



F17 Comparing Cone-Beam CT With Conventional Digital Dental Imaging for Forensic Dental Identification

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After attending this presentation, attendees will gain knowledge of the use of cone beam CT in forensic identifications.

This presentation will impact the forensic science community by understanding how the use of cone beam CT derived images in forensic identifications is a viable time saving and a resource sparing technique.

Studies have previously presented evidence showing the ease of use of cone beam computed tomography (CBCT) derived images for dental identifications. The data gained from CBCT can be formatted into images that appear similar to periapical, bitewing, and panoramic radiographs. To further test the hypothesis that CBCT derived images are similar enough to conventional digital images to allow use in forensic identification, an IRB approved survey was developed.

The survey presented sets of images, each with a CBCT-derived periapical or bitewing image (“postmortem”) as an unknown as well as five conventional radiographs (either bitewing or periapical, “antemortem”) which may or may not be a “match” to the unknown, all on a one page sheet of paper. The five radiographs reviewed for each case are from the same anatomic location, but may be from a different individual; or taken from a different angle; or include fewer or more teeth; or be a bitewing instead of a periapical. The survey will be administered to multiple groups of dental practitioners, including dental students, post doctoral residents, practicing dentists and forensically trained dentists.

Five human jaw dissection specimens were scanned using an i-CAT cone-beam CT system and digital periapical and bitewing radiographs were taken of all dentate alveolar bone areas of the specimens. For each conventional radiograph, an image representing the same anatomical area was generated from the CBCT data set, as described previously. CBCT-derived images were cropped to the field of view of a conventional dental radiograph and to an aspect ratio of 4:3. CBCT-derived and conventional images of same anatomic areas of the specimens are presented in a survey alongside de-identified conventional radiographs of the same general region from patients with similar clinical dental situations (distracter images).

The results of the survey study will be presented and show the matching accuracy of the CBCT-derived image with the correct conventional image of the same specimen. In addition, each subgroup will be evaluated against the others to determine if the ability to correctly identify the “match” image with the unknown is a factor of years of experience in dentistry, experience as a forensic dentist or if a dental knowledge base is not required.

It is believed that CBCT derived images are similar enough to the conventional digital radiographs to allow their effective use in forensic identifications. Furthermore, it is believed that in situations such as mass disasters, the use of CBCT derived images would allow for rapid imaging of the deceased, allow reviewers to be located at a distance from the disaster site and allow for adjusting the viewing angle of the CBCT-derived (“postmortem”) images to approximate that of the comparison (“antemortem”) images.

Cone-Beam CT, Dental Identification, Radiographs