F57 Validation Studies in Odontology: Part Two

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After attending this presentation, attendees will have an understanding of progress in the validation of the science underlying a basic activity of odontology: Antemortem/Postmortem (AM/PM) radiographic matching.

This presentation will impact the forensic science community by demonstrating the commitment of odontologists to addressing the *Daubert* challenge, and by providing preliminary data on error rates in a basic activity of odontology.

Introduction: In an effort to address the challenges raised by the *Daubert* Trilogy and the subsequent National Academy of Sciences (NAS) Report of 2009, a three-pronged approach to validation studies in forensic odontology was adopted. The three activities of odontology being validated are: (1) skills in dental anatomy; (2) skills in AM/PM radiographic image matching; and, (3) skills in age estimation from radiographs.

This presentation reports on Part Two of the studies: skills in AM/PM radiographic image matching. Part one has been reported on elsewhere.

Materials and Methods: A major problem in designing validation studies is the integrity of the database utilized. The use of odontology casework files as *known* matches is problematical, as the cases have generally used only odontology techniques to confirm identity, without independent confirmation. This study utilized radiographs from real DVI operations where the odontology results had been independently confirmed by DNA techniques in every case.

The study was placed online and invitations to participate sent to all known forensic odontology organizations internationally. Participants logged on, accepted the ethical guidelines, provided basic demographic data, and completed the study. University students who were not dentally trained also completed the study.

The format was that the participant was shown two images, one antemortem and one postmortem, and asked to decide if they represented the same individual. Fifty image pairs were shown. The participant was then asked to indicate their level of confidence in their decision, and to decide on a level of confidence for their decision using at least one of two scales: the American Board of Forensic Odontology (ABFO) scale and the International Criminal Police Organization (INTERPOL) scale. Feedback and correct answers were provided at the completion of the study.

Results: Preliminary results suggest that the validation study in its current format is difficult. Even qualified and experienced odontologists make some errors when asked to use a binary same/different response scale. However, qualified odontologists perform better than non-dentally trained participants, who perform at above chance levels but who are less accurate than odontologists. The presentation will expand on these results.

Discussion: This study has some limitations. The design of the validation study does not completely reflect odontology casework. Odontologists do not necessarily work alone; a decision on identity commonly relies on comparison of many radiographs rather than a single image; there is less time pressure in a real casework situation; there may be opportunity to retake postmortem radiographs in a real casework or DVI situation. Nevertheless, this study represents a preliminary approach to validation of one of the basic activities of odontology at an international level with a significant sample size, using a database which is robust.

Validation Study, Radiographic Image Matching, Odontology

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