

Effect of Acidulated Phosphate Fluoride (APF) etching duration on the shear bond strength between a Lithium Disilicate-based Glass Ceramic and Composite Resin

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Abstract

Background and Aim: Damaged all-ceramic restorations can be restored through bonding with composite resin. Etchants such as acidulated phosphate fluoride (APF 1.23%) and hydrofluoric acid (HF) are often used for this purpose. APF gel is harmless for oral mucosa unlike HF, which can cause tissue irritation. Therefore, the present study aimed to evaluate the shear bond strength between composite resin and ceramic after various durations of surface treatment with APF gel.

Materials and Methods: In this in-vitro study, seventy lithium disilicate ceramic (Empress 2) specimens (16 mm in diameter and 1.5 mm thick) were prepared and divided into 7 groups (n=10). The first group received no surface treatment and served as a control. The second group was treated with 9.6% hydrofluoric acid for 4 minutes and the experimental groups 3 to 7 were surface treated with 1.23% APF gel for durations of 4, 6, 8, 10 and 12 minutes respectively. Afterwards, the shear bond strength of each sample was evaluated. Mean bond strengths (MPa) of samples were analyzed by One-way ANOVA and TUKEY HSD tests in SPSS 17 software.

Result: The mean shear bond strength in the second group was significantly higher than the other groups and equaled 41.01 ± 14.11 MPa ($p=0.0001$), while the average bond strengths in the other groups were not significantly different ($p>0.05$) and increased etching times in the experimental groups treated with APF gel had no effect on the shear bond strength.

Conclusion: It seems that 1.23% APF gel with various etching durations is not a suitable substitute for hydrofluoric acid etchant in surface treatment of lithium disilicate ceramic.

Keywords: *lithium disilicate, composite resin, acidulated phosphate fluoride, shear strength.*