

Surgical Removal of Recurred Pyogenic Granuloma Using Diode Laser in a Pediatric Patient: A Case Report

Dr. Nehal Ahmad^{1*}, Mahendra Kumar Jindal², Saima Yunus Khan³, Dr. Imam Azam³, Dr. Mohammed Atif⁴

¹Resident, Department of Pediatric and Preventive Dentistry, Dr. Ziauddin Ahmad Dental College, A.M.U, Aligarh, India

²Professor, Department of Pediatric and Preventive Dentistry, Dr. Ziauddin Ahmad Dental College, A.M.U, Aligarh, India

³Assistant Professor, Department of Pediatric and Preventive Dentistry, Dr. Ziauddin Ahmad Dental College, A.M.U, Aligarh, India

⁴Assistant Professor, Department of Pediatric and Preventive Dentistry, Dr. Ziauddin Ahmad Dental College, A.M.U, Aligarh, India

DOI: [10.36348/sjodr.2024.v09i04.001](https://doi.org/10.36348/sjodr.2024.v09i04.001)

| Received: 08.03.2024 | Accepted: 12.04.2024 | Published: 15.04.2024

*Corresponding author: Dr. Nehal Ahmad

Resident, Department of Pediatric and Preventive Dentistry, Dr. Ziauddin Ahmad Dental College, A.M.U, Aligarh, India

Abstract

A pyogenic granuloma is an exophytic inflammatory lesion that can develop in the oral cavity. It is a benign proliferation of capillary blood vessels which causes it to bleed easily. It can often cause difficulty in mastication and trouble in performing oral hygiene procedures. The primary course of treatment is surgical excision combined with meticulous curettage of the surrounding tissues and the elimination of the causing factor. The present case is of a nine-year-old boy who complained of a recurrent swelling in the lower front teeth region. After making clinical diagnosis of pyogenic granuloma, diode laser was employed for its excision. There was favorable healing within a week and no-recurrence was seen in one year follow-up. Diode lasers can be utilized for minimally invasive operations that cause less discomfort to patients, improved hemostasis, and no need for suture. This paper describes the successful use of diode laser for excising a recurrent pyogenic granuloma with a detailed description of clinical, radiographic, and histopathologic features.

Keywords: Lobular capillary hemangioma, Large oral pyogenic granuloma, Minimally invasive surgery, Pediatric patient, Diode laser, Laser surgery.

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INTRODUCTION

Pyogenic granuloma (PG), also known as lobular capillary hemangioma, is a type of benign vascular tumor caused by inflammatory hyperplasia of the mucosa or the skin. The term pyogenic granuloma can be misleading because it is neither histologically composed of giant cells nor related to pus formation [1]. It is characterized by proliferative vascular channels, immature fibroblastic connective tissue, and dispersed inflammatory cells [2]. It could be caused by stressors like long-term localized irritation, trauma, hormonal activity, and medications [3]. Seen frequently on the attached gingiva followed by palate, floor of the mouth, lips, tongue and buccal mucosa [4]. It is typically smooth, lobulated, and raised vascular mass occasionally ulcerated. The size of PG ranges from 0.5-1 cm in diameter, occasionally reaching 2.5 cm [5]. Depending on the vascularity, color ranges from deep red to reddish purple [4]. The differential diagnoses include peripheral giant cell granuloma, traumatic fibroma, mucocele,

metastatic carcinoma, and other malignant tumors, although, only histological evaluation can provide a definite diagnosis [6]. Treatment of PG includes surgical excision with meticulous curettage of the surrounding tissues, using a variety of treatment strategies like electric cauterization, lasers, etc [5]. Lasers have emerged as a promising therapy for such lesions due to its benefits like quicker and painless aseptic procedure with minimal bleeding and discomfort, along with elimination of sutures [7]. This report describes the diode laser excision of a large pyogenic granuloma stretching from the lingual gingiva to the floor of the mouth and interdental reaching the lower labial gingiva.

