

Experimental composite brackets: influence of filler level on the mechanical properties.

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INTRODUCTION: Despite their popularity in satisfying esthetic demands, plastic brackets still have some disadvantages because of decreased wear resistance and hardness. Our aim in this study was to investigate the mechanical properties of an alternative bracket-polymer urethane-dimethacrylate (UDMA) reinforced by silicon dioxide fillers with several filler levels. **METHODS:** Three bracket groups were created: (1) unfilled UDMA, (2) UDMA with a filler content of 40% by volume, and (3) UDMA with a filler content of 70% by volume. Flexural strength, fracture force, and Vickers hardness of the bracket groups were tested. In addition, a 3-medium wear test was performed. **RESULTS:** The filler-reinforced brackets showed increased hardness, greater stiffness, and improved wear resistance compared with unfilled brackets. Higher filler concentrations in a polymer matrix result in greater stiffness of the polymer. Despite this, the filled composite brackets were not statistically more susceptible to fractures than the unfilled plastic brackets. **CONCLUSIONS:** Experimental UDMA brackets reinforced with silicon dioxide fillers showed an obvious trend for improved mechanical properties compared with unfilled UDMA brackets.

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