MICROTENSILE BOND STRENGTH OF CERAMIC TO RESIN USING DIFFERENT SILANES

OBJECTIVES: The purpose of this study was to assess the micro-tensile bond strength of a leucite-reinforced feldspathic ceramic to a resin cement using different types of silane primers.

METHODS: 18 leucite-reinforced feldspathic ceramic blocks (Ceramco II, Dentsply) in dimensional of 6×6×6 mm were fabricated. The ceramic blocks were ground on wet SiC papers and then cleansed ultrasonically in distilled water. The bonding ceramic surfaces were treated with different silane solutions as follows: Commercial silane as control: Monobond S (Ivoclar-Vivadent); methacryloxypropyl silane and experimental silanes with two concentrations (1% and 2.5%): amino, isocyanate, styryl, and acrylate silanes. The silane application method consisted of brush application, hot air drying at 50±5℃ followed by rinsing with hot water and drying with hot air. Then a thin layer of an unfilled resin was applied on the ceramic surfaces and light-cured. The ceramic blocks were transferred to a teflon and a dual-cured resin cement (Variolink II, Ivoclar-Vivadent) was light-cured incrementally on the ceramic surfaces. Specimens were kept in distilled water at 37℃ for 24 hrs and then subjected to thermocycling. The bonded specimens were cut in dimensions of 1×1×1 mm in an Isomet cutting device. The specimens were then tested in a micro-tensile tester device. The mode of failure was also examined under a stereomicroscope. The data were analyzed by ANOVA and Tukey-HSD post-hoc test.

RESULTS: The mean micro-tensile bond strength value for the 2.5% styryl silane was significantly higher ($P<0.05$) than the other types of silanes except for the Monobond S. The mean bond strength values for the 1% and 2.5% amino and isocyanate silanes were significantly lower than the other silanes tested ($P<0.05$).

CONCLUSIONS: The styryl silane may be as effective as methacryloxypropyl silane in promoting adhesion between a leucite-based ceramic and a resin cement. This was followed by an acrylate silane primer.