CASE DESCRIPTION

A nine-year-old male patient reported to the department of Pediatric Dentistry with a chief complaint of swelling in the lower front teeth region since three months, which caused difficulty in mastication and bled while brushing. There was a history of excision of

swelling at the same location six months ago at a local dental practitioner, which recurred after one month, leading the patient to the department. There was no significant medical history, and the patient appeared healthy. The extra-oral examination shows straight profile with no extraoral swelling/asymmetry or any lymphadenopathy however intraoral, the lesion appeared as an exophytic, solitary lesion with a lobular contour and glossy reddish surface measuring approx. 2.5 cm in diameter; located in the anterior lingual region and

inserted through a pedunculated base on the lingual gingiva. It was extending from 32 through 42 (Fig 1A) and well into the floor of the mouth lingually and at the buccal gingiva by crossing the interdental space between 31 and 32 buccally (Fig 1B). On palpation, the mass had a soft and compressible surface and was non-tender. Abundant stains and calculus were also noted. Mandibular occlusal radiograph was obtained, which showed no bony involvement of the lesion (Fig 2).

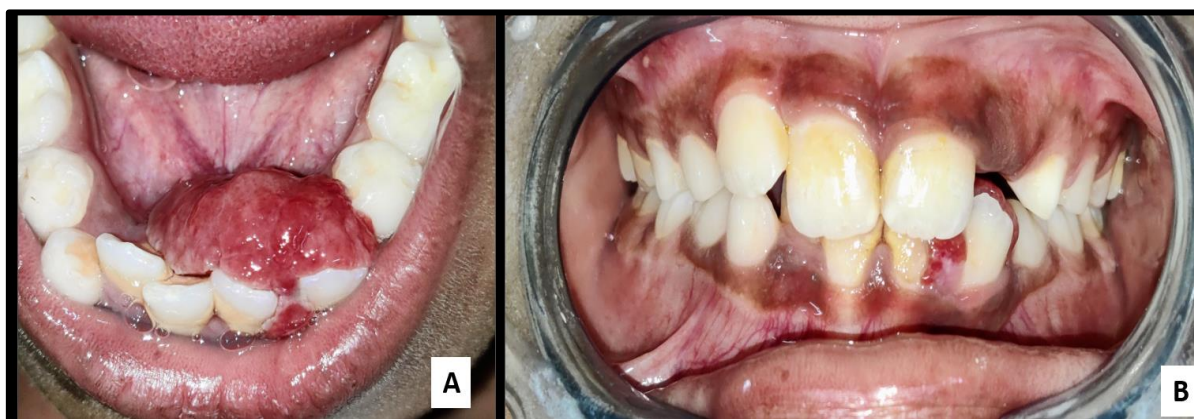


Fig 1(A): Exophytic mass with lobular contour and glossy-red color (approx.2.5 cm diameter) (B) Mass extending buccally through interdental space between teeth #31 and 32



Fig 2: Mandibular occlusal radiograph showed no bony involvement

Taking into consideration the clinical features, the clinical diagnosis of PG was made. After discussing the possible treatment plans, it was decided to opt for diode soft tissue laser for its excision. Patient's parents were explained briefly about the treatment, and consent was obtained. Oral prophylaxis was done at the first visit, along with a request for complete blood count, bleeding time, and clotting time. All reports showed normal results.

During surgery, all practitioners and the patient wore laser eye-protective glasses. Soft tissue diode laser (Elexxion AG®) with 809nm wavelength and 1W power was used (Fig. 3A). Following minimal infiltration of 2% lignocaine hydrochloride with 1:200000 adrenaline, activated laser tip of 400µm was moved in a circular motion in contact mode around the base of the lesion which was held using tweezers (Fig 3B). Non-recurrence of the mass was ensured by curetting the area of approximately 1mm in depth, from where it was excised,

i.e., where the base of PG was attached. It was done for few seconds and in the same laser mode and power. After

excision, the area lingual to mandibular incisors bled slightly and then coagulated within few seconds (Fig 4).

