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Society of Vertebrate Paleontology

and the 57th Symposium of Vertebrate Palaeontology and Comparative Anatomy (SVPCA)

University of Bristol
Bristol, United Kingdom
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African and Chinese procolophonoids, along with my redescriptions of the European many taxa have lacked adequate descriptions. Recent publications on several South Procolophonoid interrelationships, however, have remained poorly known because of The parareptilian group Procolophonoidea has been increasingly studied in recent years, PROCOLOPHONOIDEA

THE INTERRELATIONSHIPS, PALEOBIOGEOGRAPHY AND THE P-TR
ceratopsid taxon, possibly of chasmosaurine affinity. The oldest putative ceratopsid remains from North America. The preserved parietal Foremost Formation sediments date between 78-79 million years old making this material material includes portions of the braincase, quadrates, quadratojugals, squamosals, and bonebed within the Foremost Fm (lower Middle Campanian) of southern Alberta. The stegosaur remains were found disarticulated and mixed with remains of bony fishes, (Asturias, north Spain), recovered in the Kimmeridgian Lastres Formation, deltaic in origin. The stegosaur remains were found disarticulated and mixed with remains of bony fishes, turtles, plesiosaurs and theropods. Most of the bones were broken prior to fossilization, and are unidentified fragments. The best preserved fossils are cervical vertebrae, dorsal centra and ribs; there are also fragments of the sacrum, girdles and limb-bones. The degree of fusion are unidentified fragments. The best preserved fossils are cervical vertebrae, dorsal centra and ribs; there are also fragments of the sacrum, girdles and limb-bones. The degree of fusion of the neurocentral suture in the vertebrae indicates that at least two individuals are represented. The midline epiparietal forms a massive, flattened triangular spine that is flattened medially by a short, broad-based, procuring hook (with a base perpendicular to the base of the spine), and laterally by a much smaller, very low, elongate epiparietal. A parietal fenestra is present, but apparently relatively small compared to most Campanian-aged ceratopsids. The largest parietal bar preserves a fused procuring hook, but has an inflated nuchal surface for the large, but unfused. triangular spine. This suggests that the order of epiparietal fusion differs from that outlined for centrosaurs, and that complete fusion did not occur until full adult size was achieved. It also calls into question the previously proposed homology of epiparietals between centrosaurs and chasmosaurs. As presently interpreted, the remainder of the parietal frill margin is made up of a series of cup-shaped depressions, similar to those seen on some specimens of Triceratops, that mark the fusion points of the smaller isolated epiparietals. Foremost Formation sediments date between 78.79 million years old making this material the oldest putative ceratopsid remains from North America. The preserved parietal ornamentation is unique amongst ceratopsids and indicates that the material belongs to a new ceratopsid taxon, possibly of chasmosaurine affinity.

Rome Prize Session, Thursday 11:30

MYOLOGY AND FUNCTIONAL MORPHOLOGY OF BITING IN AVIAN AND NON-AVIAN DINOSAURS
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Biting is a key adaptation in vertebrate evolution and an understanding of its functional morphology and biomechanics provides a valuable insight into the behavior and ecology of feeding in animals that direct observations are all but impossible, e.g. extinct dinosaurs. However, biomechanical models of musculoskeletal systems are affected heavily by poor knowledge associated with muscle activity and conditions that are virtually unknown in extinct animals. For such taxa, one must rely on muscle reconstructions or on muscle parameters extrapolated from extant relatives. To date, efforts in constraining errors associated with muscle parameter estimation in the jaw adductor muscles of archosaurs is limited. Here, I provide an overview of the anatomy, architecture, and cross-sectional areas (CSA) of the jaw muscles in extant birds and crocodilians to form a basis for reconstructing muscle parameters in extinct non-avian dinosaurs. Further, functional metrics, primarily mechanical and displacement advantages, were calculated from digitized landmarks of the origin and insertion points of muscles in extant bird specimens. Muscle scars were investigated in dinosaurs to identify pressures and positions of jaw adductor muscle attachment sites, the digital coordinates of which were used to compute mechanical and displacement advantages. Muscle CSA were estimated in theropods using several extrapolation techniques. Functional metrics in most theropods are comparable with each other, with tyrannosaurs and carcharodontosaurs dominating the lower and lower displacement advantages respectively, confirming these two groups as above-average biters. The opposite is true of baryonychines with an extremely low mechanical advantage and extremely high displacement advantage, comparable in range to modern long-billed birds, indicating a weak-bite, fast-shutting jaw function. Preliminary CSA estimates show strong correlation with skull size, indicating a strong size influence in the estimation procedure, establishing the need for further groundwork.