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BOND STRENGTH OF BRACKETS TO COMPOSITE RESINS

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Objective: To compare the mean bond strengths and mode of bond failure, in vitro, of five bonding systems (MIP¹, Conditioner², Assure², Scotchbond³, and Transbond XT¹), when bonding an orthodontic bracket to an artificially-aged composite resin restoration, with and without mechanical surface preparation with a diamond bur.

Methods: Class V buccal composite resin restorations were prepared in 240 upper right central incisor dentiform teeth. The restorations were artificially aged for 35 days, bonded with metal brackets, stored in distilled water at 37°C for 30 days, thermocycled for 500 cycles, and subsequently debonded with an Instron universal testing machine.

Results: The mean bond strengths for Transbond, MIP, Plastic Conditioner, Assure, and Scotchbond groups were 12.1, 12.3, 13.3, 17.2, and 17.7 MPa respectively. The mean bond strengths for Transbond+Diamond, MIP +Diamond, Plastic conditioner+Diamond, Assure+Diamond, and Scotchbond+Diamond groups were 18.5, 16.4, 19.1, 19.5, and 20.7 MPa respectively. ANOVA revealed a statistically significant difference ($P \leq 0.05$) among groups.

Conclusions: Mechanically roughening the surface of a composite resin restoration with a diamond bur, provided significantly greater bond strengths, regardless of the bonding resin used. However, Assure and Scotchbrand, without diamond bur preparation, provided similar bond strengths to Transbond, MIP and Plastic Conditioner, with diamond bur preparation.

¹ 3M Unitek, Monrovia CA

² Reliance Orthodontic Products, Itasca IL

³ 3M ESPE, St. Paul MN