World Academy of Science, Engineering and Technology
International Journal of Biomedical and Biological Engineering
Vol:15, No:06, 2021

# Geometric Morphometric Analysis of Allometric Variation in the Hand Morphology of Adults

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**Abstract :** Allometry is an important factor of morphological integration, contributing to the organization of the phenotype and its variability. The allometric change in the shape of the hand is particularly important in primate evolution, as the hand has important taxonomic features. Some of these features are known to parts with the shape, especially the ratio of the lengths of the index and ring fingers (2d: 4d ratio). The hand is a fairly well-studied system in the context of the evolutionary development of complex morphological structures since it consists of various departments (basipodium, metapodium, acropodium) that form a single structure –autopodium. In the present study, we examined the allometric variability of acropodium. We tested the null hypothesis that there would be no difference in allometric variation between the two components. Geometric morphometry based on a procrustation of 16 two-dimensional (2D) landmarks was analyzed using multivariate shape-by-size regressions in samples from 100 people (50 men and 50 women). The results obtained show that men have significantly greater allometric variability for the ring finger (variability in the transverse axis prevails), while women have significantly greater allometric variability for the index finger (variability in the longitudinal axis prevails). The influence of the middle finger on the shape of the hand is typical for both men and women. The influence of the little finger on the shape of the hand, regardless of gender, was not revealed. The results of this study support the hypothesis that allometry contributes to the organization of variation in the human hand.

**Keywords :** human hand, size and shape, 2d:4d ratio, geometric morphometry
**Conference Title :** ICCAP 2021 : International Conference on Computational Anatomy and Physiology
**Conference Location :** Dubai, United Arab Emirates
**Conference Dates :** June 29-30, 2021