

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



**The effectiveness of local application of melatonin  
on enhancing dental implant stability and  
preserving marginal bone level (Randomized  
Clinical Trial)**

A Thesis Submitted to the Council of the College of  
Dentistry/University of Baghdad in Partial Fulfillment of the  
Requirements for the Degree of Master of Science in  
Periodontics

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2021 A.D.

1442 A.H.

## **Abstract**

**Background:** Dental implant is considered the most reliable method to replace missing teeth in partially and fully edentulous patients. The success rate of Dental implant is determined by many factors, one of the most important factors is marginal bone height preservation. Many attempts have been made to modify implant surface characteristics and osteotomy site by using growth factors or hormones to improve bone response and enhance bone-implant contact area to increase implant stability. Recently, a positive effect on bone remodeling, formation, and enhancing bone density has been linked to the local application of melatonin.

**Aims:** To study the effectiveness of local application of melatonin during dental implant placement on the marginal bone height preservation and implant stability by using cone-beam computed tomography and Periotest M device respectively.

**Materials and Methods:** This study was a single-blinded clinical trial following a split-mouth design with a delayed placement protocol. Selected patients received dental implants that were placed at contralateral sites that were randomly assigned as a study group at which 1.2mg of melatonin powder was locally applied in the osteotomy site before dental implant insertion. The other side was the control group where dental implant was placed conventionally. Cone-beam computed tomography and Periotest value (PTV) were taken for the dental implant at baseline and after 6 months.

**Results:** The data revealed a significant effect of melatonin in secondary implant stability after 6 months. Analysis of PTV between the control and study group showed that the mean PTV in the control group was -2.132 while for the study group the mean was -3.247. According to these data, there was a

significant difference (p-value 0.032) in the implant stability between the two groups at the endpoint of the trial. For the marginal bone height, cone-beam computed tomography images revealed a significant bone reduction in the control group in both the buccal and palatal aspects at the end of the trial while the study group showed no significant bone loss at the end of the trial. Inter-group comparison between the control and study groups showed no significant marginal bone loss in the buccal and palatal plate in both baselines and after 6 months. Nevertheless, melatonin exhibited a moderate effect (0.399) in minimizing bone loss on the buccal aspect as compared to the controls. In addition, there was a significant mesial and distal marginal bone reduction ( $p < 0.05$ ) in the control group at the end of the trial. While for the study group, no significant mesial bone loss was observed; however, the distal bone level showed a significant bone loss ( $p < 0.05$ ) at the endpoint.

**Conclusion:** Locally applied melatonin powder around the dental implant showed a positive effect on implant stability enhancement and in preserving the marginal bone level.



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## فعالية التطبيق الموضوعي للميلاتونين في تعزيز استقرار زرعة الأسنان والحفاظ على مستوى العظام الهمشية (تجربة سريرية عشوائية)

أطروحة مقدمة الى مجلس كلية طب الاسنان/ جامعة بغداد كجزء من متطلبات

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