

Evaluation of the effect of plasma on transverse strength,
surface roughness and Candida adhesion of two types of
acrylic denture base materials (Heat cure and light cure)

A Thesis

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Abstract

Introduction: Dental polymers have a great use in dental applications such as denture, temporary crowns....etc; this is due to their superior physical and chemical characteristics. At the same time some of these properties impose a limitation on applications in several new and high technology areas.

Plasma treatment is one of the most widely used surface treatment techniques in which the composition and structure of a few molecular layers at or near the surface of the polymer are modified.

Objective: The aims of this study were to evaluate the effect of plasma treatment by argon gas on transverse strength, surface roughness and Candida adherence to heat cure and light cure acrylic denture base materials. Also compare the effect of plasma treatment on heat and light cure denture base materials.

Materials and methods: A total No. of 180 specimens were prepared in this study, they were divided into two main groups according to the type of the material used (heat cure acrylic resin and light cure acrylic resin). Each main group was subdivided into three subdivisions according to the type of the test used (transverse strength, surface roughness and Candida adherence), for each test 30 samples were divided into three groups according to the time of plasma treatment that were applied (control, 5min and 10min). Plasma treatment process were performed for all studied groups in two different periods (5 min and 10 min) except for control group no plasma treatment were performed.

Results: Plasma treatment of heat cured acrylic specimens revealed a decrease in the transverse strength of the studied groups for 5min and 10min,

similar results were obtained for light cure denture base material after treatment with argon gas plasma for the same periods of time used for heat cure.

Plasma treatment of heat cure and light cure acrylic specimens showed decrease in surface roughness and Candida adherence for (5min and 10min).The correlation between surface roughness and Candida adherence in the present study showed a weak correlation for all tested groups for both types of materials except for 5 min plasma treated heat cure acrylic specimens which were moderate. Statistically there was no significant difference between surface roughness and Candida adhesion for all groups of both types of materials except for 5min group of heat cure acrylic specimens.

Conclusion: within the limitation of this study it can be concluded that argon plasma treatment to the surface of heat and light cure denture base materials can cause a decrease in transverse strength, surface roughness and Candida adherence for 5 and 10min treatment times.