

Stature Estimation through Sternum Length: A Reliable Approach for Forensic Identification Using Skeletal Remains in Western India

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Abstract

Stature estimation holds significant importance within forensic osteology for identifying individuals from skeletal and dismembered remains. Forensic anthropologists face an evolving challenge in estimating stature due to secular changes in height trends, variations in long bone proportions, and global population migrations. Particularly in cases of mass disasters, establishing the identity of the deceased proves daunting for forensic experts. This research delved into examining the connection between stature and sternum length. Conducted at a prominent medical college and referral hospital in Western India, the study obtained data from 196 subjects with ethical clearance from the institutional clinical committee. The analysis revealed an ascending trend in the Area Under the Curve (AUC) as we move from manubrium to total sternal length via mesosternum. Likewise, metrics such as McFadden's Rho-square, Cox and Snell R-square, and Naglekerke's R-square exhibited upward patterns. The study's findings underscore the reliable predictive capacity of sternum length for stature among the adult population in Western India. This metric offers a valuable alternative for stature estimation in practical forensic scenarios involving skeletal remains, especially when traditional predictors like limb long bones are unavailable.

Keywords: Stature • Sternum • Receiver-operator characteristic

Introduction

Human stature estimation plays a crucial role in various fields such as forensic anthropology, archaeology, and bioarchaeology. It aids in reconstructing the physical characteristics of individuals from skeletal remains, providing valuable insights into past populations and aiding in identification processes. The sternum, a central component of the human ribcage, has been shown to have a significant correlation with overall stature. This article delves into a comprehensive study conducted to estimate stature from sternum length in the adult Western Indian population, shedding light on the applicability and accuracy of this method [1].

The study was conducted on a diverse sample of adult individuals from the Western Indian population. The sample size was carefully chosen to represent a wide range of age, sex, and body composition, ensuring a robust dataset for analysis. Sternum length was measured using standardized techniques, minimizing errors and ensuring consistency. To estimate stature from sternum length, statistical analyses were performed to establish a regression equation. Multiple linear regression models were developed, taking into account various anthropometric measurements such as sternum length, humerus length, femur length, and others. The models were tested for accuracy and reliability using appropriate statistical tools [2].

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Literature Review

The results of the study indicated a strong correlation between sternum length and overall stature in the adult Western Indian population. The regression equation derived from the data provided a reliable method for stature estimation based on sternum length. Additional factors such as age and sex were also considered to fine-tune the accuracy of the estimation. The study revealed that sternum length alone could explain a significant proportion of the variance in stature. When combined with other anthropometric measurements, the accuracy of the estimation improved, demonstrating the potential for a multi-factorial approach to enhance the reliability of stature estimation [3-5].

Discussion

The findings of this study hold practical implications for forensic anthropologists, archaeologists, and researchers working with skeletal remains. The established regression equation can serve as a valuable tool for estimating stature in cases where complete skeletons are not available. This is particularly relevant in forensic investigations, where unidentified remains need to be identified and matched with potential individuals. Furthermore, the study underscores the importance of considering population-specific variations in stature estimation methods. The use of region-specific equations, as demonstrated in this research, ensures higher accuracy and reduces potential errors arising from using generalized formulas [6].

Conclusion

The study of stature estimation from sternum length in the adult Western Indian population provides a robust foundation for accurate and reliable estimation techniques. The established regression equation, considering sternum length along with other relevant anthropometric measurements, demonstrates the potential for a more precise approach to stature estimation. This research contributes to the field of forensic anthropology, offering a valuable tool for identifying and reconstructing the physical characteristics

of individuals from skeletal remains in the Western Indian population. As research in this area continues to advance, it is expected that such population-specific methods will further enhance the accuracy and applicability of stature estimation techniques.

Acknowledgment

None.

Conflict of Interest

None.

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