Effect of Thermocycling on Some Mechanical Properties of Polyamide Hypoallergenic Denture Base Material

(Comparative Study)

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Abstract

Statement of problem: Hypoallergenic denture base material became recently the most attractive option due to their use as alternative to poly methyl methacrylate in hypersensitive patients. The study of the effects of thermocycling on the mechanical properties is very important, as it is beneficial for clinical purposes.

Purpose: The purpose of this study was to evaluate some mechanical properties of polyamide$_{12}$ (Valplast) in comparison to the conventional heat cured acrylic (Vertex), and to observe the effect of thermocycling as one of artificial ageing process on polyamide and heat cured acrylic denture bases regarding flexural strength, impact strength, tensile strength and surface hardness.

Materials and methods: One hundred and sixty specimens were prepared according to manufacturer's instructions and they were divided into two groups: Valplast and Vertex as a control group (eighty specimens for each), twenty specimens from each material were used to test each of property. They were either thermocycled or not thermocycled (n = 10).

Results: There was significant difference between polyamide and conventional heat cured acrylic in the four tested properties. Furthermore, thermocycling significantly decreased the flexural strength of both polyamide and the heat cured acrylic and it significantly increased the tensile strength and hardness of both tested materials. Thermocycling did not significantly affect the impact strength of both materials.

Conclusion: Vertex showed higher values of flexural strength than Valplast, flexural strength of both materials decreased post-thermocycling. Although the flexural strength of valplast was relatively low, it demonstrated greater impact strength than Vertex, impact strength of both tested materials was not affected by thermocycling. The tensile strength of Vertex was more than Valplast, for both materials tensile strength increased after thermocycling. The hardness of Vertex was higher than that of Valplast, both materials' hardness increased after thermocycling.