

Low-Level-Laser-Therapy after Third Molar Removal in a Patient Affected by Osteogenesis Imperfecta

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Abstract

LLLT is used in oral surgery to reduce the discomfort of the patients after surgical procedures, such as pain, swelling and trismus.

We showed in our case report the use of LLLT as for the reduction of post-operative discomfort as to prevent osteonecrosis of the jaws, since our patient was affected with osteogenesis imperfecta.

The patient did not have any complications after surgery and after a one year follow-up she did not show any radiological or clinical sign of osteonecrosis of the jaws.

Keywords: Low Level Laser Therapy; Photo-Biomodulation; Oral Surgery; Third Lower Molar Extraction

Introduction

The extraction of third lower molars leads to some post-surgery complications such as pain, swelling and trismus, usually managed with drugs [1]. The use of the laser application at low intensity has been reported as useful in the control of the discomfort after third lower molar patient surgery [2] as in other surgical conditions such as nerve recovery after mandibular ramus osteotomy [2] or tissue healing after endodontic surgery [3].

In vitro study, trials demonstrated that LLLT enhanced growth and proliferation of human osteoblasts [4] and induced the expression of BMP-2, osteocalcin and TGF- β 1 [5]. Esmaelinejad, *et al.* evaluated the effect of LLLT on human skin fibroblasts, he concluded that LLLT stimulated the release of IL 6 e bFGF from human fibroblasts [6].

In vivo studies showed that LLLT increased the bone healing and the wound healing [7,8] and they demonstrated an increase in density and volume of trabecular bone [9,10].

According to Matsumoto, *et al.* LLLT improved bone repair in rats that had undergone surgery and LLLT, using a mechanism of up-regulation for COX-2 expression in bone cells [11].

Our case report showed the use of LLLT in a patient, affected by osteogenesis imperfecta, with a prior therapy of bisphosphonate, who underwent third lower molar surgery. We used LLLT for the reduction of the discomfort of the patient after surgery, and for the prevention of osteonecrosis of the jaws.

Case Report

A 37 years old woman, affected by osteogenesis imperfecta, came to our observation in December 2018 with pain to the right retromolar region and swelling. After an X-Ray and clinical examination (Figure 1 and 2) a diagnosis of pericoronaritis of the right third lower molar was made and we decided for surgical therapy.

The patient has been affected by osteogenesis imperfecta since birth and she took bisphosphonate until June 2018.

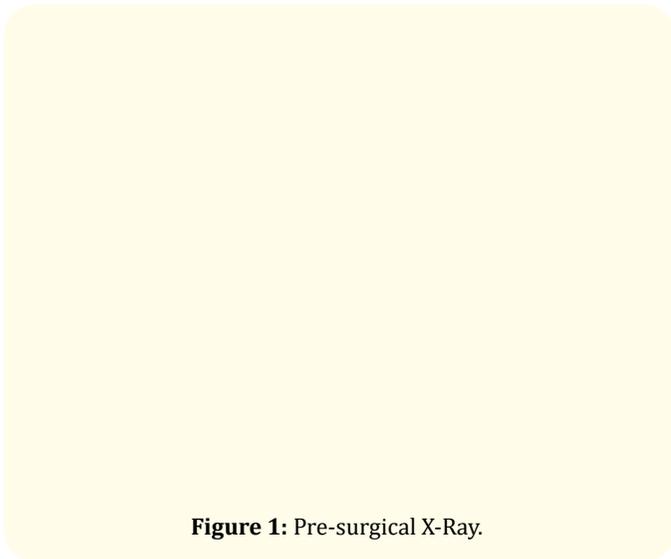


Figure 1: Pre-surgical X-Ray.

