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College of Science**



**Effect of 915 nm Diode Laser on Some  
Hormones and Minerals Concerning with  
Fracture Healing in rats  
(*Rattus norvegicus*)**

**A thesis  
submitted to the Department of Biology, college of Science - Al -  
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## Summary

The objective of this study is to investigate the effect of Low Level Laser Therapy L.L.L.T. on healing of fractured bones after irradiation with laser from the physiological point of view depending on the laboratory determination using the ELISA for the serum hormones and Spectrophotometer for the minerals which greatly interlace with fracture healing processes. The experiment was conducted on twenty four adult white male rats with (350-400) gm. body weight each, they were divided into two groups with 12 rats each one: the first group (treated group) and the second (control group).

The animals of the two groups underwent a surgical operation by inducing fracture in the tibia of left leg, two pieces of cotton used to circle the leg proximal and distal to the fracture site then gypsum used to fix the fractured bone beginning from the piece of the cotton below to that above leaving a small window in the animals of the treated group for laser irradiation. Irradiation began after the operation and continued first group. for 7 days in the animals of the nm wave length, with maximum output The laser used was diode 915 .40 0 J/cm<sup>2</sup>, pulsing frequency 10 KHz, with 32of 100 mW., density Blood samples minute /session daily directly on the window of gypsum. were collected at days (1, 2, 3, 5,7,10 and 14) from the animals of the both groups.

The samples were taken from the heart from all the animals and sent for examination with ELISA to determine the levels of Growth hormone (GH), Parathyroid hormone (PTH) and Calcitonin hormone (CTH), and with Spectrophotometer to measure the values of Calcium (Ca), Phosphorus (P) and Magnesium (Mg).

Results of the current study revealed a significant increase in the levels of GH, PTH, CTH hormones, Ca, P and Mg minerals in the samples obtained from the animals of the first group when compared with those of the second one; there was a rapid normalization of the hormonal status after the irradiation.

The results were evaluated statistically using SPSS test and found that the results of the ELISA test for the hormones and Spectrophotometer for minerals showed significant variations between the two groups of the experiment  $P < 0.05$ . According to clinical, hormonal and biochemical examinations, the process of healing ended in the 7<sup>th</sup>-10<sup>th</sup> postoperative day in the first group, and 12<sup>th</sup>-15<sup>th</sup> postoperative day in the second group.

Conclusion can be done that the treating of the fracture with low level laser radiation was useful and efficient that the healing was promoted and accelerated because its primary stages were induced by the laser irradiation.