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Transverse Strength of Reinforced Denture Base Resin with Metal Wire and E-Glass Fibers

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Abstract:

Statement of problem: Fracture strength of a denture base resin is of great concern, and many approaches have been used to strengthen acrylic resin dentures. Purpose: The aim of this study was to measure the transverse strength of a heat polymerized acrylic resin, after reinforcement with metal wire and two types of glass fibers. Materials and Methods: Forty rectangular specimens (65.0×10.0×3.3 mm) of a heat-cured acrylic resin were made according to ISO/FDI 1567. Group I (control group) consisted of 10 specimens with no reinforcement. Specimens in group II reinforced with sandblasted metal wires. Group III and IV strengthened with woven (Stick Net) and continuous unidirectional (Stick) fibers respectively. The specimens were polymerized according to manufacturer's recommendation. The transverse strengths were assessed with a 3- point bending test at cross head speed of 5mm/min. One-way ANOVA was carried out to compare and detect any differences among groups ($\alpha = 0.05$). Results: Mean transverse strength (SD) of unreinforced specimens was 85.44 (8.6) MPa. The transverse strength increased significantly to 97.97 (5.5) MPa, 109.69 (5.8) MPa, and 127.13 (6.4) MPa in Metal wires, Stick Net, and stick fibers groups, respectively. Conclusion: The transverse strength of heat-polymerized denture base resin was enhanced considerably by using metal wire and glass fibers reinforcements. However, the addition of unidirectional glass fibers was significantly more effective method to improve flexural strength of denture base acrylic resin.

Keywords:

[Denture base resin](#) . [Glass fiber](#) . [Metal wire](#)

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