Stature estimation from femoral bones in an archaeological population from the XVIII century in Lisbon

Madalena Tropa1,2, Carolina Barroso Flamino1,2, Inês Francisco1,2, Sofia Matos1,2, Rui Santos3, Cristiana Palmela Pereira4

1 Student of Master in Dental Medicine, Faculty of Dentistry, University of Lisbon, Portugal
2 Junior Investigator of the CEUUL Forensic Analysis Group
3 Assistant Professor at School of Technology and Management, Polytechnic Institute of Leiria, Portugal. Integrated Researcher at the Statistics and Applications Center of the University of Lisbon, Portugal (CEUUL). ORCID Number: 0000-0002-3731-363X
4 Auxiliary Professor with aggregação at Faculty of Dental Medicine, University of Lisbon, Portugal. Integrated Researcher at the Statistics and Applications Center of the University of Lisbon, Portugal (CEUUL). ORCID Number: 0000-0002-9164-7189

INTRODUCTION

Skeletal remains contributed to a catastrophic population concerning the 1755 Lisbon’s Earthquake were recovered in archaeological excavations carried out in 2004, in the Academia das Ciências de Lisboa. The femur, being the longest bone in the human body, is the most used resource regarding the estimation of the stature of an individual. Mildred Trotter and Goldine C. Glaser (1952) estimated the stature through the anatomical length of the femur [2]. However, in these types of populations, there is a need to develop a method to estimate stature through fragments of the same bone. Steve and Mckern (1970) conducted a study on estimating stature from long bone fragments, where they identified some reference points in American farmers, dividing them into segments. From these segments, they estimated the total length of the femur. From there, it is possible to estimate the stature using the same method as described before, namely through Trotter and Glaser’s study, although with lower precision [3]. Correlating the maximum length of an individual’s femur bone to their stature, in addition to its importance for therapeutic decisions, helps to clarify legal and civil issues, and, in disjointed archaeological populations such as the one under investigation, allows to characterize the demographic profile.

AIMS

Estimate the stature of the catastrophic population using reconstructive identification methods, used in estimation of stature by the femur bone, and identification of the maximum number of individuals (MNI).

MATERIALS AND METHODS

A. Organization and Cataloging

B. Weighing

Femur Measurements

Weighing

Femoral Length

Statute estimation

Male

Female

1. Trotter and Glaser’s formuals were used to estimate the stature from the femur length obtained [2].

Male

$F_{\text{m}} = 2.58 \times F_{\text{fr}} + 54.79 \pm 3.69$

Female

$F_{\text{f}} = 2.47 \times F_{\text{fr}} + 56.60 \pm 3.72$

2. The results obtained in this study can be linked to Manovon’s results (1893) [3], even though they are slightly above average. Concerning Mendes-Correia’s study (1912) on a modern population of Portuguese [4], our mean values for the non-discriminative femur length fit between the results obtained by the mentioned author for male and female categories. Regarding the estimation of stature, the male mean stature is slightly lower, and the female mean stature is slightly higher, compared to Mendes-Correia’s results.

DISCUSSION

Whole femurs show lower values for total stature comparing to femoral fragments, although both studies were applied to the same population. A possible explanation for this, is that femoral fragments were already previously used to estimate the total length of the femur, which can lead to less accuracy in the obtained results. Trotter and Glaser [2] made some adjustments by subtracting 0.06cm to the estimated stature in individuals aged 30 or above, in order to offset the effects of aging in bones. In our study it was not possible to determine the age of the individuals, and so this factor was not accounted for.

REFERENCES


