A58 Age Estimation of Hispanic Children Using the London Atlas

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After attending this presentation, attendees will be familiar with the technique of estimating the age of children using dental radiographs. They will also be introduced to new population data for age estimation using The London Atlas of Tooth Development and Eruption.[1]

This presentation will impact the forensic science community by contributing a new data set to the bank of population-specific age estimation data. The accuracy of the results reinforces the principle that age estimation can be pragmatically accomplished using a universal tool rather than requiring population-specific methods.

Many different age estimation methods exist and studies have shown varying levels of accuracy, depending on the population group tested. The goal of this study was to test the accuracy of The London Atlas for age estimation of Hispanic children and to determine if there is any difference in age accuracy between males and females.

This study was a retrospective cross-sectional review of records of healthy Hispanic children from ages 6 to 15.99 years who had digital panoramic radiographs taken at the University of Illinois at Chicago College of Dentistry, Chicago, IL, between January 1, 2000, and January 15, 2016. A report of all patients marked as of Hispanic ethnicity or as Spanish speaking who had a panoramic radiograph taken between the ages of 6 and 16 years since January 1, 2000, was generated. After the list was generated, it was randomized to remove any order and was then screened by the primary investigator. The exclusion criteria were radiographs that were unclear and/or distorted, and patients who had hypodontia, hyperdontia, gross pathology (e.g., taurodontism, microdontia, amelogenesis imperfecta, dentinogenesis imperfecta, tumors, abscesses, fractures, etc.), previous orthodontic treatment, and/or severe malocclusion. Chronological age was blinded from the primary investigator and age estimation was performed using The London Atlas of Tooth Development and Eruption on the left side of both upper and lower jaws. Inter- and intra-examiner reliability tests were performed on 34 randomly selected radiographs.

There were 332 panoramic radiographs evaluated. In all age groups, 34 radiographs (from 17 males and 17 females) were reviewed, except for the age bracket 6–6.99 years, for which only 26 radiographs meeting the exclusion criteria were available. The intra-examiner comparison yielded a Cohen's Kappa of 0.793 and the inter-examiner comparison yielded a Cohen's Kappa of 0.764, which indicated good reliability in the use of The London Atlas. The mean age estimated of the entire sample by The London Atlas (11.44 years) was greater than the mean chronological age (11.09 years), which was statistically significant ($P < .001$). The mean difference between chronological and estimated ages for males was 0.30 years and for females was 0.40 years, but the difference between sexes was not significant ($P = .324$). One hundred sixty-two radiographs (49%) were estimated to the exact age interval, while 45 (14%) were under-estimated and 125 (38%) were over-estimated. Two hundred and forty radiographs (72%) were estimated to a value within one year of the actual age.

There was no difference in age estimation prediction accuracy between Hispanic males and females, but an age overestimation was seen. The London Atlas accuracy is suitable for use in forensic investigation.

Reference(s):

1. AlQahtani S.J., Hector M.P., Liversidge H.M. Brief communication: The London Atlas of Human Tooth Development and Eruption. *American Journal of Physical Anthropology.* 2010 Jul;142(3):481-90. doi:10.1002/ajpa.21258.

Age Estimation, Radiographs, Children

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