

The effect of different adhesive systems on the retention strength of bonded amalgam restorations

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Abstract

Aim: The aim of this study was to evaluate the bond strength of bonded amalgam to dentin when unfilled and filled adhesive systems are employed using different application modes and to compare the adhesives with a cavity varnish and unlined restorations. **Methods and Materials:** One hundred twenty sound third human molar teeth were used in the study. A cylindrical cavity 3,3 mm in diameter was prepared in a cross section of dentin approximately 3,0 mm in thickness. The specimens were divided into six experimental groups (n=20) according to the cavity liner used in the prepared cylindrical cavity: One Coat Bond™ (O), Scotchbond Multi-Purpose™ (S), Panavia 21™ (Pa), PQ1™ (P), Copalite™ (C), and the unlined (U) group which served as the control group. Cavity surfaces were treated with the assigned adhesive/liner according to manufacturer's instructions then restored with amalgam. After storage in saline solution for seven days at 37°C, the specimens were subjected to a push-out test at a crosshead speed of 1 mm/min. The mode of failure was assessed by microscopic analysis of the fracture sites. Data were analyzed by analysis of variance (ANOVA) and Duncan Multiple range tests ($\alpha=0,05$). **Results:** No significant difference in amalgam-dentin bond strength was found among O (33,47 MPa), S (31,02 MPa), and Pa (30,06 MPa) adhesive groups, but there was a significant difference between each of these groups and the P and C groups. The U group exhibited significantly lower retention than the other groups ($P<0,05$). **Conclusion:** Different bond strengths were observed with the different types of dentin bonding agents and liners employed. The lowest bond strength was seen in the U group. **Clinical Significance:** A statistically significant difference in bond strength was observed with O, S, and Pa compared to P, but this finding is not sufficient to rely on the bonding of amalgam to dentin, particularly in complex amalgam restorations.

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