei, 1995), but the diagnoses were insufficient. The surgical trephination of the series was mentioned along with the description of the extraordinary symbolic lesions in an international journal (Berezki *et al.*, 2013).

The rescue excavation of Csárdaszállás 21. lelőhely (Hanzély-tanya, MRT 10. 385. 4/21. lh.) was lead by Pál Medgyesi in 1998. Among a total of 19 graves, 15 inhumations dated to the turning of the 7-8<sup>th</sup> c. AD were unearthed (Medgyesi, oral communication).

The Szegvár-Oromdúló cemetery (KJM Szentes 84.1.1-42.) was excavated by Gábor Lőrinczy between 1980 and 1997 uncovering 523 Early Avar (6-7<sup>th</sup> c. AD) graves (Lőrinczy, 1998). The osteological material from the first phase of excavations was investigated by Andrea Hegyi as her MSc thesis project (Hegyi, 1992), but the trephination was not mentioned. The osteological material of all graveyards is now housed, curated and investigated at the Department of Biological Anthropology, University of Szeged.

In the course of my investigations I used standard, commonly accepted macromorphological methods of bioarcheology (Acsádi-Nemeskéri, 1970; Knussmann, 1988; Ubelaker, 1989; Buikstra-Ubelaker, 1994; Bass, 1995; White *et al.*, 2011). One of the Bélmegyer cases was subjected to digital volume tomography at the Kreatív Dentál Kft. supervised by Dr. Lajos Patonay, head of the Laboratory of Applied and Clinical Anatomy, using an E-WOO Picasso Pro medium volume CBCT scanner.

Anatomical and pathological expressions were used in accordance with the recommendations of the Brencsán Orvosi Szótár (Brencsán-Krúdy, 2002). Datings indicated in the site descriptions were cross-checked with data of the latest Avar cadaster (Szentpéteri, 2002).

## **RESULTS**

### **Surgical trephinations**

Up to now, 9 surgical trephinations have been unearthed in the Avar Age sites of the Southern Great Plain. 4 of these cases were published in papers of the Department of Biological Anthropology, University of Szeged in connection with our research activity after 2005. The new cases considerably increase the number of Avar Age trephinations found in the Carpathian Basin and are especially important because of the age of the affected individuals: 3 of the 4 cases are infants. In the review of Józsa and Fóthi (2007a) 11 individuals with unidentified sex were recorded, so presumably less than 11 infants were included in the national data collection. None of these were from the Avar Age, so the 3 surgically trephined

infant skulls from the Szeged-Kiskundorozsma, Kettőshatár I. site are unique and have a national importance (Bereczki *et al.*, 2007, 2010). Our dataset however is well in accordance with the formerly built picture of surgical trephinations (Tomka, 2000; Józsa-Fóthi, 2007a): the majority of the affected individuals are adult males and most trephinations have medical (often traumatic) indication.

Extreme caution must be taken when interpreting this very low number of cases. Former reviews (Tomka, 2000; Józsa-Fóthi, 2007a) mentioned only 14 Avar Age surgical trephinations from the whole of the Carpathian Basin. In my opinion this number must be reduced since 3 of these findings do not fit the definition of surgical trephination, and 4 others can only be mentioned as possible cases.

The 4 new cases of surgical trephination described by our research team (Bereczki *et al.*, 2007, 2010) and the Stara Moravica case examined by Czékus (Czékus, 2007, oral communication; Kajdócsi-Lovász, 2013, oral communication) considerably increase the number of known Avar Age surgical trephinations in the Carpathian Basin.

### **Symbolic trephinations**

There were 21 lesions in 12 skulls found in the Avar Age material of the Southern Great Plain. 3 of these cases were published by our research group at the Department of Biological Anthropology, University of Szeged as a result of the research activity after 2005. All the affected individuals were adults at the time of their death and presumably at the time of the operation too. Among the affected individuals there were 2 young adults (20-40 yrs, male:female=1:1) 8 middle aged (40-60yrs, 7:1) and 2 elderly (60+ yrs, males). The biggest number of lesions on one skull was 7 and 4, but the majority of the cases had one lesion per skull. Most lesions were 1-3 cm in size, circular in shape, and located in the medial section of the parietal bones. 2 almond shaped lesions and 1 oval or almond shaped lesion has also been found. All lesions showed some healing thus survival too, with more than half of the cases exhibiting signs of long survival.

