



Denture-Induced Fibrous Hyperplasia: Surgical Treatment Using CO₂ Laser

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Abstract

Denture-induced fibrous hyperplasia is considered a proliferative process of the mouth and is very common in dental clinics. Clinically characterized by a tumoral mass, usually sessile and pink to erythematous in color, it usually affects the labial mucosa, fornix and palate, resulting from local irritative factor (poorly adapted prostheses). The treatment is surgical and the prognosis is good. However, due to the dimension reached, it can cause wide tissue retraction. Since its approval in soft tissue dental surgeries in 1990 by the FDA (Food and Drug Administration), the laser has been widely used in several dental specialties. The removal of oral lesions by laser surgery is a simple, fast, accurate, less stressful and invasive procedure, regardless of the type of laser used or the inherent wavelength. The purpose of this article is to present a case of the removal of denture-induced fibrous hyperplasia caused by poorly adapted prosthesis, using the CO₂ laser.

Keywords: *Fibrous Hyperplasia; Dental Restoration Failure; Denture Liners; Oral Pathology; Oral Surgery; Laser*

Introduction

Denture-induced fibrous hyperplasia, also called epulis fissuratum or inflammatory fibrous hyperplasia, is a lesion frequently found in dental clinics. However, the term epulide is in disuse, because it refers to any tumor of the gingiva or alveolar mucosa [1-3].

Hyperplasia is a tumoral mass of fibrous connective tissue, caused by trauma of the total prosthesis edge or partial removable prosthesis with inadequate adaptation. It is characterized clinically

by single or multiple folds of hyperplastic tissue in the alveolar vestibule, commonly occurring in adaptation with the edge of the prosthesis. The tissue mass is firm and fibrous, and may present erythematous and ulcerated; it reaches various dimensions, and may also extend throughout the alveolar edge. It usually affects the buccal surface of the alveolar mucosa, but it may develop on the palatal or lingual surfaces [1,3-5].

The most remarkable histological characteristic is fibrous connective tissue hyperplasia. Usually the covering epithelium is

hyperparakeratotic, with irregular papillary hyperplasia. Focal areas of ulceration are common, especially between the folds; variable chronic inflammatory infiltrate may present eosinophils or lymphoid follicles, which complement the histological picture [1,3].

It most often affects mature adults because it is related to the use of poorly adapted prostheses, and is equally distributed throughout the maxilla and mandible. The anterior region is more affected and there is a predilection for the female gender [1,3,5].

The treatment consists of surgical removal and can be performed by conventional method, by laser or electrocautery [3,5]. Additionally, the irritative factor should be reviewed, and the prosthesis poorly adapted should be corrected or a new prosthesis made to avoid the recurrence of the lesion [1-3,5].

Purpose of the Study

The purpose of this article is to present a case of the removal of denture-induced fibrous hyperplasia performed with the CO₂ laser, discussing the benefits of using this therapeutic modality.

Case Report

A Caucasian male, 60-year-old, came to the clinic complaining of need maxillary total prosthesis replacement.

Clinically, the patient presented a maxillary total prosthesis poorly adapted and the presence of a fornix lesion in the anterior superior region, composed of a tumoral mass, with a sessile and mobile base, smooth surface, erythematous coloration, adjacent to the normal mucosa, measuring approximately 40 mm in extension. Due to the clinical characteristics and relationship with the prosthesis, the clinical diagnosis of denture-induced fibrous hyperplasia was suggested (Figure 1).

To allow the new prosthesis to be made, the removal of the hyperplastic lesion was indicated. No systemic alterations were reported. It was suggested the surgical removal with the use of the CO₂ laser and after the signature of the Consent Term by the patient, the procedure was initiated. The device used was the CO₂ laser (Sharplan 20C™, Tel Aviv, Israel), following the protocol suggested by the manufacturer (10,600 nm, 5W, 0.2 mm of diameter, continuous wave).

