

Diode Laser in the Excision of Intraoral Fibroma: A Safe Tool for Minimally Invasive Dentistry

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Abstract: *Intraoral fibroma is a common lesion that develops in the oral cavity following trauma or tissue injury. It has a strong female predilection and is more frequently seen in the third and fourth decades of life. The most common site of traumatic fibroma is buccal mucosa along the plane of occlusion. The conventional method for excision of fibromas is using surgical blades. However, this method has certain disadvantages such as excessive bleeding and pain to the patient during the excision. Postoperatively, there can be delayed wound healing with occasional scarring. With the introduction of diode lasers for soft-tissue excisions in dentistry, we can now overcome these limitations. Here, we present the case series of two cases of intraoral fibroma. In this case series, intraoral fibroma was excised using a diode laser. It was observed that in both cases, the healing was much faster. There was minimal intraoperative bleeding. Furthermore, the surgical time reduced substantially and the patient was more comfortable during the procedure as well as in the postoperative phase. Thus, the diode laser has been found to be safe, less painful, and with better post-operative outcomes.*

Keywords: Diode laser, Epulis, Irritation fibroma, minimally invasive dentistry, Semiconductor

1.Introduction

The traumatic fibroma is a commonly seen intraoral overgrowth that occurs following tissue injury. Most common etiological factors include plaque, calculus, overhanging restorations, habits such as lip biting, and injury from the broken teeth [1,2]. They occur more frequently in the third and fourth decades with twice the frequency of occurrence in women as compared to men [1,3]. The most common site of occurrence is buccal mucosa along the plane of occlusion. Other sites include mandibular labial mucosa, gingiva, tongue, and palate [1,3]. Clinically, they appear as a sessile or pedunculated mass. The lesion may appear pale or similar to the surrounding mucosa. The outer surface may appear smooth and whitish due to hyperkeratosis or may be ulcerated due to repetitive trauma. The lesion is usually asymptomatic and does not have any risk of malignancy [4,5]. The recurrence rate is very low and it occurs due to incomplete elimination of the etiological factors [5].

The conventional treatment modality includes surgical excision using scalpel blades, electrocautery, and cryosurgery. These methods, however, have many disadvantages such as excessive bleeding, need of suturing, scarring in the region of excision, postsurgical pain, swelling, and delayed wound healing [6,7]. To overcome these difficulties, the "Diode Laser" has emerged as a minimally invasive tool. Lasers have been used in dentistry since 1999 [8]. The diode laser is a solid-state semiconductor consisting of Gallium, Arsenide, Aluminium, and Indium. It has been found to be superior to conventional surgical methods in terms of ease of handling, pain control, less chairside time, and low cost. This case series highlights the benefits of using a diode laser as a minimally invasive tool for excision of intraoral fibromas.

2.Case Series

Case 1

A 65-year-old female patient reported to the department of periodontology with a chief complaint of growth on the left

side of the tip of the tongue. The past medical and dental histories were not relevant. On examination, the patient's blood pressure was 120/90 mm Hg, pulse rate was 60/min, respiratory rate was 18/min, and the patient was afebrile with a temperature of 37.8°C. The solitary growth was seen approximately 4 months ago. It was initially small in size but had increased gradually to the present size (5 mm × 5 mm). The growth was firm, non-tender, and pale-pink with an intact surface and sessile base (Fig. 1a). The local lymph nodes were not palpable. Based on the clinical findings, a diagnosis of fibroma was made.



Figure 1: (a) Fibrous swelling on the tongue; (b) Surgical area immediately after the excision; (c) Postoperative view – excisional biopsy (d) Postoperative view-2 week after surgery

As the location of growth was on a highly vascular organ, i.e., tongue, it was decided to excise the growth using Diode lasers. The blood profile was normal. Local anesthesia (LA) with adrenaline (1:100,000) was administered. The lesion was held with a tissue forceps and excised completely from the base using Diode laser (Photon Plus Dental Diode Laser, Zolar Tech and Mfg. Co. Inc, Germany) (Fig. 1b). The laser was used at 960 nm wavelength with the power of 1 W in a continuous mode using a 0.4-mm fiber tip diameter. The patient did not have any intraoperative discomfort. The bleeding was minimal and there was no need for suturing.

The patient was given postoperative instructions and the surgical area was allowed to heal by secondary intention. The excised specimen was sent for histopathological examination which revealed hyperplastic parakeratinized stratified squamous epithelium. The connective tissue showed dense collagen fibers and several small-sized vessels with very few chronic inflammatory cells. The final impression was fibrous hyperplasia (Fig. 1e). The patient was followed up after 1 week. After 1 month, the area showed excellent healing (Fig. 1c and d).

