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I dedicated this study to:-

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My Parents

My Family

My Teachers

My Friends

Samia

First of all , I would like to express my deepest thanks to Allah who give me power and care to create this work.

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## **Abstract**

This research was study the effect of diode laser in hardness of the material used in the combinations of teeth (ceramics) by using the hardness tester (TH 160) to test the hardness .

Hardness was measured for samples divided into six groups, each group containing ten test sample, before and after it irradiated with the diode laser with wavelength 675 nm and power 30 mW, for a period of time two minutes for the first group, and ten minutes for the second. Also used a diode laser with wavelength 810 nm and various power 30, 200, 500 mW, with irradiation power of 200 mW for duration two minutes and ten minutes to the third and fourth groups, and irradiation power of 30 and 500 mW for duration one minute for the last two groups.

The results showed that a significant increase in the hardness of ceramic material for irradiated samples compared to non-irradiated samples, where found that the highest percentage of hardness was (41.6%) obtained upon irradiation with a laser wavelength 675 nm, and power of 30 mW for duration two minutes.

The results also showed that the increase in the irradiated time of the samples from two minutes to ten minutes, as well as increased power from 30 to 500 mW does not have a significant effect in increasing the hardness of the ceramic material.

Also we found that irradiation of samples at power 30 mW of visible laser with wavelength of 675 nm, hardness ratio was higher (41.6%) compared with the hardness ratio

(18.28%) at the same irradiation power but invisible laser at wavelength 810 nm.

## المستخلص

في هذا البحث تمت دراسة تأثير ليزر الثنائي على صلادة المادة المستخدمة في تركيب الأسنان (السيراميك) وذلك باستخدام جهاز (Hardness tester TH 160) لاختبار الصلادة.

تم قياس الصلادة للعينات المقسمة إلى ست مجموعات ، كل مجموعة تحتوي على عشرة عينة اختبار، قبل وبعد تشعيها بليزر الثنائي (الدايود) ذو الطول الموجي 675 نانومتر بقدرة 30 ملي وات ، لفترة زمنية دقيقتان للمجموعة الاولى و عشر دقائق للثانية. كذلك استخدم ليزر الثنائي ذو الطول الموجي 810 نانومتر بقدرات مختلفة 500, 200, 30 ملي وات ، حيث تم التشيع بقدرة 200 ملي وات لفترة دقيقتان و عشر دقائق لمجموعتين الثالثة و الرابعة. و التشيع بقدرة 30 و 500 ملي وات لفترة زمنية دقيقة واحدة للمجموعتين الاخيرتين .

اظهرت النتائج زيادة ملحوظة في صلادة مادة السيراميك للعينات المشعة مقارنة بالعينات غير المشعة، حيث وجد ان اعلى نسبة للصلادة كانت (41.6%) حصل عليها عند التشيع بالليزر ذو الطول الموجي 675 نانومتر بقدرة 30 ملي وات لمدة دقيقتان.

كما اوضحت النتائج ان زيادة زمن التشيع للعينات من دقيقتان الى عشر دقائق ، وكذلك زيادة طاقة التشيع من 30 الى 500 ملي وات ليس له تأثير كبير في زيادة نسبة الصلادة لمادة السيراميك . كما وجد انه عند التشيع بطاقة 30 ملي وات للليزر الثنائي المرئي ذو الطول الموجي 675 نانومتر كانت نسبة الصلادة اعلى (41.6%) مقارنة بنسبة الصلادة ( 18.28%) عند التشيع بذات الطاقة ولكن لليزر غير المرئي ذو الطول الموجي 810 نانومتر .

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