8 - Anthropology

OC-093 - (23791) - ASSESSING DISTAL FEMUR SEXUAL DIMORPHISM IN A SOUTH AFRICAN SAMPLE USING COMPUTER TOMOGRAPHY

D. Kristen (South Africa)[1]; S. Van Der Walt (South Africa)[1]; A. Oettlé (South Africa)[1]

1 - Sefako Makgatho Health Sciences University

Daniële Kristen
Pretoria

Soné van der Walt
Pretoria

Anna Oettlé
Pretoria

No conflict of interest

The distal femur provides reliable markers for sex estimation. However, in the South African context, existing standards for assessing sexual dimorphism in the distal femur have relied on a limited number of measurements from skeletal remains. To improve the applicability and reliability of these standards – particularly for fragmentary remains – this study analysed an expanded set of landmarks using contemporary 3D computed tomography (CT) models. Nineteen landmarks were placed on 3D models of CT scans from distal femurs of Black South Africans (50 males, 50 females), aged 18 to 80 years. From these, 15 linear measurements were derived and analysed using repeatability tests, Student's t-test, Mann-Whitney test, discriminant function analysis (DFA), and geometric morphometrics. (Ethics number: SMUREC/M/201/2022: PG) Significant sexual dimorphism was demonstrated, with males generally exhibiting larger dimensions. The distal epicondylar breadth (DEB) achieved the highest classification accuracy – 81% in Black South Africans and 95% in White South Africans. Discriminant function equations improved classification accuracy by 2% in each population. While shape variation produced similar classification accuracies in Black South Africans, it yielded lower accuracy in White South Africans.
This study established an expanded set of accurate, repeatable distal femoral measurements suitable for sex estimation, either as individual cut-off values or as part of discriminant function equations. The DEB emerged as the most valuable single parameter. Additionally, shape variation did not significantly enhance classification and holds limited value for fragmentary remains. The observed population differences highlight the necessity of developing population-specific forensic standards.

Palavras-chave : sexual dimorphism, discriminant function analysis, distal femur