



## **Trirachodontids (*Therapsida, Cynodontia*) as non-gomphodont cynodonts: testing a hypothesis**

A. G. MARTINELLI<sup>1</sup>

The Trirachodontids (Early to Middle Triassic) were classically grouped among gomphodont cynodonts; nonetheless, the homologies of the tooth structures among members of this group (i.e., diademodontids, trirachodontids, traversodontids) are difficult to test. Two hypotheses were proposed about the origin and homologies of the trirachodontid postcanines: a) as result of a transverse widening, following the gomphodont homologies; or b) as result of the rotation of sectorial postcanines. Trirachodontid postcanines have transversely widened crowns with three main cusps disposed in a central transverse row and cuspidate mesial and distal cingula. Anterior postcanines are simpler whereas posterior postcanines are sectorial. Trirachodontid postcanines as gomphodont imply that the “gomphodont portion” of the tooth is a new structure and the labial sectorial border is homologous with the sectorial blade tooth of many cynodonts. Based on Diademodon Seeley and basal traversodontids, the origin of the gomphodont teeth by the enlargement of the lingual cingulum seems to be the most parsimonious hypothesis but this apparently could not be the case in trirachodontids. In turn, evidence in favor of transversely widened postcanines as product of the rotation of sectorial postcanines is discussed here. This evidence includes the gradual inclination of the main axis of the tooth from a mesiodistal to a labiolingual arrangement in upper- lower postcanines, last upper sectorial postcanines (in *Trirachodon* Seeley and *Langbergia* Abdala, Neveling and Welman) with the same pattern as the preceding widened postcanines but with different orientation, main central cusp of *Cricodon* Crompton with labial and lingual (according to implantation into the alveolus) serrated carinae, central cusp of the transverse row of last gomphodont teeth larger than the remaining, and presence of interdental space among teeth. Assuming this hypothesis, the transverse crest of trirachodontids is not homologous to the transverse crest of diademodontids- traversodontids. Nonetheless, non-dental cranial features support non-gomphodont cynognathian affinity for trirachodontids.

<sup>1</sup> Laboratório de Geologia, FACIP, Universidade Federal de Uberlândia, Avenida José Dib 2545, Bairro Progresso, 38300-132, Ituiutaba, MG, Brasil. [agustin\\_martinelli@yahoo.com.ar](mailto:agustin_martinelli@yahoo.com.ar)