Margin Integrity of Conservative Composite Restorations after Resin Infiltration of Demineralized Enamel.

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Abstract

PURPOSE: To investigate the influence of pretreating demineralized enamel with a caries infiltrant on the margin integrity of Class V composite restorations bonded with different adhesives.

MATERIALS AND METHODS: A total of 60 specimens from bovine incisors were demineralized (21 days, acid buffer, pH 4.95) to create artificial enamel lesions, and circular Class V cavities were prepared. Cavities of half of the specimens were treated with either an unfilled etch-and-rinse adhesive (Syntac Classic; Ivoclar Vivadent), a filled etch-and-rinse adhesive (Optibond FL; Kerr), or a self-etch adhesive (iBond Self Etch; Heraeus Kulzer) (n = 10 per group). Demineralized enamel of the other half of the specimens was pretreated with a caries infiltrant (Icon; DMG) prior to adhesive application. All cavities were restored with a nanofilled composite material and thermocycled (5000×, 5°C-55°C). Margin integrity was evaluated using scanning electron microscopy, and the percentage of continuous margin was statistically analyzed (p < 0.05).

RESULTS: The significantly highest margin integrity was observed for Optibond FL, whether or not demineralized enamel was pretreated with the infiltrant. Pretreatment of demineralized enamel with the infiltrant resulted in a significant increase in margin integrity when the unfilled etch-and-rinse adhesive (Syntac Classic) or the self-etch adhesive (iBond Self Etch) was subsequently applied, but showed no significant improvement in combination with the filled etch-and-rinse
adhesive (Optibond FL).
CONCLUSION: Application of a caries infiltrant can improve margin integrity of composite fillings in demineralized enamel when used in combination with the examined self-etch and unfilled adhesives.

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