Dental Unit Waterline Solutions and Bond Strength (10/04)


This study evaluated the possible effects of an antimicrobial dental unit waterline (DUWL) treatment solution on the adhesion of composite resin to dentin using shear bond strength (SBS) testing. Forty teeth were evaluated using two different dentin-bonding agents. The control group was treated with water and the test group with a DUWL treatment (ICX™) solution. Shear bond strength testing was performed with a universal test machine at the default cross-head speed of 0.1 mm/min. A set of teeth, sectioned, mounted and etched as above but rinsed with a 0.01% mineral oil/water mix prior to conditioning and bonding, was used as the negative control. The findings of this study demonstrate that exposure of an etched dentin surface to a water-based DUWL treatment mixture (ICX™) has no adverse effects on subsequent adhesion strength.

DIS 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. While the present study demonstrated that there were no adverse effects on bond strength when using the ICX™ product, several studies have evaluated the effect of other DUWL treatment products on the shear bond strength of resin composite to tooth structure with somewhat equivocal results.¹⁻² Further research is warranted, as the clinical implications for the long-term effects on the restoration are uncertain at this time. Additionally, since the ICX™ solution contains sodium percarbonate, an oxidizing agent, corrosion studies were performed to evaluate the risk of damage to metallic components with the dental unit. The data indicated that the solution exhibits minimal risk of corrosion.

References