G41 Photographically and Radiographically Observed Dental Evidences Validated for Human Identification Purposes

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After attending this presentation, attendees will better understand which oral evidence(s) registered in photographic and radiographic dental records provide the highest performance to identify a subject for forensic odontological identification purposes.

This presentation will impact the forensic science community by illustrating how specific tooth- and dentition-related oral identifiers based on photographically and radiologically observed dental features can establish forensic odontological identifications.

The use of preventive dentistry is a rising trend worldwide because patients are more aware of oral health. Consequently, a reduced number of dental identifiers is expected in the near future due to treatment interventions.[1,2] From a forensic view, the reduced number of dental restorations means that human dental identifications will be necessarily founded on the oral and dentomaxillofacial morphological, positional, and pathological identifiers. The present study had two goals: (1) to register specific tooth- and dentition-related oral identifying variables on intraoral photographs, panoramic radiographs, and cephalometric radiographs; and, (2) to detect the oral identifying variable that was most useful for identifying the correct individual for each considered registration technique.

Retrospectively, a reference set of 1,727 unique subjects was collected for which a standardized set of five intraoral photographs, a panoramic radiograph, and a cephalometric radiograph were registered at the same time. Specific tooth- and dentition-related oral identifiers were collected and scored from the sets of photographs, panoramic radiographs, and cephalometric radiographs. Two observers each scored 895 and 832 subjects, respectively. For 308 subjects of each group, scores also were established by the other observer. These sets of 308 subjects were referred to as the inter-observer sets. For each of the scored identifiers, the distance was quantified between the scores from the inter-observer set and each of the scores in the reference set. The number of subjects in the reference set with a distance at least as small as the correct subject was referred to as the potential set and was expressed as a percentage of the reference set. The mean potential set was reported for each of the registration techniques separately.

For the photographic information, the panoramic information, and the cephalometric information, the number of molars (34.6%), the number of missing teeth (42.0%), and the number of displaced teeth (59.9%) were the most useful variables in identifying the correct subject, respectively. The shape of the central incisors was the best tooth-related identifying variable for the photographic and panoramic registrations (58.8% and 75.8%, respectively). By contrast, no best tooth-related identifying variable could be detected for the cephalometric registration. For each of the three types of registration techniques, the most identifying variables differed but were consistently dentition-related.

Reference(s):

1. Australian Government, Australian Institute of Health and Welfare. *Oral health and dental care in Australia: key facts and figures trends 2014*.
2. Petersen P.E. The World Oral Health Report 2003: continuous improvement of oral health in the 21st century ± the approach of the WHO Global Oral Health Program. *Community Dent Oral Epidemiol.* 2003:31(1): 3±24.

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