



Odontology Section – 2009

F4 Dental Age Estimation by Calculation of Pulp/Tooth Volume Ratios Yielded on Computerized Separation and Segmentation of Cone Beam Computed Tomography (CBCT) Images

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After attending this presentation, attendees will better understand a dental age estimation method based on the correlation between the pulp/tooth volume ratio obtained from CBCT images and chronological age.

This presentation will impact the forensic community with the demonstration of a computerized method for pulp and tooth volume calculation from CBCT images and the implementation of the attained values for dental age estimation purposes.

Dental age estimation techniques are based on the developmental, morphological, and biochemical age-related changes of teeth. Elusive and multi causal changes of the pulpodentinal complex decrease the volume of the pulp canal system during a lifetime. CBCT images permit a non-destructive 3D registration of teeth and afford a tool for computerized calculation of the volumes of a tooth and its pulp. The goal of this study is to develop a dental age estimation method by using the correlation between the ratio of these volumes and the chronological age of the respective examined persons.

A subset of CBCT images was collected from the CBCT dataset of the University Hospitals (Katholieke Universiteit Leuven). All images were taken with the SCANORA® 3D (SOREDEX® Finland) and exported as DICOM files. Optimal quality images of intact, maxillary and mandibular, single rooted, fully developed and pathology free teeth were selected from individuals of both sexes within an age range from 10 to 70 years. Pulp/tooth ratios of the investigated teeth are calculated after semi-automated separation and segmentation of the CBCT images in the Simplant® Pro 11.04 software (Materialize® Belgium). Statistical analysis is performed to establish the relation between the chronological age and the pulp/tooth ratio, and to test for observer bias during the semi-automated separation and segmentation procedures. All the specific results of this investigation will be reported and discussed in detail.

Dental Age Estimation, Cone Beam Computed Tomography, Semi- Automated CBCT Separation and Segmentation