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RESEARCH ARTICLE

Excision of irritation fibroma in a child with diode laser: A case report

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Abstract

The effects of chronic local irritation have been seen commonly in the form of fibroma in children. Fibroma is one of the most common benign lesions of the oral cavity, results from reactive connective tissue hyperplasia caused by a chronic irritant. Treatment of choice of traumatic or irritational fibroma is surgical excision. The use of lasers in different dental procedures has become very common. The diode laser was introduced in dentistry since 1999. This case describes the use of diode laser for the excision of a rare fibroma. The procedure using the diode laser was safe, quick, with minimum postoperative discomfort and complications.

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❖ INTRODUCTION

Fibromas are the most common benign oral soft-tissue neoplasm of mesenchymal origin that are composed of fibrous connective tissue.¹ They can occur in any body organ and are known as irritation fibroma, traumatic fibroma, focal fibrous hyperplasia, fibrous nodule, or fibroepithelial polyp.²

Irritation fibromas comprise 7.6% of oral soft-tissue lesions and represent inflammatory rather than neoplastic conditions. Most common sites of traumatic fibroma are the tongue, buccal mucosa, and lower labial mucosa.³

The lesions are more common in decades four through six of life, affecting both sexes with slightly higher incidence in females.⁴

Fibroma is a result of a chronic repair process that includes granulation tissue and scar formation resulting in a fibrous submucosal mass. Recurrences are rare and may be caused by repetitive trauma at the same site. This lesion does not have a risk for malignancy.⁵

Etiopathogenesis is usually related to chronic irritation of mucosa resulting from cheek or lip biting and rough or sharp margins of dental prosthesis. These signals are transferred to the submucosal connective tissue via the basement membrane, instigating an inflammatory response. An initial vascular reaction is followed by the emigration of inflammatory cells, such as neutrophils, monocytes, lymphocytes, and macrophages.⁶ Fibroblasts

synthesize a large quantity of connective tissue components, including fibronectin; glycosaminoglycan; and collagen types I, III, and IV. Formation of granulation tissue and subsequent reepithelialization of the wound site results in a fibrous mass.⁷

The lesions clinically present as round-to-ovoid, asymptomatic, smooth-surfaced, and firm sessile or pedunculated masses. lighter in color than the surrounding normal tissue, with the surface often appearing white because of hyperkeratosis or with surface ulceration caused by secondary trauma. The growth potential of fibroma does not exceed 10-20 mm in diameter.⁸

Differential diagnosis of other lesions, including benign tumors (neurofibroma, neurilemona, cellular gland tumor, salivary gland tumor, lipoma) and mucocele should be ruled out by biopsy.⁹

The definite treatment of irritation fibroma is surgical excision with no recurrence after removal of the stimulus. Conventional scalpels, electrocautery, radiosurgery, and lasers have been used for excision.¹⁰

The laser is a relatively new and modern technology developed by Maiman in 1960.¹ However, it was first successfully used in the oral cavity in 1977 with subsequent improvements and innovations over time. These included the development of the carbon dioxide (CO₂) laser with a wavelength of 10,600nm for soft tissue surgery in the 1980's, the 3W Neodymium-Doped Yttrium Aluminium Garnet (Nd:YAG) with a wavelength of 1,064nm in 1989 and the diode laser with a wavelength ranging from 810nm to 980nm. Others include the Erbrium-Chromium-Doped Yttrium Scandium Gallium Garnet (Er,Cr:YSGG) with a wavelength of 2,780nm and the Erbrium-Doped Yttrium Aluminium Garnet (Er:YAG) with a wavelength of 2,940nm¹¹

The diode laser which was introduced in dentistry since 1999 is a solid state semiconductor laser that typically uses a combination of gallium (Ga), arsenide (Ar), and other elements such as aluminium (Al) and indium (In). The diode laser system has found wide recognition in the areas of lasers as a result of its practical characteristics and is considered as an important tool for a large number of application.^{12,13}

It has a wavelength ranging from 810 to 980 nm. This energy level is absorbed by pigments in the soft tissues and makes the diode laser an excellent hemostatic agent. Thereby, it is a tool for soft tissue surgeries as well.¹⁴

Here, we present a rare case of a solitary large buccal fibrotic growth which was treated using diode laser.

