Bond Strength and Dental Waterline Cleaners (10/07)


One approach to controlling dental unit waterline (DUWL) contamination is the addition of chemical cleaners to the treatment water. Yet, there is concern that these cleaners might affect the bonding of resin-based composites to enamel and dentin. The authors evaluated the influence of DUWL cleaners on composite-to-dentin bond strengths. The authors tested the strength of resin-based composite bonded to dentin in specimens treated with distilled water (control) or one of four cleaners. They tested a total-etch adhesive, a self-etching primer/adhesive and an experimental self-etching primer/adhesive. The authors stored the specimens for 24 hours at 37ºC and tested them to determine their bond strengths. The mean shear bond strengths (SBSs) varied according to the cleaner and adhesive used, ranging from 14.7 to 21.9 megapascals. However, the authors found no statistically significant differences and/or interactions between mean SBSs of specimens treated with the various DUWL cleaners and adhesives (P ≥ 0.05). The tested DUWL cleaners did not significantly influence composite-to-dentin bond strengths for the total-etch adhesive and self-etching primer/adhesives used in this study. The conclusions imply that bonding of resin-based composites to dentin is not affected by the cleaners tested when they are used to treat DUWL contamination.

DECS Comment: Studies have demonstrated that DUWL can become colonized with microorganisms, including bacteria, fungi, and protozoa. Periodic or continuous treatment of DUWL using chemical germicides has been proven effective. Continuous treatment offers the advantages of potentially suppressing bacterial contamination in the treatment water as well as in the aerosols and spatter generated by dental rotary and ultrasonic instruments. However, concerns have been expressed regarding possible adverse effects on dentin bond strengths. When using continuously delivered waterline treatment products, the tooth is exposed to chemical agents during preparation and restoration, including adhesive bonding procedures. Several studies have addressed this potential interaction with somewhat equivocal results.1-6 This was the first published study that evaluated the self-etching dental adhesives; previous studies have used total-etch adhesives. With self-etching primers and adhesives, there is no window of opportunity for contamination of the substrate with cleaners during application of the adhesive, which is the case when total-etch adhesives are used. However, DUWL cleaners still might affect the self-etching adhesives by being impregnated into or present on the tooth immediately after tooth preparation and rinsing. In the present study, the authors concluded that the four DUWL cleaners tested (Sterilox [PuriCore, Malvern, Pa]; ICX [Ardec, Newberg, Ore]; MicroClear [Rowpar Pharmaceuticals, Scottsdale, AZ]; and Sodium Hypochlorite) did not significantly influence composite-to-dentin strengths for the total-etch and self-etching dental adhesives. New waterline treatments continue to be introduced; therefore future research is necessary to study the effects of these new agents on adhesive dentistry as well as the long term effects on the restoration.

References
6. USAF DECS. Dental Unit Waterline Treatment Bond Strengths.