Purpose of the study: The present in-vitro study was conducted to compare and evaluate the flexural strength of Autopolymerizing PMMA resin, CAD/CAM milled PMMA and CAD/CAM milled PEEK after being subjected to aging and thermocycling.

Materials and methods: Sixty identical samples measuring 25mm * 2mm * 2mm, according to ADA/ANSI specification no. 27 were fabricated using Autopolymerizing PMMA resin – GROUP I; CAD/CAM milled PMMA – GROUP II and PEEK – GROUP III (20 samples in each group). The Group I (A), Group II (A) and Group III (A) test samples (10 samples in each group) were subjected to 7 days of aging/conditioning and 500 cycles of thermocycling and Group I (B), Group II (B) and Group III (B) test samples (10 samples in each group) were subjected to 14 days of aging/conditioning and 1000 cycles of thermocycling. Aging/conditioning was done in incubator and thermocycling was done in Thermocycling unit. The flexural strength was evaluated using Universal testing machine. The data’s were analyzed with Student t test and pair–wise comparison of mean values was done by ANOVA (Analysis of Variance) test. Statistical significance was considered at 5% significance level.

Results: The Flexural strength of PEEK was higher than the Autopolymerizing PMMA resin and CAD/CAM milled PMMA. The Flexural strength of PEEK subjected to 7 days of aging/conditioning and 500 cycles of thermocycling (Group III (A)) (6628.70 Mpa) was the highest followed by the flexural strength of PEEK subjected to 14 days of aging and 1000 cycles of thermocycling (Group III (B)) (3760.50 Mpa).
Conclusion: The mean flexural strength of PEEK was highly significant than the Autopolymerizing PMMA resin and CAD/ CAM milled PMMA. But, the mean flexural strength of PEEK reduced approximately by 44% while increasing the days of aging and number of thermocycling.

KEYWORDS: Flexural strength, PEEK, CAD/CAM milled PMMA, Thermocycling and Universal Testing Machine.