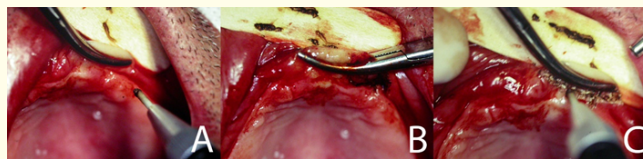


Figure 1: Denture-induced fibrous hyperplasia.

Under local infiltrative anesthesia, tissue excision was performed (Figure 2). The incision was made uniformly parallel to the base of the lesion (Figure 3). Immediately after the flaccid tissue excision of the lesion, the upper total prosthesis was readapted and rebased using surgical cement (Coe Pak™, GC America Inc., Alsip, IL, US) (Figure 4).

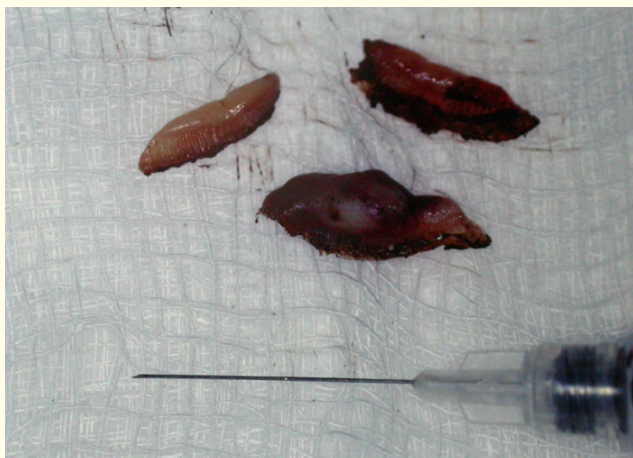


Figure 2: Incision was made uniformly parallel to the base of the lesion.



Figure 3: Post-surgical immediate.



Figure 4: Rebasing of the prosthesis.

The fragments of the lesion (Figure 5) were fixed in 10% formalin and sent to the Laboratory of Surgical Pathology of the School of Dentistry, University of São Paulo. The histopathological diagnosis was inflammatory fibrous hyperplasia.



Figure 5: Fragments of the lesion.

After 7 days, the patient was evaluated, the total prosthesis was removed and re-adapted with a rebaser (Kooliner™, GC America Inc., Alsip, IL, US). The post-surgical site presented itself in a process of tissue repair by 2nd intention, covered by a white-gray color membrane, characteristic of tissue fibrin deposition (Figure 6).

After 30 days of surgery, total repair was observed, and the patient was indicated to continue the rehabilitation treatment, with the making of the new total prosthesis (Figure 7).

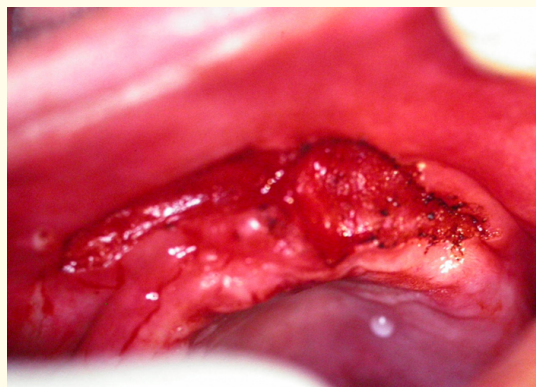


Figure 6: Post-surgical (7 days). Note the process of tissue repair by 2nd intention, covered by a white-gray color membrane, characteristic of tissue fibrin deposition.

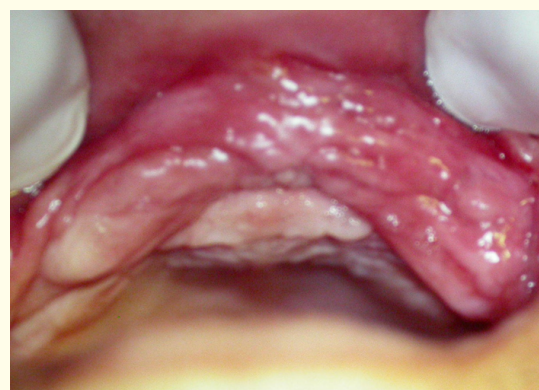


Figure 7: Post-surgical (30 days): total repair of the surgical site.