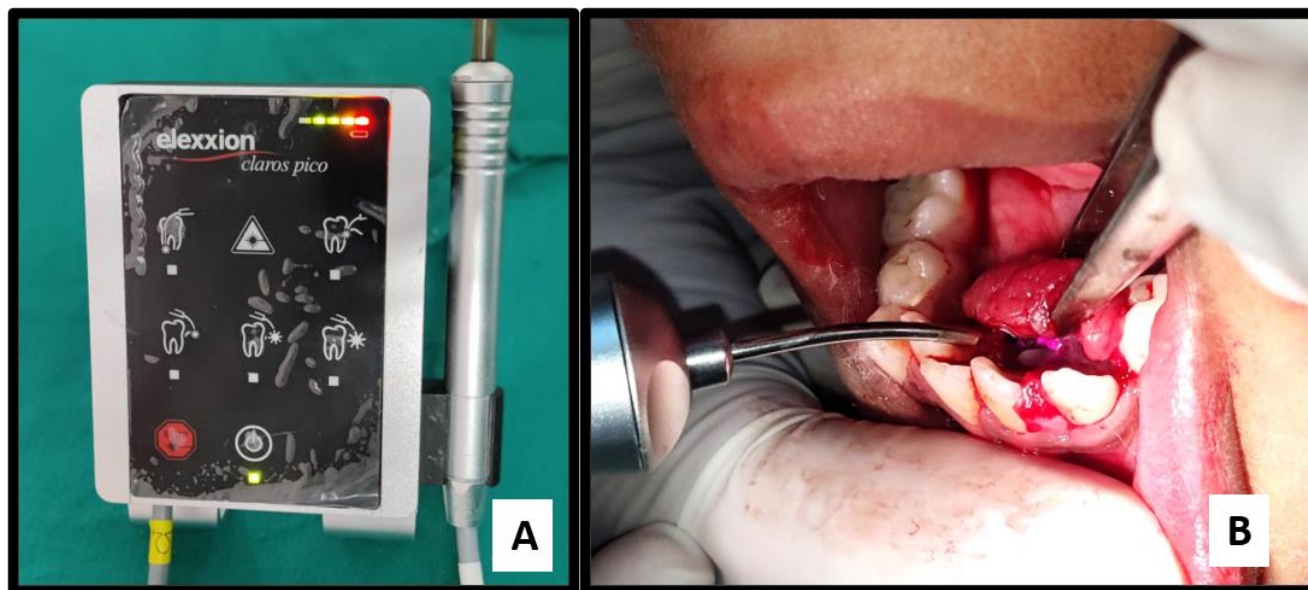


Fig 3: (A) Soft tissue diode laser (Elexxion AG®) with 809nm wavelength and 1W power was used for the surgery (B) Laser tip was moved in a circular motion around the base of the lesion which was held using tweezers



Fig 4: Photograph taken immediately after excision showed that hemostasis was achieved within few seconds of excision

The hemostasis was achieved adequately, and the site was cleaned with betadine-drenched gauze. No sutures were needed. Antibiotics and non-steroidal anti-inflammatory drugs were not prescribed. After excision, abundant calculus present in the lingual surface of lower anterior teeth was observed, which could be the probable reason of recurrence of this lesion, mentioned in history. Calculus was cleared in the follow up visit. The excised tissue specimen was stored in 10% formalin solution and

then sent for histopathological examination immediately (Fig 5A); H&E-stained section of which revealed multiple lobules lined by endothelial cells filled with varying amount of capillary-sized blood vessels along with proliferation of acute and chronic inflammatory cell infiltrate and areas of fibrous connective. These findings confirmed the diagnosis of pyogenic granuloma (Fig 5B).

