
Shear Bond Strength and Interfacial Morphology with Experimental Adhesives. EJ Velazquez*, J. Vaidyanathan, TK Vaidyanathan, Z Shey, S Von Hagen, M Houpt, UMDNJ New Jersey Dental School.

The purpose of this study is to compare the bond strengths with acetone versus ethanol as the primer solvent with two curing modes and to evaluate the hybrid layer under a scanning electron microscope using commercially available bonding systems. It was hypothesized that the mechanisms underlying the differences in bond strengths may be due to differences of the hybrid layer. Shear bond strength testing was completed for each group (n=32). The light cure group with ethanol, light cure with acetone, dual cure with ethanol, and dual cure with acetone were the four groups. SEM analysis was also completed for each group (n=8) to analyze the hybrid layer. The second part of the study repeated the methods with a light cure group with ethanol plus a flowable composite liner (n=8) and a light cure group with acetone plus a flowable composite liner (n=8). A three-factor model was analyzed using analysis of variance. The results demonstrated no significant difference when using acetone or ethanol (p=0.63). However, there is a significant difference between cure modes. Dual cure showed significantly greater bond strengths ($P < .001$) as compared to the light cure group. SEM examination demonstrated 7-8 μm thick hybrid layer formations in all groups with similar resin tag formation. Adding a flowable composite did increase the bond strength significantly when compared to the light cure group without the flowable composite (0.000005). The flowable groups resulted in similar bond strength values to the dual cure system (0.79). *Under the conditions of experiments conducted in this study, the following conclusions are drawn.* Ethanol or acetone may be used as the solvent of choice for an adhesive system. Hybrid layer thickness is not related to bond strength. Dual-cure results in higher bond strengths compared to the light cure system. Flowable composite can increase the shear bond strength when using a light cure system.