

Poster Session III (Friday)

INCREASES IN SACRAL VERTEBRAE IN NON-AVIAN DINOSAURS: A PERVERSIVE, HOMOPLASTIC, DRIVEN EVOLUTIONARY TREND

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Increase in the number of sacral vertebrae is a pervasive evolutionary trend in non-avian dinosaurs. The primitive sacral count for Dinosauria is three. Increases in the number of sacra occurred across Dinosauria as a clade, and also as repeated parallel events within clades. For example, the number of sacra increased to five in basal theropods, and this count persisted along the 'backbone' of theropod phylogeny from the base of Neotheropoda to the base of Aves (including *Archaeopteryx*). However, increases to six or more sacra occurred independently in ceratosaurs, alvarezsaurids, therizinosaurs, oviraptorosaurs, troodontids, and dromaeosaurs. The number of sacral vertebrae also increased independently in sauropodomorphs, thyreophorans, ornithomimids, and ceratopsians (and in many subclades thereof). The increase in sacral vertebrae in Dinosauria passes all of the standard tests for a driven evolutionary trend (i.e., moving minimum, subclade, and ancestor-descendant tests). Further, it is homoplastic, with increases occurring independently in every major dinosaurian clade and in many of the subclades. Remarkably, the trend shows few or no reversals in non-avian dinosaurs; sacral count increases in all lineages but decreases are limited to a handful of singleton taxa, and even these reductions are doubtful (i.e., because of ontogenetic or preservational factors). The incorporation of large numbers of vertebrae into the synsacrum in the evolution of birds can now be seen as an instance of this pervasive, homoplastic, apparently irreversible, driven evolutionary trend.