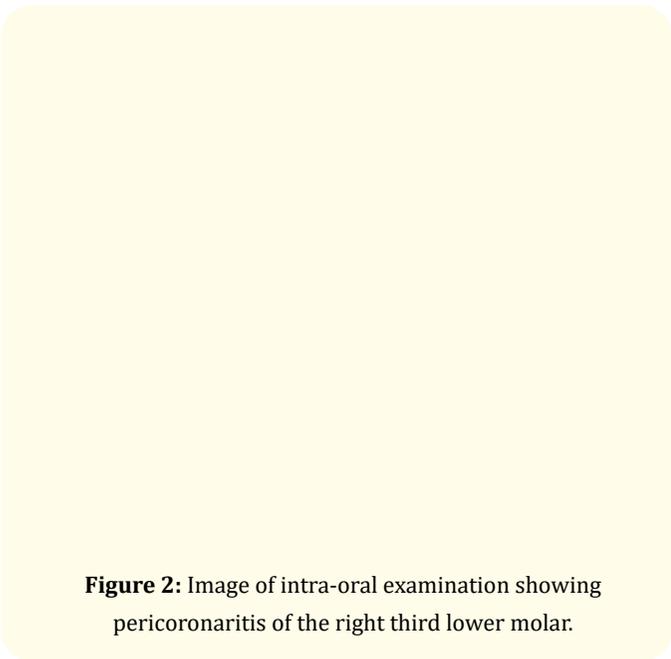


Figure 2: Image of intra-oral examination showing pericoronaritis of the right third lower molar.

Diode Laser Lasotronix Smart M PRO Fotona® (635nm wavelength, Energy density 3 J/cm², Beam area 2 cm², Irradiation time 15 s, Energy delivered 6 J, Output Power 100 mW, pulse rate continuous) to improve the healing of the wound once a week, until the healing mucosa covered the bone (Table 1).

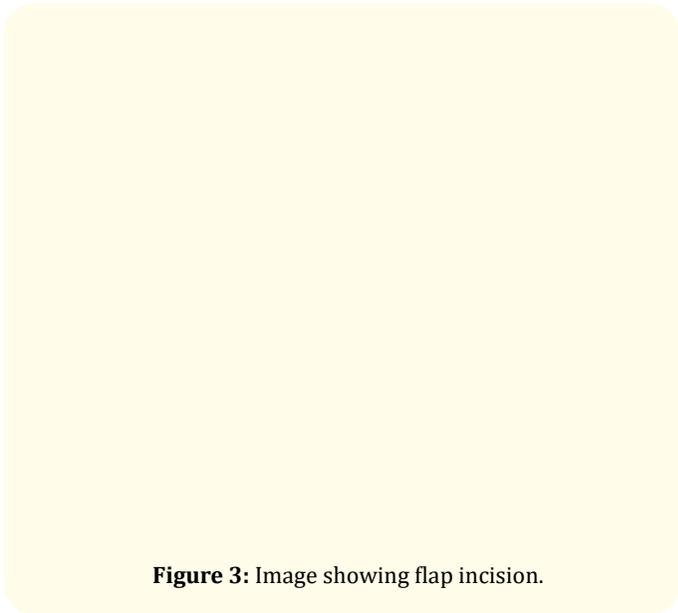


Figure 3: Image showing flap incision.

