Selective enamel etching reconsidered: better than etch-and-rinse and self-etch?


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Abstract

PURPOSE: This study evaluated the marginal quality of differently bonded direct resin composite restorations in enamel and dentin, before and after thermomechanical loading (TML). Special attention was focussed on the performance of selective enamel etching, etch-and-rinse, and self-etching adhesives.

MATERIALS AND METHODS: Eighty MO cavities with proximal margins beneath the cementoenamel junction were prepared in extracted human third molars. Direct resin composite restorations (Tetric EvoCeram, n=8) were placed with 4-step selective enamel etching (Syntac SE), 4-step etch-and-rinse (Syntac ER), 2-step etch-and-rinse (XP Bond, Scotchbond 1 XT/Single Bond Plus), 2-step self-etching (AdheSE, Clearfil SE Bond), 2-step self-etching with selective enamel etching (AdheSE SE, Clearfil SE Bond SE), and 2-step self-etching with etch-and-rinse (AdheSE TE, Clearfil SE Bond TE). Marginal gaps were analyzed using epoxy resin replicas under a scanning electron microscope at 200X magnification.

RESULTS: Initially, high percentages of gap-free margins were identified for all adhesives. After TML, the results were as follows: (A) Enamel margins: When phosphoric acid was used on enamel, results were constantly higher (approximately 90%) compared with two-step self-etching adhesives (approximately 70%; p < 0.05). (B) Dentin margins: No statistical differences were found when etch-and-rinse and selective etch approaches were compared (59% to 64%; p > 0.05). When self-etching adhesives were used as per manufacturers’ directions, dentin margins exhibited the best marginal quality (74% to 82%; p < 0.05). When self-etching adhesives were used under etch-and-
rinse conditions, marginal quality in dentin was significantly reduced to 35% to 42% (p < 0.05).

CONCLUSION: Enamel bonding was generally more effective with phosphoric-acid etching. Enamel bonding performance of 2-step self-etching adhesives was improved when phosphoric acid was applied on enamel selectively.

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