

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



# **Enhancement of Osseointegration in Dental Implants through the Use of Parathyroid Hormone (1-34) Experimental Study on Rabbits**

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**A Thesis Submitted To  
The Council Dentistry College  
Baghdad University  
In Partial Fulfilment of the Requirements for the Degree of  
Master of Science in Oral and Maxillofacial Surgery**

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**2015 A.D**

**1436 A.H**

## **Abstract**

### **Introduction:**

The study was performed to investigate the effect of PTH (1-34) (Forteo™) on osseointegration of titanium dental implants.

### **Material and Methods:**

Thirteen (13) animals received one threaded Titanium dental implant after extraction of the mandibular right incisor and preparing the socket to receive the implant, immediately after the insertion of the implant and prior to finalizing the implant procedures, all animals were tested for Implant Stability Quotient using Osstell ISQ, by mounting a smart peg on the implant. 7 of the animals received a daily dose of Forteo™ of ( 0.25µg /µl) /KG, each, they are the study group and named (RPH 1-7), while the six remaining animals left untreated as control group and named (CR 1- 6). One animal of each group (RPH7 and CR6) were sacrificed after the period of 4 weeks, The remaining animals were sacrificed after 8 weeks. Prior to the sacrifice each animal was sedated, the bone covering the implant was removed and ISQ reading were recorded one more time.

After that, bone blocks were prepared and examined radiographically, Quantitative Computed Tomography was used to obtain Bone Mineral Density (BMD), and Histomorphometric examination was performed.

### **Results and Discussion:**

The results revealed a positive effect of PTH (1-34) on osseointegration. The effect ranged from strongly significant statistically for bone area (Cohen's  $d = 3.26$ ), to strongly positive but statistically insignificant of osteoblasts count (Cohen's  $d = 0.92$ ). Other results for statistical difference between control and study groups (Cohen's  $d$  of difference) were (1.22) for mean ISQ results postoperatively, (1.14) for

minimum ISQ results postoperatively, (- 0.97) for the mean post-operative ISQ discrepancy. Even though all these results are strongly positive, they were less statistically significant, perhaps due to the small size of the study sample (n = 5).

**Conclusions:**

PTH (1-34) can enhance cortical and cancellous bone healing around dental implants, can result in more homogenous healing of the peri-implant bone with lowered decrease of the ISQ readings in short term postoperatively, which supports the possibility of early loading of the implant.