



Bond Strength of Parkell Universal Adhesive to Unground and Ground Enamel and Superficial Dentin

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Purpose:

To determine the bond strength of **Parkell Universal Adhesive** bonded to tooth structure.

Experimental Design:

Materials:

Adhesive/Composite: **Parkell Universal Adhesive/HyperFill** (HF), **Parkell Universal Adhesive/ Hyperfill HAP** (HF-HAP), **Parkell Universal Adhesive/Absolute D-LV** (ABS)

Substrate: Unground enamel, ground enamel, superficial dentin

Phosphoric acid etch: Yes, no

Specimens per condition: 8

Materials and Methods :

Buccal and lingual surfaces of freshly extracted human third molars were mounted in resin and ground or not ground with 600-grit SiC discs to produce substrates of ground enamel, unground enamel and ground superficial dentin. In the one group, the bonding agent were applied on unetched specimens according to the manufacturer's instructions. In the second group, the substrates were etched with phosphoric acid before application of the bonding agent. The composite build-ups were bonded to the surface in a shape of a cilinder with area of 1 mm² at the bonded surface and 3 mm at the top of the cilinder. There were 8 specimens per condition for a total of 144 specimens. After bonding, the specimens were stored in water at 37° C for 24 hours. They were then debonded in tension with an Instron testing machine at a crosshead speed of 1.0 mm/min. Bond strength values were calculated. Failure modes were determined using magnification. Means and standard deviations were calculated. Means were compared using three-way analysis of variance. Fisher's PLSD intervals were calculated at the 0.05 level of significance.

Results

Bond strengths are shown in the table. In all cases, etching with phosphoric acid resulted in higher bond strengths than not etching with phosphoric acid. With one exception, bond strengths to unground enamel, ground enamel and dentin were greater than 30 MPa. Composites HF and ABS had the highest bond strengths to unground enamel, Composite HF-HAP had the highest bond strength to ground enamel. Composite ABS had the lowest bond strengths to dentin.

Composite etch	HF		HF-HAP		ABS	
	Yes	No	Yes	No	Yes	No
Unground enamel	52.2 (3.7)	45.6 (3.9)	38.5 (5.0)	33.4 (4.7)	58.1 (4.1)	53.8 (3.2)
Ground enamel	44.8 (3.6)	37.4 (3.3)	54.5 (3.2)	50.9 (5.6)	50.0 (3.3)	43.5 (3.2)
Dentin	50.6 (3.8) ^a	42.5 (3.4)	51.0 (2.3) ^a	44.4 (3.1)	32.9 (3.2)	29.0 (2.4)

*Means with standard deviations in parentheses. Fisher's PLSD intervals for comparisons of means among substrates, among composites and between etched and not etched were 1.5, 1.5 and 1.2 MPa, respectively. Means with the same superscripted letters are not statistically different at the 0.05 level of significance (you can find statistical analysis on page 3). Failure mode was 100% Adhesive for all the conditions.

Conclusions

In conclusion, the bonding ability (greater than 30 MPa for all the tested conditions) of **Parkell Universal Adhesive** is comparable to the other contemporary bonding agents currently available in the US market. **Parkell Universal Adhesive** has a high potential applicability in adhesive dentistry.