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Effect of Different Palatal Vault Shapes and Woven Glass Fiber Reinforcement on Dimensional Stability of High Impact Acrylic Denture Base

A Thesis

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Abstract

Back ground: Reinforcement of high impact acrylic denture base resin may in turn affect the dimensional accuracy of acrylic resin and affecting the fitness of the denture.

Aim of the study: the present study was designed to compare the effect of palatal vault shape on dimensional changes between fiber reinforced and non-reinforced high impact heat cure denture base resin with recommended uniform denture base thickness.

Material and method: Three different palatal vault shapes were prepared on standard casts using CNC (computer numerical control) machine, then the casts were duplicated using silicon duplication material. 120 samples of heat polymerized high impact acrylic resin maxillary denture base were fabricated onto each definitive cast according to manufacturer instruction. Two methods were used to measure the dimensional changes (60 cast for each method). For each method the samples divided into three main experimental groups represented the three different palatal vault shapes (20 samples for each main group); 1st rounded 2nd U-shaped and the 3rd groups V-shaped. Each main group divided into two subgroups (10 samples for each subgroup) representing non fiber reinforced high impact acrylic group as a control and the fiber reinforced high impact acrylic. The measurements of adaptation and linear changes of denture bases done at two stages, 1st 24 hour after polymerization and 2nd measurement done after one month storage in distilled water at room temperature.

Results: dimensional changes of high impact acrylic denture base not affected by glass fiber reinforcement p-value for all reference pointes ≥ 0.05. Topographical changes in palatal vault shapes have no effect on the linear dimensional change of non fiber reinforced high impact acrylic denture base p-value ≥ 0.05 while

topographical changes in palatal vault shapes effect on linear dimensional changes of glass fiber reinforced high impact acrylic denture base p-value in AC line o.oo and in AD line 0.03. In addition topographical change in maxillary vault shapes affects on the gap-space in non-fiber reinforced high impact acrylic denture base p-value < 0.05 in point one, four, and seven.

Conclusion: The adaptation and linear dimensional changes in high impact acrylic denture base not affected by woven glass fiber reinforcement, but the linear dimensional changes in fiber reinforcement was affected by topographical changes of maxillary vault shape.