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The Angle Orthodontist: Vol. 65, No. 1, pp. 35–42.

Improving orthodontic bonding to silver amalgam

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ABSTRACT

Flat rectangular tabs (n=84) prepared from lathe-cut amalgam (ANA 2000) were subjected to aluminum oxide sandblasting or roughening with a diamond bur. Mandibular incisor edgewise brackets were bonded to these tabs using: Concise (Bis-GMA resin); one of three metal-bonding adhesives, viz., Superbond C&B (4-META resin), Panavia Ex (10-MDP Bis-GMA resin) or Geristore (composite base); and Concise after application of the intermediate resins All-Bond 2 Primers A+B, or the Scotch-Bond Multi-Purpose (SBMP) system. All specimens were stored in water at 37° C for 24 hours before tensile bond strength testing. Alignment and uniform loading during testing were secured by engaging a hook in a circular ring soldered onto the bracket slot before bonding. Similar control brackets (n=12) were bonded with Concise to extracted caries-free mandibular incisors. Bond failure sites were classified by a modified ARI system.

Mean tensile bond strengths in the experimental group ranged from 3.4 to 6.4 MPa—significantly weaker than the control sample (13.2 MPa). Bond failure generally occurred at the amalgam/adhesive interface. Superbond C&B created the strongest bonds to amalgam; according to ANOVA and Duncan's Multiple-Range test, they were significantly stronger than the bonds with Panavia Ex and Concise, with Geristore in between. However, the bond strength of Concise to sandblasted amalgam was comparable to the Superbond C&B bonds when coupled with an intermediate application of All-Bond 2 Primers A+B. The SBMP, on the other hand, was less effective. Sandblasting was more effective in preparing the amalgam surface for bonding than roughening with a diamond bur, but the difference was not statistically significant. The clinical implications of these findings are discussed.

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KEY WORDS: Adhesives, Amalgam, Bonding, Bond strength, Debonding.