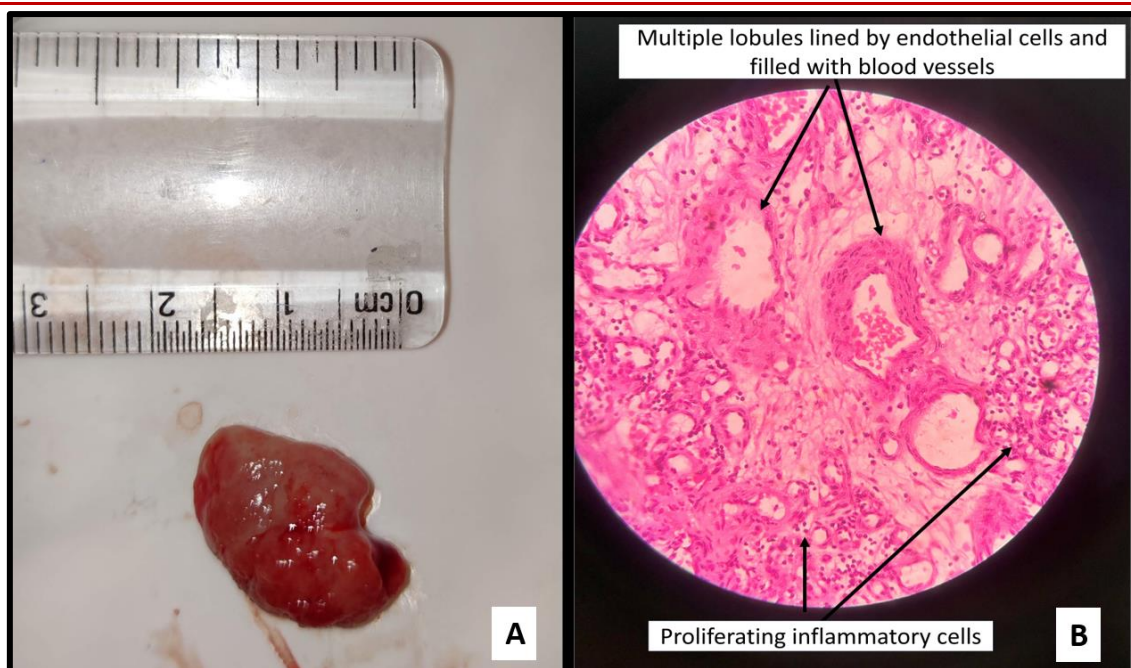


Fig 5: (A) Excision of mass done using 809 nm diode laser, (B) Histopathological report revealed multiple lobules lined by endothelium cells and presence of blood vessels along with proliferation of inflammatory cells confirming pyogenic granuloma

Patient was instructed to eat only soft and cold foods for few days. Instruction to continue proper oral hygiene by brushing twice daily was strictly reinforced. Patient and parents were advised for regular follow-up visits for clinical evaluation. Patient was called after 48 hours (Fig. 6A) to check for the healing process, which was found to be ongoing and favorable. On follow-up

visit of first week, the healing was found satisfactory after which oral prophylaxis was performed (Fig 6B). Follow up visits of twelve months showed no recurrence (Fig 6C, 6D). After excision, the lower anterior crowding became more apparent, patient was informed and advised for its treatment but patient did not give consent for the same.

