

Bond Strength to Dentin of a New Dental Cement

Purpose: To determine the bond strength to dentin of a new adhesive resin cement, Panavia V5, in comparison to three other commercially available resin cements.

Materials: *Panavia V5 with Tooth Primer* and *Clearfil Ceramic Primer Plus* (Kuraray Noritake Dental Inc.), *RelyX Unicem 2 Automix Self-adhesive Resin Cement*, *RelyX Ultimate Adhesive Resin Cement* with *Scotchbond Universal Adhesive* (3M ESPE), *Multilink Automix* with *Multilink Primer A and B* (Ivoclar Vivadent, Inc.)

Tests: Ultradent Shear Bond Strength Test

Substrate: Human, adult superficial dentin

Curing: self-cured

Test Conditions: 24 H in 37 C water

Replications: 5/test type



Methods

Pre-treatment of Substrates

Human, adult, extracted third molars, previously stored in sodium azide solution, then in saline and then in water were embedded in acrylic resin discs and ground through 600-grit SiC paper to form bonding substrates of ground dentin. Dentin surfaces were pretreated in accordance with cement manufacturer's instructions.

Use of Cements

Self-adhesive and adhesive resin cements were tested using the indirect shear strength method where specimens undergo additional preparation. Single-sided adhesive Teflon tape, 0.13 mm thick, with an approximately 3 mm diameter hole was applied over the previously prepared bonding site and burnished into place. A small dab of the test cement was then placed in the hole in the tape and atop the pretreated substrate. Stainless steel, 8 mm diameter by 3 mm thick discs were abraded with 60 grit SiC sand paper; sandblasted and then treated with *Monobond Plus* (Ivoclar Vivadent, Inc.), and then placed on top of the cement. The cement was allowed to self-cure for 10 minutes under a load of 100 g and at 37 C. The excess cement was removed immediately after loading the cylinder. *Liquid Strip* (Ivoclar Vivadent, Inc.) was then applied to the perimeter of the junction between the cylinder and the Teflon tape. During self-curing, the specimen was covered with warm damp towels to prevent drying. At the end of the ten minute curing time, each specimen was moved to a humidior (at approximately 95% relative humidity) for ten minutes and then to a beaker with 37 C water where it remained submerged for 24 H prior to testing.

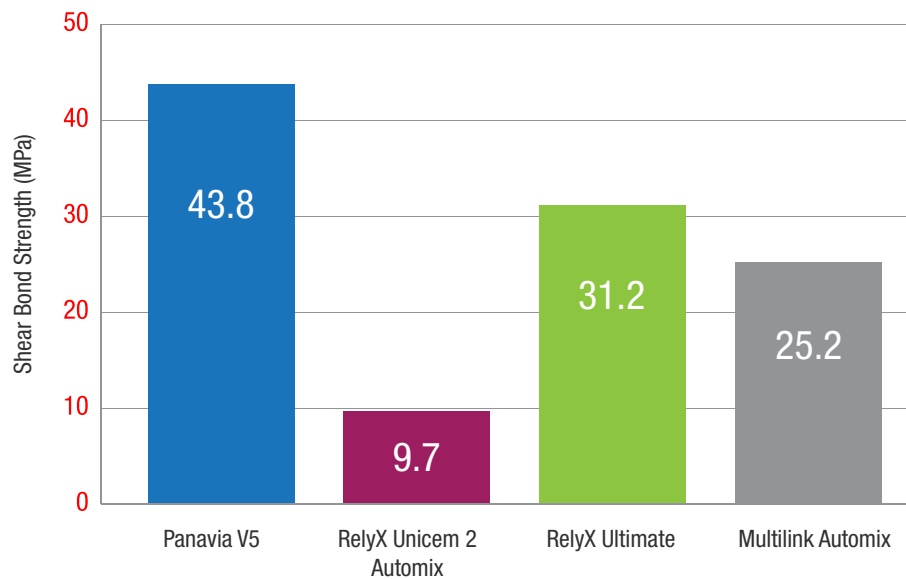
Shear bond strength testing

Testing was performed using a universal testing machine (Instron 5866) at a crosshead speed of 1 mm/min. Means and standard deviations of bond strength were calculated.

Results

Dentin Shear Bond Strength Summary

Cement	Primer	Substrate	Avg. Bond Strength (Std. Dev.), MPa	% Adhesive to Substrate
Panavia V5 (Kuraray Noritake Dental Inc.)	Tooth Primer	Superficial Dentin	43.8 (5.0)	17
RelyX Unicem 2 Automix (3M ESPE)	Self-Adhesive	Superficial Dentin	9.7 (3.3)	100
RelyX Ultimate (3M ESPE)	Scotchbond Universal	Superficial Dentin	31.2 (5.9)	26
Multilink Automix (Ivoclar Vivadent, Inc.)	Multilink Primer A&B	Superficial Dentin	25.2 (4.6)	98



Conclusions

Panavia V5 produced higher bond strength to dentin when compared to other tested resin cements.