



### H85 Increasing Transparency: The Utility of Layered Images in Postmortem Identification

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**Learning Overview:** After attending this presentation, attendees will be able to utilize a simple method of comparing radiographic images to identify remains. The goal of this presentation is also to present rationale for medical examiner access to electronic health records.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by improving the usefulness and reproducibility of radiographic comparison for identification.

Accurate identification of decedents is of paramount importance in medicolegal death investigation. There are multiple well-recognized methods of identification with the most utilized being direct visual identification by family members or close friends, which is often quick and accurate. In some circumstances (fire-related deaths, decomposition, no known next of kin, etc.), visual identification cannot be accomplished. Fingerprint identification is generally as rapid as the availability of the agency that performs the comparison, but lack of antemortem or postmortem prints may prevent such identification. DNA comparison introduces significant delays, and dental records can be challenging to acquire.

Electronic access to antemortem radiographs may prove useful, timely, and accurate as a comparison tool for postmortem radiographs. In cases of unidentified remains at the Jefferson County Coroner/Medical Examiner's Office, seven decedents were identified using a novel and simple technique of superimposing images captured from both the postmortem radiograph and antemortem records. The superimposition (or layering) was performed using an easy method in Microsoft® Word. The transparency of the overlaid image was adjusted to ensure skeletal features were consistent (if not identical) in both radiographs. Often the medical examiner had access to medical records on the day that the decedent was examined, which drastically improved the time to identification (usually one to three days) and release of remains to family members.

Traditional methods of acquiring physical Computer Discs (CDs) containing digital images usually involves facsimile requests to local hospitals, delivery by mail or in person, and review of image files with appropriate software. This process resulted in significant delays for establishing identification (5 to 41 days in this cohort). In either scenario (electronic access vs digital image from CD), many skeletal landmarks, including frontal sinus morphology, vertebral shapes, and pelvic and femoral shape, were used.<sup>1-4</sup> Of course, this radiologic comparison was used in conjunction with other circumstances from the case to conclusively identify the decedent. The resultant Microsoft® Word document can become a physical visual aid that is a permanent record within the case file and could provide a useful tool in courtrooms and meetings with individuals not accustomed to comparing side-by-side radiographic images.<sup>5</sup> The practice of capturing images for comparison is limited by the paucity of plain radiographs available in the modern medical record. Computed Tomography (CT) scans are the mainstay of clinical imaging and are difficult to compare to postmortem radiographs, unless evidence of surgery or bony trauma is obvious. However, offices with CT scanning capability may be able to use this same layering technique with antemortem CT images to aid in identification of remains.

This case series presents a novel strategy for timely and accurate identification, as well as highlighting the importance of a medical examiner's office having access to the electronic health records of local hospitals.

#### Reference(s):

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3. Martel, William, Jeffrey D. Wicks, and Robert C. Hendrix. The accuracy of radiologic identification of humans using skeletal landmarks: A contribution to forensic pathology. *Radiology* 124, no. 3 (1977): 681-684.
4. Mundorff, Amy Z., Giovanna Vidoli, and Judy Melinek. Anthropological and Radiographic Comparison of Vertebrae for Identification of Decomposed Human Remains. *Journal of Forensic Sciences* 51, no. 5 (2006): 1002-004.
5. Ross, Ann H., Alicja K. Lanfear, and Ashley B. Maxwell. Establishing Standards for Side-by-Side Radiographic Comparisons. *The American Journal of Forensic Medicine and Pathology* 37, no. 2 (2016): 86-94.

#### Identification, Radiology, Forensic Pathology