

3827 Characteristics of an unfilled and two filled versions of a self-priming adhesive

C. CHEONG¹, F.R. TAY¹, C. YIU¹, N.M. KING¹, D.H. PASHLEY², K. ITOU³, and M. HASHIMOTO⁴, ¹The University of Hong Kong, China, ²Medical College of Georgia, Augusta, USA, ³Okayama University Dental School, Okayama 700-8525, Japan, ⁴Iwate Medical University, Japan

Objectives: This study compared nanoleakage patterns, and microtensile bond strength (μ TBS) of an unfilled (OS; One-Step, Bisco), a 6 wt% spherical silica-filled (OS+; One-Step Plus, Bisco) and a 15 wt% glass-filled (OSg; Bisco) version of a two-step, acetone-based self-priming adhesive. **Methods:** Deep, coronal dentin from extracted third molars were etched and bonded using these adhesives. 1-mm thick sections were immersed in 50 wt% ammoniacal silver nitrate (pH 9.5) for 24 h. Unstained, undemineralized sections were examined by TEM. For μ TBS evaluation, 0.8 sqmm composite-dentin beams were stressed to failure at a crosshead speed of 1 mm/min (N=21-24). Fractured specimens were examined by SEM. **Results:** Hybrid layers in all three adhesives exhibited dendritic nanoleakage patterns that were indicative of incomplete resin infiltration or water removal. A second spotted type of nanoleakage pattern that consisted of isolated silver grains was evident throughout the hybrid and adhesive layers in OS, with a gradient of reducing size toward the composite side of the interface. Although the dendritic type is a lot heavier in OSg, the spotted type is a lot finer when compared with OS. They were even much finer in the adhesive layer. In OS+ and OSg, this nanoleakage pattern was notably absent within the bulk of the adhesive layer where fillers were abundant. μ TBS of OS (50.5 \pm 8.4 MPa) and OSg (51.8 \pm 6.9 MPa) were significantly higher than that of OS+ (37.1 \pm 6.4 MPa) [P<0.001]. The isolated spots of silver deposits after basic AgNO₃ staining probably represent regions of increased hydrophilicity or permeability within the cured adhesive. **Conclusion:** Partial neutralization of acidic resin monomers by basic glass fillers or hydrophobic silane in the presence of water during bonding may account for their reduction within the adhesive layer of OS+ and OSg. The hypothesis that reduced hydrophilicity/permeability after filled adhesive application results in more durable bonds with aging requires further validation.

[Seq #347 - Self-etching Adhesives/Adhesive Membranes](#)

1:30 PM-3:30 PM, Saturday, 9 March 2002 San Diego Convention Center Room 3 (Upper Level)

[Back to the Dental Materials: II - Adhesion-Other Program](#)

[Back to the IADR/AADR/CADR 80th General Session \(March 6-9, 2002\)](#)