

DIODE LASER EXCISION OF A FIBROUS EPULIS IN AN ORTHODONTIC PATIENT. CASE REPORT

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Abstract

Lasers are used in oral surgery and periodontology liberally nowadays, however, solid therapeutic protocols are still lacking in some medical areas. An epulis is defined clinically as hyperplasia of the gingival tissues, usually situated in the proximity of the interdental papilla, however it may also occur in the edentulous ridges. Regarding the origin of this particular lesion the periodontum and the periosteum are considered principal components. In this case report we present an orthodontic patient with a recurrent fibrous epulis that was treated by ablation with a diode laser (940nm). This particular method was chosen due to the reduced treatment time and diminished intrasurgical bleeding. Furthermore, an improved gingival healing compared with classical scalpel blade surgical treatment was observed. We demonstrated that diode lasers are particularly useful tools in orthodontic patients that are predisposed to gingival hyperplasia and this treatment method has supplementary advantages compared to the classical scalpel regarding the presence and intensity of pain and postoperative discomfort.

Keywords: diode laser excision, fibrous epulis, orthodontic patient

Introduction:

The most common tumorlike lesions of soft tissue in the oral cavity are reactive hyperplasia and hypertrophy and to a lesser degree, neoplastic lesions. Gingival epulis is a relatively common tumor-like lesion of the gingival tissues, considered to be a reactive lesion and not a true neoplasia, with a varying growth rate that is usually asymptomatic. Epulis is considered a reactive lesion that develops in the interproximal gingival tissues in response to

chronic and recurring tissue injury, which stimulates an excessive tissue response [1].

Due to the fact that epulis is just a clinical term and does not showcase the histopathological variety of the lesions, some authors launched a histological subclassification based on larger series. The current classification released from the World Health Organization in 2015 of disorders of the gingiva and the edentulous alveolar ridge distinguishes between fibrous epulis, giant cell epulis, flabby ridge, pyogenic granuloma of gingiva and

peripheral giant cell granuloma which encompasses a mixture of clinical and histopathological entities [2].

Pyogenic granuloma is a benign mucocutaneous lesion, appearing as an exuberant tissue, caused by local irritation or trauma, it may occur in all ages, however the peak age of incidence is in the second decade of life. Furthermore, it is more prevalent in young adult females, possibly due to the proangiogenic effects of female hormones. Clinically, it manifests as a smooth or lobulated exophytic pedunculated or sessile lesion, which is usually hemorrhagic and compressible. The differential diagnosis consists of inflammatory gingival hyperplasia, peripheral giant cell granuloma, hemangioma and peripheral ossifying fibroma. The final diagnosis is mainly based on biopsy and histopathological examination [3]. Numerous treatment modalities have been developed such as conservative surgical excision with cold blade and removal of the causative irritant or source of trauma, electric cauterization, cryosurgery, intralesional steroids, monoethanolamine oleate ligation, cauterization with silver nitrate, absolute ethanol injection, neodymium-doped yttrium aluminum garnet (Nd:YAG) laser, erbium-doped yttrium aluminum garnet (Er:YAG) laser, and diode laser have also been demonstrated as valid surgical alternative for the classical surgical treatment [4-6].

Recent research has showcased the use of diode lasers of different wavelengths (810, 830, 940, 980 nm) used in a photoablative mode in periodontal and dentoalveolar surgery. This has been mainly used for oral surgery of the soft gingival tissues and of the tongue and in advanced and severe periodontitis cases to remove the infected epithelium inside and around periodontal pockets. Surgical removal of tissues with diode laser has some clinical

benefits such as effortless gingival reshaping, a diminished need for local anesthesia, exemplary hemostasis, minimal thermal injury of deeper tissues and minimal postoperative inflammation and pain [7, 8].

Although pyogenic granuloma does not exhibit an infiltrative tendency or a potential for malignant transformation, the recurrence rate after simple excision is close to 15% [9]. Recurrence occurs after a deficient excision, failure to eliminate etiologic factors or a recurrence of the injury of lesions. The recurrence rate is much higher when the initial lesion was at the gingival level [10].

