Effect of Fluoride-containing Restorative Materials on Dentin Adhesion and Demineralization of Hard Tissues Adjacent to Restorations.

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Abstract

PURPOSE: This study evaluated (1) the dentin bond strength of fluoridated restorative systems following aging and (2) the enamel/dentin microhardness around restorations after a pH-cycling regimen.

MATERIALS AND METHODS: Sixty-four human third molars and four restorative systems were used. A resin-modified glass ionomer (GC Fuji II LC) was used as a fluoride-containing material in the positive control group, while Adper Easy Bond adhesive and Filtek Z350 XT composite resin, which are not fluoridated, were used together in the negative control group. Beautifil II composite resin and FL-Bond II adhesive, both fluoride-containing materials, were compared to Bond Force and Estelite Sigma Quick restorative system, which only contain fluoride in the adhesive. For dentin bond strengths, specimens of each material were fabricated for two test groups (n = 8): group 1: tested after 24 h; group 2: tested after 1 year of storage in artificial saliva. Both groups were tested using a microtensile method. For the cross-sectional microhardness test, standardized Class V cavities were prepared and filled with the different restorative systems. After experiencing repeated thermocycling and being subjected to pH-cycling, the teeth were sectioned. The microhardness was measured in enamel and dentin at
50 μm from the cavity wall and at six depths in relation to the surface subjected to pH cycling.

RESULTS: None of the restorative systems showed decreased bond strength after storage for one year in artificial saliva. No significant differences in microhardness were observed among the restorative materials on enamel and dentin.

CONCLUSION: All the restorative systems evaluated presented stable bond strength after one year of storage. The pH cycling caused a reduction in the superficial enamel microhardness close to the cavity wall. In dentin, the demineralization affected the superficial and sub-surface areas.

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