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Run Faster, Jump Higher:
The influence of limb symmetry on anole locomotion

All bilaterally symmetrical organisms are canalized during development in order to generate a balanced phenotype. However, genetic and environmental inputs can affect canalization and lead to developmental instability, potentially generating a less symmetric phenotype. The degree of developmental instability in an organism can be measured by quantifying fluctuating asymmetry, random left-right perturbations from symmetry, as a proxy. Such asymmetry has been suggested to impact function in a variety of vertebrates, including turtles, wall lizards, and frogs. However, the relationship between limb symmetry and locomotor function has yet to be quantitatively tested in organisms with known asymmetry magnitudes as well as quantified locomotor abilities. Using a large sample of green anoles (*Anolis carolinensis*) that were assessed for maximum sprint speed (m/s) and jump power (W/kg) as part of a previous study, we used micro-computed tomographic (μCT) scans to examine individual asymmetry magnitudes. These magnitudes were generated using three-dimensional geometric morphometrics of right and left femora from the same specimens across 14 *A. carolinensis* (totaling 28 femora). Models were run comparing both general femoral shape as well as the asymmetric component of shape with body mass and our two locomotor parameters. These preliminary analyses demonstrated that left and right femora from the same individual plotted closer to one another in shape space than to other individuals. Although no ANOVAs showed significant trends, sprint speed and jump power explained 8–10% of total shape variation after factoring out differences in body mass across lizards. Fluctuating asymmetry accounted for 15% of total shape variation demonstrating relatively high asymmetry in comparison with previous studies on crania. An additional collection of asymmetry data for the femora as well as the humeri is ongoing, with the goal of collecting three-dimensional data for 50 anoles. This work will help to understand how limb symmetry impacts locomotor function and therefore fitness.