Discussion

The surgical laser (high power) can be used in several interventions in soft and hard tissues, such as in gingivectomy; gingivoplasty; ulectomy; clinical crown augmentation; access to implants; incision for drainage of oral abscesses; excision of several types of tumors (both in incisional and excisional biopsy); hemangioma and other vascular, necrotic and pigmented lesions; eruption cyst; in the treatment of the periodontal pocket; with the purpose of hemostasis; in the removal of dental caries; in the sealing of cicatrices and

fissures, among other indications [4,6-14]. Surgical or periodontal laser procedures were more effective in preventing bacteremia in patients with cardiovascular disorders [3,5,7].

The use of the high power laser for surgeries presents several benefits due to its characteristics and versatility: it cuts, vaporizes, coagulates and sterilizes. The easiness of use and the reduction of the surgical time are highlighted; reduced trauma during the surgical intervention; hemostasis, blocking and coagulating small vessels in the incision line, resulting in a cleaner and more visible surgical site; reduction of postoperative symptoms (possibly associated with the use of low level laser therapy); acceptance on the part of the patient, as well as contributing to the reduction of apprehension; sterilization of the surgical site. Sutures are not necessary, in most cases, with reduction of the possibility of trans and postoperative infection. Reduction of edema, trauma and postoperative scars; in malignant or cancerizable lesions, it is suggested less possibility of metastases consequent to the surgical act, by the immediate sealing of blood and lymphatic vessels during the surgical procedure. Reduction in the amount of anesthetic for the various procedures [4,6,8-14]. It was reported a reduction in the need for anesthesia in approximately 55% of soft tissue procedures (incision and drainage of abscesses; ulectomy; frenectomy; ankylotomy; gingivectomy; gingivoplasty; periodontal pocket curettage; excision of pediculated tumors) [3,6].

Normally, in more extensive wounds, phenomena inherent to second intention healing can be observed, which is slower due to the more intense inflammatory process [13]. However, minimum cellular inflammatory infiltration inside the tissues was observed, as the surgical laser coagulates the blood vessels inside the tissues, preventing the extravasation of blood cells in wound repair. Epithelial formation and regeneration of connective tissue are slower in laser wounds, which allows better regeneration and asymptomatic results. At the wound edges, rapid temperature increase results in vasculogenic peptide denaturation, released in response to tissue destruction, contributing to the immediate vascular response in the wound. However, this factor may also be responsible for delayed laser wound repair. However, it was observed that these phenomena can be compensated by the coadjuvant use of low level laser therapy [3,11]. The reduced scar formation can be explained by the remaining extracellular matrix, which is not destroyed by the laser, functioning as a mechanical splint that prevents the

granulation tissue from contracting. The residual extracellular proteins are also guides for the neoformation of epithelial tissue (guided epithelial migration), as it interposes itself between the fibroblasts, preventing greater approximation between them and simultaneously preventing the formation of contractile filaments, capable of distorting the tissues in healing. Normally, during the cicatrization, the fibroblasts tend to transform into myofibroblasts capable of contracting. This process can be observed in excisional wounds. In incisional wounds (laser or scalpel), this transformation does not occur. Thus, the "disadvantage" of delayed repair becomes advantageous because there is time for the cells to form a rigid extracellular framework that cannot be distorted by weak cellular forces [11,13].

Generally, the clinical characteristics noted in the laser wound healing process, observed in the immediate postoperative period, are dry and crateriform wounds, with no signs of bleeding and deposit of carbonized tissue at the wound edges, with a halo of clotted tissue and whitish circular areas, as observed in the present report (Figure 3). Histologically, removal and displacement of epithelial tissue, the presence of clotted and necrotic epithelial remains, occluded vessels and edematous endotheliocytes may be observed in the area of clotted tissue adjacent or surrounding the laser-operated area. The repair process is initially determined by the formation of a serofibrinous clot, rich in fibronectin and without red blood cells, filling the site [13].

