

Influence of Surface Hydrophobicity on Microtensile Bond Strength of a One-Step Self-Etch Adhesive

Naeima M Betamar^{1*} and Richard Van Noort²

^{1*} Dr Naeima M Betamar, Department of Conservative Dentistry and Endodontics, Dental Faculty, Benghazi University

² Professor Van Noort, School of Clinical Dentistry, Academic Unit of Restorative Dentistry, University of Sheffield, United Kingdom

Objectives: To study the influence of surface hydrophobicity on microtensile bond strength (μ TBS) of a one-step self-etch adhesive.

Materials and Methods: I) μ TBS test was performed when Adper Prompt L-Pop™ (APLP) adhesive bonded to dentine surfaces in four different application procedures; **Gp 1**) as per manufacturer's instructions, **Gp 2**) as a multiple coats with light-curing in between coats, **Gp 3**) as a multiple coats without light-curing in between coats and **Gp 4**) with the application of a layer of Adper Scotchbond Multi Purpose Plus™ (SBMP) bond resin sealer (n=30). The fractured surfaces were examined under SEM to determine the modes of failure. Slabs of specimens corresponding to each of the four application techniques underwent SEM analysis to examine an intact bonded interface. II) Contact angle measurements determined to flat dentine surface in three conditions; untreated dentine, dentine bonded with APLP and dentine bonded with APLP plus a layer of SBMP bond resin sealer.

Results: I) A significant improvement in the bond integrity of the intact adhesive interface and the μ TBS was achieved with application of a layer of SBMP bond resin sealer on top of the APLP. II) Untreated dentine showed the lowest contact angle indicating a hydrophilic surface. Whereas adding the bonding resin to the APLP resulted in an increased hydrophobicity.

Conclusions: By converted the APLP one-step bonding system into a two-step bonding system, the μ TBS to dentine improved significantly. This improvement was due to improve the surface hydrophobicity, which facilitated bonding with the hydrophobic resin composite.

Key words: Contact angle measurements, Microtensile bond strength, one-step self-etch adhesive, SEM, Adhesion.