

Dentin and enamel shear bond strengths using fluorinated bis-EMA resins

Dr. MOHAMED F. AYAD

Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia

Statement of Problem: It is well accepted that bond strength is affected by the extent of resin infiltration into the exposed collagen network. However, failure often occurs.

Purpose: The purpose of this study was to examine the bonding of (Prodigy, Kerr (P)) and an experimental bis-EMA composite resin (E) with fluorinated TEGDMA (F-T) to enamel and dentin using experimental bonding resins, containing F-T.

Materials and Methods: TEGDMA, bis-EMA, HEMA, OptiBond SoloPlus (OB, Kerr) and All-Bond 2 (AB, Bisco) Light-curable, filled (f) and unfilled (u) bonding resins were made with F-T concentrations of 0, 17, 24, and 30 wt.%. Silanized barium silicate glass (Kerr) was used for the filled resins at 48 wt. %. Enamel and dentin, mounted in epoxy resin discs were 600 grit finished metallographically yielding a flat surface with a smear layer. Optibond Solo Plus and All-Bond 2 etchants and primers were used with the f and u experimental bonding resins to bond commercial (P) and experimental (E) composite resin cylinders 5 mm diameter and 2.5 heights to dental tissues. Five specimens for each group were made and stored at 37 °C for 24 hr. These were tested in shear mode at 0.5 mm/min. in a universal testing machine.

Results: Bond strengths to enamel (EB) and dentin (DB) are presented in MPa. EB and DB data were analyzed separately using 3-way ANOVA with filler, F-T concentration, and composite resin type as dependent factors ($P < 0.05$). Filler content was statistically significant; all other factors were not significant. With dentin bonding, many interactions were significant, only the type of composite resin and the presence of filler were not.

Conclusion: The data suggest enamel bonding is fairly consistent, irrespective of the bonding resin used but dentin bonding is more sensitive to resin formulation.

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