INFLUENCE OF MATRIX TYPE AND THERMOCYCLING ON SURFACE ROUGHNESS OF TWO RESINS FOR PROVISIONAL CROWNS AND FIXED PARTIAL DENTURES – AN INVITRO STUDY

By

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ABSTRACT

BACKGROUND AND OBJECTIVES: Provisional restorative materials are an important adjunct for a variety of indirect dental procedures, such as inlays, onlays, crowns, bridges, and implant temporization. Hence they form a vital part of fixed prosthodontics and implant therapy. The methyl methacrylates and bis-acryl composites are commonly used and posses a greater market share. Three matrices used in this study were impression materials such as irreversible hydrocolloid, poly vinyl siloxane and a vacuum-formed shell of a dental cast. They are very common and useful matrices for direct fabrication of interim crowns and FPDs. The aim of this in-vitro study was to evaluate the influence of matrix type and thermocycling on surface roughness of two commercially available contemporary provisional restorative materials.

METHOD: The material of this study comprises of 60 specimens of acrylic resin and Bis-acryl composite resin which were fabricated using the following three matrices: irreversible hydrocolloid, polyvinyl siloxane and vacuum formed matrix. The sample size for each resin-matrix combination was 10 which resulted in 6 groups. The vestibular face of one natural maxillary central incisor was used as a control to fabricate all the specimens following the custom fabrication technique. The surface topography of the specimens and the surface of the natural incisor were measured using an optical profilometer. Then all the 6 groups were subjected to thermocycling (2500 cycles between 5°C and 55°C with a dwell time of 6 seconds) and the surface topography was measured again. The data obtained was subjected to Kruskal-Wallis, Mann-Whitney U-test and Wilcoxon matched pairs test.

RESULTS: DPI resin showed no statistically significant difference ($p>0.05$) when polymerized against the three matrices. But when mean values of the matrices were compared specimens fabricated with Tropicalgin showed roughest and Bioplast showed smoothest surface. Protemp IV gave significantly smoother surface ($p<0.05$) than DPI resin regardless of the matrices used, within the matrices there was no statistically significant difference. DPI resin and Protemp IV shows no statistically significant difference ($p>0.05$) in surface roughness before and after thermocycling.

INTERPRETATION AND CONCLUSION: The present findings suggest that thermocycling and matrix type did not significantly affect the surface quality of DPI resin and Protemp IV. Regardless of the matrix used Protemp IV gave significantly smoother surface than DPI resin.

KEYWORDS: Provisional restorative materials, bis-acryl resin, PMMA, matrices, surface roughness, thermocycling