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Application of an air-abrasive cutting apparatus in the pediatric dental field: Cutting using chitin-chitosan grains

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Abstract Using an air-abrasive cutting apparatus, cavity preparation of dentin and artificially softened dentin was performed using alumina or chitin-chitosan grains as cutting media. As a result of scanning electron microscopic observation, the following findings were obtained:

1. In cutting specimens that showed high values for Knoop hardness, alumina grains exhibited excellent cutting effects.
2. Regarding specimens after decalcification for each duration, the amount of cutting was significantly larger with alumina grains than with chitin-chitosan grains.
3. Regarding specimens cut using chitin-chitosan grains, the deepest cavity preparation was obtained in the specimens decalcified for 12 hours.
4. Healthy dentin was effectively cut by the ejection of alumina grains, whereas artificially softened dentin was effectively cut by the selective use of chitin-chitosan grains.
5. Adhesion of a large amount of chitin-chitosan grains in the wet dentin specimens was observed.
6. The amount of chitin-chitosan grain adhesion was the largest in the wet dentin specimens decalcified 12 or 24 hours.

Key words Air-abrasion cutting, Artificially softened dentin, Cavity preparation, Chitin-chitosan, SEM observation

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