

DECIPHERING DENTARY ANOMALIES IN EARLY CRETACEOUS IGUANODONTIANS: INTRASPECIFIC VARIATION, PALAEOPATHOLOGY, OR FOSSILDIAGENESIS?

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This study examines two ornithopod dentaries recovered from the Camino de La Algecira site (Mirambel Formation, Barremian, Lower Cretaceous), near the locality of Ladruñán (Teruel, Spain). The two dentaries share similar general morphology and size: they exhibit dental features characteristic of basal styracosternans, including broad lanceolate crowns and longitudinal ridges on the enamelled lingual surface (a primary ridge located on the distal half of the crown and a secondary ridge positioned mesially). The crown margins bear mammillated denticles. The dentaries display slightly convex ventral margins in lateral view, lack a diastema, and possess a low number of tooth positions (18), suggesting they belong to the same taxon. Yet one specimen exhibits a prominent thickening on the medial surface below the dental row. This study aims to identify the nature of this bulging by testing three competing hypotheses: H1, resulting from a fossildiagenetic alteration that resulted in the deformation of the fossil; H2, palaeopathological origin caused by trauma or disease; and H3, real morphological disparity caused by intraspecific variability. Distinguishing genuine pathology from post-mortem fossildiagenetic changes, also known as pseudopathologies, is a primary challenge in palaeontology. The Camino de La Algecira bonebed presents severe taphonomic alterations, including the unusual pseudomorphic replacement of biogenic apatite by gypsum and aluminium phosphate phases, associated with considerable mineral volume changes, which could significantly modify fossil morphology. Conversely, if the thickening is biological in origin, it may represent a bone callus from a healed fracture, an exostosis, or a bone infection like osteomyelitis, which are well-documented in ornithopod dinosaurs. On the other hand, intraspecific variation has been recognized in ornithopods, primarily within the Hadrosauridae clade, specifically sexual and ontogenetic dimorphism associated with the size and shape of the cranial crest shape and size. Attributing the observed variation to any autecological or biological trait requires extreme caution, as these hypotheses require rigorous testing with larger sample sizes. Through macro- and micro-structural analyses, this study aims to disentangle these variables and determine the true nature of this iguanodontian dentary “anomaly”.

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