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## Editorial

### How Cranial Surgery was Performed in Italy During the Centuries After the Roman Empire but Before the Rise of the Medieval Universities: Integrating Paleopathology and Medical History

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Intermittently we witness how evidence from one academic field can have a significant impact on researchers working in other specialties; in this case, the fields of osteoarchaeology and medical history. In this issue an article by Micarelli et al. (2023) entitled *An unprecedented case of cranial surgery in Longobard Italy* presents a fascinating example of surgery from the early medieval period. A cross shaped area of inflammatory change on the outer table of the skull of a 6<sup>th</sup>-8<sup>th</sup> century female from Castel Trosino is described. This cruciform change also contains linear parallel scratch marks suggestive of the use of surgical instruments. At the centre of the cross is an oval area where the bone is markedly thinned in a way that would be compatible with a healing trepanation, where the outer table of bone was previously scraped as part of the surgical procedure.

While population level studies of trepanation of the cranium have been undertaken at a number of European contexts such as 6<sup>th</sup>-8<sup>th</sup> century CE Germany (Weber and Czarnetzki, 2001) and Bronze Age to Byzantine period Greece (Aidonis et al., 2021), what is special about this case from Castel Trosino that the cruciform area of inflammation with scratch marks likely indicates that a cross-shaped incision was used to allow a surgeon to peel away the scalp from the deeper tissues and expose the bone. This is not something found in those earlier cases of trepanation, and shows us how such operations could actually be performed.

#### **Surgery in Italy from the 11<sup>th</sup> Century**

In the 1100s a tradition of the writing of surgical texts began in Italy, which over the next 200 years developed and became known as 'rational surgery' (McVaugh, 2006). This followed the translation into Latin of 10<sup>th</sup> century surgical texts of Arabic medical practitioners such as Al-Majusi (Burnett and Jacquart, 1994). This revolution started at

Salerno with Constantine the African from the 1070s and then later spread to the newly created medical schools in the universities of northern Italy, such as at Bologna and Padua. The resulting series of surgical texts by Roger Frugardi (1180s), Bruno Longobucco and Theodorich Borgognoni (both mid-1200s), and others were written in a style that did not merely pass on the texts of classical, Greek, Roman and later Arabic authors, but gave a real sense that the operations were being performed and developed by these Italian surgeons (McVaugh, 2006).

The earliest evidence for a cruciform incision approach to cranial surgery that we have from these Italian medical texts is from the Bamberg Surgery, written in the mid 1100s. In the section on treatment of a compound fracture of the skull, we find the words 'If the contusion of the flesh is small but that of the bone great, the flesh should be divided by a cruciate incision down to the bone and everywhere elevated from the bone' (Corner, 1937). This surgical approach is also described in the text of Roger Frugardi, dating from the 1180s, and illustrations of this incision (Figure 1) are included in later copies of the manuscript (e.g. British Library MS Sloane 1977). However, until now we had no idea whether this surgical approach to the cranium was first developed in the 1100s, or if it had earlier origins but was just never written down in the few medical texts that survive from early medieval Europe.

### **Development of Roman Surgical Techniques in the Longobard Period**

The early medieval period in Italy, and indeed the whole of Europe, has much less surviving textual evidence for surgery and other forms of medical care than was the case in the classical period or high medieval period (Fischer, 2000; Pilsworth, 2014; Skinner, 1997). One interesting example is evidence for the use of medicines providing pain relief during surgical procedures in a 9<sup>th</sup> century manuscript held at the Benedictine monastery at Monte Cassino in Italy. This describes the soporific sponge, infused with plant extracts from henbane, hemlock, mandrake and opium poppy. The manuscript describes how it was useful for those undergoing surgery 'to allow the sleeper to feel no pain while being cut' (Sudhoff, 1921). However, these texts do not detail the kinds of operations performed.

The excavated human remains from Castel Trosino provide us with key evidence for surgical treatment in the period after the Romans but before the 'rational surgery' of the high medieval period - at a time when the paucity of medical texts in Europe had left us in the dark as to what treatments were being undertaken, and how operations were performed. It shows how the cruciform incision to expose the bones of the skull was in use in Italy several hundred years before the first medical texts describing it were written. For this reason, the archaeological case described here will be of great interest to medical historians investigating the development of surgery in Europe, and the degree to which the tradition of medicine in the Roman Empire may have been transmitted and developed within Italy prior to the translation of Arabic medical texts from the eleventh century onwards.

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**Figures:**

Figure 1: Surgeon using a knife to make a cross shaped incision to the cranial vault in the medieval Italian surgical text of Roger Frugardi. Reproduced with permission of the British Library. MS Sloane 1977, fol.3r.

