

Dentin Bond Durability of Fluoride Containing Self-Etch Adhesive Under Simulated Intra-Pulpal Pressure

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Abstract

Objective: To evaluate the dentin bond strength durability of adhesives containing modified-monomer with/without-fluoride after aging in artificial saliva and under intrapulpal pressure simulation (IPPS). **Materials and Methods:** Occlusal enamel of thirty-six freshly-extracted teeth was trimmed to expose mid coronal dentin. Roots were sectioned to expose pulp-chamber to connect the specimens to the pulpal-pressure assembly. Specimens were distributed over three groups (n=12) according to adhesive system used. The adhesive systems were: a two-step etch-and-rinse adhesive system (SB-Adper TM Single Bond 2, 3M ESPE) and two single-step self-etch adhesives with the same modified monomer (bis-acrylamide); one containing fluoride (AOF, AdheSE One F, Ivoclar- Vivadent) and the other not (AO, AdheSE One F, Ivoclar-Vivadent). Bonding was done while the specimens were subjected to 15mmHg IPPS. Resin composite (Valux Plus, 3M ESPE, USA) buildups were made. After curing, specimens were aged in artificial saliva and under 20mmHg IPPS at 37°C in a specially constructed incubator either for 24h or 6 months prior to testing. Thereafter, bonded specimens (n=6/group) were sectioned into beams (n=24/group) with a cross-section of 0.9+1-0.1 mm² and subjected to microtensile bond strength (μ TBS) testing using a universal testing machine. Data were statistically analyzed using Kruskal- Wallis and Mann- Whitney tests (P>0.05). Failure modes were determined using a stereomicroscope at x40 magnification.

Results: At 24h, SB showed -statistically higher μ TBS (P<0.05) than the other two adhesives which were not statistically different (P>0.05). The μ TBS of SB fell significantly (P<0.05) after 6-month aging in artificial saliva and under IPP. For AO and AOF, the bond values at 6-month were not statistically different from the values measured at 24-h (P>0.05). Modes of failure were mainly adhesive and mixed. **Conclusions:** Etch-and-rinse adhesives are more sensitive to IPPS than self-etch adhesives. Adhesives modification with hydrolytically stable monomers could be a valuable approach to enhance dentin bond durability.

Keywords:

Adhesion; Dentin; Dentin bonding agents; Fluoride and pulpal pressure