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Evaluation of Microtensile Bond Strength Between Biodentine and Post Cement at Different Time Intervals

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Abstract

Objectives: To investigate the microtensile bond strength (μ TBS) of various adhesive systems (etch & rinse, self-etch, and self-adhesive) for bonding MultiCore Flow and Biodentine at different time intervals.

Methods: Sixty pairs of 7x7x3 mm resin-based 3D-printed blocks with a 1x1 mm central tube were used in this study. One side of the blocks was filled with Biodentine, while another side was filled with MultiCore Flow. The materials were bonded using one type selected from these adhesive systems: ExciTE F DSC (etch & rinse), Multilink N (self-etch), or RelyX U200 (self-adhesive). Each group was subdivided into immediate and delayed groups (n=10). Specimens were subjected to μ TBS testing, and failure modes were observed under a stereomicroscope. Two-way ANOVA was used to analyze the influence of time and adhesive system on μ TBS.

Results: The results revealed that Multilink N group showed significantly higher μ TBS in the immediate group compared to the delayed group ($p=0.01$). When comparing the materials, ExciTE F DSC performed significantly worse than Multilink N ($p=0.02$) and RelyX U200 ($p=0.04$) in the immediate group. The predominant failure modes observed under the stereomicroscope were mixed failure and cohesive failure within Biodentine.

Conclusions: Immediate placement of adhesives and MultiCore Flow over Biodentine showed higher microtensile bond strength than delayed placement. Overall, self-adhesive systems demonstrated high bond strength at both time intervals. Immediate bonding with self-adhesive systems may enhance the bond strength between Biodentine and MultiCore Flow in clinical practice, potentially leading to improved restoration longevity and reduced risk of failure.

Keywords: biodentine, cement, failure mode, microtensile bond strength, post