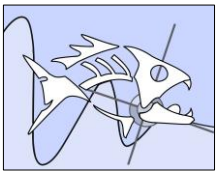

Comparative Analysis of the Mineralization of the Rocker Bones in two Ophidiiform Species

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Among ophidiiform fishes, certain species of the genera *Ophidion* (Ophidiidae) and *Onuxodon* (Carapidae) possess a highly specialized mineralized structure traditionally referred to as the "rocker bone." Located at the anterior end of the swimbladder, this structure serves as the insertion site for sonic muscles and transmits their contraction forces to the swimbladder wall during sound production. The rocker bone's formation is therefore likely driven by muscle-induced mechanical stresses, although its evolutionary origin remains unclear. This study compares the rocker bone in these two genera to assess whether this structure may result from such mechanical stresses, and to test for a common mechanistic basis underlying its formation across families. We estimated sonic muscle-induced stresses and examined rocker bones using histology, backscattered scanning electron microscopy (BSE-SEM), and energy-dispersive X-ray spectroscopy (EDX) in *Ophidion rochei* and *Onuxodon fowleri*. We identified a consistent spherulitic mineralization pattern, indicating that the rocker bone originates from mineralization processes occurring within the swimbladder tissues. However, light and electron microscopic analyses revealed distinct tissue organization, connections to the swimbladder wall and mineralization distribution between the two species, suggesting a different mode of development of the rocker bone. Consequently, while the rocker bones of both species share remarkably similar spherulitic ultrastructure, our results demonstrate distinct developmental pathways, supporting the hypothesis of functional convergence driven by similar mechanical constraints during sound production.