

## Bonding effectiveness of universal adhesives combined with dual-cure composite cements

**Objective:** To investigate the ‘immediate’ and ‘aged’ bond strength to dentin of two universal adhesives applied in etch&rinse vs. self-etch mode in combination with auto-cured vs. light-cured composite cements.

**Materials and Methods:** A 46- $\mu\text{m}$ -grit bur-cut smear layer and a 0.3-mm-thick central groove were prepared on exposed dentin surfaces of 48 molars in light of a split-tooth design: etch&rinse vs. self-etch. Two universal adhesives (exp. K5D-01, Tokuyama; Scotchbond Universal, 3M) were applied on dentin according to the respective manufacturer’s instructions (37°C warmed up teeth, 100% humidity), but were not light-cured. CAD-CAM blocks (Estelite, Tokuyama), 8x8x5-mm in size, were sandblasted (30- $\mu\text{m}$  silica-coated  $\text{Al}_2\text{O}_3$ ) and adhesively luted using the adhesives in combination with their respective composite cement (exp. K5DCE-01, Tokuyama; RelyX Ultimate, 3M) under a constant 1-kg seating load during 10 min. Half of the specimens were left for auto-curing, while the other half were light-cured using a LED light-curing unit (1,632  $\text{mW}/\text{cm}^2$ ). Upon 1-hr storage (37°C, 100% humidity), the specimens were transferred into 37°C water for 1 wk, after which they were sectioned perpendicular to the interface to obtain square micro-specimens (1x1 mm); they were randomly divided in 3 groups to be subjected to a micro-tensile bond strength ( $\mu\text{TBS}$ ) test immediately, or after 25,000 and 50,000 thermo-cycling aging. The  $\mu\text{TBS}$  data were statistically analyzed using 4-way Anova ( $p < .05$ ).

**Results:** Aging did not affect the  $\mu\text{TBS}$  of both adhesives. The highest  $\mu\text{TBS}$  was recorded for both adhesives applied in etch&rinse mode, except for the auto-cured Scotchbond Universal/RelyX Ultimate combination. Irrespective of curing mode, the self-etch mode resulted in a significantly lower  $\mu\text{TBS}$  for both adhesives.

**Conclusions:** Considering the cementation of CAD-CAM composite blocks with universal adhesives and dual-cure composite cements, improved dentin bonding was reached upon an etch&rinse bonding mode. Light-curing of the tooth-restoration complex appeared mandatory for the Scotchbond Universal/RelyX Ultimate combination.

