



Republic of Iraq  
Ministry of Higher Education  
and Scientific Research  
University of Baghdad  
College of Dentistry



# **EFFECT OF PLASMA TREATMENT ON BONDING OF HEAT-CURED SOFT LINER TO HIGH IMPACT AND CAD-CAM ACRYLIC DENTURE BASES**

A thesis

Submitted to the council of the College of Dentistry/ University of Baghdad in  
partial fulfillment of the requirement for the degree of Master of Science in  
Prosthetic Dentistry

Submitted by

**Lubna Maitham Hameed Qanber**

B.D.S.

Supervised by

**Prof. Dr. Thekra Ismael Hamad**

B.D.S., M.Sc., Ph.D.

**2021 A.D.**

**1442 A.H.**

# ABSTRACT

**Background:** Soft liners are commonly used in dentistry to reshape denture surfaces that come in contact with the soft tissue of the oral cavity. They function as shock absorbers, reducing and redistributing pressure on the denture bearing tissues. However, there's a critical issue with soft liners; they debond from the denture base material after a period of usage.

**Aims:** This study aims at evaluating the effect of oxygen and argon plasma treatment on the shear bond strength between soft liner material and three acrylic denture materials; conventional heat-cured acrylic, high impact acrylic and CAD-CAM acrylic denture base materials.

**Materials and Methods:** 60 pairs of specimens for testing shear bond strength (SBS) were prepared (conventional acrylic, high impact acrylic and CAD-CAM acrylic; n=20 pairs for each group), with the dimensions (75 × 13 × 13 mm) length, width and thickness, respectively, with a 3 mm depth stopper. Ten pairs of specimens from each acrylic group were plasma treated for 5 minutes. Then, heat-cured soft liner was added joining each pair of specimens. Shear bond strength (SBS) was then analyzed using universal testing machine. Vickers microhardness, wettability, Fourier transform infrared (FTIR), scanning electron microscopy (SEM) and atomic force microscopy (AFM) were also analyzed for all of the groups. The data were statistically analyzed using paired samples t-test, ANOVA, and Tukey's multiple comparisons test ( $\alpha=0.05$ ).

**Results:** The SBS of plasma treated specimens of the three acrylic materials were significantly higher than that of their respective untreated groups

( $p < 0.001$ ), with high impact acrylic showing the highest SBS mean values initially and following plasma treatment. Microhardness was not significantly affected, and wettability got significantly higher following plasma treatment for all of the three tested groups.

**Conclusion:** Within the limitations of this study, it has been found that oxygen and argon plasma treatment has efficiently increased shear bond strength between soft liner material and the three acrylic materials. Plasma treatment has also improved surface wettability and topography without affecting the microhardness.



جمهورية العراق  
وزارة التعليم العالي والبحث العلمي  
جامعة بغداد  
كلية طب الأسنان



## تأثير المعالجة بالبلازما على ربط مبطنات طقم الأسنان اللينة مع كل من مادتي طقم الأسنان المصنوعة من الأكريليك عالي الصدمات والمصنوعة بتقنية CAD-CAM

رسالة  
مقدمة الى مجلس كلية طب الاسنان / جامعه بغداد كجزء من متطلبات نيل درجة الماجستير في صناعة  
الاسنان

من قبل  
لبنى ميثم حميد القنبر  
بكالوريوس طب وجراحة الفم والاسنان

بإشراف  
أ.د. ذكري إسماعيل حمد  
بكالوريوس طب وجراحة الفم والاسنان  
ماجستير/دكتوراه صناعة الاسنان