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## Brief communication

## Skeletal evidence of a post-mortem examination from the 18th/19th century Radom, central Poland

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## ABSTRACT

The paper presents a post-mortem examination performed on an adult male from the town of Radom in central Poland. The calotte of this individual had been surgically opened after death with a saw. Based on the archaeological context, this was most probably a Radom resident. The stratigraphy, archaeological artefacts and written historic sources indicate that the post-mortem examination was most probably conducted by the Austrian military physicians between 1795 and 1809. This post-mortem examination is the first published example from the territory of Poland and most probably in the whole of Eastern Europe for the period from the late 18th and the early 19th century.

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## 1. Introduction

Although the skeletal evidence for post-mortem examinations<sup>1</sup> of a human body is not uncommon in palaeopathological studies, this aspect of research is often neglected in comparison with the studies dealing with ante-mortem pathological changes. Nevertheless, during the last three decades numerous cases of post-mortem examinations from archaeological contexts have been reported. The vast majority of these originate in Great Britain (e.g. Waldron and Rogers, 1987; Chapman, 1997; Anderson, 2002; Chamberlain, 2012; Fowler and Powers, 2012), France (e.g. Valentin and d'Errico, 1995; Signoli et al., 1997) and the United States (e.g. Angel et al., 1987; Owsley, 1995; Davidson, 2007; Nystrom, 2011). In contrast to Western Europe and North America, archaeological finds suggesting post-mortem examination from the region of Central and Eastern Europe have rarely been published (e.g. Likovský and Stloukal, 2006).

This paper presents skeletal evidence of a post-mortem examination from the city of Radom in central Poland, which probably represents the first case to be reported from Eastern Europe with both a well established context and chronology.

## 2. Materials and methods

Radom is a medium-sized city located in central Poland (Fig. 1). Archaeological site 1 in Radom is situated at the bottom of the river Mleczna valley in the centre of the contemporary town. The site was an early mediaeval stronghold that functioned between the 11th and 14th centuries. In 1791 the first “modern” municipal cemetery was founded at the site, but due to the lack of space a new cemetery was established in 1811 at another location, while the municipal cemetery at the stronghold has been abandoned and forgotten.

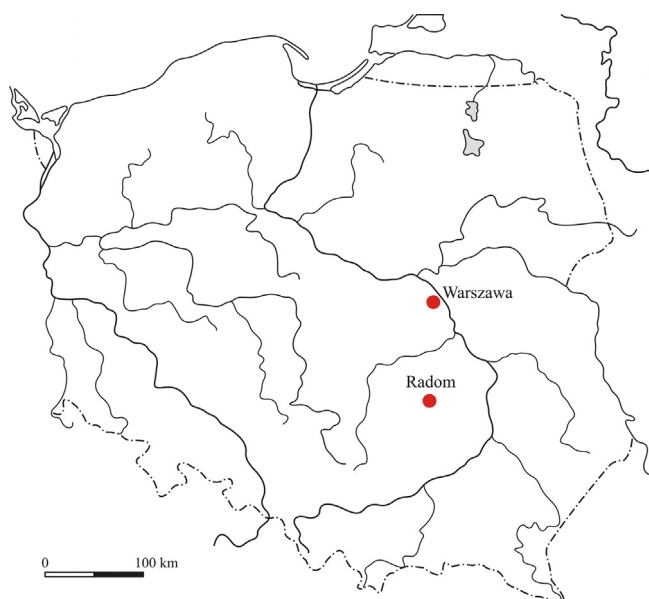
During archaeological excavations at site 1, begun in 2010, a total of 250 burials have been uncovered. The cemetery covered the entire former stronghold, with a clear concentration of graves in the central part of the site. Archaeological artefacts were scarce, consisting mostly of clothing remnants, along with religious and personal items (Auch et al., 2012). The skeletal material examined in this report came from a grave situated in the central part of the cemetery (Fig. 2). The stratigraphy and written sources date the use of the cemetery, including this grave, to between 1791 and 1811. The grave contained skeletal remains of two individuals laid together in a wooden coffin: “individual A” was placed on its back with the head facing west (Fig. 3), while “individual B” was placed on the right leg of the “individual A”. The only artefact found in the grave was a copper button.

