G28 Dental Age Assessment From Analysis of Canine Pulp/Tooth Volume Ratios Using Cone Beam Computed Tomography (CBCT)

Mohammed A. Barayan, University of Texas HSC San Antonio, 7703 Floyd Curl Drive, San Antonio, TX 78229; David R. Senn, DDS, University of Texas HSC San Antonio, 7703 Floyd Curl Drive, Mail Code 7919, San Antonio, TX 78229-3900; and Husniye Demirturk Kocasarac, DDS, PhD, University of Texas HSC San Antonio, 7703 Floyd Curl Drive, San Antonio, TX 78229*

After attending this presentation, attendees will better understand the correlation between pulp/tooth ratio volume and age assessment and will appreciate the benefits of using Amira™ radiographic software for *in vivo* volumetric analysis of tooth/pulp volume. Additionally, attendees will better understand the effect of gender and arch location of canine teeth in the accuracy of age assessment.

This presentation will impact the forensic science community by providing a non-invasive and dependable modality for age assessment. This presentation also introduces a segmentation tool that provides the ability to segment both the tooth and the pulp structures without including the surrounding bone.

Background: Dental age assessment presents greater challenges for adult cases than for cases involving adolescents or children with mixed dentitions. Some dental methods are invasive and very technique-sensitive compared to others, and some can be applied only to deceased individual cases. Among different potential parameters for age assessment, tooth and pulp space have gained more interest in recent years. It is well known that pulp space decreases in size with aging. Therefore, several studies have evaluated tooth/pulp size ratio using two-dimensional radiographs. Fewer studies have been published using 3D CBCT. The hypothesis developed for this study is that analyses of the ratios of the volumes of canine teeth and their pulps using CBCT can provide an acceptably accurate estimation of age in adults. The purpose of this study was to develop an accurate and non-invasive age assessment method by performing volumetric measurement of tooth and pulp space using CBCT on living subjects.

Material and Methods: The study population consisted of 135 subjects (67 males and 68 females) aged 18 to 75 years old. Maxillary and mandibular canines were used in this study. All scans had been taken earlier for varying diagnostic purposes, such as implant planning and endodontic evaluations. Teeth with caries, fracture, or a history of orthodontic treatment were excluded. Amira™ software was used to quantify the volume of the tooth and pulp space. Pulp/tooth ratio was calculated. All assessments were performed by a single evaluator (a board-certified oral and maxillofacial radiologist), and 60 of the scans were re-evaluated for intraobserver agreement. Data were analyzed using Pearson correlation and regression analyses and significance was set at 0.05.

Result: There was a strong correlation between pulp/tooth volume ratios and age. The age estimates for maxillary canines correlated with chronological age better than the estimates from mandibular canines. There was good intraobserver agreement. The findings indicate that analysis of pulp/tooth volume ratios of both maxillary and mandibular canine teeth are useful for age assessment.

Age Assessment, CBCT, Pulp/Tooth Volume

*Presenting Author