ULTRASTRUCTURAL APPEARANCE OF DECIDUOUS ENAMEL AND DENTINE IN OSTEOGENESIS IMPERFECTA (OI).

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Dental anomalies have been recognized in OI. Uncommon in type IB OI, more frequent in types IVB and III OI, the pathologic condition is known as dentinogenesis imperfecta. Enamel surface and prism organization of teeth affected by OI were described as normal but could fracture away from tooth and attrition might occur. The purpose of this investigation was to clarify the ultrastructure of enamel and that of the aberrant dentin in OI so as to explain fracture and attrition. Exfoliated deciduous teeth from children, 18 with type IVB OI and 2 with type III OI, were collected, fixed in 80% ethanol and examined after removal of organic matter using 5-7% sodium hypochlorite for 15 min, using a scanning electron microscope (SEM) at an accelerating volatage of 7 kiloVolts. Prisms and crystallites morphology were altered with some areas showing a normal key hole prism pattern while other regions showed no discernable prism pattern. At higher magnification, the crystallites had an altered size and morphology and appeared rough and granular compared with control enamel crystallites which displayed smooth surface without globular structures and had widened intercrystallites spacings while control crystallites were more densely packed.
The dentine of patients with type IVB OI exhibited a variety of features. The first formed peripheral dentine was normal and sharply demarcated from aberrant circumpulpal dentine where, as a rule, mineralization occurred by calcospheric calcification. Tubules traversed its entire thickness and contained intracanalar collagen fibers bundles extremely densely packed and calcified lying parallel to its walls. The mineral might nucleate within or between collagen fibrils causing changes in collagen organization. Intratubular collagen was mineralized to become part of the calcified dentine. The tubules, disappearing from view, could not be identified. But, in places, the collagen fibers were largely non calcified or encrusted with a fine mineral deposit. Scattered, round shaped crystallites were deposited onto calcified fibrils surface. Sometimes, an isolated osteocyte-like lacuna was enclosed in affected dentine.
In OI with DI prisms and crystallites organization might alter the enamel architecture and its mechanical properties. Unmineralized defective collagen would constitue soft area while regions of intratubular calcified collagen fibers would tend to be hard and brittle. Altered mineral deposit indicated a suitable collagen template is important for mineral deposition.
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