

Employment of Diode Laser in the Treatment of Epulis Fissuratum. Case Report

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Abstract:

Background:Diode laser has become an important alternative technique for surgical treatment of oral lesions. Case report. It is reported a 73-years-old female patient case diagnosed of epulis fissuratum that was treated with FOX[®] diode laser. Re-evaluation showed an appropriate healing with a total removal of the lesion. **Discussion:**Diode laser can be used for the removal of soft tissue oral lesions with very good results due to its numerous advantages.

Keywords: Diode laser, soft tissues, oral cavity, oral surgery.

I. Introduction

Since its apparition in dentistry, diode laser has become an important alternative for the surgical treatment of lesions in the oral soft tissues due to the numerous advantages it offers, such as the lower intraoperative bleeding and therefore a better visibility, less inflammation of the area, better coagulation and scarring, no need of suture, reduction of surgical time and reduction of postoperative pain [1,2]. Within the wide range of available lasers, diode laser has become one of the most used in oral surgery due to its effectiveness, ease of use and low cost compared to other types of lasers [2-4].

II. Case report

We report the case of a 73-years-old female patient who attends the Oral Medicine service of the Faculty of Dentistry of Complutense University of Madrid describing a lesion in the anterior maxilla. The patient carries a superior denture and an implant-supported overdenture in the mandible. It was observed that the patient is allergic to penicillin and suffers from type II diabetes mellitus, arterial hypertension and hypercholesterolemia, pathologies for which she is currently being treated with Metformin, amiloride hydrochloride, Hydrochlorothiazide and Rosuvastatin. The intraoral examination showed a fibrous hyperplastic lesion in the buccal mucosa of the anterior maxillary involving the frenulum (Fig. 1.1). In addition, it is seen that the denture is misadjusted and causes trauma to the area during mastication. According to the data obtained, a presumptive diagnosis of epulis *fissuratum*, also known as fibrous reactive hyperplasia or fibrous hyperplastic lesion induced by prosthesis, was performed. It consists on a lesion caused by chronic irritation due to the repeated trauma of an unsuitable prosthesis.

At the first appointment, an adjustment of the prosthesis is performed to relieve the entire area that is contacting the lesion. Even so, the patient is asked not to use the prosthesis for three weeks to assess, after that period of time, if the size of the lesion is reduced on its own, or if, on the other hand, surgical removal is needed. The lesion is evaluated after 21 days and, as there is no variation on its size, we decide to remove it with the consent of the patient.

The surgical procedure was performed with high power laser considering the advantages that it brings us. The FOX[®] diode laser (Sweden & Martina; Valencia, Spain) (Fig. 1.2) was used, a laser with a wavelength of 810 nm indicated mainly in those situations in which tissue must be removed, while performing instantaneous blood coagulation. This laser is used in conjunction with application fibers that direct the laser beam into the tissue that needs to be treated, causing a minimal impact on the surrounding tissue and reducing wounds or pains.

FOX[®] laser devices belong to the IV laser category in accordance with EN 60601-2-22 or EN 60825-1. Category IV normally includes high-power lasers, so special measures must be taken to ensure safety and effectiveness. The patient and the operators must be protected with suitable glasses and clothing. A complete removal of the lesion was planned, which included a frenulectomy of the upper labial frenulum because the epulis invaded the area, in order to avoid a recurrence of the lesion. For this purpose, the P03 program was used, corresponding to the surgical excision of oral cavity lesions, with a power of 3.0W.

Once the appropriate program and tip was selected, it was activated a process called "hot tip", consisting of a photo-thermal reaction whereby the monochromatic laser light is converted into heat. The heat generated is responsible for causing a localized area of vaporization, surrounded by areas of carbonization (try to keep this area of coal as small as possible), coagulation and hyperthermia. With the help of Adson toothless forceps, the lesion was excised, deepening as little as possible in the healthy connective tissue and including the superior labial frenulum, area where it was deepened to the periosteum to remove all the muscular fibers of insertion of the bridge (Fig. 1.3-1.6). After the excision, it was irrigated abundantly with physiological saline solution and the wound was left bloody to heal by secondary intention. The surgery was performed under an infiltrative local anesthesia technique of Lidocaine 2% with adrenaline 1: 200.000 (Normon; Madrid, Spain).

