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Enamel microstructure of permanent and deciduous teeth of a species of notoungulate *Toxodon* : Development, functional, and evolutionary implications

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Enamel microstructure is studied here in *Toxodon* sp., a notoungulate from the Pleistocene of South America. The material includes 13 specimens from outcrops in São Paulo and Rio Grande do Sul states, Brazil. Analyses of ground sections of upper and lower incisors, premolars, molars, and deciduous premolars by scanning electron microscopy reveal Schmelzmuster with three enamel types: modified radial enamel (MRE), associated with the enamel-dentine junction (EDJ); Hunter-Schreger bands (HSB), an intermediary layer with decussating prisms; and radial enamel (RE), a layer placed next to the outer enamel surface. Microstructural features vary in each tooth category, on the buccal and lingual sides, as well as in the different regions of each tooth. The proportion of RE increases in the occlusal area of I2, which commonly exhibits intense wear, and may be related to abrasion resistance. HSB thickness ranges from 6 to 20 prisms, with the thickest portions placed in areas with intense masticatory loads. The most concentrated packing densities of HSB in the upper incisors and lower premolars suggest these teeth bore the greatest biomechanical demands. Incisors and cheek teeth show differentiation of Schmelzmuster, suggesting dental antagonistic contact areas, as well as leading and trailing edges. Deciduous premolars exhibit enamel in the early stages of development, and a neonatal line is observed almost parallel to the EDJ, possibly related to biological stress during birth. The EDJ is scalloped in all dental categories, with varying sizes and shapes. Larger and more pronounced scallops are observed in I2, i3, p4, and in the enamel folds of the upper and lower cheek teeth, associated with microstructural features indicative of greater biomechanical demands. Microstructural enamel findings presented here corroborate morphological trends in the dentition of Notoungulata related to hypsodonty, providing greater resistance to the consumption of abrasive diets in these euhypsodont-toothed herbivores.

Key words: Mammalia, Toxodontidae, euhypsodont teeth, enamel-dentine junction, Hunter-Schreger bands, neonatal line, Pleistocene, Brazil.

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