Effect of Primers on Bond Strength of Polyamide Thermoplastic Resins

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Objectives: Recently, thermoplastic resin has been frequently used to fabricate flexible dentures without metal clasps. Because polymethyl methacrylate (PMMA) resin does not bond to polyamide thermoplastic resin, it is necessary to develop a bonding methodology for denture repair or relining. In this study, the bond strength of PMMA resin to polyamide thermoplastic denture base resins was evaluated using new primers. Materials and Methods: The surfaces of polyamide (nylon 6) thermoplastic resin (Bioplast, High Dental, Japan) plates (10 × 10 × 2 mm) were polished using 600-grit abrasive paper and sandblasted with 50-μm alumina particles (0.48 MPa). Then the primers Pre-primer (Pre-P, Relining-Pre primer, High Dental, Japan) and Val-fuse Repair Liquid (Val, Valplast, USA) were used on the surface. Specimens without primer and heat-polymerized denture base resin (Acron, GC, Japan) were prepared as controls. Autopolymerized PMMA resin (Provista, Sun Medical, Japan) was mixed, poured into a Teflon ring (3 mm in diameter, 1 mm in height) stabilized on the experimental groups, and polymerized according to the manufacturer's instructions. After polymerization, the specimens were stored in 37°C distilled water for 24 h. The tensile bond strengths were measured on an autograph (AG-IS, Shimadzu, Japan) at a crosshead speed of 2.0 mm/min. The results (n=5) were analyzed by ANOVA and Tukey's test (α=0.05). Results: The use of Val resulted in higher bond strength than Pre-P (p<0.05). Bonding to the thermoplastic resin Bioplast with Val and heat-polymerized denture base resin showed similar bond strengths (p>0.05). Conclusions: PMMA resin exhibited the greatest bonding strength to polyamide thermoplastic resin when treated with Val. Clinical Significance: Polyamide thermoplastic resin can be repaired and relined with PMMA resin after treatment with Val-fuse Repair Liquid.