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Laser Treatment of Oral Hard and Soft Tissues

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SUMMARY

The usefulness of lasers for oral hard- and soft-tissue procedures has been reported by several Authors. The main clinical advantages are represented by minimal patient discomfort and good recovery, with decreased or absent post-operative pain. Recently a number of cases have been described in the literature concerning the advantages of using lasers for the management of osteonecrosis of the jaws in patients under bisphosphonates. In comparison to using traditional tools, lasers offer increased infection control and improved bone and soft-tissue healing.

Erbium laser techniques provide the opportunity to perform bone resection of the upper and lower jaw affected by BRONJ, even under local anesthesia. Surgical debridement can also be performed, gradually evaporating the portion of necrotic bone at increasing depths close to the healthy bone. Comparing the peripheral bone damage induced by different cutting systems reported that all sections obtained with Er:YAG laser were superior to those obtained by piezosurgery, high-speed drill, and low-speed drill. The Er:YAG laser showed less peripheral carbonization with a regular incision, and without a residual bone smear-layer. Both Er:YAG and Nd:YAG lasers are useful for performing oral mucosa incisions, inducing less pain and promoting better healing than the traditional scalpel, so it's convenient if both laser wavelengths are integrated in a single device like with Fotona's LightWalker systems.

One further advantage of laser applications is the biostimulatory effect with certain wavelengths as reported frequently in the literature. Low Level Laser Therapy (LLLT) is used extensively in medicine and dentistry to treat both hard- and soft-tissue injuries, with an improved healing process and better pain management. The usefulness of LLLT has been reported for the treatment of bisphosphonate-related osteonecrosis of the jaws (BRONJ). The combination of neodymium laser (Nd:YAG) LLLT with medical or surgical treatment appears to offer improved vascularization of the mucous membrane, regeneration of the bone, reduction of pain as well as signs of reduced inflammation and complete mucosal healing.

PIPS® and LAI: Where is the Difference?

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SUMMARY

The aim of this presentation is to clarify the differences between PIPS, LAI and conventional laser techniques in endodontics.

PIPS is used to activate the commonly used irrigants in endodontics (NaOCl and EDTA) and does not replace the standard instrumentation, but only reduces it to a minimally invasive ISO 20-25 enlargement of the root end.

The PIPS protocol is validated by several in vitro studies and supported by a strong body of both published and non-published experiments and data. Scanning electron microscopy, confocal analysis and CT scans were used to evaluate the tissue dissolution, the debridement and smear layer removal at the apical third. Bacteriological studies were performed to assess the decontaminating effect of the technique.

Furthermore, PIPS has been confirmed by thousands of clinical trials and differs from the other investigated LAI techniques in the following ways:

- it uses a specific and unique tip design
- it uses sub-ablative or minimally-ablative energy
- it is delivered via a very short pulse duration (SSP mode), thus producing a very high peak power
- it requires an easy positioning of the tip in the pulp chamber only and not into the canal
- it advocates minimal root canal and apical preparation.

Clinical cases, videos, experimental images are used to illustrate this topic.