

Case Report

Diode Laser for Excisional Biopsy of Combined Gingival Enlargement: A Case Report

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Abstract

Gingival health is influenced by multiple local and systemic factors. One of the most commonly occurring lesions in the oral cavity is Inflammatory Fibrous Hyperplasia. These are reactive hyperplastic lesions that represent a reaction to underlying irritant or low-grade injury like mastication, entrapped food, dental calculus, fractured teeth, overhanging flanges of dentures, overhanging dental restorations along with certain iatrogenic factors. Diagnosis of any such lesions is based upon co-relation of clinical and radiographic features, but histopathological diagnosis is the fundamental basis for final diagnosis. Scalpel is always the first line of treatment, nowadays lasers are found to be superior alternative to treat such lesions. Irradiation with lasers provides precise incision with minimal use of local anaesthetic, concomitant coagulation, causes rapid haemostasis with added anti-inflammatory action, reduces the size of scar formation due to minimal mechanical trauma to the underlying tissues and decreasing other post-operative infections. Thus, the substantial potential of lasers, with its undiscovered limits, may provide a reliable path to treat such recurrent lesions in medically compromised patients.

Keywords: Inflammatory fibrous hyperplasia; Diode laser; Excision; Excisional biopsy; Combined gingival enlargement; Dentistry

Introduction

Inflammatory Fibrous Hyperplasia (IFH) is one of the most commonly encountered reactive soft-tissue lesions in the oral cavity [1,2], having predilection for the gingiva, cheek mucosa, lips and palate [3].

Etiology behind such lesions could be any injury caused during mastication, hard flecks of dental calculus impinging on gingiva, sharp edges of fractured teeth, overextended flanges of complete dentures exerting excessive pressure, overhanging dental restoration margins, ill-fitting dentures, diastema, sharp-edged teeth, smoking, iatrogenic complications and poor oral hygiene [4-8].

IFH is more prevalent in women than in men, while the predominant lesion site is the buccal sulcus with peak incidence occurring most commonly in the fifth decade of life [9-12]. Diagnosis of such lesions is carried out by correlating their clinical features with radiographic images and histopathological appearance [13].

Surgical resection of the lesion is always the first treatment of choice for IFH. In addition, removal of the etiological factors ensures successful treatment. It can also be treated with electrosurgery,

cryotherapy, chemosurgery and with variety of lasers like Diode laser, CO₂ laser, Nd: YAG, Er: YAG, Er: YSGG etc., [10,14,15].

Diode laser is the FDA approved most commonly used laser in oral surgical procedures. This laser is not known to penetrate in the deeper layers of the epithelium and hence, the wound created by diode laser irradiation is quite superficial. A few chemical mediators of inflammation like histamines, serotonin, TNF- α , leukotrienes, interleukins, etc are also released from the lased wound compared to the surgical wounds which help in better healing [16-18].

In the immediate postoperative period, the laser irradiated wound results in intermediate healing by crust formation (dry in skin, wet in mucosa) along with formation of inorganic tissue or even charred tissue with bright yellow or whitish areas [19,20].

We report a case of excision of inflammatory fibrous hyperplastic lesion of the oral mucosa area using an 810 nm diode laser and provide a review of the literature with particular emphasis on the use of lasers in treating such lesions in medically compromised patients.

Case Presentation

A 70 year old patient, reported to the Department of Periodontology with the chief complaint of a slowly growing enlargement in the lower left region of the jaw since 6 to 7 months.

The enlargement was initially smaller in size which gradually increased to the present size and caused difficulty in mastication and also resulted in food lodgement. There was no pain associated with the enlargement. Patient was hypertensive since 24 years and was on-Tab Nocardia-20, Tab Atenolol-50, Tab Valent-40, Tab- Shelcal-OS, Cap-Coladex, Cap Ecosprin-AV-75/10 mg. Patient had undergone dental extractions in the same region one year ago and on routine radiographic examination, a root piece was detected in the same region (Figures 1-3).

Intraoral examination showed a partially movable, pale-pink, smooth tri-lobed enlargement with irregular borders which was firmly

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Figure 1: Clinical picture before treatment (occlusal view).



Figure 2: Clinical picture before treatment (lateral view).



