In vitro study on application mode of a self-etching adhesive.

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Objectives: To evaluate the influence of adhesive application mode on adhesive layer thickness and shear bond strength (SBS) to human teeth when using the self-etching adhesive iBond (Heraeus Kulzer). **Methods:** Flat enamel and dentin surfaces (n=8) were prepared on SiC paper, grit 80 through 500. Adhesive application modes varied as follows (dwell time 30s each, halogen light curing time 20s each): (A) apply one layer, dwell, evaporate solvent, cure. (B) apply first layer, dwell, evaporate solvent, cure, apply second layer, evaporate solvent, cure. (C) apply three consecutive layers, dwell, evaporate solvent, cure. (D) apply first layer, dwell, evaporate solvent, apply second layer, evaporate solvent, apply third layer, evaporate solvent, cure. (E) apply three consecutive layers, dwell, evaporate solvent, cure, apply another three consecutive layers, evaporate solvent, cure. Venus composite (Heraeus Kulzer) was bulk filled in cylindrical plastic molds (Ultradent equipment) and cured for 20s with halogen light. SBS was determined after 24h storage of specimens in 37°C tap water. Statistical analysis w as done by ANOVA and Duncan ($p<0.05$). Adhesive layer thickness was investigated by light microscopy (x500) on sections perpendicular through the bonding interface. **Results:** SBS [MPa] on enamel/dentin: 19.9/15.9 (A), 18.8/21.1 (B), 19.5/26.7 (C), 18.7/19,9 (D), and 16.8/13.5 (E). Adhesive layer thickness [µm]: 7.0 (A), 13.4 (B), 10.0 (C), 9.7 (D), and 16.8 (E). **Conclusions:** Variation of adhesive application mode resulted in statistically significant differences in adhesive layer thickness. No statistically significant differences were found concerning SBS to enamel when using different application modes. Unlike the enamel results SBS to dentin was influenced by the mode of adhesive layer application.