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


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. 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. Previous studies have reported that the bond strengths of self-etching systems are reduced on caries-affected dentin. 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. 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-caries cervical lesions.

References