



Title	Cause-effect relationship of varying bonding thicknesses in dentine adhesion of universal adhesives [an abstract of dissertation and a summary of dissertation review]
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# 学位論文内容の要旨

博士の専攻分野の名称 博士 (歯学) 氏名 Alam Arefin

学位論文題名

Cause-effect relationship of varying bonding thicknesses in dentine  
adhesion of universal adhesives

ユニバーサル接着材の象牙質接着における接着厚さの変化が及ぼす因果関係

キーワード Dentine; Universal Adhesives; Additional coating; Adhesive  
thickness; Microtensile bond strength; Hardness; Elastic modulus

The purpose of this study was to evaluate if varying thicknesses of universal adhesives utilising the additional coating strategy would affect their bond strength to dentine and their hardness and elastic modulus.

Ninety-nine human maxillary premolars were cut to expose the coronal dentine. The exposed dentine were ground with regular-grit (63  $\mu\text{m}$ ) diamond burs to produce clinically relevant smear layers. The ground teeth were randomly distributed to nine groups based on two variables - (1) adhesive: Scotchbond Universal Adhesive (SB; universal), G Premio Bond (GP; universal) and Clearfil Megabond 2 (MB; two-step self-etch; control); and (2) application strategy (one, two or three coats; each coat light-cured). After adhesive application, the teeth were incrementally restored with light-cure resin composite. The bonded teeth were then stored in distilled water at 37 ° C for 24 h. Resin-dentine sticks from eight premolars per group (each premolar rendering 3 sticks; n = 24 sticks altogether) were prepared for the microtensile bond strength ( $\mu\text{TBS}$ ) test using a universal testing apparatus, followed by measuring the adhesive thicknesses at their fractured ends using scanning electron microscope. The hardness and the elastic modulus of the adhesive

layers produced by different coats were evaluated on separate resin-dentine slices (n = 3 teeth per group) with an ultra-microhardness tester. The effects of different coats on the  $\mu$ TBS of the adhesives were tested with Two-way ANOVA followed by Tukey's post hoc test. The adhesive thickness, hardness and elastic modulus data were analysed with Kruskal-Wallis test with Dunn's Bonferroni adjustment. Spearman correlation test was done to check the association between the  $\mu$ TBS and adhesive thickness.

Two coats significantly increased the  $\mu$ TBS ( $p < 0.001$ ) of all the adhesives. Regarding the application of one, two and three coats, the correlation between adhesive thickness and bond strength was positive for GP, but negative for SB. In the case of hardness and, elastic modulus, additional coating significantly increased the values of GP ( $p < 0.05$ ) but did not affect SB and MB ( $p < 0.05$ ).

An additional adhesive coating over the manufacturers' recommendations improved the bond strength of all the adhesives tested. However, as the hardness and elastic modulus were found to be not influenced, the beneficial effect of additional curing was material dependent.