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COMMENTARY

IN SITU EFFECT OF 10% CARBAMIDE PEROXIDE ON RESIN-DENTIN BOND STRENGTHS: A NOVEL PILOT STUDY

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This study investigates the problem of reduced composite bond strength to dentin treated with 10% carbamide peroxide gel. The authors correctly point out that exposed root surfaces are being bleached in adults and the elderly, in whom gingival recession is a common finding. The frequency of bleached root surface dentin has increased because of the popularity of dentist-dispensed and over-the-counter peroxide bleaching agents. At the same time, the need for restorations bonded to root surface dentin is also increasing. It is important that dentists learn more about this issue and that researchers discover the mechanisms of the effects of peroxide bleaching agents on tooth structure.

The effects of peroxide bleaching on the bond strength of composite to enamel is well documented, and it is prudent to wait at least 2 weeks following the final bleaching treatment before performing adhesive procedures on enamel. There is some controversy on the mechanism causing the decreased bond strength; however, residual oxygen molecules in the tooth that inhibit full polymerization of the resins largely contribute to the problem. It seems unlikely that the peroxide alters the enamel structure in any way that would cause a reduction in composite bond strength. The effects on dentin may be quite different owing to the higher organic content compared with enamel. Thirty-three percent of the total volume of dentin is organic (primarily collagen) compared with < 4% of total volume for enamel.

The research described in this article is a novel approach to evaluating the effect of 10% carbamide peroxide on composite bond strength to dentin. Third molar teeth from one subject were extracted and prepared for microtensile testing. Prior to bonding of the composite, the subject from whom the teeth were extracted wore a removable appliance for 21 days containing dentin disks cut from the extracted teeth. The subject bleached

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his teeth for 2 h/d, which caused two of the four dentin disks to be bleached. The two unbleached control disks were removed from the appliance during bleaching, but were otherwise exposed to the same oral conditions as the bleached disks. A statistically significant difference in mean bond strengths of 39.2 MPa and 29.9 MPa was found for the unbleached and bleached dentin. The authors conclude that bleaching dentin may lead to reduced composite bond strengths.

It should be noted that by using an in situ model, the researchers have bridged the gap between laboratory and clinical research, improving the clinical relevance of the data. Wide application of the results to recommended practice guidelines is cautioned owing to the limitations of this pilot study, which included using only one research subject and one bleaching agent and using dentin exposed by removal of occlusal enamel rather than root dentin. The time period from the final bleaching treatment until the composite bonding was completed is not clear, so the actual effects of bleaching may be more or less than reported, depending on how long a dentist waits to place a dentin-bonded restoration. Further research on the recovery of dentin bond strength following bleaching is needed. Despite the limitations of this study, the authors should be commended for their novel approach, and others should be encouraged to develop research models, such as that reported in this article, that provide clinically relevant data.