

Evaluation of Root Surface Protection Potency of All-in-one Adhesive Materials

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Background and Aim : Protection of root surface from decay is a key strategy for an elderly society with good oral health. The aim of this study was to assess the potentials of new all-in-one adhesives to protect root dentin from biofilm assaults *in vitro*.

Methods: Bovine root dentin was sliced and ground with 600-grit SiC to obtain a flat surface. The flattened surface of each specimen was divided into three areas: the first third was coated with a nail varnish as a control site, the middle third was single-coated with one of three all-in-one adhesives; Hybrid Bond (HB, Sun Medical, Japan), Shake One (SO, Shofu, Japan) and Reactmer Bond (RB, Shofu, Japan) according to the manufacturers' instructions, and the last third left untreated as a negative control site. Surface roughness (Ra) of the specimens was measured by using a confocal laser microscope (UK-8500, Keyence, Japan). They were then exposed to a *Streptococcus mutans* biofilm assault in an artificial mouth system for 40 hrs. Depth of the demineralized dentin was assessed by fluorescence microscopy (CKX41, Olympus, Japan). All numerical data were statistically analyzed using one-way ANOVA & Turkey's HSD ($p=0.05$).

Results: All coated areas showed significantly lower Ra values than uncoated areas, ($p<0.05$). Among the coat, SO and RB demonstrated significantly lower Ra values than HB ($p<0.05$). After biofilm formation, control sites with nail varnish and the adhesive coated areas indicated no signs of demineralization, while caries-like lesions were observed in the exposed dentin. A mean depth of the demineralization in the exposed dentin was approximately 70 μm . At the margin between the exposed dentin and adhesives, the fluoride-releasing adhesives, SO and RB, showed significantly lower depth of demineralization than fluoride-free adhesive, HB ($p<0.05$).

Discussion and Conclusions: It was suggested that surface coating by the all-in-one adhesive materials could protect the underlying dentin from demineralization.