H91 Sex Determination Based on Clavicles from a Sample of Modern Colombian Mestizos

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The goal of this presentation is to provide insight into new research on sex estimation that has been recently conducted in Colombia. This project aims to document sexual dimorphism in the modern Colombian population by investigating metric differences of the clavicle between males and females.

This presentation will impact the forensic science community by demonstrating significant sexual dimorphism of the clavicle of modern Colombians. In addition, it presents three discriminant function equations that can be utilized by Colombian forensic anthropologists and potentially by other workers in South America.

Sex determination in forensic anthropology is a critical pillar of the biological profile, as this variable often informs other biological parameters such as stature and age. Considering that Colombian forensic practitioners frequently receive incomplete, dismembered, and decomposed bodies, metric analyzes of various postcranial skeletal elements are often required for sex estimation. Based on the above scenarios and the need to develop standards specific to the Colombian population, this research developed three discriminant function equations based on four measurements of the clavicle.

This research used a sample of clavicles drawn from the Colombian Modern Skeletal Collection from a total of 102 individuals (38 females and 64 males), with an average age-at-death of 50 years. Four measurements were utilized: maximum length (XLN), anterior-posterior diameter at midshaft (APD), superior-inferior diameter at midshaft (SID), and circumference at midshaft (CIR). In cases where both right and left clavicles were present, each was measured so that bilateral asymmetry could be tested.

The mean measurement values of the left clavicle were as follows: XLN (137.23 mm females; 154.33 mm males), APD (10.18 mm females; 11.82 mm males), SID (8.69 mm females; 9.92 males), and CIR (43.02 mm females; 51.43 mm males). The resulting mean measurement values of the right clavicle were as follows: XLN (136.66 mm females; 153.13 mm males), APD (10.54 mm females; 11.99 males), SID (9.43 mm females; 10.03 males), and CIR (33.23 mm females; 37.12 mm males).

The results obtained show that the differences between the means of male and female individuals were statistically significant (*p-value* < 0.05). Bilateral asymmetry was also statistically significant between right and left sides (*p-value* < 0.05), which resulted in the calculation of discriminant function equations for both the right and left clavicle. One equation was also calculated that utilized measurements from both the right and left clavicle together.

The following discriminant function equations for sex estimation were developed:

- Left Clavicle: (0.082*XLN) + (0.192*APD) + (0.363*SID) – 17.788);
- Right Clavicle: (0.085*XLN) + (0.141*APD) + (0.073*CIR) – 16.761);
- Right/Left Clavicle: (0.085*XLNR) + (0.067*APDR) + (0.079*XLNL) + (0.361*APDL) – 16.361.

In each of the above equations the sectioning point was 0, with females falling below this value and males falling above it. When the formulae were applied to the sample, the equation for the left clavicle classified 89.0% of cases correctly, the equation for the right clavicle classified 87.9% of cases correctly, and the equation utilizing both right and left clavicle data achieved a correct classification rate of 85.7%. Further testing of these equations on other known Colombian cases is necessary in order to discern a wider applicability of these formulae.

This research is expected to contribute to the improvement of the quality of forensic anthropological analyzes in Colombia by generating population-specific sex estimation criteria. It will expand forensic knowledge at both national and international levels as researchers continue to investigate population variation throughout Latin America.

Sex Determination, Clavicle, Colombian Population Standards

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