

Case Report

Treatment of Denture Induced Fibrous Hyperplasia with Carbon Dioxide Laser

Luís Silva Monteiro, João Mouzinho, Marco André Martins

Abstract

Denture-induced fibrous hyperplasia is an adaptive growth located over the soft tissues of the vestibular sulcus caused by chronic irritation from poorly adapted prostheses. The haemostatic capacity of carbon dioxide laser is described widespread as being a useful instrument for oral surgery. The aim of this article is to present a case of a large denture-induced fibrous hyperplasia in a patient with antithrombotic medication demonstrating the usefulness of the carbon dioxide laser for treatment of this lesion. An excision procedure was performed with carbon dioxide laser with additional vestibuloplasty under local anesthesia. After three weeks, wound healing was completed uneventfully. No complications were recorded as hemorrhage, pain, swelling or infection. One year after treatment the patient was free of recurrence. The use of carbon dioxide lasers could be very useful in the excision of this type of pathology.

Key-words: Dental Prosthesis; Dentures; Fibrous Tissue Hyperplasia; Epulis Fissuratum; Optical Device; Lasers; CO₂; Gas; Oral Cavity; Oral Pathology.

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Introduction

Denture-induced fibrous hyperplasia (epulis fissuratum) is an adaptive growth located over the soft tissues of the vestibular sulcus caused by chronic irritation from badly adapted prostheses with variable degrees of hypertrophy and hyperplasia.¹ The term epulis, first used by Virchow, that means “over the gums”, it’s not appropriate to these lesions as the affected mucosa is oral mucosa of vestibular sulcus and not gingival mucosa.¹ On the other hand, the term epulis refers only to the site. In this view we agree with some authors that prefer to call these lesions denture-induced fibrous hyperplasia.²

Clinically, this adaptive lesion presents a raised sessile lesion in a form of folds, with a smooth surface and normal mucosa coloration.³ Depending on the intensity of the trauma, the surface may become ulcerated. The definitive treatment is excision with appropriate prosthetic reconstruction. Recurrences are rare as long as the sources of trauma and/or the patient’s habits are eliminated and the appropriate prosthetic rehabilitation is provided.^{1,3} In modern societies, there is an increasing number of older patients treated with antithrombotic therapy especially those with common systemic diseases such as cardiovascular diseases. In this context there is an increase

in the risk of bleeding in dental surgical procedures.⁴

High-power lasers are one of the greatest technologies advances in dentistry field. In 1989 the first laser specifically designed for use in dentistry, a carbon dioxide (CO₂) laser was introduced.⁵ The CO₂ laser emits energy with a 10.6µm wavelength in the infrared zone that is absorbed by water. The high water content of the oral soft tissues makes this laser a useful tool in oral soft surgery with many advantages over conventional surgery including convenient mucosa removal, high precision in tissue destruction, excellent haemostasis with a bloodless field, and no need for sutures. Moreover, the noncontact surgery, and the bactericidal properties of laser beam minimize the possibility of postoperative infection, pain, and oedema.^{3,6-8} The haemostatic capacity of CO₂ laser is described widespread being a useful instrument for oral surgery in patients that suffered from blood disturbances.^{9,10} The aim of this article is to present the usefulness of CO₂ laser in the treatment of a maxillary denture-induced fibrous hyperplasia in a patient with antithrombotic therapy.

