

# Ultrasonic Post-polymerization and Surface Treatments Increased the Flexural Strength of Denture Base Reline with Hard Lining Material

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## Abstract

**Objectives:** To evaluate the effect of ultrasonic post-polymerization and chemical surface treatment on the flexural strength of relined denture base.

**Methods:** Ninety heat-polymerized acrylic resin blocks (64x10x2 mm) were randomly divided into three groups by chemical surface treatments before relining; no treatment (N), applied with methyl methacrylate for 180 seconds (MMA), and applied with methyl formate: methyl acetate (25:75% v/v (MF-MA)) for 15 seconds. The samples were relined with auto-polymerized acrylic resin. Each relined sample was 64x10x3.3 mm. The relined groups were divided to three subgroups based on post-polymerization method: no post-polymerization (X), ultrasonic treatment in water (W), and ultrasonic treatment in 30% ethanol (E). The ultrasonic water bath was set at 40 kHz, 50°C, for 5 minutes. The samples were polished and stored in 37±2°C distilled water for 48±2 hours before undergoing a three-point bending test. The results were analyzed using two-way and one-way ANOVA.

**Results:** There was no interaction between ultrasonic treatment and chemical surface treatment. In each surface treatment group, W groups demonstrated a significantly higher flexural strength than X groups ( $p<0.05$ ). E groups had a significantly higher flexural strength than W groups ( $p<0.05$ ). In the same post-polymerization groups, N groups presented a significantly lower flexural strength than the MMA and MF-MA groups ( $p<0.05$ ). The MMA and MF-MA groups were not significantly different ( $p>0.05$ ).

**Conclusions:** ultrasonic treatment increased the flexural strength of relined denture base. MMA and MF-MA treatment increased the flexural strength of relined denture base.

**Keywords:** denture base, flexural strength, methyl acetate, methyl formate, ultrasonic treatment