FEEDING RELATED CHARACTERS IN BASAL PTEROSAURS: IMPLICATIONS FOR JAW MECHANISM, DENTAL FUNCTION AND DIET

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Abstract

Comparative study of various feeding related characters observed in basal pterosaurs reveal a significant change in feeding strategies during the early evolutionary history of the group. These features are related to the skull architecture (e.g. temporal cavity, quadrate morphology and orientation, jaw joint), dentition (e.g. crown morphology, wear patterns), reconstructed adductor musculature, and postcranium. The analysis indicates that the most basal forms (*Preondactylus*, dimorphodontids and anurognathids) were small bodied animals with a wing span no greater than 1.5 m, they possessed a relatively short skull composed of weakly ossified skull elements, lightly constructed, straight mandibles with a large gape, sharply pointed teeth, and well developed external adductors. The absence of tooth wear marks excludes active dental occlusion, and the jaw closure was simply orthal. These primitive forms probably represent the earliest groups of pterosaurs, and their features indicate a predominantly insectivorous diet. Among the stratigraphically oldest but more derived forms (*Eudimorphodon*, *Raeticodactylus*, *Caviramus*) complex, multicusped teeth (probably independently evolved in several lineages) allowed the consumption of a wider variety of prey via a more effective form of active food processing. This is strongly supported by heavy dental wear in all forms with multicusped teeth which indicates efficient dental occlusion. Piscivory, as the dominant feeding mode, probably did not become widespread within the Pterosauria until the Early Jurassic. Typical piscivorous forms are characterized by widely spaced, enlarged procumbent teeth forming a fish grab, and an anteriorly inclined quadrate, allowing only a smaller gape for the mandibles. In addition the skull became more elongate and body size increased. Besides the dominance of piscivory, dental morphology and the scarcity of tooth wear reflect accidental dental occlusion that could have been caused by the capturing or seasonal consumption of harder food items.