

The effect of hybrid layer thickness on microtensile bond strength of three-step and self-etching dentin adhesive systems

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I. Objectives

The purpose of this study was to evaluate the correlation between hybrid layer thickness and bond strength using confocal laser scanning microscope and microtensile bond strength test of two adhesive systems.

II. Materials and Methods

The dentin surface of human molars, sectioned to remove the enamel from the occlusal surface. Either Scotchbond Multipurpose(SM, 3M) or Clearfil SE Bond(CS, Kuraray) was bonded to the surface, and covered with resin-composite. the resin-bonded teeth were serially sliced perpendicular to the adhesive interface to measure the hybrid layer thickness by confocal laser scanning microscope. The specimen were trimmed to give a bonded cross-sectional surface area of 1mm^2 , then the micro-tensile bone test was performed at a crosshead speed of $1.0\text{m}/\text{min}$. All fractured surfaces were also observed by stereomicroscope.

III. Results

There was no significant differences in bond strengths the materials($p>0.05$). However, the hybrid layers of three-step dentin adhesive system, SM, had significantly thicker than self-etching adhesive system, CS($p<0.05$). Pearson's correlation coefficient showed no correlation between hybrid layer thickness and bond strengths($p>0.05$).

IV. Conclusions

Bond strengths of dentin adhesive systems were not dependent on the thickness of the hybrid layer.