

The osteoderm microstructure in doswelliids and proterochampsids and its implications for palaeobiology of stem archosaurs

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Osteoderms are common in most archosauriform lineages, including basal forms, such as doswelliids and proterochampsids. In this survey, osteoderms of the doswelliids *Doswellia kaltenbachi* and *Vancleavea campi*, and proterochampsid *Chanaresuchus bonapartei* are examined to infer their palaeobiology, such as histogenesis, age estimation at death, development of external sculpturing, and palaeoecology. Doswelliid osteoderms have a trilaminar structure: two cortices of compact bone (external and basal) that enclose an internal core of cancellous bone. In contrast, *Chanaresuchus bonapartei* osteoderms are composed of entirely compact bone. The external ornamentation of *Doswellia kaltenbachi* is primarily formed and maintained by preferential bone growth. Conversely, a complex pattern of resorption and redeposition process is inferred in *Archeopelta arborensis* and *Tarjadia ruthae*. *Vancleavea campi* exhibits the highest degree of variation among doswelliids in its histogenesis (metaplasia), density and arrangement of vascularization and lack of sculpturing. The relatively high degree of compactness in the osteoderms of all the examined taxa is congruent with an aquatic or semi-aquatic lifestyle. In general, the osteoderm histology of doswelliids more closely resembles that of phytosaurs and pseudosuchians than that of proterochampsids.

Key words: Archosauria, Doswelliidae, Proterochampsidae, palaeoecology, microanatomy, histology, Triassic, USA.

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