Readers' forum
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RDE Restorative Dentistry & Endodontics

Drying adhesives

Q Drying of solvent from adhesives during adhesion procedure is significanlty important. However, every manufacturer recommends different methods. How can we achieve the best result in drying the adhesives?

A The solvent is the indispensable composition of the adhesives that is needed for tooth adhesion. In etch and Rinse (E&R) adhesives, the function of the solvent is to promote penetration of the monomers in the exposed collagen network of the demineralized dentin.[1] In self-etch adhesives (SEAs), the solvent (water) is used for the ionization medium of the acidic monomers.[2] The solvent is present within the primers (3-step E&Rs and 2-step SEAs) or the solvated resin blends (2-step E&Rs and 1-step SEAs). In dental adhesives, ethanol, water and acetone are the commonly used solvents.

After application of adhesives, the evaporation of solvent is very important. Remaining solvents hamper the polymerization of adhesives and reduce its mechanical properties.[3] Also, the permeability and nanoleakage of adhesive layer may be increased by the hydrophilicity of remaining solvents.[4]

On adhesion procedure, air-drying accelerate the removal of remaining solvent from the adhesive. Air-drying for 3 - 4 seconds advocated by manufacturers is too short to evaporate the solvent. Actually, air-drying for more than 10 seconds is recommended and it is longer than the instruction of manufacturers.

However, complete evaporation is impossible through clinical air-drying time.[5]

The use of warm air stream is a clinical tool to increase the evaporation rate of adhesive.[6] This method improves the bond strength and the quality of the hybrid layer (less nanoleakage and pores within the adhesive layer).[6]

Finally, the use of solvent-free adhesives (bonding resin) may enhance the tooth adhesion free from the residual solvent. Because these adhesives are hydrophobic and dense, these have less water sorption and solubility than solvated resin blends.[7] The solvent free layers show minimum nanoleakage compared to solvated resin blends.[8]

From **Jeong-Bum Min**
(Chosun University)

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