Treatment usually comprises of total excision of the lesion and meticulous curettage of the area due to the lesions' origin in the periosteum and periodontal ligament cells and to avoid recurrence. The extraction of neighboring teeth is generally not considered mandatory unless there is considerable underlying bony involvement [11]. The most frequently used instruments are the surgical or electric scalpel, however, in cases where there is an important vascular component of the lesion, diode laser is the preferred method since they have a hemostatic effect, thus produce a bloodless surgery [11].

Clinical case:

The patient was a 26-year-old Caucasian female, referred to "Baza Clinica de Invatamant Stomatologic" from the University of Medicine and Pharmacy, Faculty of Dentistry, "Grigore T. Popa" Iasi, Romania, for persistent gingival swelling after the surgical uncovering and orthodontic traction of an included 1.3. Her medical history was unremarkable, with the exception of massive bleeding during an attempt to surgically remove the same gingival lesion performed by his general practitioner two months earlier. The patient referred no previous bleeding at other sites

and her blood tests were within normal limits.

At intra-oral examination, a soft, firm and painless swelling of the adherent gingiva (at the cervical level of 1.3) of red coloration was detected (Figure 1, 2 and 3), with a size of 9/7/6 mm. The exophytic

lesion appeared nine months before referral time. Radiological examination did not show any osseous lesion at that level or any cortical bone erosion. 1.4, 1.3 and 1.2 responded positively to the vitality tests, all teeth had physiological mobility.



Fig 1: Clinical aspect of the gingival lesion at the level of 1.3



Fig.2: Clinical aspect of the gingival lesion at the level of 1.3



Fig.3: Clinical aspect of the gingival lesion at the level of 1.3

Based on anamnestic data we decided the removal of the lesion with diode laser, aimed at reducing the intra-lesion vascular component, with a simultaneous biopsy. After local anesthesia, the excision was performed by diode laser (Epic X,

wavelength of 940 nm), a 400 µm flexible fiber and an energy output of 2W in continuous wave modality. Following laser excision we performed thorough curettage. In our case the controlled excision of the lesion with diode laser and the

comprehensive subsequent osseous curettage of the adjacent periodontal membrane, periosteum and alveolar bone were essential to avoid the recurrence. Conservative laser excision with gingival recontouring was favored because of the absence of bone invasion and the obvious aggressiveness of classical surgery. The patient reported no discomfort during surgery.

The procedure lasted approximately 10 minutes from start to finish. In figures 4 and 5 we can notice the intraoperative clinical status, minimal to no bleeding is observed. A biopsy taken the lesion was sent for histopathological examination. The results confirmed our presumptive diagnosis of fibrous epulis. We decided on the temporary

debonding of the bracket on 1.3 and 1.4 to remove the chronic traumatic factor and aid in the healing of tissues. Furthermore, starting with the third day after the intervention a regimen of mouthrinse with Chlorhexidine 0.2% was recommended twice a day for 2 weeks to lower the plaque deposition and bacterial flora in the oral cavity. The archwire was changed to Stainless Steel 0.017x0.025 with a step-out bend in the canine region to further distance the wire from the tooth and gingival surface.

After the operation the patient did not report any complications, thus diode laser excision was able to produce total epithelial photoablation and improve surgical comfort compared to cold blade removal.



Fig. 4: Intra-operative aspect during laser diode removal of the gingival lesion



Fig. 5: Intra-operative aspect during laser diode removal of the gingival lesion

Nr.23858

Buletin histopatologic

Nume:	██████████	Prenume:	██████████	Sex:	F
CNP:	-	Domiciliul:	-	Județ:	-
Clinica:				F.O.	
Diag. clinic:	Obs. hiperplazie gingivală. Obs. epulis 1.3				
Piesa expediata:	-				
Medical care a trimis:	██████████			Data primirii:	26.05.2017

Diagnostic histopatologic:**Macroscopie:**

Formațiune polipoidă de 8/7/5 mm, suprafață netedă, culoare alb-sidefie.

Microscopie:

Epulis fibros cu metaplazie osoasă în focar, edem și moderat infiltrat inflamator limfoplasmocitar subepitelial. Se mai constată eroziuni punctiforme ale mucoasei.

