

Bond Strength Testing of a Universal Cement System to Teeth

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Introduction:

G-CEM ONE is the latest in a series of universal cements which may be used with or without an additional primer to a variety of surfaces. As a follow up study to RR 154 (Novel Universal Cement Bond Strength to Multiple Substrates), we tested the combination of **G-CEM ONE** and **G-Premio BOND** to examine how the system performs in terms of bond durability and compatibility in the self-curing mode to tooth structure. This study used a modified ISO/TS 11405:2015 method for testing cement indirect bond strength by using a single sided PTFE tape to create a 3 mm interface and cement is bonded to an opaque metal disc to test the self-curing capabilities of the cement. We tested this cement system to human dentin and enamel, at 24 hours to provide a baseline to compare with the bond strength after artificial aging of 10,000 thermocycles.

Experimental Design:

Materials: **G-CEM ONE** with **G-Premio BOND** and **G-CEM ONE Adhesive Enhancing Primer** (AEP) (GC America), **RelyX Ultimate + Scotchbond Universal** (3M), **Panavia V5 + Tooth Primer** (Kuraray)

Tests:

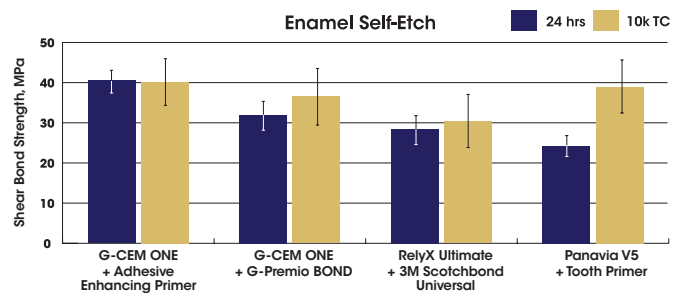
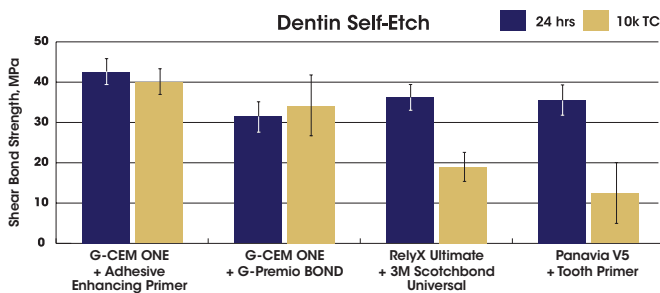
Substrates: Human superficial dentin, human self-etched enamel

Storage Conditions: 24 hours in water and 10,000 thermocycles

Methods:

Indirect Shear Bond Strength [n=8] to dentin, enamel: Molars, sterilized in a 1% chloramine solution, and stored in deionized water were embedded in acrylic resin discs and ground through 600-grit SiC paper to form bonding substrates of superficial dentin and ground enamel. Test groups for adhesive bonding had their surfaces treated. Specimens were then prepared in which single-sided adhesive PTFE tape, ~0.10 mm thick, with an approximately 3 mm diameter hole is placed over the bonding site and burnished into place. 10 mm diameter metal cylinders were ground with 60 grit SiC Paper, sandblasted, and primed to simulate an indirect restoration which should have a higher bond strength than the substrate being tested. A dab of the cement was placed in the center of the metal cylinder and the cylinder gently applied concentric with the hole with finger pressure before being placed in a loading jig where a 1 kg weight was applied at room temperature. The excess cement was removed by cotton without light and the load was removed then transferred to a 37°C, 100% R.H. oven carefully and dwelled for 10 minutes. They were then transferred to a container with 37 °C water for 24 hours. One group was then additionally thermocycled for 10,000 cycles between 5 and 55°C water before testing. The shear bond strength test was performed on a universal testing machine (Instron model 5866) at a crosshead speed of 1 mm/min. Means and standard deviations of bond strength were calculated and reported in the results section.

Results:



Conclusions:

G-CEM ONE with **G-Premio BOND** showed no decrease in bond strength after artificial aging.

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