H20 Evaluation of Three Methods of Age Estimation From Human Skeletal Remains (Suchey-Brooks, Lamendin, and Two-Step Strategy)

Rika Prodhan, BS, 547 Cedar Branch Road, League City, TX 77573; Douglas H. Ubelaker, PhD, Department of Anthropology, MRC 112, National Museum of Natural History, Smithsonian Institution, Washington, DC 20560; and Debra A. Prince, PhD, Joint POW/MIA Accounting Command Central Identification Laboratory, 310 Worchester Avenue, Building 45, Hickam AFB, HI 96853*

The goal of this presentation is to evaluate the application of a comprehensive (combined) method of age estimation compared with two isolated, individual methods. The methods considered are the Two Step Strategy (comprehensive method), and Lamendin and Suchey-Brooks (individual methods).

This presentation will impact the forensic community and/or humanity by demonstrating appropriate times of use of comprehensive methods versus individual, isolated methods of age estimation.

Previous research suggests that a method which utilizes more than one anatomical part of the body will have higher accuracy in age estimation than a method which considers only one anatomical part. The Two Step Strategy (TSS) utilizes ages generated from the Suchey-Brooks (SB) method of evaluation of the pubic symphysis for younger adults and those generated by the Lamendin (L) method based on single rooted teeth for older adults. This presentation offers forensic anthropologists an assessment of the usefulness of these three methods of age determination when applied to the same individuals from the Terry Collection housed at the Smithsonian Institution's National Museum of Natural History.

This study compares the measure of reliability (how close a result comes to the true value) of those three methods when applied to the Terry collection. The sample consisted of 312 individuals (age 25 to 99 years, with a mean age of 52.97 years and a standard deviation of 14.87years): 78 black females (age 25 to 99 years, mean 52.75, SD 16.57), 63 white females (age 27 to 90 years, mean 58.63, SD 14.16), 90 black males (age 26 to 76 years, mean 47.66, SD 13.00), 81 white males (age 27 to 85 years, mean 54.58, SD 13.67). To ensure unbiased results the real ages were hidden from the observer, and each method was applied with complete independence.

The smaller the value of the mean error (ME) is the higher the method's reliability. The ME of the TSS method was 7.7 years while the ME for the SB and L methods were 8.6 years and 8.1 years respectively. Overall, all three methods underestimated ages.

Samples were sub-grouped according to sex and ethnicity, and interestingly within some groups TSS was less accurate than the individual methods (L and SB). For example, accuracy was equal for the TSS and L methods (8.7 years) in White females (which had the highest mean error values) where as the ME was 9.4 years for the SB method. The estimations obtained from the SB method were inaccurate enough to substantially decrease TSS's accuracy, since TSS takes SB method's estimates into account. Similarly in White males, the mean error values of the TSS and L methods were almost equal (8.1 years and 8.0 years respectively, and 9.1 years for SB). In Black males, which had the lowest mean error values (SB: 7.2 years, L: 7.1 years, TSS: 6.8) TSS had much higher accuracy than the other two methods. Estimates generated by all the methods for males were more accurate than those for females, and more accurate for Black samples than for White samples.

Overall, the comprehensive TSS method was more accurate than the other two individual, isolated methods (L and SB). This trend of the TwoStep Strategy having the most accuracy at estimating age supports previous research that strongly suggests comprehensive approaches, such as TSS, are superior to isolated ones, such as L and SBS methods (Prince and Ubelaker, 2002; Lamendin *et al.,* 1992; Brooks and Suchey, 1990; Helena *et al.,* 2003; Baccino *et al.,* 2003).

However, when different subgroups were taken into account, the notion that combined methods have more accuracy in age estimation than individual methods was not well supported. This study suggests that the L method can be used alone for White samples, but a more comprehensive approach is recommended for other groups if the relevant skeletal parts are available. The greater accuracy of the L method when applied to White samples can prove advantageous since teeth offer superior preservation over pubic bones. All parts of the skeleton should be considered if they are available.

 ** Presenting Author*

MEAN ERROR VALUES (in years)

Sub-groups	SBS	Lamendin	TSS
WFemale	9.4	8.7	8.7
BFemale	9.27	8.8	7.7
Wmale	9.1	8.0	8.1
BMale	7.1	7.1	6.8
Black (F & M)	8.2	7.9	7.2
White (F & M)	9.3	8.4	8.4
Male (B & W)	8.1	7.6	7.4
Female (B & W)	9.3	8.8	8.2
Overall	8.6	8.1	7.7

Age Estimation, Lamendin, Suchey Brooks

 ** Presenting Author*