INFLUENCE OF SELF-ETCHING PRIMER DRYING TIME ON ENAMEL BOND STRENGTH OF RESIN COMPOSITES

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ABSTRACT

Objective: The purpose of this study was to evaluate the effects of self-etching primer drying times on the bond strength of resin to bovine enamel.

Materials and Methods: Three self-etching primer adhesive systems —Imperva Fluoro Bond® (Shofu Inc., Kyoto, Japan), Clearfil® Liner Bond (Kuraray Co. Ltd., Osaka, Japan), and Mac Bond® II (Tokuyama Corp., Tokyo, Japan)— were used in this study. The labial enamel surfaces of bovine incisors were exposed by grinding with 240-grit and 600-grit wet silicon carbide paper. The primers were applied to enamel surfaces as per manufacturers' instructions. After priming, the surfaces were dried with compressed air for 0, 2, 5, 10, 20, or 30 seconds from 10 cm above the surface using a three-way syringe. Following the application of adhesive resin, resin composites were applied into molds (diameter = 4 mm, depth = 2 mm) and were light-cured. The shear test was performed at a crosshead speed of 1.0 mm/min. The ultrastructure of resin-enamel interfaces was observed with SEM at magnifications of 2,000× to 3,500×.

Results: Mean enamel bond strengths varied with the different drying times and ranged from 8.2 to 17.4 MPa for Clearfil Liner Bond, from 10.9 to 16.3 MPa for Imperva Fluoro Bond, and from 17.5 to 19.4 MPa for Mac Bond. For Clearfil Liner Bond and Imperva Fluoro Bond, mean bond strengths increased significantly at the 10-second drying time, whereas Mac Bond did not experience a significant change in bond strengths. SEM examination revealed morphologic differences among the groups with varying drying times. Resin tag penetration was not clearly seen at the 0-second drying time, but resin tags appeared to be intimately adapted to the enamel surface in specimens at the 30-second drying time.

Conclusions: The drying time of the self-etching primer prior to the application of bonding resin affected the shear bond strength of resin to enamel for two self-etch adhesive systems.

COMMENTARY

This study reported adequate enamel bond strengths of self-etching primer adhesive systems to ground enamel surfaces. The effect of primer drying time to the bond strength was system dependent. However, shorter drying times generally resulted in lower bond strengths. These primers contain water or ethanol solvents, and inadequate removal of those solvents could inhibit resin polymerization, accounting for the lower bond strengths with shorter drying times.

SUGGESTED READING

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