❖ Case Report

A 11 year old boy had reported to the Department of Paediatric and Preventive dentistry with a chief complaint of a soft tissue growth which was positioned in the middle of his left buccal mucosa with no associated pain since 1 year. The patient gave a history of the swelling being small at first with a slow enlargement. The habit of cheek biting was also confirmed by the parents. No relevant medical history was revealed.

Extra orally, there was no deformity detected and the regional lymph nodes were not palpable. Intra orally there was presence of a solitary, sessile, pale pink coloured lesion on left side of buccal mucosa 2 cm away from corner of mouth. Lesion appeared as an elevated nodule with a smooth surface measuring 12 mm x 7 mm in diameter. (Figure 1&2)

The lesion was non scrapable, and non-tender. On correlating the chief complaint, a provisional diagnosis of irritational fibroma was given. As the size of the lesion was >12mm, it was planned to be excised with laser. An informed consent was obtained from the patient/parent after explaining the procedure.

After topical anesthetic agent application, complete excision of the gingival growth was performed utilizing a diode laser unit (Picasso, AMD laser technologies, USA; wavelength 810 nm). Laser parameters were 1 W at continuous mode. The procedure was done in contact mode. Surgical assistant grasped the soft tissue growth with tissue pliers and retracted with minimum tension (Figure 3). The fiberoptic tip was placed at the periphery and gradually moved around the lesion, continuously firing the laser to dissect out the fibroma completely. The excised tissue was immersed in a 10% formalin solution and sent for histopathological examination (Figure 4)

There was no bleeding, the patient was comfortable, and no suture was necessary. Antibiotics were not given postoperatively. Patient was instructed to take analgesics if needed. Patient was recalled after 1 week to evaluate the healing which was uneventful (Figure 5&6)

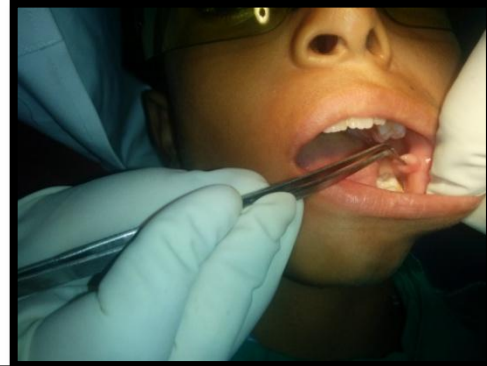


Figure 1&2 - Pre-operative view of Fibroma appearing as an elevated, sessile nodule on left buccal mucosa



Figure 3- Excision of irritation fibroma using diode laser.



Figure-4 Immediate post-operative Showing peripheral zone of edema



Figure 5&6 showing postoperative healing after 1 week

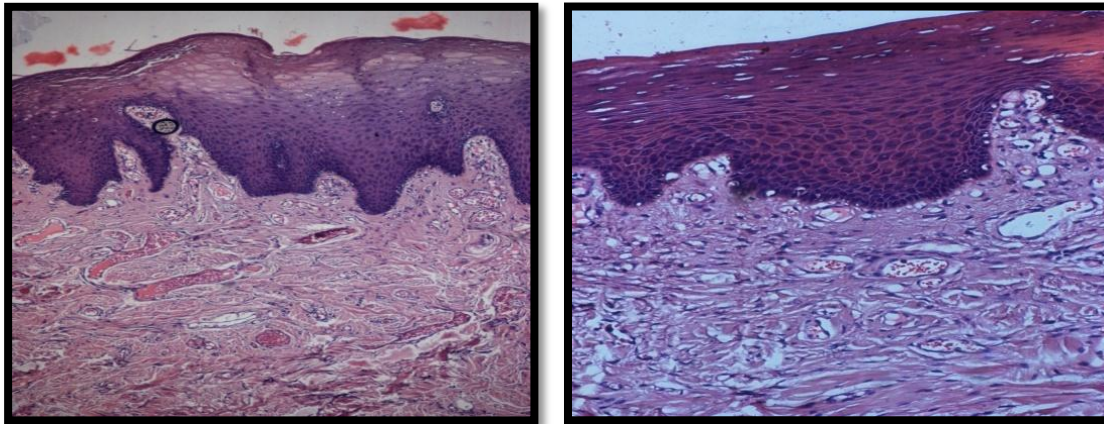


Figure 7&8 Photomicrograph of fibroma reveals the surface showing stratified squamous epithelium and interlacing collagenous fibers

❖ Histopathological Analysis

H&E stained section shows parakeratinized stratified squamous epithelium with long thin rete ridges. Underlying connective tissue stroma is fibrous with thick bundles of collagen and large amount of dilated blood vessels.