These trends match the findings of the latest large scale study on Conquest Age symbolic trephinations (Bernert *et al.*, 2006). The almond shaped engravings found in the Avar material of the Southern Great Plain are fairly well known in the Conquest Age and the

Early Árpáadian Age. The literature provides a total of 20 cases from the 10<sup>th</sup> and 11<sup>th</sup> c. AD with almond shaped or oval lesions bigger than 3 cm (Bartucz, 1950; Anda, 1951; Nemeskéri *et al.*, 1960, 1965; Kustár-Szikossy, 1995; Bernert *et al.*, 2006), as we have also emphasized it in our latest study (Bereczki *et al.*, 2013). The similarity of the shape and the possibly way of preparation requires further research, but at this point it seems to be certain that symbolic trephinations of the Late Avar Age and the Conquest Age share their characteristics. The reason for this similarity is most likely common cultural origins of the two period's population.

The morphology and the occurrence of larger almond shaped and oval lesions also raise other questions. Do their characteristic shape and their uneven localisation on male skulls have some kind of connection? The literature traditionally uses the expression almond shaped (plum seed shaped in Hungarian) to refer to lesions like that of Bélmegyer-Csömökidomb grave no. 27. But aren't we actually seeing a female sexual symbol? The interpretation of this particular group of symbolic trephinations is definitely worth revisiting and requires further investigations.

### **Post mortem interventions**

Interventions made after death are often confused with *intra vitam* modifications or taphonomic phenomena in bioarcheological remains. Therefore, one of the most important goals of the research must be the differentiation between these three aetiologies (Nemeskéri *et al.*, 1960). *Post mortem* interventions are relatively rare in the material of the Carpathian Basin, but there is evidence for Avar Age occurrence of such traditions. There are two cases of possible *post mortem* trephination (or cultical trephination) in the Late Avar cemetery of Kiskőrös-Város alatt (Farkas-Marcsik, 1986). Here again, further research and parallels would be needed to strengthen *post mortem* origin and ritual indication.

## **DISCUSSION**

After having reviewed the literature of each trephination phenomenon (Aim #I), having collected data of the formerly published and newly described cases of trephination

(Aim #II and #III), and having analyzed the Avar Age findings (Aim #IV), the following can be said.

The Avar Age trephination traditions of the Southern Great Plain fit our formerly built picture of the particular types of trephination in question. This is especially true, when the Avar finds are compared to those of the Conquest Age. Speaking of surgical trephinations, the 3 infants among the 4 newly described cases must be mentioned. Surgical trephination is rare observed on remains of subadults, and such finds have never been documented before in the Avar Age material (Józsa-Fóthi, 2007a). Among symbolic trephinations, those almond shaped lesions require special attention that formerly have only been reported from the 10<sup>th</sup> and 11<sup>th</sup> c. AD (Anda, 1951; Nemeskéri *et al.*, 1965; Bartucz, 1966). The occurrence of these types in the Avar material raises certain questions: a rare, specific custom appearing in two subsequent historical periods refers to inheritance of the tradition, common origin of knowledge or common ancestry of the two populations? The new case described in my thesis considerably increase the amount of information available on the Avar Age trephination traditions but these results are still not enough to turn the scale in such a long-running debate.

Based on the trephination cases of the Southern Great Plain I think there must be have been strong, close cultural connection between the Late Avar and the Conquest Age Hungarian populations. These traditions may derive from a pool of knowledge that connects not only the modification practices of these two periods, but also includes the trephining traditions of the Proto-Bulgars (Boev, 1968; Éry, 1988; Jordanov *et al.*, 1988; Fóthi *et al.*, 2001; Reshetova, 2012). I am convinced, that not only the research development of each affected historical period in the Carpathian Basin, but the investigations concerning the history of the Khazar Kaganate and the Saltovo-Mayaki culture will help us to clarify these problems. And probably these developments will also help us to understand such unparalleled phenomena as the Kiskőrös cases of *post mortem* trephination.

Trephination practices were deeply rooted in the world concept and ethos of the populations practicing them. The reason why I regard the research of trephinations and other modification phenomena important, is that they represent experience, beliefs and traditions of a historical period, but they also refer to individual choice. If we understand why and how those people altered their bodies so dramatically following their experience and traditions, we might turn towards singularities of our own age with a bit more acceptive attitude.

