



## Physical Anthropology Section – 2004

### H18 New Formulae for Estimating Age in the Balkans Utilizing Lamendin's Dental Technique

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After attending this presentation, attendees will understand how to estimate age-at-death in the Balkans based on an appropriate reference sample and formula

This presentation will impact the forensic community and/or humanity by providing an appropriate formula based upon a Balkan reference sample to estimate age-at death for genocide victims.

As with all forensic identifications, proper reference samples are critical when anthropologists employ methods to identify victims of genocide. Several methods to estimate age-at-death are utilized in the Balkans, such as osteomorphic changes of the pubic symphysis and sternal ends of ribs, histological sections of the clavicle and Lamendin's dental aging method. This presentation will focus on Lamendin's method and the purpose is two fold: 1) to analyze the consistency and accuracy of four observers employing Lamendin's technique and, 2) to recalculate the formula specific to the reference sample.

Lamendin et al.'s (1992) original research analyzed 306 singlerooted teeth extracted at the time of autopsy from 208 individuals. All individuals were considered to have French ancestry. Three measurements were required to estimate age-at-death: root height (the maximum distance between the apex of the root and the cemento-enamel junction); periodontal regression (maximum distance between the cemento-enamel junctions and the line of soft tissue attachment); and translucency of the root (measured from the apex of the root towards the cemento-enamel junction, using a lightbox to enhance the image). This research produced an overall mean error of + 8.4 years on their working sample and + 10 years on their forensic control sample. Prince and Ubelaker (2002) employed Lamendin's method on an American sample of 400 teeth, where absolute mean errors of 8.23 years and 7.7 years were produced using Lamendin's method and recalculated formulas. Sarajlic et al. (2003) employed Lamendin's original formula and Prince and Ubelaker's formula to Balkan males. They reported that Prince and Ubelaker's white male formula lowered mean errors for the male sample in the Balkans.

The current research applies Lamendin's method to 429 singlerooted teeth of known age and sex, which were extracted at the time of autopsy from genocide victims in the Balkans. Three measurements were taken from each tooth: root height, periodontal regression, and translucency of the root. All measurements were taken from the labial surface with digital calipers and recorded in millimeters. Four observers, three with modest experience of the procedures and one observer with considerable experience, took the measurements from each tooth. Each observer took blind measurements. Attrition scores were also recorded after Smith (1984).

All data were analyzed using the "R" statistical package. A repeated measures ANOVA was utilized to determine any significant difference among the four observers and regression analysis was used to produce the new formula based on the Balkan reference sample.

Although previous research has shown that Lamendin's method is reliable in estimating age-at-death, a formula based on an appropriate reference sample is necessary for application in the Balkans. The author proposes that recalculating the formula based on the sample above will reduce mean errors when estimating age-at-death and be more appropriate for estimation in the Balkans. 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 Sciences* 1992;37(5):1373-1379. Prince DA, Ubelaker DH. Application of Lamendin's adult dental aging technique to a diverse skeletal sample.

*J Forensic Sciences* 2002;47(1):107-116.

Sarajlic N, Klonowski E, Drukier P, Harrington R. Lamendin and Prince's dental aging methods applied to a Bosnian population. *Proceedings of the Fifty-fifth Annual American Academy of Forensic Sciences*; 2003 Feb 16-21; Chicago (IL): 2003;250.

Smith BH. Patterns of molar wear in hunter-gatherers and agriculturalists. *Amer J Physical Anthropol* 1984;63(1):39-56.

#### Balkans, Age-At-Death, Dental