

Abstract

Background and aim: The resin modified glassionomercement (RMGIC) is one of the most adequate materials for sandwich technique; the clinical success of this technique depends on the bond strength of the RMGIC to both dentin and resin composite. Therefore, the aim of this *in vitro* study was to compare the shear bond strength (SBS) of resin composite to RMGIC utilizing different generations resin adhesives versus a GC Fuji bond LC.

Materials and methods: Twenty-one acrylic blocks were prepared with four holes in each block for retaining the RMGIC. The 84 specimens were randomly divided into seven groups of 12 specimens each. In group I, no adhesive was applied between resin composite (Point 4) and RMGIC. The specimens in group II were notched, while in group III were etched with phosphoric acid for 15 seconds. Then, two-step etch-and-rinse adhesive (OptiBond Solo Plus) was applied on the cement surfaces in these two groups. In group IV, a two-step self-etch adhesive (OptiBond XTR) and in group V, one-step self-etch (OptiBond All-in-One) were applied between resin composite and RMGIC, respectively. In group VI, a GIC-based adhesive (Fuji Bond LC) was prepared using twice the liquid powder ratio and painted over the cement surface and cured for 10 s. In Group VII, the GIC-based adhesive was brushed over the RMGIC followed by the placement of resin composite and co-cured for 20 s. All the materials were used according to the manufacturers' instructions. Afterward, resin composite cylinders were placed on the treated cement surface, and light cured for 20 s. The specimens were placed in 100% humidity for one month and then stored in distilled water at $37 \pm 1^\circ\text{C}$ for two weeks. The shear bond test was performed using a Universal Testing Machine at a cross-head speed of 1 mm/s and calculated in MPa; also the specimens were examined to determine mode of failure. The results were analyzed using one-way analysis of variances (ANOVA) and post-hoc Tukey test ($\alpha=0.05$).

Results: The maximum SBS values (24.62 ± 3.70 MPa) were recorded for OptiBond XTR self-etch adhesive (Group 4) and minimum SBS values (18.15 ± 3.38 MPa) for the control group. The pairwise comparisons showed that there was no significant difference in the SBS of the resin composite to RMGIC between the groups that bonded with different adhesives ($p > 0.05$). The adhesive failure pattern was the most common failure mode observed.

Conclusion: According to advantage of RMGIC, the present study suggests application of glass-ionomer adhesive system (Fuji Bond LC) over RMGIC as co-cure technique for sandwich restorations instead of employing the resin adhesives system.

Key words: glass-ionomer based adhesive, resinous adhesives, resin-modified glass-ionomer cement, resin composite, shear bond strength

Clinical relevance: The glass-ionomer adhesive system as co-cure technique can be a useful bonding agent when a resin composite is bonded over set RMGIC to enhance adhesion.