Shear Bond Strength of Five Adhesives to Dentine

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Objectives: To evaluate the shear bond strength (SBS) of different adhesives and identify the failure mode at resin-dentine bonded interface. Methods: A total of 75 sound premolar teeth were selected and randomly assigned to five different groups (n=15). The groups were: OptiBond Solo (OS, total-etch), Optibond Versa (OV, two-bottles, self-etch), Adhe SE Ivoclar (ADHE, two-bottles, self-etch), G-Bond (GB, one-bottle, self-etch), and Optibond All in One (OBO, one-bottle, self-etch). The teeth were mounted in epoxy resin and the occlusal surface of the crowns were abraded to expose a flat dentine surface. Composite resin cylinder (4 mm diameter x 2 mm high) was built up on the occlusal surface of the tooth using a custom made mould. The specimens were subjected to 500 thermal cycles between 5⁰ and 55⁰ C and dwell time of 10 s. The SBS was tested using a universal testing machine at a crosshead speed of 0.5 mm/min. Data were statistically analyzed by one-way ANOVA and Post Hoc Test (Dunnett T3) multiple comparison test at 95% confidence level. Failure mode was determined as adhesive, cohesive or combination of both using stereomicroscope and the data were analyzed using Fisher's exact test. Results: The total-etch adhesive system, OS, had significantly higher values of SBS than the two self-etch adhesive systems (ADHE and GB). Within the self-etch systems, OV showed significantly higher values of SBS than ADHE and GB. However, there were no statistically significant differences between types of failure mode (P=0.40) and adhesive group. Conclusions: The average SBS value of total-etch system (OS) was higher compared to self-etch (GB) and (ADHE). Among the self-etch groups, OV showed the highest SBS. The difference compositions in the self-etch adhesive materials may contribute to the bond strength value. The failure modes detected within all tested groups did not show clinically important differences.