Deeper stroma shows adipose cells and cementoid like calcification occurring in globular pattern (Figure 7&8)

❖ Discussion

Unhealthy habits, when repeated excessively become harmful, contributing to orofacial muscular imbalance associated with alterations in bone growth, dental malposition, and dentofacial abnormalities. Biting, licking, or sucking of lips and cheeks is frequently accompanied by chapping, dryness, erosion, irritation of one of both lips and/or vermilion borders.^{15,16}

Fibroma is the most common benign soft tissue tumor in the oral cavity. Most fibromas represent reactive focal fibrous hyperplasia due to trauma or local irritation. Hyperplasia is a self-limiting process unlike neoplasia and hyperplastic cells sometimes show regression after removal of the stimulus.¹⁷

The general literatures have cited the reason for a few of the oral lesions like irritation fibroma and mucocele, due to oral habits such as lip biting/sucking in childhood. Rare association of reactive hyperplasia or traumatic fibroma with a natal tooth in an 4 year and 6 month old infant has been reported.¹⁸

In our present case report, we have chosen Laser as a treatment modality, over the standard treatment procedure which is performed by scalpel, considering the large size of the fibroma.

A comparison of the handling properties between scalpel, laser, and electrocautery, it was observed that scalpel has advantages of ease of use, precise incision with well-defined margins, relatively fast and uneventful healing, no unwanted lateral tissue damage can be used to bone proximity and economic. Disadvantages of scalpel are need of anesthesia, excessive bleeding, inadequate visibility caused by blood in the operating field and non-sterilized incision cut.

Advantages of electrocautery observed are, the electrode cuts on its side as well as on its tip, angulated electrode meets the clinical need, cuts are made with ease when the device is set correctly, hemostasis is immediate and consistent, the wound is nearly painless and the tip is self-disinfecting. Disadvantages of electrocautery include need of anesthetic agent for cutting, unavoidable burning-flesh odor, low tactile sense, does not allow for their use around implants, bone can be damaged, dangerous in an explosive environment etc.¹⁹

Lasers are the most important minimally invasive tools in dentistry and evidence shows that they will continue to be a superb tool in the dental field.²⁰ Laser surgery is superior to scalpel surgery for several reasons. Soft tissue surgery with the use of lasers provides some advantages, including the need for small amounts of local anesthetic agents, better cutting precision with the laser than with the scalpel, a clearly visible cut and more rapid hemostasis, because the laser plugs the lymphatic and blood vessels, low risk of post-operative infections because the laser beam sterilizes the tissue simultaneously with cutting, and minimal post-operative pain and swelling, which leads to faster post-operative healing and decreased scar formation.^{20,21}

Release of histamine subsequent to a laser procedure is much less than that after using a drill and a scalpel; therefore, pain and edema decrease to a great degree. It has been demonstrated that children accept soft tissue surgeries with the use of lasers more easily.²¹

In addition, a large number of patients dread local anesthetic needles, or the whine of the dental hand piece during dental procedures. The greatest merit of the laser for a pediatric patient is the eliminates local anesthetic injection.^[20,22] A further advantage, which will facilitate behavior management process by the pediatric dental practitioner.²³

Diode laser radiation is an excellent, simple, and safe form of treatment of oral lesions. In the above mentioned case, patient was satisfied with laser surgery since it was a painless procedure both intra and postoperatively. The safety and efficacy of laser systems and especially diode laser is already evaluated for the treatment of facial pigmentation and vascular lesions, fibroma, excision of epulis fissuratum, and gingival hyperplasia.²⁴

❖ Conclusion

It can be concluded that excision of traumatic fibroma with diode laser is a relatively simple and safe method. Easy handling of the fiberoptic tip combined with the properties of diode laser helped in obtaining a clean, thin, and fast cut; without bleeding or scarring. Because of the sterilizing and tissue growth stimulating properties of the laser, we were able to obtain excellent healing in a few days, even without surgical suturing.

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