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A Note on *Champsosaurus's* Interior Cranial Anatomy

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Description

Our The braincase of these creatures is mysterious because to the fragility of their skulls, despite the fact that solitary *Champsosaurus* bones are frequently found in Upper Cretaceous deposits of North America. In order to define their neurosensory structures and estimate their sensory capacity, two well-preserved specimens of *Champsosaurus* (CMN 8920 and CMN 8919) are CT scanned in this study. However, impressions of the olfactory stalks show that they were elongate and most likely facilitated good olfaction. The anterior region of the braincase was weakly ossified and hence does not allow visualisation of a complete endocast. The back of the braincase resembles other extinct diapsids morphologically and is ossified [1-3].

Introduction

The strongest proof of how prehistoric creatures functioned and interacted with their environment comes from palaeo neurology the study of the brain in the fossil record and how it has changed through time. Based on the morphology of brain regions that are specifically responsible for processing sensory data and creating behaviour, it is possible to deduce the behaviour and sensory capabilities of extinct animals. Other neural structures, such as the cranial nerves and membranous labyrinth which convey sensory and motor information to and from the brain and support the perception of movement and orientation respectively are frequently included in palaeo neurological investigations The principle of appropriate mass which asserts that the size of a brain region dedicated to a given function is directly connected with the amount of processing capacity required to execute that function enables estimations of sensory ability and behaviour based on the morphology of the brain. As a result areas of the brain that need more processing capability are typically larger to accommodate more neurons. The brain end cast is not a perfect representation of the brain in life because it also represents other soft-tissue structures housed within the endocrinal cavity that did not fossilise, such as the dura matter and vascular tissue which did not fossilize. This correlation allows hypotheses to be made about the sensory ability of extinct animals based on the morphology of the brain however these structures do not represent the brain in its ideal form. Despite this, information on an extinct animal's endocrinal cavity can be used to infer its neurosensory capacities by comparing it to closely similar extant taxa, which enables the development of hypotheses about its behaviour and ecology As equilibrioception6 and auditory abilities are known to correlate with the anatomy of the membranous labyrinth, it can be used as a proxy for assessing these abilities.

The semi-circular canal morphology and locomotors strategy and ecology have also been revealed to be correlated in numerous recent studies, with phylogenetic ally distant lineages having converging ear morphologies as a result of comparable types of locomotion and ecology. Despite the fact that the relationship between canal morphology and ecology is widely understood, it must be noted that the relationship is not perfect and that some groups' canal shapes are known to be very changeable.

Despite this general locomotor strategies or ecologies can still be inferred from descriptions of the labyrinth anatomy in extinct animals. A description of *Champsosaurus'* endocranial anatomy and a comparison of the inner ear with those of other taxa are required to ascertain whether their sensory anatomy reflects the adaptations for aquatic habits seen in other aquatic reptiles, despite the fact that *Champsosaurus* are widely acknowledged to be aquatic.

A considerable phylogenetic signal has been seen in the shape of semicircular canals in numerous lineages, according to several studies. Given that Choristodera's evolutionary position within Neodiapsida is poorly understood and that recent phylogenies have put Choristodera in a polysemy with Archosauromorpha and Lepidosauromorpha this has significant implications for *Champsosaurus*. Therefore, new information on the evolutionary position of Choristodera could be learned by contrasting the inner ear of *Champsosaurus* with those of other neodiapsids [4,5].

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