COMMENTARY

BOND STRENGTH AND ETCHING PATTERN OF ADHESIVE SYSTEMS TO ENAMEL: EFFECTS OF CONDITIONING TIME AND ENAMEL PREPARATION

Edward J. Swift Jr., DMD, MS*

The four adhesives used in this study represent the four major approaches for bonding resin-based materials to tooth structure: three-step etch and rinse, two-step etch and rinse, two-step self-etch, and one-step self-etch. These self-etch materials differ greatly in pH. The two-step system Clearfil SE Bond is considered to be a mild self-etch material, while Prompt L-Pop is considered to be strongly acidic.

This article provides excellent images of the etched enamel and resin–enamel interfaces produced by the various systems. However, the bond strength data are somewhat surprising and difficult to explain. Because both etch enamel with phosphoric acid, I would have expected the mean bond strengths of the two OptiBond products to be similar to each other and to be significantly higher than the self-etch materials. Further, I would have expected Prompt L-Pop to have intermediate bond strengths and Clearfil SE Bond the lowest. Instead, OptiBond FL had the lowest mean bond strengths, and the other three materials were similar to each other.

In addition, neither doubling the conditioner application times nor grinding the enamel had any effect on bond strengths. The latter finding is particularly surprising because much research has shown that grinding the enamel substantially improves the bonding of self-etch adhesives.

So what is the reader to make of the findings in this study? Certainly, it would be a mistake to conclude that a mild self-etch material such as Clearfil SE Bond provides a better bond to enamel than any etch-and-rinse system, whether a three- or a two-step system. I believe it also would be wrong to conclude that roughening the enamel surfaces has no effect on the bond strength of self-etch adhesives. Doubling the application time may or may not have an effect, as research in this area is inconclusive; however, there is some evidence that this *can* improve adhesion.

It is possible that the testing method contributed to the anomalous results of this study. As the authors themselves point out in the Discussion, the proportion of resin cohesive failures was extremely high for OptiBond FL. When cohesive failures of this type occur, the test is measuring the cohesive strength of the resin material, not its adhesion to the enamel substrate.

*Professor and Chair, Department of Operative Dentistry, University of North Carolina, Chapel Hill, NC

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