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Workshop

Challenging the limits of oral surgery and implantology

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IMPLANTO DAYS

Workshop II

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Challenging the limits of oral surgery and implantology

Alveolar bone and soft tissue remodeling are a normal physiological response following tooth extraction. The resorption process varies amongst patients and tooth anatomic position and may be affected by several factors such as the presence of infection, previous periodontal disease, the extent of a traumatic injury and the number or the thickness of the bony socket walls. An equilibrium is reached approximately 3 to 4 months post-extraction. The clinical consequences of post-extraction remodeling may affect the outcome of the ensuing therapies aimed at restoring the lost dentition, either by limiting the bone availability for ideal implant placement or by compromising the aesthetic result of the prosthetic restorations. Therefore, effective methods of reducing bone loss, accelerating bone healing, and increasing predictability are actively sought. Most studies focus on drugs or surgical techniques although other modalities affecting the healing process have been investigated; among which is the use of laser therapy.

The laser wavelength and parameters used are of crucial importance; Nd:YAG laser (1064nm) has been found to improve healing after extraction in patients with high risk of osteonecrosis. The Er:YAG laser (2940nm) for degranulation has been studied in periodontal and peri-implant treatments. It seems to promote re-osseointegration on contaminated implant surfaces, and improve haemostasis and disinfection.

The Er:YAG laser may be safely used in hard and soft tissues due to its high absorption in water, resulting in efficient ablation with minimal thermal effect. This feature of the Er:YAG laser also allows very fine control of ablation depth, which makes it highly suitable for fast and safe de-epithelialization of the extraction socket and the surrounding gingiva. This de-epithelialization prevents ingrowth of epithelium into the socket and at the same time, produces an ablated rough surface, which may enhance retention of the blood clot.

Laser irradiation of bleeding sockets may facilitate immediate clot formation and hemostasis. Different types of lasers have been used successfully in coagulation to prevent the loss of blood clot from extraction sockets in animal studies, resulting in improved alveolar bone preservation. The Bactericidal effect of laser therapy is considered advantageous for postoperative wound healing once lasers are able to create an intra-operative disinfected field that reduces the risk of infection. In addition, Nd:YAG laser exhibits selective absorption in pigments, that may be particularly relevant for extractions performed due to periodontal disease. Moreover, lasers can ablate or inactivate toxic substances, such as bacterial endotoxins (lipopolysaccharide), which may positively influence wound healing of the treated site.

Photobiomodulation (PBM) in post extraction healing is well documented; accumulated animal and clinical studies reported that PBM laser therapy induced higher concentration of osteogenesis markers and higher bone density.