Figure 3: Intra-Oral measurements of the enlargement.

adherent to the underlying mucosa. The mesio-distal dimensions of the enlargement were 20 mm while bucco-lingual dimensions were 9 mm beginning from distal of left canine, not extending in to the vestibule. There was no purulent discharge noted in the region of the enlargement and considering the medical condition, laser was preferred over scalpel.

The initial line of treatment was Phase I therapy included ultrasonic scaling and root planning followed by a 2 weeks of maintenance with proper brushing techniques and patient was advised oral mouth rinse of 0.12% chlorhexidine mouthwash twice a day for a week. Routine haematological investigations were performed and a written informed consent was obtained from the patient. Patient was asked to discontinue anti-platelet drug 5 days prior to the surgical procedure with the fitness certificate duly signed by the physician.

In the surgical phase, local anaesthesia (2% lignocaine hydrochloride) was infiltrated in the adjacent tissues. The 810 nm diode laser was used to surgically excise the enlargement from the base. The settings of the 810 nm diode laser were 2.8 W with continuous wave in a focussed mode with a fibre tip of 400 nm. High evacuation suction was used to contain the laser plumes which were formed during the procedure. Patient was recalled for assessment of healing at one week, and the healing was found to be uneventful.

During the entire surgical procedure, complete laser safety protocol was followed such as protective eyewear along with aseptic surgical conditions. The excised tissue was kept in formalin (10%) and was further sent for histopathological examination. At the end of laser irradiation session, the patient was referred for extraction of the residual root fragment and subsequent oral rehabilitation, along with replacement of drug for hypertension which could be one of the possible reasons for gingival enlargement (Figures 4-8).



Figure 4: Laser beam in position at the base of the enlargement.



Figure 5: After complete excision.

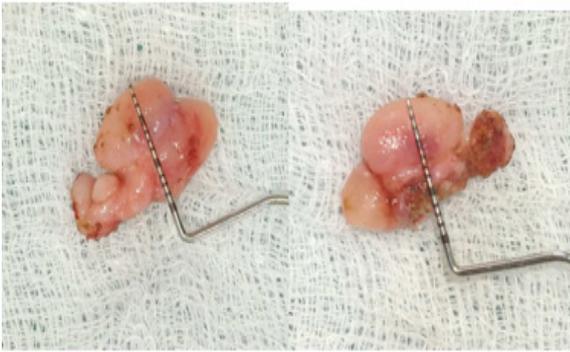


Figure 6: Bucco-lingual dimensions of the enlargement.



Figure 7: Mesio-distal dimensions of the enlargement.

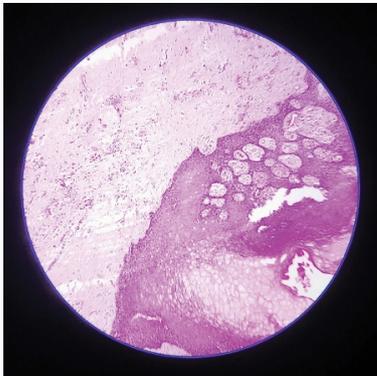


Figure 8: Histopathology images (10x) - inflammatory fibrous hyperplasia.



Figure 9: Pre-operative radiograph.



Figure 10: Post-operative radiograph.

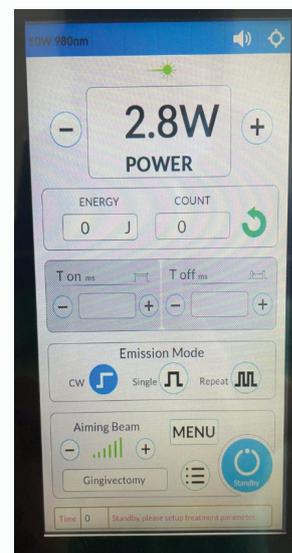


Figure 11: Diode laser settings image.



Figure 12: Post-operative clinical pictures (1 week, 3 weeks, 15 weeks).

Provisional diagnosis

On the basis of the patients underlying medical history and clinical features, a clinical diagnosis of Nifedipine- induced gingival overgrowth compounded with underlying root piece with local factors was made.

Differential diagnosis

Traumatic fibroma, Reactive fibromatosis gingivae, Angiogramuloma.

Histopathology

The Haematoxylin and Eosin section revealed hyperkeratotic



Figure 13: Extraction fragment of root piece.

stratified squamous epithelium which is hyperplastic. The underlying connective tissue stroma is composed of dense collagen fibre bundles interspersed with fibroblasts. Foci of dense chronic inflammatory cell infiltrate chiefly composed of lymphocytes and plasma cells can be seen. Numerous dilated and engorged blood vessels, areas of haemorrhage can be noted. Overall findings are suggestive of “Inflammatory fibrous hyperplasia”.

