

Correction: The first pterosaur pelvic material from the Dinosaur Park Formation (Campanian) and implications for azhdarchid locomotion

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Abstract

UALVP 56200, originally identified as a partial pelvis of an azhdarchid pterosaur, is a badly broken tyrannosaurid squamosal. Previous conclusions presented about pelvic myology and locomotion in azhdarchids are unsubstantiated and should be disregarded. UALVP 56200 is briefly redescribed here as a squamosal, and provides insights on the extent of cranial pneumaticity in tyrannosaurids.

Key words: pterosaur, pelvis, tyrannosaurid, squamosal, pneumaticity



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Introduction

[Funston et al. \(2017\)](#) recently described UALVP 56200, a badly broken, pneumatic bone, as a partial pterosaur pelvis. Shortly after publication it was suggested by T. Carr that the specimen could be a tyrannosaurid squamosal. Further examination confirmed this identification. The specimen shows extensive pneumatic excavation, including enclosed pockets not yet described in tyrannosaurids.

Description

UALVP 56200 is the medial portion of a left squamosal ([Fig. 1](#)). Its anatomical orientation is similar to that described by [Funston et al. \(2017\)](#) except that the lateral surface is actually the medial surface, and vice versa. Anterior and dorsal directions, however, were determined correctly. In articulation, the morphology of a tyrannosaurid squamosal is partly obscured by the parietal, quadrate, and postorbital ([Brochu 2003](#); [Currie 2003](#)), which partly accounts for the erroneous identification.

The feature interpreted by [Funston et al. \(2017\)](#) as the “acetabulum” is actually the quadrate cotylus ([Currie 2003](#)), a deep cavity obscured by the quadrate in articulated specimens. The structure interpreted as the “preacetabular process of the ilium” is the parietal (medial) process, and the so-called “muscle scar” on its anterodorsal surface is the facet for the paroccipital process ([Brusatte et al. 2012](#)). The curved edge that was interpreted as the anterior junction of the “sacral rib” and “preacetabular process” is the posteromedial corner of the supratemporal fenestra.

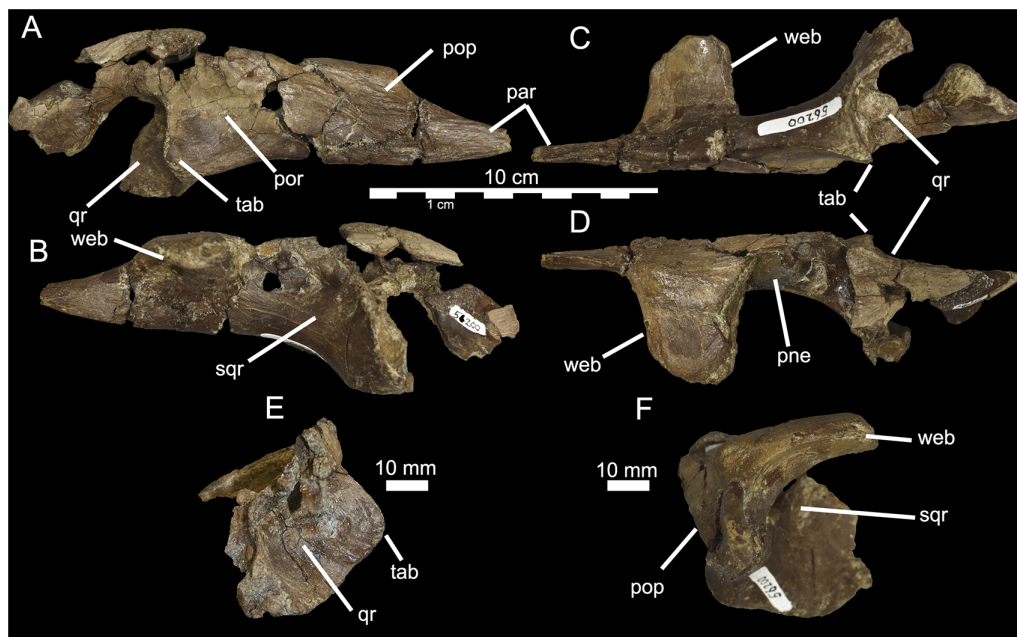


Fig. 1. *Daspletosaurus* sp. (UALVP 56200) partial squamosal in medial (A), lateral (B), ventral (C), dorsal (D), posterior (E), and anterior (F) views. par, parietal process; pne, pneumatic cavity; pop, facet for paroccipital process; por, pneumatopore; qr, quadrate recess; sqr, squamosal recess; tab, medial tab; web, web of bone connecting medial and lateral processes.

