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> [Dent Res J \(Isfahan\)](#), 15 (4), 283-288 Jul-Aug 2018

# The Effect of Low-Level Laser 810 Nm and Light-Emitting Diode Photobiomodulation (626 Nm) on the Stability of the Implant and Inflammatory Markers interleukin-1 Beta and Prostaglandin E2, Around Implants

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## Abstract

**Background:** One of the most common problems in edentulous patients is the low stability of lower dentures. The most effective method to overcome this problem is implant-supported overdentures. After placing an implant, for the process of osseointegration to be complete and successful, it is better that patients do not use their denture for few months. This may be nonconvenient for patient because they are unable to speak and eat properly. The aim of this study was to evaluate the effect of low level laser (LLL) and light-emitting diode (LED) photobiomodulation on implant stability as well as their effect on interleukin-1 beta (IL-1 $\beta$ ) and prostaglandin E2 (PGE2) biomarkers around implant in lower anterior region (over denture).

**Materials and methods:** In this clinical trial, 36 implants were placed in fully edentulous mandibles (12 people per person - three implants in areas of midline and canine). Each of the implants was randomly placed in one of three groups of laser, LED, and control. LLL (power of 50 mw and the amount of 20 J/cm<sup>2</sup> for each implant) and LED with dose (20 mw/cm<sup>2</sup>) were irradiated on the day of surgery (zero), 3, 7, 10, and 14 days. The stability of implants was measured on the day of surgery and weeks 3, 4, and 8 after surgery with Periotest. The inflammatory biomarkers of IL-1 $\beta$  and PGE2 were also collected from gingival crevicular fluid around implants in 4 and 8 weeks. The collected data were analyzed by ANOVA statistical tests.  $p$ value<0.05 considered significant.

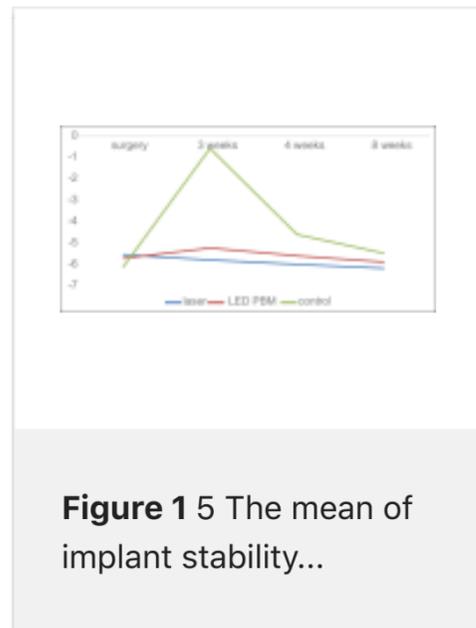
**Results:** The amounts of Periotest significantly increased 3<sup>rd</sup> week after surgery in the control group ( $P < 0.001$ ). However, the laser group and LED group were associated with minimal changes,

which indicates lower stability of implant in 3<sup>rd</sup> week in control group but no changes in stability of test groups (laser and LED). Laser and LED had no effect on the level of IL-1 $\beta$  and PGE2 in 4 and 8 weeks.

**Conclusion:** The use of LLL or LED has a positive effect on the stability of the implants 3 weeks after surgery.

**Keywords:** Dental implants; interleukin; laser; overdentures; prostaglandin E2.

## Figures



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