

Case Report

Minimally invasive laser assisted excision of pyogenic granuloma

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ABSTRACT:

Pyogenic Granuloma (PG) is a type of inflammatory hyperplasia seen in the oral cavity. It is a response in reaction to minor trauma or chronic irritation. Also, various treatment techniques have been described for the management of PG. Although the most common treatment advised for PG is surgical excision. Alternative approaches such as laser-assisted excision have also been recommended, especially for pediatric patients. The present case describes a minimally invasive laser-assisted excision of pyogenic granuloma is done in a 5-year-old male patient reported with a chief complaint of a lesion on the gingiva of the left lower primary second molar for one month. On through clinical examination and based on clinical findings, A provisional diagnosis of pyogenic granuloma is given. Excision is done using a diode laser, and the specimen was sent for histopathological examination, which suggested a definitive diagnosis as pyogenic granuloma.

Keywords- Pyogenic Granuloma, Minimally Invasive, Lasers

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HIGHLIGHTS OF THE STUDY

- This case report enlightens the novel usage of lasers in the removal of soft tissue lesions with ease and instilling an excellent behavioral attitude in children
- Conservative management is the mainstay management of behavior in children. Lasers are minimally invasive with fewer post-op complications.
- This method shows a promising result and can be used in some selective cases.

INTRODUCTION

Pyogenic granuloma (PG) is a common, acquired, benign vascular reactive hyperplasia of the skin or mucosa.¹⁻³ Hullihen first described it in 1844, and Hartzell introduced the term pyogenic granuloma or granuloma pyogenicum in 1904.^{4,5}

PG is considered a reactive tumor-like lesion, which arises in response to various stimuli such as chronic low-grade local irritation, traumatic injury, hormonal factors, or certain drugs.⁶ Agulio reported PG's

formation due to injury to a primary tooth, and Milano et al. reported PG's case associated with aberrant tooth development.^{7,8} It has been stated that even eruption of teeth can be a precipitating factor of pyogenic granuloma development.^{9,10}

PG's most frequent intra-oral site is the marginal gingiva, but lesions also occur on the palate, buccal mucosa, tongue, and lips. Extraorally, it has been reported on the skin of the face, neck, upper and lower extremities, and mucous membrane of the nose and eyelids.^{2,11} PG may occur in all age groups. The peak age of incidence is usually the second decade of life, although some investigators have reported children's preference. It is also more common in young adult females because of female hormones' vascular effects.⁶ Clinically, an oral PG appears as a tumor-like, painless, exophytic mass with erythematous papules that tend to bleed easily, and sizes ranging from a few millimeters to a few centimeters have been reported.³ The color of the lesion may vary according to the level of vascularity.¹¹

Various treatment techniques have been described for its management. Conservative surgical excision and removal of the causative irritant or source of trauma are the usual treatments. Also, cauterization with silver nitrate, cryosurgery, sclerotherapy, Nd: YAG (Neodymium- Doped Yttrium Aluminium Garnet), and CO₂ (Carbon Dioxide) laser as well as laser photocoagulation have been proposed for treatment^{6,11}.

The advantages of laser surgery compared to conventional surgical methods includes the maintenance of sterile conditions, good estimation of cutting depth, reduction in the number of operative instruments, often no need for suturing or bandages, pain reduction both intra- and postoperatively, promotion of wound healing, fewer scars, staff and time.¹² In this report, we present the successful application of diode laser in the context of a large pyogenic granuloma.

CASE PRESENTATION/CASE REPORT

A 5-year-old male patient reported to OPD with a chief complaint of a lesion on the gingiva of the left lower primary second molar for the past one month, which was first noticed two weeks ago and had gradually increased in size. The parents stated that the child had undergone a pulpectomy procedure of the first and second deciduous molars one month ago. Medical history was not contributory.

On clinical examination, a solitary sessile, exophytic mass, red in color and soft in consistency, about 3×1cm in diameter, was observed along the buccal gingiva of 1st and 2nd primary molars(Fig 1).

Fig 1: lesion irt – 74 75



The lesion appeared lobulated with a smooth surface and bled on palpation. Based on the above clinical findings, a provisional diagnosis of pyogenic granuloma was made.

Written informed consent was obtained from the patient's parents for excising the lesion by diode laser. The patient and the operating dentist, along with the assistant, wore protective glasses during the procedure. Local anesthesia was achieved by infiltration.

Diode laser model: DenLase-810/7 (Diode Laser Therapy System, China) at 810 nm wavelength and continuous wave mode with a power output of max 7 watts and a 0.4-mm diameter fiber optic was set for excising the lesion (Fig 2).

Fig 2: Diode laser



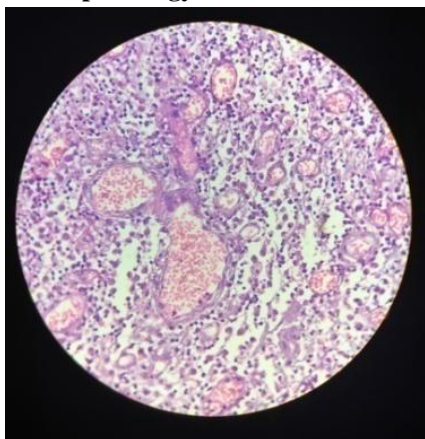
The tip was directed at an angle of 30 to 45 degrees, moving around the base of the lesion in a circular motion(Fig 3).