Anthropological analysis of the skeletal remains was conducted in the Institute of Archaeology and Ethnology of the Polish Academy of Sciences in Warsaw. Sex and the age at death were estimated using methods described in Buikstra and Ubelaker (1994). All skeletal elements were examined under strong illumination with the use

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<sup>1</sup> Post-mortem examination is used as a general term that encompasses any medically based post-mortem investigation; dissection is reserved for post-mortem examination of the body for anatomical study, while autopsy specifically refers to a post-mortem examination in order to determine cause of death where anatomical study would not be the primary focus (Nystrom, 2011).



**Fig. 1.** The geographical location of Radom.

of magnifying glass, while the dimensions of observed cuts were recorded with the use of sliding calliper.

### 3. Results

Both skeletons were generally well preserved, except for fragile and/or small bones such as the ribs. Slight post-mortem damage (erosion) was recorded on some of the skeletal elements belonging to both individuals.

"Individual A" was an adult male aged between 36 and 45 years at the time of death. The cranium exhibits a defect that

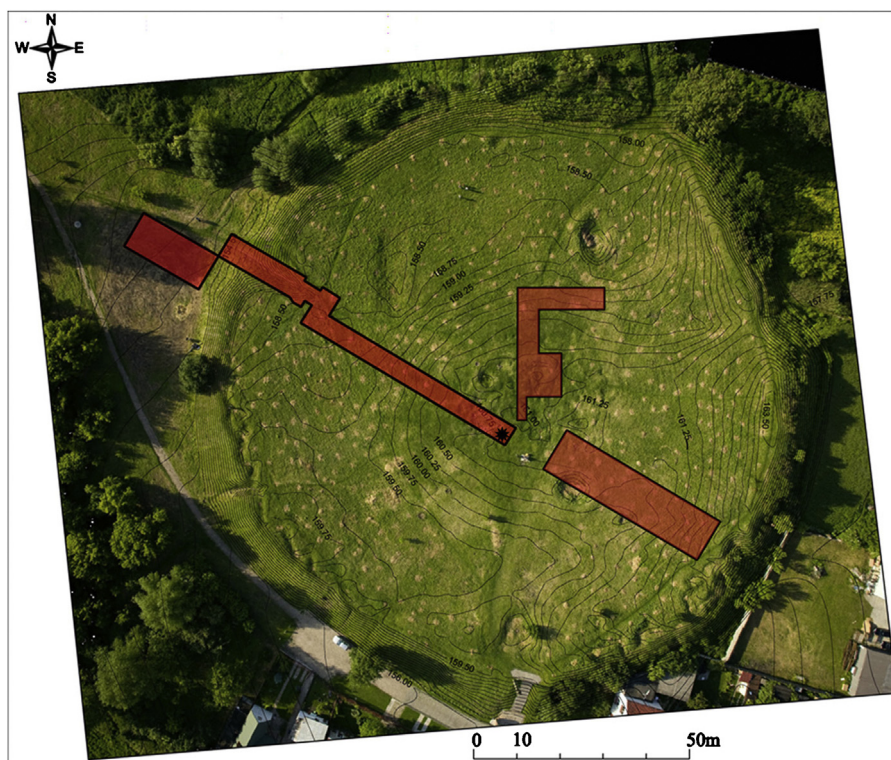
reflects a post-mortem examination. The calotte had been completely detached from the rest of the skull by a sharp tool (Fig. 4). The incision started on the frontal bone approximately 28 mm superior to the supraorbital margins. It affected the superior edge of the left temporal bone 16 mm inferior to the left squamosal suture. Then it continues in a straight line through the left parietal bone approximately 28 mm superior to the left asterion. The cut affects the central part of the occipital bone approximately 40 mm inferior to lambda, after which it continues in a straight line through the right parietal bone approximately 21 mm superior to the right asterion. Then the incision extends across the superior edge of the right temporal bone about 12 mm inferior to the right squamosal suture (Fig. 5A). Horizontal straight shallow cuts about 10 mm long and less than 1 mm wide, located approximately 2 mm inferior to the defect and parallel to it, are present on the left side of the frontal bone; similar shallow cuts, 9 mm in length, located 2 mm inferior to the main defect are present on the right temporal bone (Fig. 5B and C). The cut around the whole cranium is smooth, with regularly shaped striations (kerf patterns) visible on the part located on the right parietal and the occipital bones (Fig. 6). No pathological changes are visible on the endocranial surface of the skull.

