Bonding to cervical sclerotic dentin: effect of acid etching time.


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Abstract

PURPOSE: The aim of this in vitro study was to evaluate the microtensile bond strengths (MTBS) of two total-etch one-bottle adhesive systems to natural cervical lesions with 2 different etching times (15 s vs 30 s).

MATERIALS AND METHODS: Thirty-two human canines and premolars with saucer-shaped noncarious cervical defects were cleaned and randomly assigned to 4 groups. The adhesive systems – Single Bond (SB; 3M ESPE) or OptiBond Solo Plus (OP; Kerr) – were applied on cervical dentin after acid etching with the proprietary acid gel (35% or 37.5% phosphoric acid) for 15 s (manufacturer’s instruction) or for 30 s. The respective hybrid composite was inserted in three increments and light cured. After 24 h water storage, the specimens were cut perpendicularly with a low-speed diamond saw (Isomet) to obtain slices with a cross section of ca 0.8 mm. After that, the slices were trimmed with a diamond bur to obtain a surface area of 0.7 +/- 0.05 mm2 (n = 12). MTBS was measured in a Bencor device with an Instron machine at a crosshead speed of 0.5 mm/min. The data were subjected to two-way ANOVA and Tukey’s LSD post-hoc test (p < 0.05).

RESULTS: MTBS are given in MPa (mean +/- SD), where means with the same superscript letter are not statistically different at p < 0.05: OP15 = 30.9 +/- 8.8ab, SB15 = 25.6 +/- 9.6bc, OP30 = 19.0 +/- 4.8c, SB30 = 35.9 +/- 11.0a. When data were pooled for “adhesive system”, SB resulted in statistically higher bond strengths than OP (p < 0.043). “Acid etching time” had no significant effect (p < 0.766), but the interaction of the two main factors yielded significant differences (p < 0.0001). Extending etching time to 30 s resulted in a more predictable bond to noncarious cervical sclerotic dentin with SB, but resulted in lower MTBS with OP.

CONCLUSION: Composite bonding to cervical sclerotic noncarious dentin may depend on acid demineralization capacity and bonding system. Knowing the
etching demineralization rates of the commercially available acid etching seems to be an important factor for selecting the best acid-etching time of cervical sclerotic dentin.

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