Final diagnosis

The final diagnosis based on co-relation of clinical and histopathologic findings is Inflammatory Fibrous Hyperplasia.

Discussion

Inflammatory fibrous hyperplasia is a benign soft tissue lesion caused due to underlying local irritants [21-22].

In the present case report, an inflammatory hyperplastic lesion in the mandibular premolar-molar region of a 70 year old medically compromised male was excised with an 810 nm diode laser.

Removal of the underlying etiology is the preferred treatment for Inflammatory hyperplastic lesions, followed by surgical resection, which can be performed using either a conventional scalpel technique, electrocautery, cryotherapy or laser [7,16,17].

The underlying etiology behind this inflammatory fibrous hyperplastic lesion could be underlying retained root piece, which was extracted after the excision of the lesion to prevent the recurrence.

Considering the medical condition of the patient, laser was preferred over scalpel in this case. Jaimes et al. [23] in 2008 carried out a case study, in which, they used surgical scalpel for excision of denture induced inflammatory fibrous hyperplasia. Fixation of the prosthesis was carried out in this study for the support of tissues during healing period which resulted in better healing. Thus, the authors concluded surgical resection could be one of the most promising modalities in treatment of inflammatory fibrous hyperplasia.

Eliades et al. [24] in 2010 carried out a case study using 808 nm diode laser for excision of fibroma. The laser irradiation was carried out using 808 nm diode lasers having optical fibre of 300 µm at 1100

mW in continuous output. Also no sutures were required due to laser irradiation which also declined the risk of post-operative infection. Thus, the 808 nm diode laser proves to be a better option in excision of such inflammatory lesions.

Another split-mouth study was conducted by Cayan et al. [25] in 2018, in which they compared efficacy of diode laser surgery with scalpel surgery in the removal of Inflammatory Fibrous Hyperplasia (IFH). Total 22 patients were recruited for this study. The diode laser was adjusted at following settings: 400 µm-fiber tip, 808 nm continuous wavelengths, 10 Hz pulse frequency, and 2W power for ~4 sec × 60 sec. One side of hyperplastic enlargement was randomly treated with scalpel blade while the other one was treated with diode laser. Peri-operative bleeding, post-operative pain, wound healing and bacterial counts were evaluated post treatment. The results showed, bleeding on the site treated with diode laser was found significantly lower compared with the site treated with scalpel. A significant reduction in total bacterial counts was observed in the laser group after the first post-operative day. No significant differences were observed in postoperative pain evaluation between both the groups. The healing of the postoperative wounds was significantly faster in the surgical site group. Thus, authors concluded, diode laser proved to be better in treatment of Inflammatory Fibrous Hyperplasia (Figures 9-13).

Katara et al. [26] 2021 carried out a case study on excision of irritational fibroma using diode laser. A 15 year old male subject presented with an ill-defined overgrowth on the gingiva which was diagnosed as an irritational fibroma due to presence of calculus. The overgrowth was excised using biolase laser in excision mode at 1200J/s and at 940 nm wavelength. Healing was noted uneventful postoperatively. The advantages of laser over scalpel are minimal anaesthesia, rapid hemostasis, precise excision, concomitant coagulation, less postoperative complications, healing without scar formation. Thus, the authors concluded use of biolase diode laser was found beneficial over scalpel in treating lesions like irritational fibroma.

As a result, this case report supports the superiority of the 810 nm diode laser in comparison over conventional scalpel surgical treatment because of its advantages and satisfactory results.

Conclusion

Thus, the 810 nm diode laser proves to be an excellent non-invasive option in oral surgical procedures. The primacy of diode laser is that it provides a precise excision, maintenance of adequate hemostasis throughout the procedure, no need of suturing, better post-operative wound healing, reduced post-operative time compared to conventional surgeries and less or no post-surgical pain. However, it is mandatory to know the specific functions and prop-erties of lasers in order to utilize their potential and adapt to the present situation using newer safety recommendations. Thus concluding, the authors recommend use of 810 nm diode laser over scalpel in treatment of such inflammatory lesions in medically compromised patients and can be used routinely for such inflammatory lesions.

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