This skeleton also exhibits a healed fracture of the mid-shaft of the right tibia that resulted in bone callus and antero-lateral angulation. In total, 21 teeth (eight maxillary and thirteen mandibular) are still present in the alveoli while eight teeth were lost ante-mortem (five maxillary and three mandibular); two carious lesions are present in the maxillary teeth.

"Individual B" was a subadult aged between 12 and 18 months. The only recorded pathological change on this skeleton was slight, active periostosis present on the mid-shafts of both tibiae.

### 4. Discussion and conclusion

The case of post-mortem examination from Radom is one of the first published examples from the region of Central and Eastern



**Fig. 2.** Ortophotomap of site 1 with trenches excavated between 2010 and 2012. Position of the studied grave is marked by the asterisk.



Fig. 3. Position of the skeleton in the grave after the exploration.

Europe. Probably the only exception is the example published by Likovský and Stloukal (2006).

The absence of skeletal evidence for post-mortem examinations from this region of Europe is surprising, especially since Poland has a long history of such procedures. Namely, in 1613 the first public foetal autopsy in central and northern Europe was performed in Gdansk (Gulczyński et al., 2010), while the first scientific description of an autopsy was published in 1615 in Krakow (Kowalczykova, 1964). During the second half of the 18th century post-mortem examinations were carried out regularly: the first autopsy in Vilnius was conducted in 1770 (Sabat, 2004), dissections available to the public for a fee were performed in Krakow since 1780 (Kowalczykova, 1964), and even Wroclaw had its theatre for dissections during this period (Kozuszek, 2007).

Although the available documents provide ample evidence about the tradition of post-mortem examinations in Poland, they do not describe either the techniques or tools used in such procedures. Fortunately, some historic documents from other parts of Europe provide more details. A graphic representation of the post-mortem opening and examination of the cranium was described

by Andreas Vesalius (1543) in his book *De humani corporis fabrica*, which is considered by many a pioneering work in human anatomy. Perhaps the most exhaustive description of the protocol used in post-mortem examinations, accompanied by the graphic representation of the tools used, was provided by Pierre Dionis (1708). Since the cranial autopsy protocol proposed by Dionis has been thoroughly discussed by Signoli et al. (1997) in their paper describing the case of cranial autopsy from Marseille, we will present it here in the abbreviated form. First, skin was separated using the scalpel: the first cut started at glabella and finished at theinion in the sagittal plane, and the second cut was performed from one ear to the other in the frontal plane. The skull was opened with the use of a saw: the sawing started at the frontal bone, continuing to one of the temporal bones, then to the other, finishing at the occipital bone. Finally, the calotte was removed. This protocol generally corresponds to the post-mortem examination from Radom, wherein two types of cuts can be distinguished: shallow straight cuts on the frontal bone and the right temporal bone, most probably representing incisions made by scalpel to detach the skin from the skull, and the cut around the whole cranium, which was probably performed