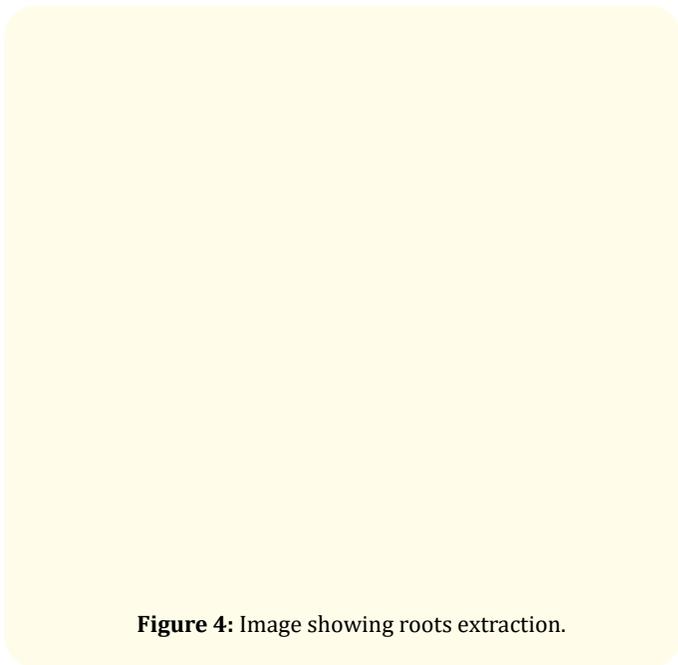


Figure 4: Image showing roots extraction.

The patient underwent surgery with the administration of the antibiotic therapy (Amoxicillin 2 gr/die for 14 days). A local anesthesia was performed with articaine and 1:100.000 adrenaline. A triangular flap was made to expose the crown of the tooth (Figure 3), then the osteotomy was performed and the crown and the roots were separated and extracted (Figure 4). A silk 3-0 suture was positioned. We applied low-level laser therapy (Figure 5) with

Figure 5: Image showing Low-Level laser therapy with Diode laser.

Parameter	Value
Wavelength	635 nm
Beam Area	2 cm ²
Output Power	100 mW
Irradiation time	15s
Energy Density	3 J/cm ²
Energy Delivered	6J
Pulse Rate	Continuous

Table 1: Parameters used in this case report.

Home care instructions included antibiotics therapy, anti-inflammatory and analgesics therapy, 0.12% chlorhexidine mouth rinses twice a day for one week, ice therapy, liquid diet for two days. After 7 days of follow-up, the patient was healed without any complication and the suture was removed.

At one year follow-up the patient did not show any signs of osteonecrosis of the jaw (Figure 6).

Discussion

This case report demonstrated how the application of LLLT can be helpful in the management of postoperative discomfort after third molar surgery. In addition, our patient was affected by osteogenesis imperfecta and she took bisphosphonate until 2018, this could lead, in case of surgery, to a major risk to develop osteonecrosis of the jaws [12].

Figure 6: Image showing the one year follow-up with any clinical sign of osteonecrosis of the jaws.

According to Statkiewicz, *et al.* the use of LLLT after tooth extraction, in patients with bisphosphonate therapy, can reduce the risk to develop osteonecrosis of the jaws [13].

Our patient did not have any complications and she did not report any discomfort during the post-operative period. At one year follow-up she had not developed any signs or symptoms of osteonecrosis of the jaws.

The extraction of an impacted third molar usually leads to some complications such as: pain, edema, trismus, limited jaw opening and movements [1]. Although, according to different authors in literature, LLLT can be helpful in reducing the post-operative discomfort [14-20], the efficacy of LLLT in prevention of pain, swelling and trismus is controversial. This is probably due to the different laser parameters, non-standardized protocol, different study design and difficulties in data analysis [21,22]. According to other authors LLLT, after third molar surgery, did not have any statistically significance in the reduction of pain and swelling when compared to the placebo site [23-27].

Dostolova, *et al.* analysed the effect of LLLT on inflammation associated with surgical removal of impacted lower third molar, using immunologic markers secretory immunoglobulin A and lysozyme. The healing process was evaluated with an infrared thermography. She concluded that with an 830 nm wavelength LLLT, a positive association between the immunoglobulin A and lysozyme was found, on the contrary there was no difference on the face temperature [28].

In a recent review Hosseinpour, *et al.* described LLLT as effective in different post operative conditions. The author concluded that LLLT had a positive effect in reducing pain, swelling and trismus after third molar tooth extraction, neurosensory and nerve recovery [29].

Conclusion

Our case report demonstrated that LLLT can be useful in the management of post-operative discomfort after lower third molar extraction. In addition we use LLLT as a prevention of osteonecrosis of the jaw in a patient with a previous therapy with bisphosphonate. Further studies are needed to confirm this report.

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