

EVIDENCE FOR ENAMELOID IN XENACANTHID SHARK TEETH

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ABSTRACT

The Xenacanthida (Chondrichthyes: Elasmobranchii) are characterized in part by the lack of enameloid in their teeth. The cusps are composed of orthodentine, sometimes with an outer layer of pallial dentine which is penetrated by tubules from the orthodentine. In 2003, the junior author described a new late Paleozoic genus, *Barbclabornia*, with one species, *B. (Xenacanthus) luedersensis* that is endemic to North America. The cusps were described as containing “hypermineralized pallial dentine” in the cristae, based on the presence of dentinal tubules which penetrate only slightly into the outer layer, unlike pallial dentine. Also in 2003, in a paper reviewing the Xenacanthida from the Carboniferous of the British Isles, it was stated that “*X. luedersensis* tooth cusps contain enameloid, based on thin-section analysis, and therefore may not be a xenacanthid.

Enameloid contains dentinal tubules that extend into that tissue from the orthodentine. True enameloid also contains crystallites which are not visible in thin section and are only made evident by scanning electron microscopy (SEM).

Because of the taxonomic implications, the authors analyzed the cusps of *Barbclabornia luedersensis* with SEM, and also those of two species of *Orthacanthus*, a well known xenacanthid genus, with serrated (*O. texensis*) and smooth (*O. platypternus*) carinae. All *Orthacanthus* teeth lack enameloid. The orthodentine, as seen with SEM and in thin-section, is similar in all three species. Identification of the tissue in the *Orthacanthus* carinae on the basis of SEM is equivocal, but more significantly, the tissue in the *B. luedersensis* cristae is considerably different. However, when compared to published descriptions and illustrations of the crystallites in the enameloid of euselachian sharks, it is evident that the presence of crystallites in *B. luedersensis* teeth cannot be established. The “texture” of the tissue in the cristae has a coarse granular appearance as seen with SEM; its classification, i.e., hypermineralized dentine or some new form of enameloid, remains unknown.