

Original Article

Effect of Acidulated Phosphate Fluoride Gel on Zirconia Intaglio Surface: *An In-Vitro Study*

Abstract:

Aim: To evaluate the micro-shear bond strength (μ -SBS) of resin-modified glass ionomer cement and to assess the chemical and topographical changes in the zirconia fitting surface induced by acidulated phosphate fluoride (APF) gel using scanning electron microscope (SEM) analysis and Fourier transform infrared (FTIR) spectroscopy. **Materials and Methods:** Thirty-two samples were prepared from two zirconia materials, UPCERA HT White and BruxZirR Solid Zirconia, milled by a computer-aided design/computer-aided manufacturing system. From each zirconia sample, six plates were prepared for FTIR and SEM testing. Following sintering, the samples were divided into control and test groups for each material. The APF gel (1.23%) was applied to the intaglio surface of each test group. To measure the μ -SBS between the zirconia materials and luting cement, 20 rectangular samples of zirconia material were prepared. Ten samples were obtained from Upcera and ten from Bruxzir, with five assigned to the control and five to APF groups. **Statistical Analysis:** For the μ -SBS test, independent samples t test was conducted to determine the level of significance between the tested groups. **Results:** FTIR spectroscopy revealed new bands for Upcera and Bruxzir zirconia owing to ion exchange between the formed sodium phosphate and the zirconia surface and the formation of zirconium phosphate by an ester reaction. SEM assessment identified lines, scratches, or surface dissociation that appeared on the intaglio-zirconia surface after conditioning. The μ -SBS test, as indicated by the independent samples t test, showed a significant increase in bond strength of 1.266 and 1.566 MPa for Upcera and Bruxzir zirconia, respectively. **Conclusion:** This study offers new practical, cost-effective, and accurate tests to enhance the μ -SBS of luting cement to yttria-stabilized tetragonal zirconia polycrystal ceramics.