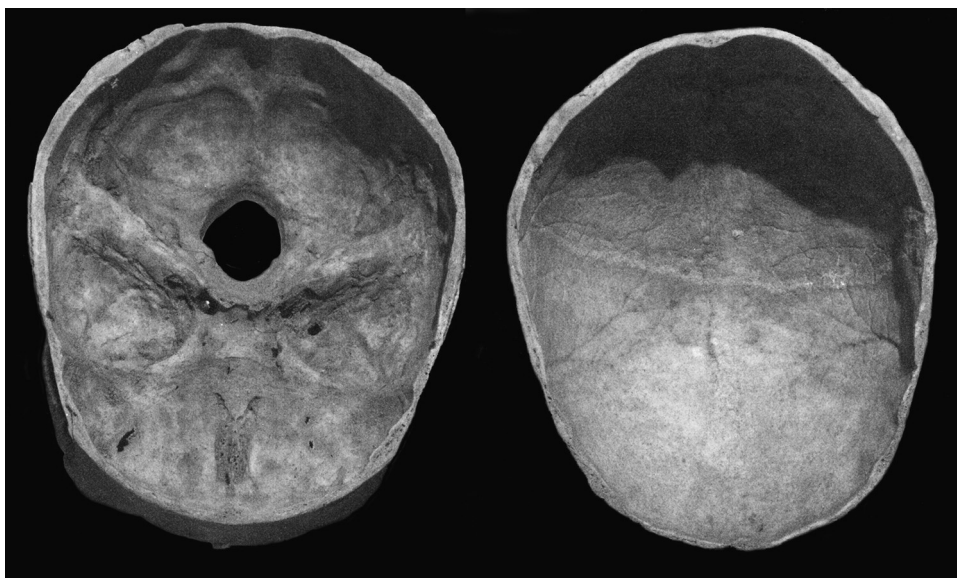
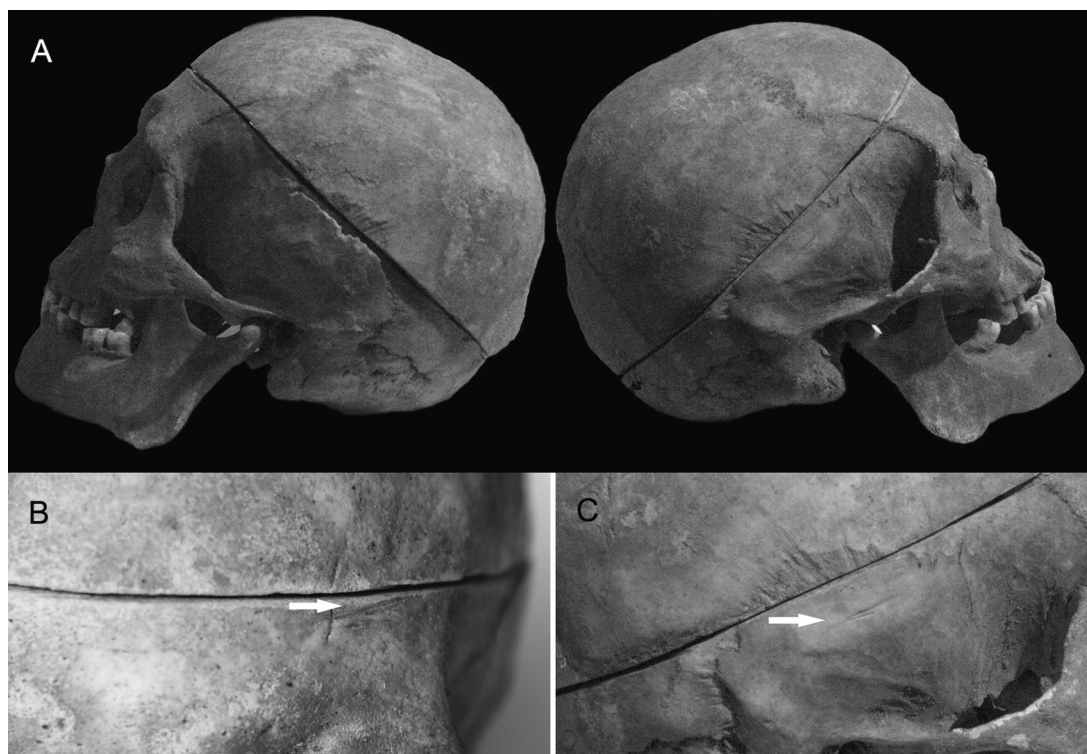
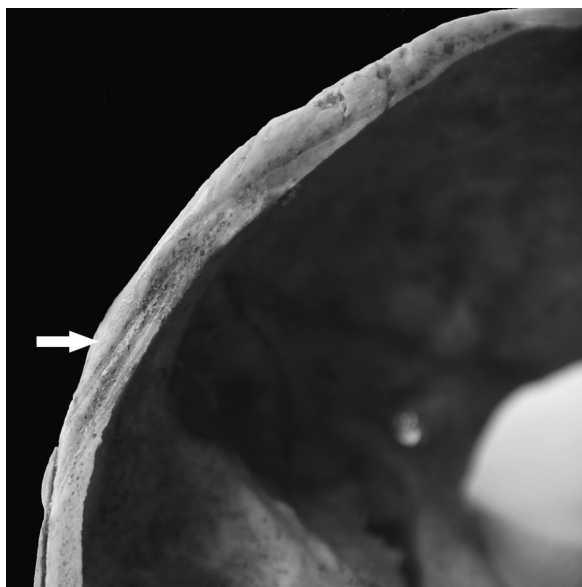


