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College of Dentistry

The Effect of Intra and Extraoral Low Level Laser Therapy on the Sequelae of Surgical Removal of Impacted Mandibular 3rd molar

(Comparative study)

A thesis
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Abstract

Background: Third molars remain impacted in the jaws as a result of many causes so that surgical removal of impacted wisdom teeth is frequently encountered in dental clinic. Pain, trismus, and swelling are common postoperative sequelae for third molar surgery. Different methods have been used to prevent or decrease these postoperative sequelae, one of them is the application of Low-Level Laser Therapy (LLLT) that shows many advantages in controlling the inflammation, so reducing pain, trismus and swelling. The exact biological mechanism behind its action is still unclear. There is an evidence to suggest that it may have significant neuropharmacological effects in the synthesis, release, and metabolism of a series of biochemical substances.

Aim of the study: This study aimed to demonstrate the effects of extra and intraoral application of low-level laser therapy (LLLT) on postoperative pain, trismus and facial swelling following the surgical removal of mandibular third molars.

Materials and Methods: This double blind placebo controlled randomized prospective clinical study was performed during period from December 2018 until the end of April 2019, on (40) patients, (18) male and (22) female, age range was between (18-35) years, with impacted mandibular third molar in similar positions (Class I-II-III and position B, Pell and Gregory's classification). They were randomly assigned into two groups, 20 patients for low level laser therapy group, and 20 patients into placebo control group. After surgery, patients in study group received low level laser irradiation intraorally (at three points occlusal, buccal and lingual to operation site at 1cm away from the target tissues) and three points extraorally at the masseter muscle including origin and insertion. A Gallium- Aluminum Arsenide (Ga-Al-As) diode laser device with a continuous wavelength of 980 nm was used, laser energy was applied at 100 mW (0.1 W) for a total of 180 s (0.1 W×180 s=18 J) 30 s for

each point. For patients in the placebo control group the biostimulation handpiece was inserted intraorally at proximity to the site of operation and then was touched extraorally to the masseter muscle for 180 s total, but the laser device was not operated. Assessment of trismus was done by measuring the maximum mouth opening and the swelling was assessed by measuring distance between five predetermined points (tragus, angle of mouth, pogonion, lateral angle of eye and angle of mandible). These measurements were done before surgery as a baseline record as well as at the second and seventh postoperative days. Pain was evaluated using numeric rating scale from the day of surgery until the seventh day. All these variables in addition to the duration of operation were compared between the two groups.

Results: Regarding the pain, there was a significant difference between laser and placebo control groups on the first day of operation, and a highly significant difference at the second, third, and fourth days. From the day 5 until the day seven, there was no statistical significant difference between two groups ($P > 0.05$). Pain intensity was less in laser group in all time points.

Mouth opening was better in the low level laser group as compared with placebo control group but the statistical analyses showed no significance in the differences between the two groups ($P > 0.05$). However, laser group had lower scores.

Swelling was less in the low level laser group and it showed highly significant difference at the second postoperative day ($p \leq 0.01$), and significant change was seen at the seventh postoperative day ($P \leq 0.05$).

Conclusion: this study showed that low level laser application reduced pain, trismus, and facial swelling following lower third molar surgeries. However, the trismus did not reach statistically significant level.