Fig. 6: Histopathological results from the biopsy taken during surgery

Discussion:

As epulis is merely a clinical macroscopic diagnosis established in the case of local reactive hyperplasias of the gingival tissue but from a histological point of view it comprises of various distinct entities. A recent study on 92 clinical cases revealed that histologically speaking the authors established seven clearly distinguishable entities each appearing as epulis. The histopathological examination exposed peripheral ossifying fibroma in 32.6 % of cases, fibroma/fibrosis in 29.3 %, giant cell lesion in 13.1 % of cases and granuloma pyogenicum 8.7 % as the most frequent underlying entities. Moreover, as an element of novelty, hyperplastic squamous epithelium (7.6 %), granulation tissue (5.4 %) and peripheral odontogenic fibromas (3.3 %) were observed to clinically mirror an epulis [13].

In most cases described in the literature, the occurrence of the epulis was associated with gingivitis and in some cases with occlusal trauma, and even parodontitis and occlusal trauma in the development of these lesions [14-16]

Regarding the sex distribution for all types of epulides, female subjects were more frequently affected compared to males, at a ratio of 2.2:1. This is most likely due to hormonal dysbalances, in addition to inflammation and trauma [17,18].

The age distribution reported in the literature for cases of peripheral ossifying fibroma exposed the highest incidence in the third and fifth decade [19]. However, another study from 2010 reports a younger distribution of almost a decade [18]. Moreover, with regard to gender, the study of Truschnegg revealed the greatest frequency in males between decade four and six, while in female subjects in decade three and five [13]. The age difference may be explained by hormonal triggering of these lesions. However, in a study by Garcia de Marcos et al., on peripheral ossifying fibromas which affected women exclusively, no oestrogen or progesterone receptors could be demonstrated, thus questioning the essential role of hormones in the lesions' origin [20].

One of the many uses of lasers in dentistry is soft tissue surgery and removal

of lesions. The benefits of laser application are a relatively bloodless surgery, minimal edema, scarring and coagulation, no need for applying sutures, reduction in surgical time and less or no postoperative pain. Also, the laser instantly disinfects the surgical wound as well as allowing a noncontact type of operative procedure and therefore no mechanical trauma to the tissue [21].

Laser systems and their application in dental medicine and especially in oral and periodontal surgery are swiftly improving today. The specific advantages of lasers are incision of tissues, coagulation during operation and postoperative benefits. Semiconductor diode lasers (Gallium arsenide (GaAs), gallium-aluminum-arsenide (GaAlAs)) are portable compact surgical units with efficient and reliable benefits. They are assigned according to economic and ergonomic consideration and offer reduced costs in comparison to other modern laser devices. This type of laser can be utilized in a continuous or pulsed mode of operation through contact or noncontact application on tissues according to the clinical outcome desired and treatment method [21, 22].

In a study from 2015 the authors revealed that the use of a laser, compared with conventional surgery with a cold blade, determined a lower mean duration of surgical procedures regarding presurgical, intrasurgical, and postsurgical clinical parameters [23, 24]. Moreover, Ize-Iyamu et al in a clinical comparison between the effectiveness of a 810 nm diode laser with conventional surgery for the management of different soft tissue muco-gingival surgery

in orthodontic patients, showed that surgical procedures performed with diode laser presented less intraoperative bleeding and the need of sutures compared with cold blade surgery [25]. In our study, the use of diode laser yielded a complete removal of the gingival surface epithelium and an excellent patient compliance and satisfaction, minimal bleeding (only after the curettage) no post-surgery pain [26].

The diode laser devices enjoy a relatively small size, are portable and have a lower cost that appeal to dental practitioners and oral surgeons for use in various surgical indications in comparison to other laser equipment.

Diode lasers can be utilized in periodontal and oral soft tissue surgery due to the ease of application, excellent coagulation, no need for applying sutures, less edema and pain, as well as for its superior esthetic outcome. It can be considered as a first choice in the removal of epulis lesions due to faster action, minimal or no bleeding and better tissue healing outcome.

Conclusion

The diode laser surgical technique used in this clinical case was an effective choice. The therapeutic success was due to the good intraoperative cooperation of the patient, the positive psychological approach, also the favorable postoperative follow up without complications led to an optimal healing of the gingival tissues and no recurrence.

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