



OSTEOHISTOLOGY AS A TOOL FOR IDENTIFYING BIOMECHANICAL DIFFERENCES AMONG HADROSAURIFORM DINOSAURS

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Hadrosauriform dinosaurs exhibit one of the most complex locomotor patterns among Dinosauria, including bipedal, quadrupedal, and facultative locomotion. However, reconstructing locomotor behaviour in this group remains challenging because osteological features, body mass, ontogenetic stage, and phylogenetic position are not always strictly correlated with preferred locomotor strategies. The identification of biomechanical patterns based on additional anatomical proxies is necessary to better understand locomotor evolution in hadrosauriforms. Osteohistology represents a valuable but still underexplored tool for biomechanical and myological studies in dinosaurs, and among skeletal elements, the pelvic girdle constitutes a particularly relevant target because it integrates major hindlimb musculature and plays a central role in force transmission and postural support during locomotion. Here, we apply osteohistological criteria, including global compactness, tissue-front distribution, Haversian remodelling, and the organization of Sharpey's fibres, to pelvic bones of several hadrosauriform specimens from Spain (MPZ 2024/94, MPZ 2025/06, MPZ 2025/512 and MPZ 2025/513). Thin-section histology, CT scanning, and quantitative microanatomical analyses are used to identify common patterns and potential biomechanical differences among taxa. Preliminary ischial analyses indicate that hadrosauriform dinosaurs share a generally conservative microstructural framework, although significant differences are present in several microanatomical parameters. These differences suggest distinct locomotor regimes and pelvic muscle dynamics between non-hadrosaurid styracosternans and more deeply nested hadrosaurids studied so far. In the near future, the sample will be expanded and additional pelvic elements incorporated into the analyses to achieve a better understanding of locomotor evolution in hadrosauriform dinosaurs.

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