

THE POSTCRANIAL MORPHOLOGY AND PHYLOGENY OF TAENIODONTS (MAMMALIA: TAENIODONTA); DETERMINING LOCOMOTOR ADAPTATIONS IN PALEOGENE MAMMALS

KYNIKOPOULOU, Zoi, University of Edinburgh, Edinburgh, United Kingdom; SHELLEY, Sarah L., Carnegie Museum of Natural History, Pittsburgh, PA, United States of America; WILLIAMSON, Thomas E., New Mexico Museum of Natural History, Albuquerque, NM, United States of America; BRUSATTE, Stephen L., University of Edinburgh, Edinburgh, United Kingdom

After the Cretaceous-Paleogene (K-Pg) mass extinction mammals, which originated during the Mesozoic, managed to survive and thrive. However, the tempo and mode of evolution for eutherians (placentals and close relatives) after the extinction are still unclear. An ideal group to investigate the post KPg evolution of mammals is the taeniodonts, as they are among the few taxa to purportedly cross the boundary. They then underwent a radiation in the early Paleogene and are defined primarily by their unusual dentition which is suited to chew an abrasive and tough diet. Ten genera of taeniodonts are currently recognized and are commonly arranged into two families. The Conoryctidae is usually considered to have a more generalized body plan while Stylinodontidae possess relatively extreme digging adaptations and more highly derived dentitions with enlarged canines. We conducted a phylogenetic analysis by applying parsimony and Bayesian techniques to a dataset of characters gathered from extensive observation of new specimens. We found limited support for the conoryctid-stylinodontid division and the genera *Conoryctes* and *Onychodectes* are placed as key basal taxa outside the clade of the more robust derived taxa (*Wortmania*, *Ectoganus*, *Psittacotherium*, *Stylinodon*). We then assessed postcranial bones to determine functional modes for taeniodonts and to test changes across phylogeny. Qualitatively, most taeniodonts, including *Onychodectes*, possess indicators of digging, i.e., a well-developed deltopectoral crest and broad distal end of the humerus for increasing flexion, pronation and supination, a long olecranon process of the ulna and enlarged manual unguals. Then we conducted quantitative multivariate analyses (linear discriminant analysis), using 9 forelimb linear measurements and 29 tarsal ones, comparing taeniodonts to a suite of extant mammals with known locomotor mode and other Paleogene taxa. Our results suggest *Onychodectes* to be terrestrial/semifossorial and comparable with the numbat (*Myrmecobius fasciatus*).

Ectoganus and *Stylinodon* are semi-fossorial and fall out near the gopher, *Pappogeomys merriami* and the aardvark (*Oryzomys afer*). Therefore, our study indicates that digging behaviors are ancestral for taeniodonts, and suggest that burrowing may have been integral to their survival across the KPg boundary and their subsequent radiation.

Grant Information:

European Research Council Starting Grant (ERC StG 2017, 756226, PaIM),
National Science Foundation (EAR- 1325544, 1654952, DEB-1654952,
1654949)