Public Abstract

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Title: Longitudinal Assessment of Age-Related Change in the Dental Pulp Chamber and Age Estimation Using Dental Radiographs

This dissertation presents a new and practical method of adult age estimation with successful tests of its validity and repeatability. Six qualitative criteria evident in oral radiographs were developed from 37 subjects represented on three occasions each. Age was estimated from averaged criterion scores by reduced major axis (Model II) regression incorporating longitudinal information for prediction with cross-sectional data. Spearman correlation of scores to known age was $r_s = 0.82$, for 45 subjects aged 17 to 86 years in an independent test set. Mean error of estimated age was 0.08 year (SD 8.3 years). In contrast, longitudinal premolar pulp chamber sizes typically showed Pearson correlations to age of $r \approx -0.50$, with no pattern of association by premolar type, sex, or trend over time useful in age estimation.

Eleven raters with experience in skeletal analysis ranging from student to professional showed the qualitative method to be independently repeatable using only a written rubric and graphic examples. Raters' scores had Spearman correlations to age of $0.70 < r_s < 0.85$, and a mean error of 0.91 year (SD 13.7 years), in a sample of 20 subjects selected for approximately equal distribution by age and sex.

Oral radiography is noninvasive, commonly available to archaeologists and routine in forensic identifications. This qualitative method is applicable in adults through age 90, and may be incorporated into existing protocols to advance assessment of population distribution and individual age.