Lasers in Implantology

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SUMMARY

Implants are one of the most widely accepted and innovative applications in dentistry. The possibilities to save healthy tooth structure without grinding the teeth for prosthetic bridge treatments, or to give back the ability to chew to a patient who has missing or even no teeth is almost miraculous. Implant restorations have played significant roles in mastication, aesthetics and phonetics.

Implants are placed surgically, which may have some drawbacks during the initial phase. Possible complications include pain, swelling and infection. There are many roles that dental lasers can play in helping to alleviate these issues. A combination of Er:YAG and Nd:YAG lasers is an excellent solution to increase the success rate and reduce post-operative complications.

After raising the flap, if the procedure will be an immediate implantation, the teeth should be extracted causing as little trauma as possible. Usually extraction is indicated because of a large infection either at the apical part (endodontic) or coronal (periodontal) part of the tooth. This involves defects of bone and granulation tissue filling these defects. The Er:YAG laser is a perfect tool to remove the granulation tissue neighboring the bone (Fig. 1) because it does not cause mechanical or thermal trauma to the bone while disinfecting the surface it is acting upon. Conventionally, when a curette is used there is a risk of traumatizing the bone, especially the thin vestibular wall of a socket. Any present infection is a problem for osseointegration and even more so if bone augmentation is planned. A Nd:YAG laser can be used for deep disinfection of the bone, also having a biomodulation effect on deeper layers.

The Er:YAG laser can also be used to level the bone around the implant bed. When this is done with burs, there is a high chance the bone will become heated. If it is a cortical bone then there will be resorption around the neck of the implant. If it is cancellous bone then the ground bone will be pushed into the trabeculae and will cause edema. In both cases the patient feels discomfort during the procedure because of the pressure and vibration caused by the bur.

Another use for the Er:YAG laser is the uncovering of the implant in a two stage surgery. With the use of Er:YAG, no anesthesia is needed for this procedure. The impression can be made during the same session, as the tissue is not heated and will not retract later. Again, as the ablation is "cold for the tissue" there is no risk of damaging the bone surrounding the implant or the implant itself.

A very successful indication for the Er:YAG and Nd:YAG laser is the treatment of peri-implantitis. As microorganisms are present in the microporous surface of the implant in a case of peri-implant infection, the photons of a laser have a suitable antimicrobial effect. After removing the granulation tissue around the implant and disinfecting both bone and implant surfaces with Er:YAG, bony walls are perforated to induce bleeding for better augmentation success without any negative side effects. The Nd:YAG laser is also used for deep disinfection and biomodulation.

As seen in all the indications regarding implantology, laser use is advantageous for both the doctor and patient.

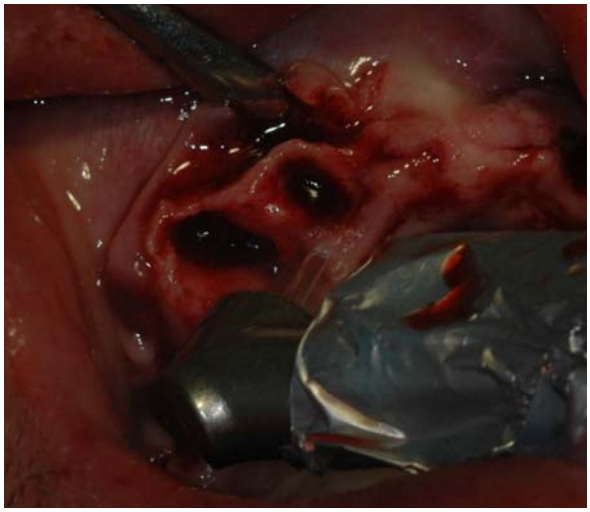

Fig. 1: Removing granulation tissues before placing implants.