## H94 "Virtopsy" Utility on Mummified Corpses: Two Italian Iconic Cold Cases

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After attending this presentation, attendees will understand the usefulness of Computed Tomography (CT) scan analysis, especially in very fragile corpses such as mummified corpses, through the presentation of two iconic Italian cold cases.

This presentation will impact the forensic science community by explaining whether or not spiral CT scans were important in finding out cause, time, and manner of death of bodies found in different circumstances and conditions, all of which were involved in famous media and/or Italian judicial events.

In the field of forensic medicine, the use of diagnostic imaging such as pre-autopsy CT represents an essential preliminary accessory examination for postmortem forensic assessment. Imaging techniques present the possibility of realizing a "virtual autopsy," called "virtopsy". Moreover the lack of the suffix "auto" underlines the objectiveness of this method that results in non-invasive, 3D, and sometimes the only possible evaluation on mummified, extensively decomposed or pre-skeletonized bodies where it is impossible to perform angio-CT scan or Magnetic Resonance Imaging (MRI). A CT scan examination cannot be considered an alternative to conventional autopsy, but rather a first useful tool in unusual cases, such as the cases described here. The goal of this study was to evaluate the role of a previous CT scan analysis performed in the forensic examination of extensively decomposed corpses. A CT scan was used in all the corpses deemed "precious," which will certainly be at the center of a case status. Experience dictates that virtopsy should be routinely performed on precious bodies involved in complex cases, to crystallize them in "as is" condition before they undergo forensic examination, where they will be necessarily destroyed. The CT-scan will guarantee objective data available during the entire time of a trial and beyond.

**Case 1:** The mummified corpses of two young brothers were found in a pit of a large abandoned house in the downtown Gravina in southern Italy two years after their disappearance. At the time of the discovery, their father was in preventive detention as he was suspected of having beaten his sons to death and hidden their bodies. A CT-scan performed on the brothers prior to autopsy revealed multiple fractures of the pelvis and inferior limbs related to a fall. The subsequent autopsy and the histological examination confirmed the bone lesions previously detected and also discovered a soft peri-fracture haemorrhage residual confirming the "vitality" of these injuries. The cause of death of both children was identified as severe trauma due to falling from a height. The lack of any kind of possible voluntarily inflicted injury allowed the father be blame-free. The CT-scan examination was essential for localizing the injuries without modifying the related bone connections and was a useful guide for those who performed the forensic autopsy.

**Case 2:** The mummified and partially skeletonized corpse of a girl was found in the loft of a church 17 years after her disappearance. A boy belonging to a very influential family was suspected of the girl's murder; his family and the church itself attempted to hide and confuse the truth. The CT-scan and 3D reconstruction of the girl's remains described the interruption of the inferior cortical layer on the posterior arch of a number of ribs. During the autopsy, it was possible to identify the exact pattern of lesions as being sharp and cut injuries identified by the CT-scan results. Virtopsy alone could not replace the forensic autopsy which made it possible to detect the exact nature, number, and direction of the lesions' patterns and manner.

**Virtopsy, CT Scan, Mummified Corpses**