Mechanical Load Cycles Effect on Bond Strength of One-step Adhesives

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Pre-clinical *in vitro* investigations are desirable to estimate fatigue resistance and failure predictability of new dental adhesives. ***Objectives:*** To evaluate the influence of different fatigue load cycling on the bond strength of one-step self-etch adhesives to human dentin.

Methods: Three one-step self-etch adhesives: Tokuyama Bond Force (TBF, Tokuyama Dental Corporation), One-Up Bond F plus (OUB, Tokuyama Dental Corporation), and G-Bond (GB, GC Corporation) were used. Flat, mid-coronal dentin surfaces were bonded with the adhesives according to manufacturers' instructions. Bonded teeth were stored in water at $37^{o}C$ for 24 h and were divided into three groups: 1) sectioned into beams with $1.0mm^2$ cross-sectional area, 2) fatigue load cycled (5000 cycles, 90N, 3.0Hz) and sectioned into beams, 3) fatigue load cycled (50000 cycles, 90 N, 3.0Hz) and sectioned into beams. Beams were tested in tension until fracture at 0.5mm/min. Load cycles were applied in wet conditions. ANOVA and SNK multiple comparisons tests were performed at $P<0.05$.

***Results*:** Mean (SD) bond strength values (MPa) are shown in the table. Same numbers indicate no differences in columns and letters in rows.

	24 h	5000 cycles	50000 cycles
TBF	31.76 (10.91) 1a	16.45 (9.06) 2b	34.37 (9.37) 1a
OUB	28.23 (10.30) 1a	28.76 (9.08) 1a	31.45 (10.03) 1a
GB	14.30 (4.75) 2a	13.16 (4.04) 2a	15.44 (8.79) 2a

***Conclusions*:**   TBF and OUB attained the highest bond strength. Fatigue resistance at 50000 cycles was attained for the three tested adhesives.