

COMMENTARY

EFFECT OF SURFACE SEALANTS ON MARGINAL MICROLEAKAGE IN CLASS V RESIN COMPOSITE RESTORATIONS

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This is a very well-controlled study to evaluate a technique to help improve the seal of a direct composite restoration to tooth structure with the use of either a surface sealant or an adhesive system. I compliment the authors for their efforts and thoroughness.

The long history that we have in adhesive dentistry leads to some interesting thought. Enamel bonding was first presented in the early 1950s and has continued to evolve since. In the early years of enamel adhesion, the dentin was covered with a liner, the enamel was etched for 60 seconds with 37% phosphoric acid, and rinsed and dried to achieve a frosty white appearance as evidence of a well-etched enamel surface. The etched enamel was then coated with a hydrophobic unfilled resin adhesive, light cured at low intensity, filled with an early generation resin composite and cured with a low intensity light for a minimum of 60 seconds. I have had the opportunity to follow many 30+ year-old resin composite restorations to find great clinical success in most where margins are limited to enamel-only extensions. Removal and replacement is mainly because of discoloration and a desire to improve esthetics. My clinical experience has demonstrated very low incidence of marginal leakage and underlying caries under these older restorations.

Newer materials and instrumentation have introduced a different protocol with less consistent results.¹ The chemistry has changed to include very hydrophilic monomers and solvents to help with the moist dentinal environment and dentin adhesion. If the solvents are not well evaporated, they can reduce the polymerization of both the adhesives and the resin composite. This can lead to water absorption, osmotic blistering, and an increased incidence of micro leakage at the margins.^{2,3} The trends toward self-etching adhesives have shown potential compromises in the seal and retention to enamel.⁴ The newer instrumentation includes high-intensity narrow spectrum light technology to decrease clinical time. However, this approach can induce greater shrinkage stress, increased brittleness, and lower conversion potential.^{5,6} We are producing compromised results with great time efficiency. Is this the goal?

Modern clinical results have demonstrated concerns not observed in early treatment techniques. This study focuses on the concern of enamel marginal leakage. The 360-degree enamel margins are the “Gold Standard” in adhesive dentistry and will still produce the very best possible clinical outcome when not compromised with some of the newer chemistry and techniques. I hope to see more work conducted toward the improvement of the dentin-composite marginal seal, which has not shown to be as predictable. Clinically, I am not seeing long-term failures when all margins are in enamel, phosphoric acid is used as the etchant, and material chemistry is considered during the application. Unfortunately, the same cannot be said for enamel margins treated with most of today’s self-etching primers that are inherently far less acidic. I do believe we need to focus more attention on the dentinal seal. It would be interesting to see if the discussed technique would help improve the marginal seal when extended onto dentin or cementum. It would also be interesting to see results of this study using an earlier system where the chemistry is applied separately.

In my opinion, I would like to see different materials and protocols used for either a mostly enamel-only preparation, as in a conservative veneer, or a mostly dentin preparation, seen more with posterior restorations. My fear is one where we will no longer be able to reproduce the enamel bonds and seals of yesterday because of the discontinuation of mostly all products in the earlier modes of action. These products are being replaced with chemistry that does not give the clinician options for different substrates. Ideally, hydrophilic monomers would not be used on enamel-only preparation or on the internal surface on the porcelain restorations. The use of glass ionomers placed over areas of

dentin should not be abandoned. Predictable long-term results are what our patients deserve. I hope to see changes for the better in the future development of products and the teaching of techniques.

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