



F32 Using Combined Evidence From Dental Calcification and Wrist-Hand Bone Maturation to Assess Chronological Age

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After attending this presentation, attendees will be briefed on recent data on the comparison of dental and skeletal methods for age estimation and their accuracy. Three dental methods and three skeletal methods are adopted and their use explained.

This presentation will impact the forensic science community by describing the interdisciplinary results of the present research which bring an improvement in the procedures of age estimation in the living.

Background: The Age Estimation (AE) of children or adolescents is becoming one of the most relevant areas of forensic odontology, due to the increasing number of criminal cases involving young people, irregular immigration, and the many issues related to asylum seekers and adoptions. In the last several decades, researchers are ever more committed in searching reliable and accurate methods to assess chronological age of children and adolescents. Dental age estimated by tooth mineralization detected by Orthopantograph (OPG) and skeletal age assessed through the wrist-hand maturation evaluated by direct X-rays were found to be highly correlated with chronological age of the subject, thus resulting useful tools for accomplishing with AE demands. Dental methods and skeletal methods based on wrist-hand bones are largely experimented with and widely used for forensic purposes. According to research, very few studies compared dental and skeletal age on the same sample of children and examined a combination of dental and skeletal evidence for a possible improvements in the predictions of chronological age.

Goal: In the same sample of subjects, both dental age based on teeth mineralization and skeletal age through wrist-hand bones maturation was examined, comparing the reliability and the accuracy respectively of dental methods and skeletal methods. A possible combination of dental and skeletal evidence to improve the estimation of chronological age will be studied and pursued.

Material and Method: The sample consisted of 269 X-rays of left wrist-hand and 269 OPGs of Italian children aged between 6.93 years and 17.89 years of age (2530 and 6529 days) and was composed of 133 males and 136 females. The OPG and the wrist X-rays were taken on the same day. One forensic pathologist trained in AE and two trained forensic odontologists respectively and independently provided the skeletal age estimations and OPGs scoring. For bone AE, three methods were applied: Greulich and Pyle (GP) atlas-method and the Tanner-Whitehouse scoring-system, TW2, and TW3 version. Dental age was estimated according to three methods: Demirjian's original method (seven teeth), Demirjian's eight-teeth method, and Willems' method. No other information but the sex was available to the operators at the moment of age estimations. The intra-observer repeatability was tested asking the operators to repeat the estimations on 30 X-rays randomly selected from the entire sample after three weeks. A regression model was employed to combine skeletal and dental evidence for age prediction.

Results and Conclusions: The correlation index between chronological age and estimated age is high both for dental methods and for skeletal methods. On the basis of preliminary results, skeletal methods tend to over-estimate age more than dental methods. When combined, skeletal and dental evidence improve the prediction of age, thus statistical analysis is nearing completion.

Human Identification, Dental Age Estimation, Wrist-Hand Bone Age Estimation