



### **G14 Case Studies of Cranial Trepanation in Apulia (Southern Italy) Through Forensic Imaging**

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After attending this presentation, attendees will have a greater understanding and interpretation of trepanated skulls.

This presentation will impact the forensic science community by allowing a differential diagnosis between traumatic and intentional ante or postmortem trepanation.

Cranial trepanation is a practice known since prehistory in various, often geographically distant populations, from Europe to Peru. It seems to have been mainly spread during the Bronze Age and underwent a partial decline during the Iron Age. Also during the Roman Era this practice is well attested by detailed description of specific surgical techniques and tools. It consists of several surgical treatments performed with various tools with the aim of opening a hole in the cranial vault for therapeutic purposes on living individuals. It is believed that this surgery was intended to cure cerebral disturbances related to vascular pathologies, migraines caused by intracranial pressure, or edema drainage after a severe skull trauma or as a religious ritual to drive out the evil spirit, to obtain bone powder to be used in curative potions, to obtain a bone disc as an amulet against disease, to fill the skull with incorruptible substances, or as a victory sign on dead enemies.

Differential diagnosis and the interpretation of trepanated skulls can be particularly difficult. It is necessary to distinguish between traumatic or intentional and ante or postmortem trepanation.

In case studies two early trepaned skulls who are being evaluated through radiological imaging are presented. Both skulls were found in Apulia (Italy). The first skull comes from Canosa (6<sup>th</sup>–7<sup>th</sup> AD) and the second is from Vieste (3<sup>rd</sup> BC). Both skulls present perforation, although at different stage of healing. The radiological analysis confirmed that the skull perforation was a consequence of a therapeutic operation following trauma in the Vieste skull, while the perforation was a pathologic process in the Canosa skull.

The radiological analysis was performed with a portable X-ray device (Nomad) combined with a digital sensor and computerized axial tomography with 3D reconstruction. Signs of healing reaction and bone apposition around the perforations were recognized in the Vieste skull, but not in the Canosa skull. The Vieste skull perforation can therefore be referred to as a therapeutic operation following trauma, while the lesions of the Canosa skull suggest a pathological process or a postmortem ritual practice.

The case study indicates the value of a forensic imaging approach in order to improve data analysis for a complete osteological evaluation of skulls.

**Forensic Science, Cranial Trepanation, Forensic Imaging**