

**Republic of Iraq
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College of Dentistry**



**The Effect of Plasma Treatment on Shear
Bond Strength of High Impact Acrylic
Resin Denture Base Lined With Two Types
of Soft lining Materials After Immersion in
Distilled Water and Denture Cleanser**

A Thesis

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By

ShahadBasim Mustafa

B. D.S

Supervised by

Assist. Prof. Dr. Thekra Ismael Hamad

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Abstract

Background: In dentistry, dentists take the advantages of soft lining materials due to the viscoelastic properties. These liners act as shock absorbers in order to minimize and distribute pressure on the denture bearing tissue however, the major problem was and still is the adhesive failure between the denture base and the soft liner.

Aim of the study: This study was performed to evaluate the effect of plasma treatment to improve the shear bond strength between high impact acrylic denture base and two types of chair side soft lining materials the silicone based soft liner material and an acrylic based soft liner material, after immersion in distilled water and denture cleanser for 30 days.

Material and Methods: A total of (80) specimens were prepared for shear bond strength test, were divided into two (major groups) with and without oxygen plasma treatment. Each major group (40) specimens was divided into two subgroups according to the type of soft lining material (silicone and acrylic soft liner) (20 specimens for each subgroup), 10 specimens were immersed in distilled water and other 10 specimens in denture cleanser (for 30 days). Testing the bond strength for all specimens until failure was evaluated under the shear loads, the peak load was recorded and statistically analyzed.

Results: The result revealed that there was an increase in the shear bond strength of both soft liners (silicone and acrylic) for the study groups (with oxygen plasma treatment) after immersion in distilled water for 30 days as compared with control group (without oxygen plasma treatment). While there was a decrease in the shear bond strength of both soft liner (silicone and acrylic) for the study group (with oxygen plasma treatment) after immersion in denture cleanser for 30 days as compared with the control group (without oxygen plasma treatment).

Chemical surface analysis for the oxygen plasma treated group revealed that oxygen plasma surface treatment did not lead to formation of a functional group that led to change in the chemical composition of the high impact acrylic resin.

AFM analysis showed that Oxygen plasma treatment increased the surface roughness (pits and pores formation) which led to an increase the surface area and increased the shear bond strength.

Conclusion: Oxygen plasma surface treatment was an effective method for increasing adhesion by physical topographic surface changes (due to the plasma etching process which led to removal of some material from the surface and this increased the surface roughness which in turn led to an increase in the bond strength).