

## Bonding of Self-Etching Adhesives to Caries-Affected Dentin (11/03)

Microtensile bond strength of total-etch and self-etching adhesives to caries-affected dentin. Ceballos L, Camejo DG, Fuentes MV, Osorio R, Toledano M, Carvalho RM, Pashley DH. J Dent 2003;31:469-477.

The purpose of this study was to evaluate the microtensile bond strength of total-etch or self-etch adhesives to caries-affected versus normal dentin. Extracted carious human molars were ground flat to expose caries-affected and normal dentin. Surfaces were bonded with two total-etch, two-step adhesives, Prime & Bond NT (Dentsply Caulk, Milford, DE) and Scotchbond 1 (3M ESPE, St Paul, MN), a self-etch, two-step adhesive, Clearfil SE (Kuraray, New York, NY) and a self-etch, one-step adhesive, Prompt L-Pop (3M ESPE, St Paul, MN). Composite resin (Tetric Ceram, Ivoclar Vivadent, Amherst, NY) was built-up and the teeth were vertically sectioned and tested in tension at 24 hours. **The total-etch adhesives yielded higher bond strengths than self-etching systems. Significantly lower results were obtained with Prompt L-Pop. All the adhesives attained higher strengths to normal dentin than to caries-affected dentin, but the differences were only significant for Prime & Bond NT and Clearfil SE.**



**DIS Comment:** Caries-affected dentin contains dentinal tubules that are filled with acid-resistant minerals that may interfere with the infiltration of adhesive resins.<sup>1</sup> The application of phosphoric acid in a separate etching step may solubilize the intratubular mineral deposits in caries-affected dentin better than weaker acids, thereby contributing to better resin retention.<sup>2</sup> Previous studies have reported that the bond strengths of self-etching systems are reduced on caries-affected dentin.<sup>3</sup> In this study, the lowest bond strengths were attained with Prompt L-Pop, a one-step, self-etching bonding agent. These results are in agreement with previous laboratory studies.<sup>4,5</sup> The correlation between laboratory bond-strength studies and clinical success is unknown. However, Prompt L-Pop has also been reported in a recent clinical study as having low retention of composite resin in non-carious cervical lesions.<sup>6</sup>

### References

1. Frank RM, Voegel JC. Ultrastructure of human odontoblast process and its mineralization during dental caries. Caries Research 1980;14:367-380.
2. Yoshiyama M, Urayama A, Kimochi T, Motosuo T, Pashley DH. Comparison of conventional vs. self-etching adhesive bonds to caries-affected dentin. Oper Dent 2000;25:163-169.
3. Nakajima M, Ogata M, Tagami J, Sano H, Pashley DH. Bonding to caries-affected dentin using self-etching primers. Am J Dent 1999;12:309-314.
4. Perdigao J, Frankenberger R, Rosa BT, Breschi L. New trends in dentin/enamel adhesion. Am J Dent 2000;13:25-30.
5. Frankenberger R, Perdigao J, Rosa BT, Lopes M. No-bottle vs multi-bottle dentin adhesives: a microtensile bond strength and morphological study. Dent Mater 2001;17:373-380.
6. Brackett WW, Covey DA, St Germain HA. One-year clinical performance of a self-etching adhesive in Class V resin composites cured by two methods. Oper Dent 2002;27:218-222.