## F30 Age-at-Death Estimation of Historical Remains Using Dental Age Estimation and Skeletal Age Estimation Techniques: A Case Report

*James P. Fancher, DDS, PhD*, 345 Blue Lane, PO Box 682, Martindale, TX 78655; and Daniel J. Wescott, PhD, Texas State University, Dept of Anthropology, 601 University Drive, San Marcos, TX 78666-4684*

After attending this presentation, attendees will understand some principles of age estimation using dental and skeletal methods.

This presentation will impact the forensic science community by illustrating the relative accuracy and use of various age-estimation techniques.

**Introduction:** Age-at-death estimation for subadults is often done using dental methods because dental development is very regular and is under fairly tight genetic regulation. The appearance and union of epiphyses also are useful in the morphological assessment of age-at-death estimation using existing reference standards. The purpose of this case report is to document the biological age-a-death of five subadult individuals from a 19th-century cemetery whose graves were exposed by flooding. Both dental age estimations and skeletal evaluation were used to assess the agreement of methods.

**Methods:** It was determined that four individuals fell into the category of adolescent (12-20 years of age) and one could be classified as a child (3-12 years of age) on the basis of physical evaluation and review of dental radiographs. All individuals had a diagnostic full-mouth series of radiographs for dental evaluation. The adolescents all showed evidence of eruption of permanent teeth with developing third molars. The child was in a mixed dentition stage of development. The dental age was estimated for each case using atlas approaches.[1,2] The adolescent cases were analyzed using the UT-Age Estimation database, based on third molar development stages.[3] The child case was evaluated using age approaches as described by Moorrees *et al.* and Demirjian *et al*.[4,5] The stage of union for epiphyseal fusion and primary ossification centers was recorded on a standard form, and age was estimated using standard data from reference data sets.

Examination of the adolescent cases all indicated that each individual except one was female based on *os coxae* criteria. The undetermined adolescent case and the child appeared to be too immature to make sex estimation. UT-Age tests for the adolescent cases were run using sex as female for the three cases, and the undetermined sex case was run as both male and female. Ancestry was set as African (Black) for all cases.

**Results:** All adolescent cases were found to be approximately 15 years of age using dental techniques, and the child had a median range of 7 years/9 months – 9 years/3 months for female and 8 years/2 months – 9 years/4 months for male using dental techniques. The skeletal techniques gave estimates of 15-20 years for three of the adolescents, and 10-15 years for the one with immature sexual differentiation. The child skeletal estimate was 5-10 years.

**Discussion:** There is generally good correlation between dental and skeletal age-at-death estimations within the scope of each method with significant overlap in estimation intervals. The UT-Age technique gave results that may be considered more precise and accurate when compared to other techniques because this technique is based on an individualized statistical interpretation of development with a median expression of age and 95% confidence intervals. The analysis of the child with the mixed dentition gave results that are all consistent with each other. The internal consistency between all techniques indicates that a good indication of biological age has been achieved.

**Conclusions:** (1) A variety of dental and skeletal age at death estimations for subadult individuals are consistent with each other within the limitations of each technique; and, (2) The UT-Age third molar assessment for adolescents gives the most precise and accurate age estimate when applicable.

**References:**

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**Age Estimation, Adolescent, Child**

 ** Presenting Author*