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Biomaterials Research Results

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Uni-Q Universal Bond Strength Pilot In Vitro Evaluation

Purpose:
This is an initial study to evaluate the bonding performance of the new Universal Adhesive, **Uni-Q Bond Universal** including human tooth substrates. Additional testing may be added after initial results which might include testing the compatibility with different cements, comparisons to competitive materials and thermocycling to test bond durability.

Materials:

- **UNI-Q Bond™** (B.J.M. Laboratories Ltd., lot 5100UBA), **Q-Match** (B.J.M. Laboratories Ltd., lot 5104QMBC1)

Substrates: Self-Etched Human Dentin, Self-Etched Human Enamel, **Katana™ Zirconia STML** (Kuraray Noritake Dental, Inc), **IPS e.max® CAD** (Ivoclar Vivadent, Inc.)
Storage Conditions: 24 hours
Methods:

Direct Shear Bond Strength [n=8] to dentin, enamel, Katana Zirconia STML, **IPS e.max CAD**: Human adult molars, sterilized in a 1% Chloramine T 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. Zirconia plates were previously cut to be ~12 mm x 12 mm x 2-3 mm thick, processed according to manufacturer instruction, embedded in acrylic resin discs, finished through 600 grit diamond paper, and surfaces treated. The surface treatment was 5% hydrofluoric acid (**IPS Ceramic Etching Gel**, Ivoclar Vivadent) for at least 20 seconds to **IPS e.max CAD** and sandblasting with 3 bar (0.3 MPa) pressure and 50 µm particles to Zirconia. Specimen surfaces had bonding agent placed according to manufacturer instructions. **Q-Match** composite was then placed on top of the bonding agent utilizing the Ultradent Shear Test mold and jig to produce a 2.38 mm diameter shear test cylinder according to ISO 29022:2013. The cylinder was light-cured for 20 seconds while in the mold with an **Elipar Deep Cure-S** (3M) curing light. The specimens were then transferred to a 37°C deionized water bath for 24 hours storage until testing. Testing was performed using a universal testing machine at a crosshead speed of 1 mm/min. Means and standard deviations were calculated.

Results Summary:

UNI-Q Bond **24h Bond Strength Results**	
Dentin	39.7 (4.9)
Self-Etched Enamel	22.6 (4.2)
IPS e.max CAD	38.1 (5.9)
Katana STML Zirconia	40.3 (4.9)

Dentin: This result is near the maximum bond strength possible for 24-hour dentin results.

Enamel: This result is average for self-etched enamel bond strength among universal adhesives for 24-hour results.

IPS e.max CAD: This result is high for 24-hour testing, however, thermocycling is critical for assessing bond durability to glass ceramics.

Katana STML Zirconia: This result is average to above average for 24-hour testing among zirconia primers.

Observations: UNI-Q Bond appears to be nearly colorless when placed and spreads evenly on all surfaces with no evidence of voids. The adhesive spreads less under gentle air drying potentially allowing less spreading into undesired areas clinically. These are excellent handling characteristics.

Conclusion: Uni-Q Bond performed well in initial bond strength testing to all substrates.

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