Case 2

A 58-year-old male patient reported to the department of periodontology with a chief complaint of swelling on gums in the upper anterior teeth region for the last year. The past medical history was not relevant but the patient gave a history of toothbrush trauma. On examination, the patient's vitals were in the normal range. The blood pressure was 110/70 mm Hg, pulse rate was 74/min, respiratory rate was 16/min, and the patient's temperature was 38°C. Initially, the swelling was small but had increased gradually to the size - 4 mm × 7 mm. The growth was non-tender and pink colored. The superficial surface was intact. The lesion had a sessile base with a soft consistency. The probing depth was approximately 3 mm in relation to tooth #11 and #21 (Fig. 2a). Clinically, a diagnosis of pyogenic granuloma was made. The differential diagnosis included fibroma, peripheral ossifying fibroma, peripheral giant cell granuloma, neurofibroma, and giant cell fibroma.

It was decided to excise the overgrowth using a diode laser. Her blood investigations did not show any abnormality. Under LA with adrenaline, the tissue was excised and the periodontal dressing was placed (Fig. 2b and d). The patient was reviewed after 1 week. The area showed satisfactory healing (Fig. 2e). The histopathological examination revealed parakeratinized stratified squamous epithelium with underlying connective tissue showing numerous dense bundles of collagen fibers with many plump fibroblasts. Few proliferating blood vessels and inflammatory cells were seen. The wound healed with secondary intention without scarring (Fig. 2f).

3. Discussion

Intraoral fibroma, also known as irritation fibroma or traumatic fibroma, constitutes a group of hyperplastic lesions that occurs in response to local trauma or tissue injury. Approximately, 60 percent of the fibromas appear in the upper jaw and almost half of them involve the incisor-cuspid region [1,4,9]. In the present case series also, the lesions had occurred in the common sites of occurrence. The clinical features also matched with the earlier reported cases [4,9].

Conventionally, the excision of fibromas is done using surgical blades, electrosurgery, or cryosurgery. However, these methods have limitations such as intraoperative bleeding, pain during the procedure, delayed wound healing, and post-surgical discomfort to the patient. With the advent of lasers, the scenario of surgical treatment has changed. Today, diode lasers are effectively used for the excision of

intraoral lesions with minimal intraoperative and postoperative problems [6,7].



Figure 2: (a) Soft tissue swelling on gingiva in relation to #11 #21; (b) intra operative view (c) Surgical area-immediately after excision; (d) Postoperative view-1 week after surgery

In the present case series, it was shown that the excision with lasers reduced the intraoperative time and healing was faster. The postoperative period was uneventful and complete healing occurred within a couple of weeks. Similar cases of irritational fibromas on different areas in the oral cavity were reported by Pai et al. [6]. In this case series, the fibromas were excised from the buccal mucosa, palate, and buccal gingiva. All the two cases showed that with lasers, there was a clean and fast cut with good hemostasis and excellent healing without the use of periodontal dressing. In the first case reported in this case series, the fibroma was on the tongue which would have made the placement of periodontal dressing impossible. Furthermore, suturing the wound would cause discomfort to the patient in the postoperative healing phase. Hence, the use of laser for excision benefitted the patient and the operator as the bleeding during the procedure was minimal.

Bakhtiari et al. also reported the effective and beneficial use of diode laser in the excision of irritation fibroma lesion from the retromolar pad region. In their case, the large fibroma was excised using laser and scalpel from the posterior part of the oral cavity which is usually difficult to access [2]. A case reported by Jain et al. regarding the excision of irritational fibroma on the mandibular labial gingiva showed that a diode laser is a simple and safe tool for excision of such oral lesions. They concluded that lasers cause less damage to the adjacent tissues and provide good visibility [9]. Ayoub and Negm reported the excision of fibroma from the cheek mucosa region. They reported that due to the use of lasers, the procedure was painless and healing occurred faster and was uneventful. They concluded that diode lasers can benefit dental patients as well as dental professionals as it minimizes blood loss and patient discomfort [10].

In this case series, the provisional diagnosis for the second case was pyogenic granuloma. However, on histopathology examination, it was revealed to be a fibroma. Thus, the importance of histopathological testing cannot be overruled. Similarly, in the case reported by Vujhini et al., the authors

could confirm the diagnosis upon the histopathological examination [11].

Conventional surgery using a surgical blade has many drawbacks such as intra- and postoperative bleeding, swelling, scarring, pain in the postoperative period, and a longer healing period. However, with diode lasers these drawbacks can be overcome. They provide multiple benefits such as instant sterilization, decreased bacteremia, reduced postsurgical edema, minimal scarring, reduced mechanical trauma, minimal wound contraction, and increased patient's satisfaction. It can be used effectively in difficult to reach areas, for large lesions, and also for lesions where excessive bleeding is predicted. However, they are expensive and technique sensitive as their inadvertent use can lead to tissue trauma. However, in experienced hands, they can prove to be a boon as they are minimally invasive.

4. Conclusion

The diode laser is an effective tool for the excision of intraoral fibroma as it is least traumatic to the patient. It provides multiple benefits to dental professionals and hence, can be considered as a safe tool for minimally invasive dentistry.

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