G3   Reassessing the Dental Features of Lamendin's Age-Estimation Method

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After attending this presentation, attendees will be more aware of each dental feature of Lamendin's method and its accuracy in age estimation. Repeatability, high accuracy, and high correlation with age are traits of a good age indicator.

This presentation will impact the forensic science community by helping forensic practitioners decide if the new equations derived only from certain dental features should be used for aging human remains.

Age estimation forms one of the most important steps in forensic anthropological analysis. Teeth, being very resistant to postmortem destruction and fragmentation, can be used as an alternative biological material for age estimation, especially when bones are not well preserved. Gustafson was the first to develop an aging method based on six features of dental structure.[1] Modifications of this method were later developed, including the technique of Lamendin et al.[2] The authors of this method established an equation for estimating age-at-death in adults based on the measurement of periodontosis (gingival regression) and root transparency height as related to the overall height of the root, taken from the labial surface of single-rooted teeth. The goal of the present study is to reassess the significance of these dental variables in estimating age-at-death using the canines from a modern European skeletal sample. A new equation for age estimation is derived for each canine using only the variables presenting significant correlation with age. The canines of 73 individuals (43 males and 30 females) from the Athens Collection were examined. This skeletal collection consists of individuals of known sex, age, occupation, and cause-of-death that died in the second half of the 20th century in Athens, Greece. The mean age was 46.02 years (range: 24-96 years) and 48.30 years (range: 20-85 years) for males and females, respectively. Periodontosis, root transparency, and maximum root height were measured at the mesial, distal, labial, and lingual surface of each canine, using a digital sliding caliper. Pearson's rank correlation statistics were applied to identify relationships between each measurement taken and chronological age. Multiple Regression Analysis (MRA) was applied in correlation with age variables in order to produce the best predictive model for age estimation. In addition, bias and inaccuracy tests as well as a Wilcoxon test were performed to assess the accuracy of the method. Age was estimated using the prediction equation for each canine. Only periodontosis and root transparency presented a statistically significant positive correlation with age. MRA produced four different models for each canine with R^2 ranging from 67.6% to 79.2%. Bias results showed that there was a small overestimation of one to two years for ages 20-59 years old; however, in ages more than 60 years, there was an underestimation that reached 17 years. The Wilcoxon test showed a significant difference between estimated and real age only for individuals over 60 years of age.

In conclusion, periodontosis and root transparency are robust age indicators as they present a high correlation with age. The new regression equations were found to be suitable for an accurate age estimation with the most accurate results to be observed among individuals 20-59 years of age. The low values of mean error (bias) from the real age make canines reliable for estimating age-at-death using only the dental features of periodontosis and root transparency.

References:

1.   Gustafson G. Age determination on teeth. *J Am Dental Assoc* 1950, 41: 45-54.
2.   Lamendin H, Baccino E, Humbert JF, Tavernier JC, Nossintchouk RM, Zerilli A. A simple technique for age estimation in adult corpses: the two criteria dental method. *J Forensic Sci* 1992, 37(5): 1373-1379.

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