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Adaptive Value of The Intramandibular Joint in Archosaurs: *In Vivo* Experimental Evidence From Crocodilians

Mobility between the dentary and the post-dentary series of bones in the mandible has implications for the evolution of feeding in archosaurs. There has been much conjecture about the adaptive value of kinetic movements at the intramandibular joint and a wide range of functions hypotheses have been proposed. These include increasing gape through lateral expansion of the mandibular rami, more precise occlusion of the upper and lower tooth rows, and absorption of high bite forces.

We investigated strain patterns across the dentary-angular intramandibular joint in crocodilians as a first step to investigating the function of this joint in archosaurs. Strain gauges were placed on the dentary and angular of two species of crocodilians,*Caiman crocodilus* and *Alligator mississippiensis*. On the ventral side of the mandible during feeding, compressive strain magnitudes in the dentary were consistently higher than those in the angular bone. Additionally, strain orientation changed significantly across the joint. It is hypothesized that during jaw closing the mandible is loaded in torsion with some ventral bending in a parasagittal plane, causing compression on the ventral aspect of the mandible.

These results do not directly address whether movement occurs across the dentary-angular joint, as has been proposed for some theropod dinosaurs. However, it appears that in some archosaurs, the intramandibular joint serves to re-orient or absorb some of the force passing through it. The relationship between the function of this joint and the ability to generate a high bite force is presently unclear. While a mobile intramandibular joint may have decreased stresses transmitted into the posterior portion of the mandible and the skull, it would also decrease muscle forces that travel rostrally through the joint to the bite point. Detailed investigation of intramandibular joint morphology in extant and extinct archosaurs would serve to better address the function of this structure.