The removal of laser lesions has been widely reported by several authors, regardless of the type of laser used or the inherent wavelength [3,5-8,11,12,14]. This modality of treatment does not require suturing, requiring minimal amount of anesthesia and not presenting bleeding [3,6,7]. The absence of pain and postoperative bleeding is frequently reported [3,9,10]. It is also important to emphasize that several precautions must be taken with anatomical accidents during trans-surgery with the laser, due to the possibility of thermal damage. Therefore, the operator must be qualified and properly trained in the use of this therapeutic resource.

The CO₂ laser is constituted by active gas, whose beam of 10,600 (infrared spectrum range) shows great affinity for water. It can emit the radiation in continuous wave, pulsed or super-pulsed mode. The latter allows controlling the thermal elevation in the tissue [4].

Conclusion

The use of laser in soft tissue surgery of the mouth, particularly denture-induced fibrous hyperplasia, is a fast and safe procedure and can be considered as an important tool in the dental surgeon's arsenal to meet the various specialities of Dentistry.

Bibliography

1. Neville BW, Damm DD, Allen CM, Bouquot JE. Patologia oral e maxilofacial. Rio de Janeiro: Guanabara Koogan; Tumores dos tecidos moles, 2004:419-476.
2. Regezi JA, Sciubba JJ. Patologia bucal - Correlações clinicopatológicas. Rio de Janeiro: Guanabara Koogan; Lesões do tecido conjuntivo, 2000:158-194.
3. Pedron IG, Carnaval TG, Utumi ER, Moreira LA, Jorge WA. Hiperplasia fibrosa causada por prótese: remoção cirúrgica com laser Nd:YAP. Rev Clin Pesq Odontol. 2007;3(1):51-56.
4. Hanna R, Amaroli A, Signori A, Benedicenti S. Utilization of carbon dioxide laser therapy in the management of denture-induced hyperplasia and vestibuloplasty in a medically compromised patient: a case report. Int J Prosthodont. 2019;32(2):211-213.
5. De Jesus AO, Matias MDP, Arruda JAA, Aires AV, Gomes IP, Souza LN, Abreu LG, Mesquita RA. Diode laser surgery versus electrocautery in the treatment of inflammatory fibrous hyperplasia: a randomized double-blind clinical trial. Clin Oral Investig. 2020.
6. Abdel-Aziem F. Clinical evaluation of pulsed Nd:YAG dental laser applied on oral soft tissues. Egypt Dent J. 1994;40:863-870.
7. Bader HI. Use of lasers in periodontics. Dent Clin North Am. 2000;44:779-791.
8. Bullock Jr N. The Use of the CO₂ laser for lingual frenectomy and excisional biopsy. Compend Contin Educ Dent. 1995;16:1118-1123.
9. Genovese WJ, Santos MTB, Moreira LA, Ardohain RS, Fernandes DR. Utilização do laser Neodímio-YAP em cirurgias de tecido mole. Rev Assoc Paul Cir Dent. 2002;56(supl):19.
10. Moreira LA, Genovese WJ, Bordini PJ, Zampieri MJ, Ardohain RS, Fernandes DR. Estudo comparativo clínico entre os lasers cirúrgicos Neodímio-YAP e CO₂ na remoção de hemangioma e hiperplasia fibrosa inflamatória. Rev Assoc Paul Cir Dent. 2002;56(supl):27.
11. Pick RM, Colvard MD. Current status of lasers in soft tissue dental surgery. J Periodontol. 1993;64:589-602.
12. Pick RM, Powell GL. Lasers in dentistry. Soft-tissue procedures. Dent Clin North Am. 1993;37:281-296.
13. Luomanen M. Processo de cicatrização nas cirurgias a laser. In: Pinheiro ALB, Brugnera Jr A, editores. Lasers na odontologia moderna. São Paulo: Pancast; 1998:221-232.
14. Russo J. Periodontal laser surgery. Dent Today. 1997;16:80-81.

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