

Flexural Properties between Domestic and Dental Glass Fibers Reinforced Polymethylmethacrylate

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Abstract

Objectives: The aim of this study was to examine the flexural properties of PMMA reinforced with domestic glass fibers compared to PMMA reinforced with dental glass fibers. Thirty-two PMMA bar specimens size 10x64x3.2 mm³ (ISO 20795-1) were divided equally into 4 groups (eight specimens for each) according to the types of fibers: 1) no fibers 2) dental fibers 3) silane impregnated domestic glass fibers 4) non-silane impregnated domestic glass fibers. All specimens were subjected to 2,000 cycles of thermocycling. Flexural strength was determined using a three-point loading test set up at a cross-head speed of 5 mm/minute by Universal Testing Machine Model 5566. Scanning electron microscopy was used to examine the microstructure of the cracked surface at 200X and 1000X. The results were analyzed by One-way ANOVA and Tukey HSD ($\alpha=0.05$).

Results: The silane impregnated domestic glass fibers demonstrated the highest flexural strength compared to the others while the non-impregnated domestic glass fibers had the lowest flexural strength.

Conclusions: Reinforcing PMMA with silane impregnated domestic glass fibers could improve its flexural strength.

Keywords: flexural properties, glass fibers, polymethylmethacrylate, silane coupling agent