The description of the pneumatic cavities by [Funston et al. \(2017\)](#) was essentially correct, except that the anatomical landmarks used to describe their positions were erroneous. Only the anterior pneumatic cavity and posterior pneumatic cavity would have been enclosed in bone in life. The other pneumatic cavities are outpockets of the ventral concavity described by [Currie \(2003\)](#), which he suggested hosted an air sac. [Brusatte et al. \(2012\)](#) described similar recesses in *Alioramus altai* and indicated their presence in other tyrannosaurids, except *Gorgosaurus libratus*.

Discussion

The inferences of pelvic myology and locomotion presented by [Funston et al. \(2017\)](#) are unsubstantiated, although they did not differ greatly from previous studies. We urge that these conclusions be disregarded by future studies.

UALVP 56200 is indistinguishable from the squamosal of TMP 1994.143.0001 ([Currie 2003](#)), a juvenile *Daspletosaurus* sp., and is therefore referable to that taxon ([Fig. 2](#)). This is supported by the apparent lack of the squamosal recess in *Gorgosaurus libratus* ([Brusatte et al. 2012](#)), which is the only other tyrannosaurid known from the Dinosaur Park Formation. Some features of UALVP 56200 are surprising for a tyrannosaurid, particularly the degree of pneumatic excavation and the reduced thickness of the bone wall. In addition to cavities confluent with the squamosal recess, UALVP 56200 possesses entirely enclosed chambers that have not yet been described in tyrannosaurs. Despite the considerable bite force of tyrannosaurs and associated stresses, the squamosal is a delicate element. The cortex of the medial wall is <1 mm thick, typically more reminiscent of pterosaurs than of tyrannosaurids. The reinterpretation presented here will hopefully act as a cautionary note for future work on difficult-to-identify specimens.

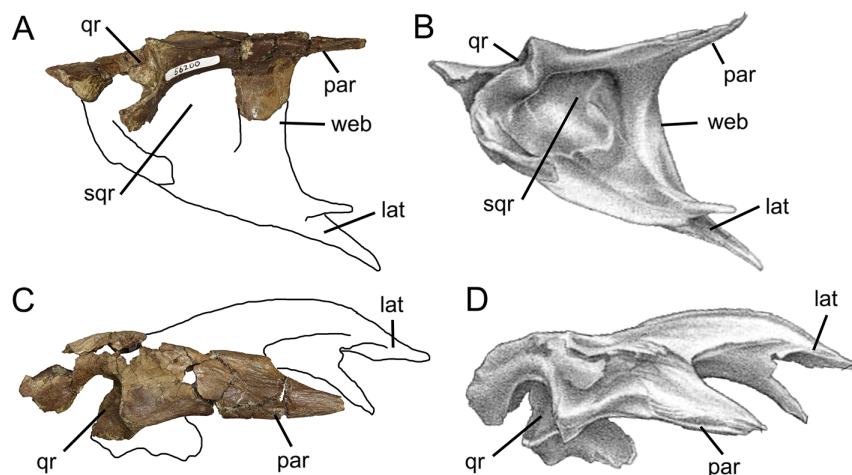


Fig. 2. Left squamosals of *Daspletosaurus* sp. in ventral (A, B) and medial (C, D) views. Reconstruction of UALVP 56200 (A, C), and TMP 1984.143.0001 (B, D). Images (B) and (D) from Currie (2003) and used with permission. lat, lateral process; par, parietal process; qr, quadrate recess; sqr, squamosal recess; web, web of bone connecting medial and lateral processes.

Conclusions

UALVP 56200 is a tyrannosaurid squamosal referable to *Daspletosaurus* sp., not an azhdarchid pelvis. Squamosal pneumaticity is widespread in tyrannosaurids except *Gorgosaurus libratus*.

Institutional abbreviation

UALVP, University of Alberta Laboratory of Vertebrate Paleontology.

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