## **PAPERS PROVIDING BASIS FOR THE GRADUATION**

Bereczki, Zs-Molnár, E-Marcsik, A-Pálfi, Gy (2013) Rare types of trephination from Hungary shed new light on possible cross-cultural connections in the Carpathian Basin. *International Journal of Osteoarchaeology* (2013) Published online in Wiley Online Library, (wileyonlinelibrary.com) DOI: 10.1002/oa.2304 IF: 0,955

Giblin, JI-Knudson, KJ-Bereczki, Zs-Pálfi, Gy-Pap, I (2013) Strontium isotope analysis and human mobility during the Neolithic and Copper Age: a case study from the Great Hungarian Plain. *Journal of Archaeological Science* 40:227–239. IF: 1,914

## **OTHER PAPERS RELATED TO THE TOPIC OF THE THESIS**

Bereczki, Zs-Marcsik, A (2005a) Trephined skulls from ancient populations in Hungary. *Acta Medica Lithuanica* 12:65-69.

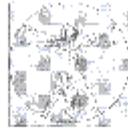
Bereczki, Zs-Marcsik, A-Paja, L (2003) New cases of trephination from a 10-11th century Hungarian site. *Papers on Anthropology* 12:21-31.

Bereczki, Zs-Molnár, E-Marcsik, A-Pálfi, Gy (2010) Evidence of surgical trephinations in infants from the 7th-9th centuries AD burial site of Kiskundorozsma-Kettőshatár. *Acta Biologica Szegediensis* 54(2):93-98.

Bereczki, Zs-Tóth, Zs-Marcsik, A (2007) Sebészi trepanációk Kelet-Magyarországon – újabb esetek a szarmata és az avar korból. *A Magyar Biológiai Társaság 5. Kárpát-medencei Biológiai Szimpóziuma, Budapest, 2007. szept. 20-22., Előadáskötet, 21-31.*

## DECLARATIONS OF CO-AUTHORS

SZEGEDI TUDOMÁNYEGYETEM  
TERMÉSZETTUDOMÁNYI és INFORMATIKAI KAR  
EMBERTANI TANSZÉK



5726 Szeged, Közép faszt: 54.  
Telefax: (63) 544 514

Dr. habil. Pálfi György PhD  
tanszékvezető egyetemi docens  
E-mail: pallfigy@e.u-szeged.hu  
Mobil: 06-30-598-9589

### Társszerzői nyilatkozat

Aláírással igazolom, hogy a *Bereczki, Zs Molnár, E-Márcsik, A-Pálfi, Gy (2013) Rare types of trephination from Hungary shed new light on possible cross-cultural connections in the Carpathian Basin. International Journal of Osteoarchaeology (2013) Published online in Wiley Online Library, (wileyonlinelibrary.com) DOI: 10.1002/oa.2504* tanulmányok a Bereczki Zsolt doktorjelölt PhD értekezésében is szereplő eredményei nagymértékben a jelölt munkáját tükrözik, azokban a jelölt szerepe meghatározó fontosságú, így ez a tanulmány tudományos fokozat megszerzéséhez nem használok fel.

Szeged, 2013. március 25.



Dr. Molnár Erika, egy. adj.



Dr. Márcsik Antónia, ny. tszv. egy. doc.



Dr. Pálfi György, tszv. egy. doc.

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April 4, 2013

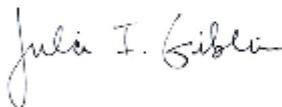
To whom it may concern,

This is to certify that Zsolt Bereczki had a significant contribution to the work described in the publication Giblin et al., 2013. I declare that I will not use the publication for getting PhD degree.

(Alulírott nyilatkozom, hogy Bereczki Zsolt jelentős mértékben hozzájárult a Giblin et al., 2013-as tanulmány eredményeihez. Kijelentem, hogy az adott tanulmányt nem fogom felhasználni PhD fokozat megszerzéséhez.)

If you have any questions, please feel free to contact me.

Sincerely,



Julia I. Giblin, Ph.D.  
Assistant Professor of Anthropology  
Department of Sociology, CAS1 - 316  
Quinnipiac University  
Hamden, CT 06518  
Phone: 203-582-8381  
Email: [Julia.Giblin@quinnipiac.edu](mailto:Julia.Giblin@quinnipiac.edu)