

Intra-Species Comparison of Forelimb Bone Morphology in Passerine Landbirds

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Introduction

- Bones are responsible for providing a structural framework for supporting the body.
- Microarchitecture of bones is oriented appropriately to resist applied forces.¹
- Bone tissue is constantly remodeling itself in response to altered mechanical loading demands.
- There are well-documented changes in tissue and organ size of landbirds during the migratory event, but no one has previously explored differences in bone.^{2,3}
- The purpose of this preliminary study is to make intra-species comparisons of bone morphology in birds collected during migration with birds collected at the breeding grounds.

Methods

- Right humeri were harvested from Veery (*Catharus fuscescens*) collected from 2 sites.
 - n = 2 collected during migration in Louisiana (LA) *gender not known.
 - n = 4 males and 2 females collected from breeding grounds in Northeast Pennsylvania (PA).
- Measurements of bone size (length and width) were made using a Mitutoyo digimatic caliper (Figure 1). The average was calculated from three separate measurements on each bird bone.



Figure 1 Length measurements were obtained by placing the outside measuring faces of the caliper proximally at the tip of the humeral head and distally at the groove lateral to the medial condyle (shown above). Width measurements (medial-lateral and anterior-posterior) were taken at 50% of the length of the humerus (not pictured).

- Micro-computed tomographic imaging (12 μm) of the humerus was done for microarchitectural analysis.

Results

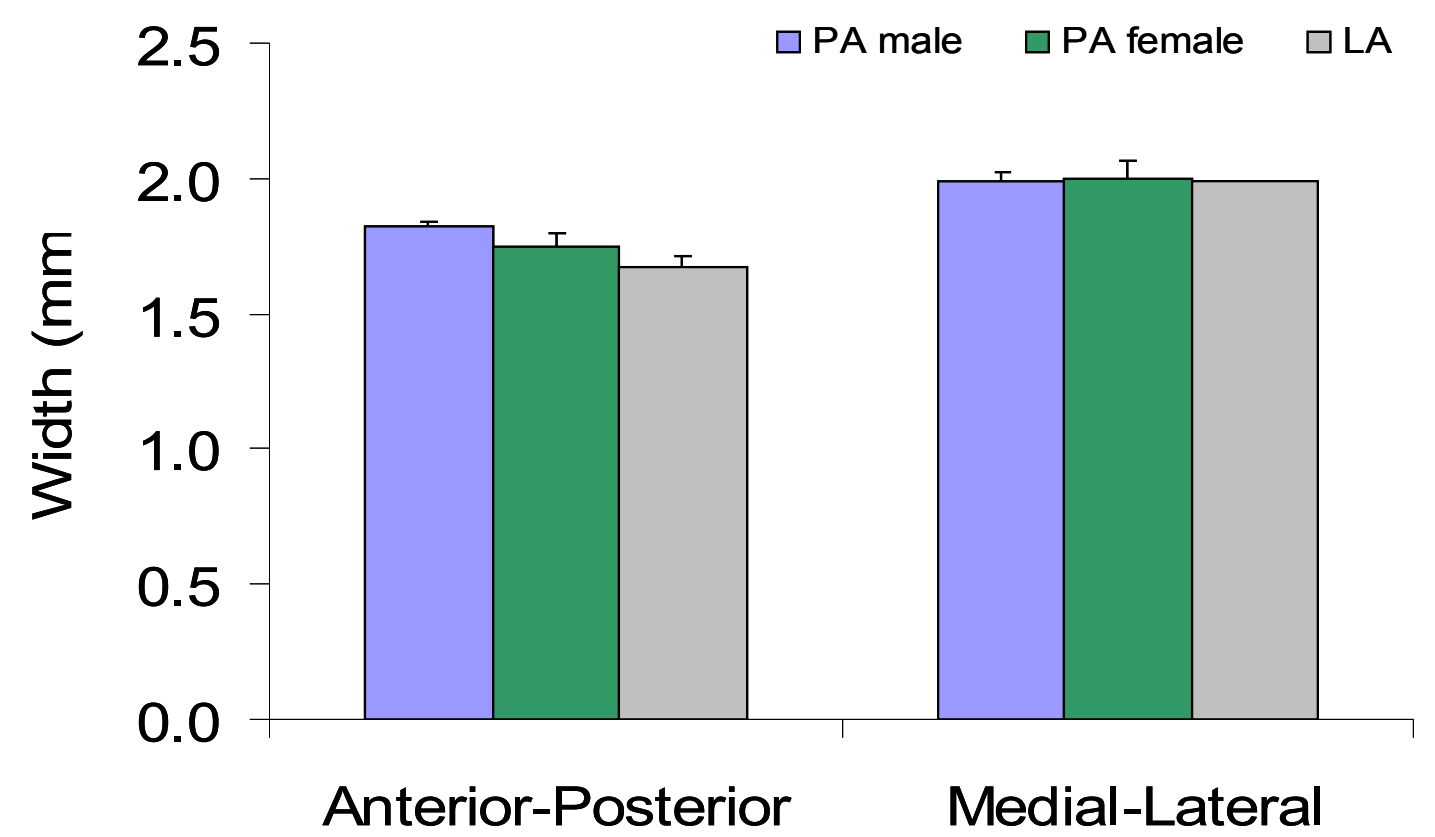


Figure 2 Comparisons of anterior-posterior width and medial-lateral width of humeri from PA males (n=4), PA females (n=2), and LA (n=2) birds.

