

Effect of Primer on Bonding between Resin Cement and Zirconia Ceramic

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Abstract : Objectives: Recently, the development of adhesive primers on stable bonding between zirconia and resin cement has been on the increase. The bond strength of zirconia-resin cement can be effectively increased with the treatment of primer composed of the adhesive monomer that can chemically bond with the oxide layer, which forms on the surface of zirconia. 10-methacryloyloxydecyl dihydrogen phosphate (10-MDP) that contains phosphate ester and acidic monomer 4-methacryloxyethyl trimellitic anhydride(4-META) have been suggested as monomers that can form chemical bond with the surface oxide layer of zirconia. Also, these suggested monomers have proved to be effective zirconia surface treatment for bonding to resin cement. The purpose of this study is to evaluate the effects of primer treatment on the bond strength of Zirconia-resin cement by using three different kinds of primers on the market. Methods: Zirconia blocks were prepared into 60 disk-shaped specimens by using a diamond saw. Specimens were divided into four different groups: first three groups were treated with zirconiaLiner(Sun Medical Co., Ltd., Furutaka-cho, Moriyama, Shiga, Japan), Alloy primer (Kuraray Noritake Dental Inc., Sakaju, Kurashiki, Okayama, Japan), and Universal primer (Tokuyama dental Corp., Taitou, Taitou-ku, Tokyo, Japan) respectively. The last group was the control with no surface treatment. Dual cured resin cement (Bissem, Bisco Inc., Schaumburg, IL, USA) was luted to each group of specimens. And then, shear bond strengths were measured by universal testing machine. The significance of the result was statistically analyzed by one-way ANOVA and Tukey test. The failure sites in each group were inspected under a magnifier. Results: Mean shear bond strength were 0.60, 1.39, 1.03, 1.38 MPa for control, Zirconia Liner (ZL), Alloy primer (AP), Universal primer (UP), respectively. Groups with application of each of the three primers showed significantly higher shear bond strength compared to the control group ($p < 0.05$). Among the three groups with the treatment, ZL and UP showed significantly higher shear bond strength than AP ($p < 0.05$), and there were no significant differences in mean shear bond strength between ZL and UP ($p < 0.05$). While the most specimens of control groups showed adhesive failure (80%), the most specimens of three primer-treated groups showed cohesive or mixed failure (80%).

Keywords : primer, resin cement, shear bond strength, zirconia

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