Dentin Bonding Durability of Two-step Self-etch Adhesives with Improved of Degree of Conversion of Adhesive Resins.

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Abstract

PURPOSE: To evaluate (1) the initial and long-term microtensile bond strengths of two-step self-etch adhesives with different degrees of conversion (DC); (2) the elastic modulus of the respective adhesive resins; (3) the water sorption of the respective adhesive resins.

MATERIALS AND METHODS: Two two-step self-etch adhesives, Clearfil SE Bond (CSE) and Clearfil SE Bond 2 (CSE2) were used in this study. The DC was determined using ATR/FT-IR with a time-based spectrum analysis. Midcoronal flat dentin surfaces of 24 human molars were prepared with 600-grit SiC paper for microtensile bond strength (μTBS) testing. CSE and CSE2 were applied to the dentin surfaces according to the manufacturer’s instructions, followed by composite buildups. The μTBS was measured after water storage for 24 h, 6 months, and 1 year. The elastic modulus (before and after 1 month of water immersion) was determined by the three-point flexural bending test and water sorption values by the water sorption test.

RESULTS: CSE2 showed significantly higher DC than CSE. The μTBS of CSE2 was significantly higher than that of CSE in all water storage periods. One-year water storage decreased the μTBS of CSE; however, it did not decrease that of CSE2. Regarding the polymerized adhesive resins, the elastic modulus of CSE2 was significantly higher than that of CSE before and after water immersion (p < 0.001), and the water sorption of CSE was higher than that of CSE2.
CONCLUSIONS: The higher DC of adhesive resins of two-step self-etch adhesives resists water aging and improves the initial bond strengths and durability of the resin-dentin bond.

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