Fig 3: Excision of lesion



It took 5 minutes to complete the procedure. The diode laser provided an optimum combination of clean cutting of the tissue and hemostasis. The patient was discharged with the necessary post-operative instructions to maintain good oral hygiene and keep the area clean. No additional analgesic or antibiotics was recommended.

The specimen was stored in formalin Buffer Solution 10% and sent for histopathological examination. Histopathological view of the specimen stained by Hematoxylin and eosin showed a soft tissue fragment covered by Para keratinized stratified squamous epithelium, which was ulcerated and replaced by fibrinoleukocytic membrane in some spaces. The proliferation of multiple blood vessels, hemorrhage, and inflammatory cell infiltration was also seen in the connective tissue. The characteristics confirmed the diagnosis of PG (Fig 4).

Fig 4: Histopathology 40x

The patient did not complain of any discomfort during and after the procedure. After 21 days, the patient revisited, and the healing process was desirable after a follow-up of 3 months (Fig 5 & 6).

Fig 5: 3 weeks follow up**Fig 6: Post-op 3 months follow up**

DISCUSSION

Hyperplastic reactive lesions, which include inflammatory gingival hyperplasia, peripheral giant cell granuloma, peripheral cemento-ossifying fibroma, and oral pyogenic granuloma, are among the most common oral lesions.^{6,13}

Oral PG is a typical reactive lesion that can appear at any age but is frequently seen in patients between the age of 11 and 40.¹⁴ Although a wide age range (4.5 to 93 years old) has been postulated for oral PG, the highest incidence in the 2nd decade of life.⁶ Unanimously, it is agreed that PG is formed in response to various stimuli such as traumatic injuries, chronic low-grade local irritation, and certain kinds of

drugs. Injury to the primary tooth, aberrant tooth development, and even eruption of teeth also have been mentioned in the literature as precipitating factors for PG development.^{6,9,10} In the present case, it is associated with chronically inflamed first and second deciduous molars, along with low-grade infection could have been the predisposing factors.

Clinically, PG is a smooth or lobulated exophytic lesion with small, erythematous papules on a pedunculated or sessile base. It bleeds easily and proliferates, and its size rarely exceeds 2.5 cm and is generally asymptomatic and painless.⁶ The surface is often covered by fibrin and is ulcerated and friable due to masticatory trauma.¹³ Depending on the lesion's age, the color of the surface ranges from pink to red or purple. Young PGs have higher vascularity and hyperplastic granulation tissue, while older PGs have more collagen.⁶

Differential diagnosis mainly includes vascular tumors like haemangioma, oral fibroma, peripheral giant cell granuloma, peripheral ossifying fibroma, or neoplastic lesions like Kaposi sarcoma, metastatic carcinoma, and other malignant tumors.^{15,16} Conservative surgical excision and elimination of causative irritant is the usual treatment. Also, cryosurgery, sclerotherapy, cauterization with silver nitrate, Nd: YAG, and CO₂ laser and laser photocoagulation have been proposed as treatment options.^{6,11}

Laser therapy advantages include minimal post-operative pain, conservative site-specific minimally invasive surgeries, and elimination of sutures' need. Patients with no adverse effect well tolerate laser excision.¹⁷ In a case report by Kocaman *et al.* where Nd: YAG laser was used to treat PG, bleeding time and operating time were reduced during surgery. Also, rapid post-operative hemostasis was achieved, and no scarring and discomfort were observed.¹⁸ Rai *et al.* introduced laser as a powerful tool for the treatment of pyogenic granuloma.¹¹

Also, diode lasers have the ability to cut the tissue to perform coagulation and hemostasis and have a higher tissue ablation capacity and enough bleeding, hemostatic properties compared with most laser systems.¹⁹ It has also been documented in various studies that laser creates locally sterile conditions, which would result in the reduction of bacteremia concomitant to the operation field.²⁰ From another perspective, laser application in oral soft tissue surgery for pediatric patients, would result in less stress and fear in patients.²¹ The patient did not complain of any discomfort after or during the procedure.

CONCLUSION

The diode lasers can be used as an alternative method to the conventional scalpel method with the superiority of causing no discomfort and no complications with good wound healing in children. For soft tissue surgeries, such as removing pyogenic

granuloma would lessen stress and fear of pediatric patients and minimize discomfort during and after surgery.

CLINICAL SIGNIFICANCE

The use of lasers in children is a boon as they aid in their behavior management. The inherent advantages of laser-like local analgesia, bloodless surgical procedures, and no discomfort during the healing period make children more cooperative toward future dental treatment.

CONFLICT OF INTEREST STATEMENT

The authors disclose no potential conflicts of interest.

ETHICS STATEMENT

The procedure was explained to the parents, and written consent was obtained for the treatment and publication of the case report.

INFORMED CONSENT

Written consent was taken for the participation of both parents and children in the study.

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