

G11 Second Expert Opinion in Human Identification Through a Virtual, Digital, and Remote Dental Autopsy

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Learning Overview: After attending this presentation, attendees will understand the advantages of teleconsultation in forensic odontology when a second opinion on a dental autopsy could be helpful or appropriate.

Impact Statement: This presentation will impact the forensic community by presenting the innovative process of a virtual, digital, and remote dental autopsy.

The principle behind the human identification process is comparing antemortem to postmortem evidence and the findings from the primary identifiers: fingerprint, DNA, and dental data. The collection, analysis, and interpretation of dental information require experienced dentists with a forensic odontology background and knowledge of disaster victim identification. Although forensic odontology is taught in most countries, forensic odontologists are not always available or recruited systematically for the human identification process. Furthermore, when the nationality of the deceased is unknown or in very challenging cases, a second expert opinion could be decisive in the correct interpretation of dental treatments found in the mouth of the deceased.

The process of virdentopsy™ proposed by the Human Identification Laboratory (HIDentiLab) of the University of Turin, Italy, was employed to verify the feasibility and efficacy of transmitting postmortem dental data from human remains in order to obtain a second expert opinion from forensic odontologists situated in Italy¹. “Virdentopsy™” differs from “virtopsy” because the former is based on a different process and workflow, which also includes live streaming.²

Forensic odontologists from India, Peru, Syria, Sudan, and Pakistan performed a traditional dental autopsy, then transmitted the following postmortem dental data to HIDentiLab: photographs, video recordings, and X-ray images of dental arches and skulls.² The data received were analyzed, and a report was elaborated using the biological dental profile of the human remains, inclusive of dental age estimation.

The remote evaluation performed by experts in forensic odontology and disaster victim identification can be a concrete contribution to achieving timely and effective personal identification in those scenarios in which dental identifiers have been collected.³⁻⁶ Examples are the victims of migrations, the unidentified human remains of unknown nationality, and when second expert opinions are needed.⁶

Virtual, digital, and remote dental autopsy broadens the horizon of the forensic casework involving odontologists from various countries without the need for them to be onsite and could become a standard practice for each unidentified dead body recovered or for age estimation. This procedure is a possible solution when forensic odontologists are not available at the mass disaster site, when recovery is needed, or when a second expert opinion is needed to allow for the widening or confirming of dental findings, such as age, habits, and dental treatments, thus reducing bias. This process can be a useful tool in archeology and paleopathology, for training in forensic odontology courses, or when using live streaming smart glasses and augmented reality. Per this work, virdentopsy™ should also be considered a humanitarian forensic odontology tool that can support countries in need of teleconsultations in forensic odontology, given the extremely low cost of the procedure.

Reference(s):

1. Nuzzolese, E. VIRDENTOPSY: Virtual dental autopsy and remote forensic odontology evaluation. *Dent. J.* (in press).
2. Silver, E.W.; Souviron, R.R. Postmortem records. The dental autopsy. In *Dental autopsy*; Silver, E.W.; Souviron, R.R. Eds.; CRC Press, Boca Raton, 2009; pp. 89–112.
3. Franco do Rosário, Junior, A.; Couto Souza, P.H.; Coudyzer, W.; Thevissen, P.; Willems, G.; Jacobs, R. Virtual autopsy in forensic sciences and its applications in the forensic odontology *Rev. odonto ciênc.* vol.27 no.1 Porto Alegre 2012.
4. Franco, A.; Thevissen, P.; Coudyzer, W.; Develter, W.; Van de Voorde, W.; Oyen, R., et al. Feasibility and validation of virtual autopsy for dental identification using the Interpol dental codes. *J Forensic Leg Med.* 2013 May;20(4):248–54.
5. Rupsa, D.; Jen, S. Virtopsy in Forensic Odontology: The no Touch Autopsy. *Indian J Forensic Medicine & Toxicology*, October–December 2019; 13 (4).
6. Nuzzolese, E. Integration of dentistry and forensic odontology for a structured identification system and border control. *Forensic Sciences Research* 2021. doi:10.1080/20961790.2020.1842155.

Virdentopsy, Dental Autopsy, Human Identification