



### F2 Photographic Superimposition of Dental Remains Over an Antemortem Photograph Used as an Adjunctive Means of Identification: A Case Presentation

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After attending this presentation, attendees will have a means to aid dental identification of an individual when antemortem records are absent or incomplete.

This presentation will impact the forensic community by validating a technique to aid in the identification of individuals where antemortem records are insufficient.

The purpose of this presentation is to demonstrate the feasibility and methodology to augment dental identifications utilizing photographic superimposition of dental remains with anterior dentition to an antemortem photograph of an individual.

**Background:** Dental identification of human remains requires accurate and complete antemortem dental records containing written and radiographic records to be used in comparison to the postmortem remains. When all or some of these components are missing or insufficient, positive dental identification of an individual may require adjunctive procedures to positively identify the individual. At the 2005 AAFS Meeting, Susan Bollinger, DDS, et al. introduced the Grin Line ID System (GLID) as an adjunctive procedure to be used in dental identifications. This system utilized digital photographic superimposition of historic photographs and current photographs of individuals to allow for exclusion or possible or probable identification.

In August of 2004, skeletal remains of an individual were found inside a van that had been missing for approximately one year. The van was discovered in an enclosed storage rental unit in Alabama. The maxilla and mandible were presented for dental identification with two sets of dental records of the same individual from different dentists. The first contained only a written record indicating no dental restorations other than sealants on the first and second molars. The second record contained written records and three (3) sets of horizontal bitewing radiographs. These written dental records indicated two (2) posterior composite dental restorations consistent with the remains; however, additional restorations were noted postmortem. The most recent bitewing radiographs were fuzzy and only faintly revealed one composite dental restoration.

Two digital techniques were used to further support identification of the individual: 1) bilateral digital overlay comparison of the posterior antemortem bitewing radiographs onto the postmortem posterior bitewing radiographs; 2) digital photographic overlay comparison of the dental remains over an antemortem photograph of the individual provided by the family.

**Methodology:** A high quality digital camera with a 28-200 mm lens was placed on a tripod and used to take a digital image of the photograph of the individual provided by the family. The dental remains (maxilla and mandible) were articulated and photographed using the same camera body with a 105 mm lens on a tripod. Multiple angulations similar to that of the antemortem photograph were taken. The postmortem photographs were evaluated and the one best representing the antemortem angulation of the individual was selected for analysis. Both images were imported into Adobe® Photoshop® 6.0. The image resolution was verified to be the same and then the distance between furthest discernable points along the dentition in both photographs (in this case, the cusp tip of tooth number 6 to the facial cusp tip of tooth number 12) was measured using the measure tool in Adobe® Photoshop® on the antemortem photograph. This distance was then used to resize the postmortem image to a 1:1 image in relation to the antemortem photograph. Next, the postmortem photograph was cropped leaving only the dental structures desired for comparison. The cropped and 1:1 postmortem image was then superimposed over the antemortem photograph aligning the dental structures of the two images. Using the opacity slide located on the layers tab, the opacity of the postmortem image was adjusted allowing for analysis for points of concordance with the antemortem photograph.

**Conclusions:** Although this case was worked prior to the presentation of the GLID system, a similar technique was used to compare “grin lines” as an adjunctive means to dental identification. This technique substantially aided in the positive identification of the individual thus substantiating its usefulness in dental identification cases where antemortem dental records provided are not available or insufficient for positive dental identification.

#### Odontology, Forensic Identification, Digital Photographic Comparison