



Laser decontamination and LED photobiomodulation promote bone regeneration and wound healing by secondary intention, in alveolar ridge preservation - clinical and radiographic evaluation: a pilot experience

ABSTRACT

After tooth extraction, the objective of alveolar ridge preservation techniques is to preserve both the height and the thickness of the pre-existing dental alveolus, and to promote the proliferation of keratinized gingiva, reducing the physiological post-extraction resorption. Different approaches have been proposed in order to support the possibility of placing implants. Many laser-assisted protocols were proposed and the most studied procedure in periodontology is photodynamic therapy.

In this article, the Authors reported the result of their pilot study which aimed to consider, in alveolar ridge preservation, the regenerative and decontaminating potential of oxygen high-level laser therapy (OHLLT), a high-frequency and high-power diode laser combined with hydrogen peroxide 10 volumes 3%, and to evaluate wound closure during the 14–21 days after surgery, and bone regeneration until 4 months. 15 patients were enrolled (6 males and 9 females; average age 48.6 years; age from 35 to 61 years). After tooth extractions, the sockets were treated with photodynamic therapy without dye (OHLLT/SiOxyL+ protocol) to decontaminate the area. Subsequently, sockets were grafted with porcine bone (Osteobiol® Gen-Os®, Tecnoss®, Giaveno, Italy; granulometry 250-1000 µm), PRF membranes, and collagen membrane (Biogide/Geistlich). Photobiomodulation (PBM) sessions with ATP38 were made for the first 4 months every 2 weeks. Clinical evaluations were performed at 14, 21, 90, and 240 days. Radiographic evaluations (CBCT) were performed at 240 days. After 9 months implants could be placed in all patients.

In this study, the use of OHLLT promoted the decontamination of the surgical sites; the surgical approach with flap elevation and graft combined with membranes allowed to considerably reduce both vertical and horizontal atrophy of the alveolar ridge. Moreover, this regenerative technique, which combines decontaminating and photobiostimulating effects, was successful in reconstructing the lost bone volume and allowed implant placement without other reconstructive surgeries. The PBM helped to improve the bone and soft tissues regeneration.

CONCLUSIONS

This pilot study showed that OHLLT, combined with PBM sessions after surgery, was able to improve both the healing of hard and soft tissues, reducing the risk of complication during the bone regeneration therapy. Moreover, the Authors evidenced that “two interesting elements presented in this study are, as graft materials, the use of OsteoBiol® Gen-Os®, a porcine bone graft, and PRF, a latest generation platelet concentrate, which enhances the healing phases, enabling to obtain flap closure by secondary intention at 14-21 days in almost all patients”.

ALVEOLAR REGENERATION

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