Case report

A 56 years old woman was referred to the oral medicine department for evaluation of a

lesion in the maxilla. She reported a maxillary enlargement with six months of evolution with oral discomfort in the last month. Patient gave a history of arterial hypertension, and congestive heart failure with 10 and 3 years respectively. Habitual medication included ticlopidina 250mg twice daily and captopril 25mg. On oral examination a fibrous mass of 6 x 3cm, with multiple folds, firm, and with normal mucosa coloration was located on maxillary vestibular sulcus (Fig 1). She was using upper and lower ill fitting dentures. There were no cervical or submandibular adenopathy. Denture-induced fibrous hyperplasia provisional diagnose was made. Complete blood count, coagulation tests and general biochemistry were within normal values with an INR of 3.1. Blood pressure was recorded before the surgery (diastolic 90mmHg and systolic 132mmHg). She had not stopped her medication for surgery with physician consent. This lesion was treated under local anesthesia with CO₂ (10600nm) laser (DEKA™ Smart US20D, Firenze, Italy), focalizing the beam for mucosal cut (Fig 2), on a pulse mode (50Hz), 4.5 W power, 1 mm spot, PD 573.25 W/cm², fluence 11.46 J/cm² and defocalizing for tissue coagulation on a continue mode, 7W power, 2mm spot, PD 222.93W/cm² and fluence 222.93J/cm².¹¹ Usual safety precautions to protect the operator, patient and assistant were followed. Additionally to excision of denture induced fibrous hyperplasia, we performed vestibuloplasty to maintain a uniform sulcus depth (Fig 3). Immediately after surgery, old prosthesis was relined with a tissue conditioner (Viscogel, DENTSPLY®, Konstanz, Germany). No suturing was used and the wound was allowed to heal by secondary intention. Paracetamol 1gm at 8 hours interval during 3 days and 0.12% chlorhexidine mouthwashes were prescribed. Excised tissues were submitted for routine histological examination with indication of a CO₂ laser excision. After three weeks, wound healing was completed uneventfully (Fig 4). The patient did not report post operatory pain or swelling. Histopathological report revealed "fibrous tissue with some inflammatory cells infiltration, limited by a stratified epithelium with acantosis confirming a denture-induced fibrous hyperplasia (Fig 5). Appropriate new prosthetic rehabilitation was then provided. The patient had appointments after one month and then one year later showing no signs of recurrence.

Discussion

Most of denture-induced fibrous hyperplasia occur in the anterior region of the upper or lower jaws.^{1,6,12} More than 60% have a multifold presentation as was observed in our case.⁵ They are more frequent in females and in an advanced age.^{1,13}

Surgical excision is the definitive treatment of denture-induced fibrous hyperplasia, always with appropriate prosthetic reconstruction. The treatment is usually performed with conventional surgical excision using scalpel. Other treatment modalities could be used such as laser, electrotome or liquid nitrogen cryosurgery.^{1,14} However electrotome is associated with an elevated thermal denaturation effect and can cause some electro-contraction of the underlying muscle tissue.¹⁵ Cryosurgery may have a lack of cutting precision.¹⁴ CO₂ laser could be a useful tool in this type of surgery with its cutting precision and the uniqueness of its noncontact technique reducing the risk of infection and sterilization of the surgical wound.¹⁶ One of the main advantages over conventional surgeries is an excellent hemostasis. For these reasons there is no need for suture and the wound is allowed to repair by healing by secondary intention. As the patient presented in this article, many older patients are medicated with antithrombotic drugs. As recent guidelines suggests the patient and cardiologist preferred not to suspend this medication during oral surgery.⁴

Over the past years, laser hemostasis has been established as an alternative to conventional techniques.^{8-10,17,18} Gáspár & Szabó, 1989, found no significant differences between the group of patients with hemorrhagic diathesis and control patients in the respect of the duration of operation, degree of bleeding and healing of the wound and complication.⁹ The authors conclude that CO₂ laser high energy was found to be well applicable in the field of oral surgery owing to its excellent hemostatic effect. In our case we observed a good bleeding control. We think that CO₂ laser is a precious help in the treatment of these patients. Blood vessels smaller than 0.5mm diameter are spontaneously sealed, allowing excellent visibility (bloodless operating field) and precision when dissecting through the tissue planes.¹ Comparative to scalpel surgery a coagulum of denatured collagen on the surface is formed and with laser

sterilization of wound, the acute inflammation reaction is delayed and

minimal, with few myofibroblasts and hence little wound contraction.⁸



Figure 1: The Clinical photograph showing an upper denture induced fibrous hyperplasia with multifold presentation (a) and excision procedure (b) with the final aspect of surgical wound after defocalized beam CO2 laser to ensure hemostasis (c).

