



F8 Radiological Length Ratio of Human Third and its Preceding Second Molar as Age Predictor

Patrick W. Thevissen, DDS, Katholieke Universiteit Leuven, School of Dentistry, Forensic Odontology Department, Kapucijnenvoer 7, Leuven, 3000, BELGIUM; and Guy Willems, PhD, Katholieke Universiteit Leuven, School of Dentistry, Kapucijnenvoer 7, Leuven, B-3000, BELGIUM*

After attending this presentation, attendees will be able to perform dental age estimations on third molar development applying a new developed methodology.

This presentation will impact the forensic science community by demonstrating a semi-automatic dental age estimation method with high reliability.

Dental age estimation methods based on tooth development collect information about tooth eruption, the transition between deciduous and permanent dentition, and tooth germ calcification. The developmental stage of the radiologically detected tooth germ is registered by scoring, measurements or comparison with common tables or reference atlases. The aim of this study was to develop a dental age estimation method based on the calculation of the ratio between the developing third molar length and the length of the preceding second molar.

From the datasets available at the dental clinics of the Katholieke Universiteit Leuven, 170 orthopantomograms of each gender were selected. The subjects were of Caucasian origin, their chronological age at the moment of radiological exposure was between 7 and 24 years and uniformly spread within the collected sample. The x-rays were imported in Adobe Photoshop® for standardized length measurements of the lower right third molar and its preceding second molar. For evaluation of inter- and intra observer reliability the variables of 17 randomly chosen female and male subjects were measured again after one month by the main and a second observer. Descriptive and inductive statistics were performed to detect the relation between ratios of the measured variables and the suspects chronological age. The developed dental age estimation methodology prescribes different protocols whether the second molar was completely developed or not. Furthermore a probability of the age of complete development and the related prediction interval for the second molar is given. The high precision of the variable measurements and corresponding high repeatability and reproducibility was proven by the very good inter and intra observer reliability scores. Specific gender related characteristics concerning this age estimation method were reported. The new methodology and its obtained results are discussed in full extent. Based on variables measureable with high precision, perfect reliable tools for age estimation of unaccompanied asylum seekers are made accessible.

Dental Age Estimation, Tooth Length Ratio, Orthopantomogram