ALEX BORDENET, College of Science and Technology, Fairmont State University, Fairmont, WV, 26554 & KRISTY HENSON, College of Science and Technology, Fairmont State University, Fairmont, WV, 26554, Biomedical Sciences, West Virginia School of Osteopathic Medicine, Lewisburg, WV. Applying morphometrics to a semi-quantitative measurement approach to identify spinal pathologies in human skeletal remains

Back pain is a common complaint in modern clinical populations, but spinal pathology is underreported in paleopathology, where assessment relies on qualitative scoring and semi-quantitative fracture identification ratio. In skeletonized remains, the absence of intervertebral discs prevents direct measurements of spinal curvature and Cobb angle assessment, making it challenging to determine pathology presence. This study aims to evaluate variation in vertebral body shape using quantitative morphometrics to determine whether outliers demonstrate spinal pathology. Nine vertebral landmarks were measured on the vertebral bodies of C3 – L5 of 177 individuals. Measurement reliability was tested using Cohen's Kappa Coefficient. Intraobserver reliability was high (0.90). Exploratory Principal Component Analyses were run using 95% ellipse and convex hull on each vertebral segment and the full spine. Variability of vertebral segments were driven by PCA1 and PCA2 with cervical variability (48.77; 11.74), thoracic (64.36; 8.47), lumbar (65.6; 9.35), and full spine (37.72; 35.23) with minimal outliers. PCA outliers did not correspond with individuals who had spinal pathology based on semi-quantitative compression fracture ratio calculations. The next steps of this project include running a Procrustes ANOVA and conducting data modeling. This project contributes to a larger investigation aiming to quantify vertebral shape and Cobb angle calculations in paleopathology.

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