G43 The Accuracy of Dental Identification of Adults With Unrestored Teeth by Visual Comparison With Radiographs of Mixed Dentition

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After attending this presentation, attendees will better understand the forensic identification process by dental means. Attendees will learn that in a case of unrestored dentition with a long time lapse between Antemortem (AM) and Postmortem (PM) data, visual comparison of dental radiographs is an adequate method.

This presentation will impact the forensic science community by confirming the value of dental radiographs in identification, which should not be restricted to the analysis of the dentition only. On the contrary, all visible cranio-facial structures and bone characteristics surrounding the teeth should be attentively compared.

Nineteen examiners from the United Kingdom, Canada, the United States, Australia, Brazil, Italy, Iceland, Mauritius, and Mexico (15 forensic dentists and 4 forensic anthropologists) participated in a web-based questionnaire to assess identification in 12 cases; each case required the radiographic comparison of one dental PM panoramic radiograph to three dental AM panoramic radiographs belonging to three different individuals, of which only one was the correct match. The examiners were given four options following the American Board of Forensic Odontology (ABFO) guidelines: established identification, possible identification, insufficient data, or exclusion; the observers also explained the reason for each of their conclusions. The radiographic samples were provided by Italian private clinics; the time lapse between the correct AM and PM radiographs varied from 3 to 18 years.

The total of 684 answers were analyzed. The sensitivity of the methodology was 53.5%, the specificity was 86.4%, and the accuracy was 75.4%. This suggested that excluding the incorrect individuals was easier than matching the correct radiographs; however, achieving a positive identification more than 50% of the time should be considered a satisfactory result, considering that only half the panoramic was compared and no background of the subjects was provided. Examiners with sensitivity higher than 80% primarily compared dental anatomy, particularly root and crown morphology, and primarily analyzed incisors and first molars; approximately 41% of the answers also quoted the maxillary sinus morphology or other bone characteristics, such as trabeculation and mental foramen. Anatomy and development of third molars represented an important misleading feature for identification, which was chosen by most examiners with sensitivity lower than 80%; additionally, the comparison of non-dental features dropped significantly.

Dental identification is not an easy task and hasty conclusions may have catastrophic consequences, such as the exclusion of the correct individual and the misidentification of the wrong person. Even in cases with a long interval between AM and PM radiographs and unrestored dentitions, the meticulous attention to anatomical features helped reaching a conclusion. A constant examination of non-dental features would have probably reduced the error rate. This process requires time, knowledge of anatomy, embryology, and development and aging modifications, not only of the dentition, but of all cranio-facial structures; the accuracy of assessment could be improved by specific training.

Radiographs, Identification, Unrestored Dentition

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