Fig. 4. Superior view of the cranial base and the endocranial view of the calotte.



**Fig. 5.** View of the left and right side of the cranium showing the cut mark (A); close-up of the shallow cut marks on the frontal bone (B) and the right temporal bone (C).



**Fig. 6.** Superior view of the cranial base (right parietal bone and the occipital bone) with visible striations (kerf patterns).

by a saw, as indicated by the regularly shaped striations (kerf patterns) on the right parietal bone and the occipital bone. This also suggests that the post-mortem examination presented here was performed by the professional physicians.

This individual was most probably a Radom resident, which is suggested by the position of the burial in the central part of the cemetery that was usually reserved for the most prominent members of a community. Additionally, a joint burial with a small child indicates that the male was a Radom resident and not some traveller who died while passing through the town. At the moment we

cannot tell whether the small child buried with the adult male was related to him, but the joint burial in one coffin suggests this.

During the period between 1791 and 1811 there was no civilian hospital in Radom. A poorhouse that also served as a hospital had been established in 1432. In 1787 the parish church took over its assets, and the hospital ceased to exist (Luboński, 1907). In 1791 the building burned down and was quickly dismantled. A report prepared in 1791 by the Committee of Good Order – an institution set up to re-organise Polish cities – states that Radom had neither the hospital nor certified physicians, but a few not very highly qualified pharmacists (Luboński, 1907). After the third partition of Poland in 1795, Radom became part of the Austrian Empire, and it remained under Austrian rule until 1809 (Witkowski, 1985). Professional physicians re-appear in 1795 along with the Austrian administration, and in 1809 a military hospital connected with the garrison is mentioned. The first public hospital in Radom was built in 1829 (Luboński, 1907; Wiśniewski, 1911).

The post-mortem examination analysed here was most probably carried out in Radom by the Austrian military physician(s) during the period between 1795 and 1809, i.e. during the Austrian occupation of this part of Poland. In the absence of detailed historic sources it is not possible to discern whether this is the case of a dissection or an autopsy. Both scenarios (dissection and autopsy) are equally plausible. There is no supporting skeletal evidence of any condition that would lead to an autopsy, but this is not definitive without soft tissues. On the other hand, during this period Radom was a small provincial town without university or even a town hospital where dissections for educational purposes might have been performed. This does not mean, however, that the military doctors could not have dissected the individual in question. At the moment this issue will have to remain unresolved, at least until more comprehensive evidence from the local archives becomes available.

As already mentioned, Poland has a tradition of post-mortem autopsies and dissections dating at least to the early 17th century. With this multidisciplinary approach, we have succeeded

in partially reconstructing the circumstances under which such a procedure was carried out in Radom between 1795 and 1809. It currently represents the first published example from the territory of Poland, and probably for the whole of Eastern Europe during the late 18th and the early 19th century.

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