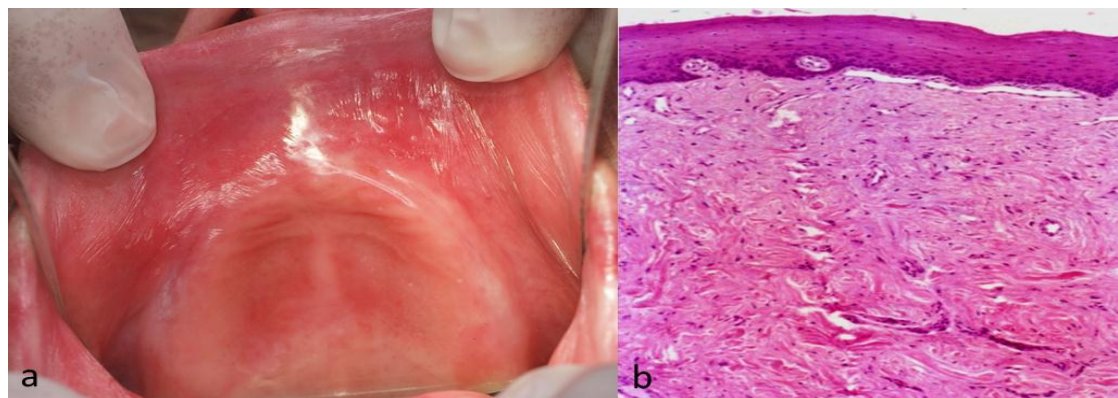


Figure 2: The photograph with clinical aspect three weeks after surgery (a) and the hematoxylin and eosin stained photomicrograph at low power view showing fibrous tissue limited by a stratified epithelium compatible with a denture induced fibrous hyperplasia (b).

Additional and important advantages of lasers, as we observed in our case, are minimal postoperative complains as pain, infection and edema.³ Attending to the size of the lesion here presented is remarkable that during operative and postoperative period pain was absent. This is an important advantage of lasers treatment report by many authors. Pogrel et al, 1990, attributed this reduction in pain to the fact that the inflammatory reaction associated with CO₂ laser application is reduced, since blood and lymphatic vessel sealing occurs, with prevention of the extravasation of fluids responsible for inflammation and pain.¹⁹ Moreover, laser irradiation cause sealing of the nerve endings in the surgical contact area and the denaturalized collagen layer formed on the surface of the surgical wound serves to isolate from the oral fluids.^{219,20} However, with secondary wound healing, re-epithelization is delayed and the wounds take a longer time to re-epithelise.^{5,7,8} The healing process as finished in three weeks with anatomic sulcus integrity. Recurrences are rare as long as the sources of trauma and/or the patient's habits are eliminated

and the appropriate prosthetic reconstruction is provided.

In this view, we consider that CO₂ laser excision with the construction of new dentures is the best treatment for these patients. The CO₂ laser effectively removed this extensive lesion and kept bleeding under control during the surgical procedure and postoperative period. Keng & Loh, 1992, in 20 patients submitted to epulis fissuratum CO₂ laser excision observed bleeding control in most patients, with no hemorrhage in the postoperative period, as well notable absence of pain and infection.⁶ Tuncer et al, 2010, observed that CO₂ laser was an effective instrument for soft tissue excisional biopsies with minimal intraoperative and postoperative complications and good pain control compared to scalpel surgery.⁷

Conclusion

Given the intrinsic qualities of CO₂ laser when used for oral tissue surgery, this treatment option could be very useful in denture-induced fibrous hyperplasia's,

especially in patients with hemorrhagic diathesis or antithrombotic therapy.

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