

Improved Bonding to Dentin with Multiple Adhesive Applications (9/04)

Hashimoto M, Sano H, Yoshida E, Hori M, Kaga M, Oguchi H, Pashley DH. Effects of multiple adhesive coatings on dentin bonding. *Oper Dent* 2004;29:416-423.

The purpose of this laboratory study was to evaluate the effect of multiple consecutive adhesive applications to dentin on microtensile bond strength and microleakage. Recently extracted non-carious human premolars were sectioned mid-coronally and two two-step total-etch (i.e., etch & rinse) adhesives (Single Bond, 3M ESPE, OptiBond Solo Plus, Kerr) were applied to the exposed dentin in multiple consecutive applications (1, 2, 4, 6 and 8) per group. The solvent was gently evaporated (i.e., air dried) after each application, however, light curing was completed only after the final layer was applied. Composite resin (Z250, 3M ESPE) was incrementally applied and light cured. The teeth were sectioned perpendicular to the adhesive interface to produce individual beams. For microtensile bond strength testing, the beams were loaded in tension until failure. Mean microtensile bond strengths were evaluated by two-way ANOVA and Fisher's PLSD test ($\alpha=0.05$). For microleakage testing, the beams were immersed in silver nitrate for 24 hours and evaluated by transmission electron microscopy (TEM). **The results indicated that dentinal bond strengths increased dramatically with each coating up to four coats. Microleakage decreased with each coat, becoming very minimal after four or more coats.**



DIS Comment: The authors speculate that the consecutive-coating technique without light curing might remove residual water, thereby improving resin-infiltration and cross-linking of the adhesive monomers within the hybrid layer. Interestingly, no major differences in adhesive layer thickness were found between the groups regardless of the number of adhesive applications. The effectiveness of multiple coats of self-etch adhesives has also been reported in the literature.^{1,2} This study demonstrated a similar efficacy with consecutive layers of total-etch adhesives.

References

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2. Pashley EL, Agee KA, Pashley DH, Tay FR. Effects of one versus two applications of an unfilled, all-in-one adhesive on dentine bonding. *J Dent* 2002;30:83-90.