As postoperative instructions, Perio-Aid[®] 0,12% chlorhexidine gel (Dentaid; Madrid, Spain) was prescribed to avoid wound overinfection and salt water rinses to aid healing. At the same time, an anti-inflammatory drug (Ibuprofen 600 mg every eight hours for four days) and an analgesic (Paracetamol 650 mg every eight hours for four days) were prescribed, citing the patient for two weeks to check the evolution of the lesion. Two weeks after performing the surgery, a correct evolution of the bloody area was observed and adequate healing with epithelialization of the wound and formation of a fibrin layer covering the area (Fig. 2.1). One month later it was observed that the evolution was adequate, without relapse of the lesion, with a suitable cure of the area.

A month and a half later the presence of scar tissue was observed in the area where the lesion was, which does not show signs of recurrence (Fig. 2.2). In these circumstances, it is planned to perform relining of the denture, improving the fit and, therefore, the quality of life of the patient, as well as avoiding the recurrence of the lesion.

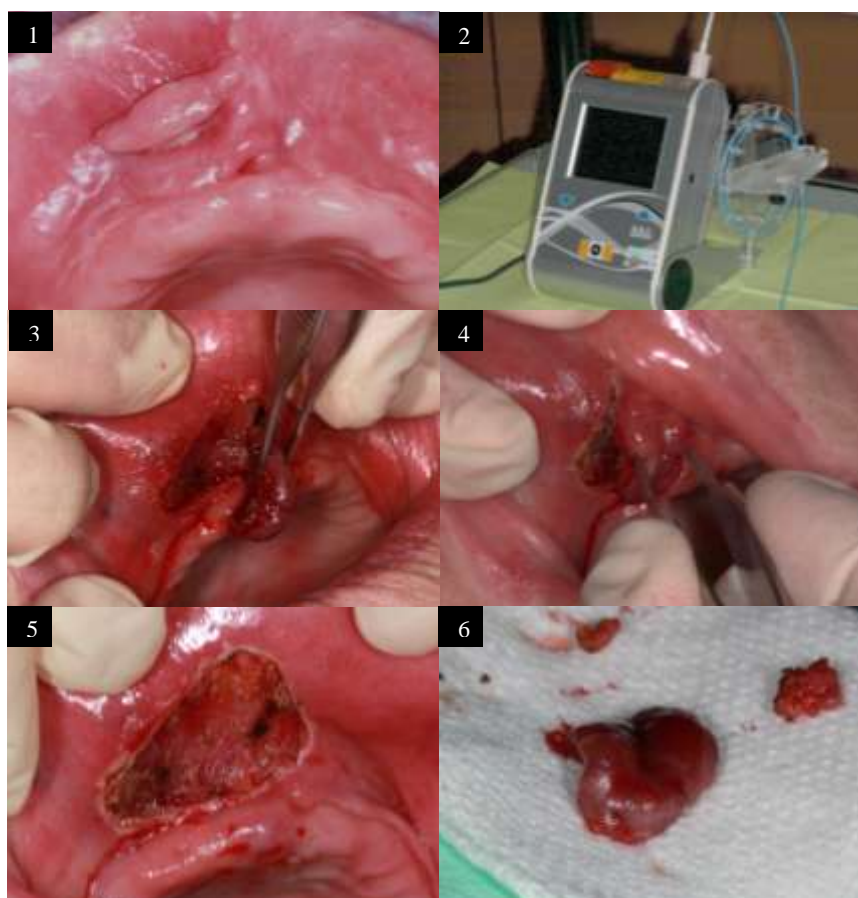


Figure 1. (1.1) Fibrous hyperplastic lesion caused by repeated trauma of misadjusted denture. (1.2) FOX[®] diode laser. (1.3-5) Surgical treatment. (1.6) Image of the excised lesion.

