



G48 The Development of an Ultraviolet Photography Protocol for Composite Restorations

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After attending this presentation, attendees will better understand the development of a protocol for utilizing ultraviolet fluorescent photography to document the presence of composite restorations during dental identification procedures.

This presentation will impact the forensic science community by demonstrating a protocol to be used in taking ultraviolet photographs of composite restorations.

On November 10, 2015, a Hawker 125-700A private jet crashed in Akron, OH, killing seven passengers and two pilots. Anthropologists recovered nine bodies from the wreckage in less than 24 hours following the crash. Antemortem dental records were located for all nine of the victims. Records for five victims were provided within five hours of the accident. The seven passengers were identified within 48 hours using dental records. The pilot and co-pilot were identified by DNA analysis within 72 hours of the crash. Antemortem dental records were first compared to full body X-ray scans. In addition, focused dental autopsies were performed. This procedure provided access and exposure to specific areas of the dentition to allow comparison of antemortem and postmortem dental data for the basis of identification. Digital dental radiography was accomplished using DEXIS® software and a portable NOMAD™ X-ray unit, allowing side-by-side comparisons of antemortem and postmortem radiographs. Dental identifications of the pilot and co-pilot were made difficult by translation and interpretation issues with the Spanish language antemortem dental records and the quality of the antemortem radiographs. Ultimately, the pilot and co-pilot were identified by DNA analysis.

Antemortem radiographs indicated that one victim had a composite restoration on tooth number five (Universal system). This restoration was not visible on the postmortem full body radiographs and not readily visible during the initial oral examinations. Examination with an Ultraviolet (UV) light source was used to fluoresce the restoration in tooth number five to see that it was, in fact, present. Although examination using an ultraviolet light source allowed visualization of the fluorescence from the composite restoration, attempts to photographically document the fluorescence proved difficult with the equipment available in the morgue. This led to the development of a protocol for taking photographs that demonstrates the fluorescence of composite restorations using an ultraviolet light source in a morgue setting. The equipment required was: (1) a high-resolution digital camera that allows photography without a flash; (2) a UV light source producing UV at a wavelength between 365nm and 395nm; (3) an orange composite-curing-light filter; and, (4) a tripod or unipod to hold equipment.

The protocol was: (1) turn the camera flash off; (2) place or mount the orange filter directly in front of the camera lens; (3) direct the UV light onto the restoration; (4) place equipment on a tripod or unipod if taking the photographs unassisted; and, (5) collect images with and without an American Board of Forensic Odontology (ABFO) #2 scale in place.



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Details of the identification of the victims of the crash and further discussion and details of the procedures employed and images produced by the protocol developed will be presented.

Ultraviolet Photography, Dental Identification, Composite Restorations