Bonding Effectiveness of Self-Etch Adhesives (3/05)


A trend exists toward simplified adhesive application procedures for bonding of resin composites. The purpose of this article was to compare the bonding effectiveness of one- and two-step self-etch adhesives to a more traditional three-step etch-&-rinse adhesive. One 1-step self-etching adhesive (Adper Prompt, 3M ESPE) and three 2-step self-etching adhesives (AdheSE, Ivoclar Vivadent; Optibond Solo Plus Self-Etch, Kerr; Clearfil SE, Kuraray) were compared with a three-step etch-&-rinse adhesive (Optibond FL, Kerr). Microtensile bond strength to enamel and dentin was determined using extracted non-carious human third molars. The bonding mechanism to enamel was morphologically assessed by Field-emission Scanning Electron Microscopy (Fe-SEM) and to dentin by Transmission Electron Microscopy (TEM). The one-step adhesive, Adper Prompt, scored the lowest bond strength. The two-step self-etch adhesives, Clearfil SE and Optibond Solo Plus Self-Etch, approached the values obtained by the three-step etch-&-rinse adhesive, Optibond FL.

DIS Comment: Self-etch adhesives were introduced to reduce the difficulties associated with the application of etch & rinse adhesives by being less technique sensitive and less time consuming. The authors stated that for enamel bonding, etch-&-rinse adhesives still remain the "gold standard", but when bonding to dentin some two-step self-etching adhesives are able to compete with etch & rinse adhesives. The authors speculate that two-step self-etching adhesives may someday become the future standard of adhesion due to the lower technique sensitivity, faster application, and lower risk of leakage. However, the authors questioned the long-term durability of the one-step self-etching adhesive, Adper Prompt. An original version of Adper Prompt was reported in a clinical study as having low retention of composite restorations in non-carious cervical lesions. Currently, no clinical data is yet available for AdheSE or Optibond Solo Plus SE. Optibond FL and Clearfil SE have both performed well in clinical trials. Caution is advised with new adhesive systems until multiple longer-term controlled clinical studies are available.

References