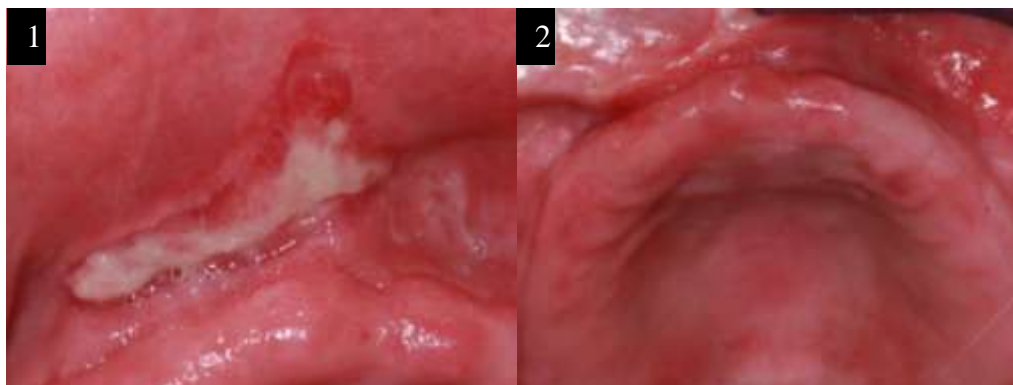


Figure 2. (2.1) Evaluation of the treated area 15 days after surgery. (2.2) Evaluation of the treated area at 45 days.

III. Discussion

According to the literature up to date, one of the applications of lasers in dentistry is soft tissue surgery. Nowadays, the diode laser is being one of the most used for this task, since it gives numerous advantages compared to the conventional scalpel or other types of lasers[1-5]. Some of these advantages are less intraoperative bleeding and therefore better visibility during surgery, less inflammation of the area, better coagulation and scarring, no need of suture, reduction of surgical time and minor or even the absence of surgical trauma and postoperative pain. In addition, an instant disinfection of the surgical wound, also reducing the mechanical trauma on the tissue. However, in some cases a greater delay in healing has been observed with respect to surgeries performed with a conventional scalpel [1-4].

Compared to other lasers, diode laser also has certain advantages as discussed below. The CO₂ laser, like the diode laser, offers advantages over the conventional scalpel, as it reduces operative bleeding, improves coagulation and reduces inflammation and post-surgical pain. In addition, the CO₂ laser has been shown to produce less collateral thermal damage at the edges of the lesion, and is considered by some authors as the "Gold Standard" for epulis fissuratum removal due to its speed and greater penetration. However, its cost, superior to that of the diode laser, and its greater difficulty of handling and size, make it a method not too employed and for this reason other simpler alternatives such as the diode laser are taken into considerations [6-10]. In relation to the Erbium (Er:YAG and Er, Cr:YSGG) lasers, they are being very recently used in conservative dentistry and bone surgery[5]. Like the CO₂ laser, its wavelength allows it to penetrate less into the tissue, so the degree of injury on the treated area is less compared to the diode laser and therefore the recovery is faster. However, it has been shown that the degree of intraoperative coagulation and hemostasis is lower compared to the diode laser and its pulsatile emission mechanism results in a more unequal cut than continuous-wave lasers such as diode, which is an important to take into consideration when removing lesions in an aesthetic area [8,11].

Regarding Nd:YAG lasers, their wavelength and their ability to penetrate deep in the soft tissues implies collateral damages far superior to the rest of lasers. Therefore, they are little used in the removal of soft tissue exophytic lesions, and as the literature shows, the diode laser can be a safer alternative to them[1,2,8]. Comparison between the use of the diode laser and the electric scalpel has shown that the use of the diode laser produces less postoperative pain during the first 24 hours[12]. As described in the case report, the use of the diode laser can provide a truly effective treatment in the excision of the epulis fissuratum, without any surgical or postoperative complications, very mild post-operative discomfort and an excellent healing as observed in the re-evaluation. These results agree with the current literature, which evidences the effectivity of this laser in the extirpation of lesions in soft tissues.

IV. Conclusion

Therefore, the diode laser can be used with very good results in oral surgery for the removal of soft tissue lesions, being especially used in small exophytic lesions because of its easy application and low cost in comparison to other lasers, its adequate coagulation, no need to suture and the slightest swelling and pain it causes. It is a safe, effective and predictable method for performing oral soft tissue surgeries, clearly superior to the conventional scalpel and with numerous advantages over other types of laser or electric scalpel.

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