- There were no apparent differences in humeral length of PA female (20.5 ± 0.16), PA male (20.9 ± 0.40), or LA (20.5 ± 0.12).

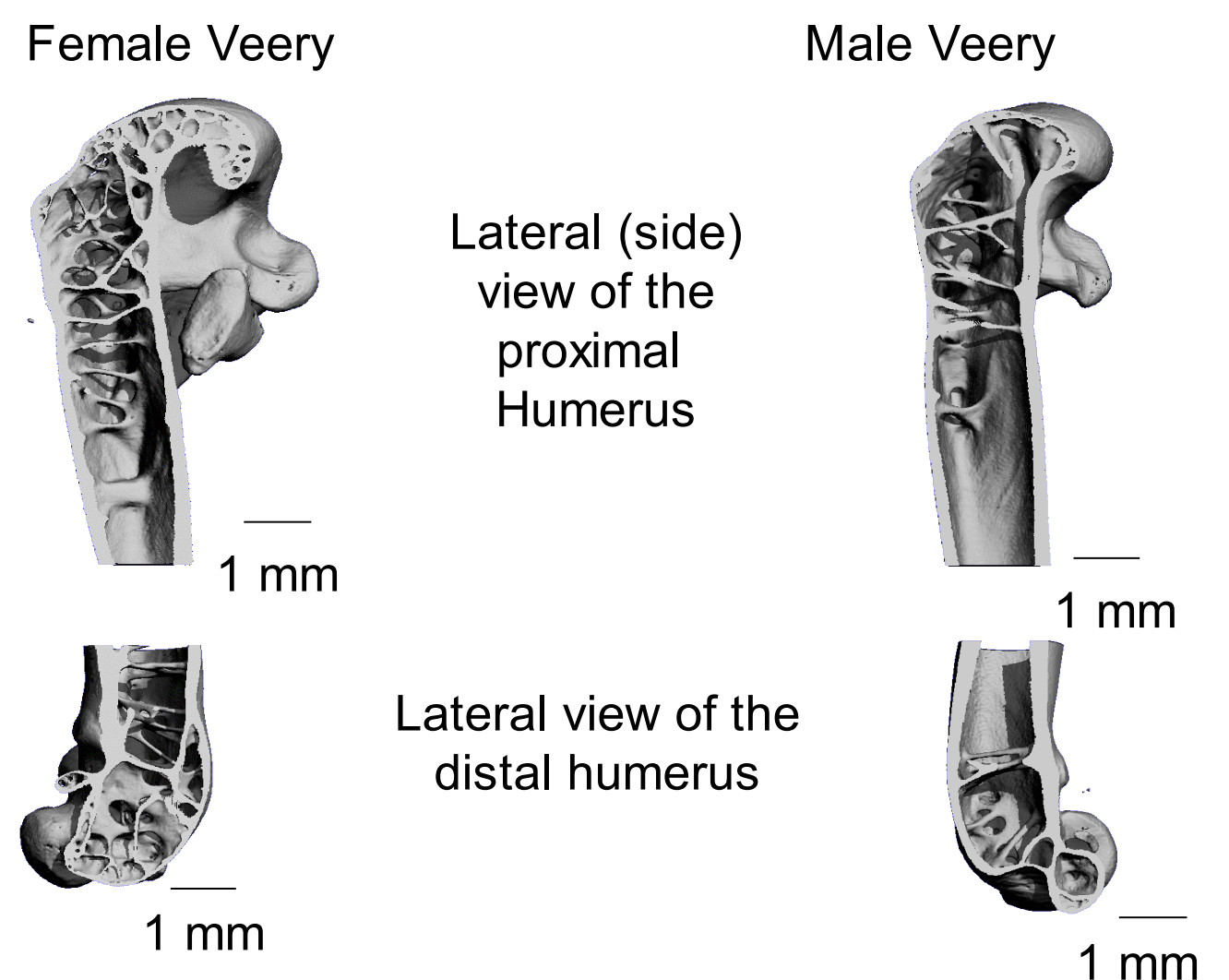


Figure 3 MicroCT images of the humerus of a) female and b) male Veery depicting gender differences in morphology.

Discussion

- The aim of this preliminary study was to make intra-species comparisons of bone length, width, and microarchitecture in Veerys collected during migration and at the breeding grounds.
- No differences in length or medial-lateral width were evident across the three groups.
- The data suggest that there may be a difference in anterior-posterior width across the three groups, but more research is needed.
- MicroCT images suggest differences in the male and female humeral microarchitecture, and analyses of specific parameters are ongoing.

References

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