



## Jurisprudence Section - 2014

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### F14 Dental Identification Utilizing Digital Dental Laboratory Evidence

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After attending this presentation, attendees involved in victim identification will gain better insight into identification modalities utilizing digital dental records stored in a dental laboratory database. The introduction of new technologies has increased the potential to gather significant identifying antemortem evidence.

This presentation will impact the forensic science community by introducing an additional source of dental information that may possibly be used in a dental identification of recovered human remains. Awareness of this digital evidence may possibly provide critical information that could establish a positive identification in a previously undetermined case.

On July 13, 2011, Pennsylvania State Police (PSP) discovered the dismembered and burned remains of what they believed to be two humans. The victims were tentatively identified as husband and wife, residents of the estate where they were found. Upon further investigation, the son of the presumed male victim was arrested in connection with the deaths.

During their scene investigation, bones were discovered in and around a pond on the property, approximately 250 yards from the house. Two burn barrels were also located about 200 yards from the house. A forensic anthropology team from Mercyhurst College in Erie, Pennsylvania was called in to perform a forensic archeological survey and recovery from the scene.

Among the specimens recovered by the anthropologists was a human skull with the maxilla, a separate mandible, and a pelvis consistent with a female and one consistent with a male. Along with various other bones, incinerated fractured teeth and roots were recovered. Also, what were believed to be two fractured ceramic crowns were discovered in the burn pile.

The initial recovered skeletal and odontogenic materials that might establish a dental identification were presented to the forensic dental consultant by the PSP. The odontologist performed a complete forensic dental exam which included photography and radiography. The fragmented skeletal remains were compared to the antemortem (AM) records, narrative and radiographic, of the presumed female victim. The quantity and quality of the recovered dental evidence were sufficient to establish a positive identification.

As the scene recovery continued, further dental evidence was recovered. These were also presented to the odontologist. The quality and quantity of the postmortem materials were incinerated and insufficient to establish a positive identification. The evidence allowed for a possible, non-exclusionary identification. Antemortem records were sufficient to establish identification with adequate postmortem evidence. Among the recovered remains were two laboratory-fabricated ceramic crowns. Although similar in shape to crowns of the suspected male victim, a positive identification was not immediately possible. The postmortem evidence was insufficient.

In July 2012, the PSP presented the crowns to the State University of New York at Buffalo School of Dental Medicine based Forensic Dental Research Laboratory in an attempt to establish an identification from a dental material standpoint. The ceramic crowns were analyzed but the material composition was not sufficiently unique to establish a positive identification. Without a positive identification of the male victim, the defense submitted a motion to dismiss charges against the suspect.

A break came in the case came when, through further questioning of the male suspect's dentist, it was determined that digital laboratory records existed. The crowns were fabricated through a Computer-Aided Design/Computer-Aided Manufacturing (CAD-CAM) system whereby digital records could refabricate exact replicated dental dies of the suspect's prepared teeth prior to cementation of the crowns. Recovery of this digital information and an analysis of the adaptation of the crown fragments to the dental dies established a positive relationship to the male suspect and the recovered dental evidence. This information, along with recovered male skeletal remains and other non-exclusionary dental evidence, established a positive identification of the male suspect. This identification allowed the district attorney to proceed with the charge of double homicide against the suspect.

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### Dental Identification, CAD-CAM, Homicide