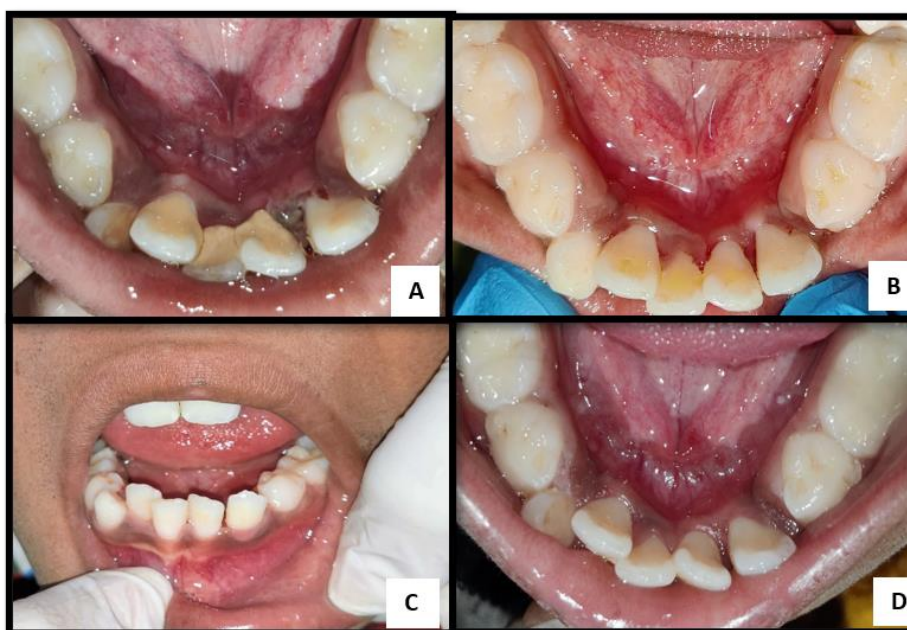


Fig 6: (A) 48-hours post-operative photograph reveals satisfactory ongoing healing. (B) 1-week post-operative photograph taken after oral prophylaxis reveals favorable healing (C) 12-months follow-up photograph (labial view) shows no recurrence of the mass with good oral hygiene (D) 12-months follow-up photograph (occlusal view) shows no recurrence of the mass along with good oral hygiene

DISCUSSION

PG is also referred to as capillary hemangiomas of the lobular subtype, which explains why they typically bleed with little to no trauma [2]. It is usually painless, but can spread quickly and interfere with speech, mastication, and deglutition [5]. In this case, the lesion being painless caused bleeding and discomfort during eating, which made the patient seek treatment.

It is caused by localized connective tissue reaction to a mild injury or underlying irritation like calculus, overhanging restorations, cheek biting, etc. This inflammation can promote hyperplastic fibrovascular connective tissue and granulation tissue growth, resulting in its formation [4]. In the present case, the patient had very poor oral hygiene with abundant calculus, suggestive of the triggering factor for PG.

Being highly vascularized, PG might bleed excessively after surgical excision. Several treatments have shown to minimize bleeding during excision; including electric cauterization, laser surgery, cryosurgery, intralesional steroids, absolute ethanol injection, etc [6].

In this case, an 809 nm diode laser was used for the surgical removal of PG to minimize bleeding. Diode lasers are lightweight, portable, and simple to operate [2]. Bansal *et al.*, [8] in their report, highlighted that 980 nm diode laser can be utilized efficiently for the resection of pyogenic granuloma with minimal discomfort during and after surgery. According to Akbulut *et al.*, [9], diode lasers are helpful for soft tissue surgeries because water absorbs light at their wavelength (810-980 nm), as does other chromophores like melanin and oxyhemoglobin.

A case reported by Asnaashari *et al.*, [10] utilizing an 810 nm diode laser in a pediatric patient demonstrated good healing and absence of recurrence after 13 months of its excision. Its usage also reduced anxiety and fear in the patient while minimizing discomfort.

Pisano M *et al.*, [6] utilized a diode laser for surgical excision of a pyogenic granuloma in a pediatric patient and discussed its benefits like being less invasive, avoiding discomfort, achieving effective hemostasis, and improving postoperative management.

Lasers also exhibit bactericidal and decontaminating properties on tissues, therefore prescribing postoperative anti-biotics are often unnecessary. In this case neither anti-biotics nor anti-inflammatory were prescribed to the patient.

In literature, up to 16% recurrence rate of PG after excision has been reported, possible reason being incomplete excision of the mass or failure to eliminate causative factors [12]. The follow up results of this case showed excellent and favorable healing. The area near

the base of the PG after excision was again treated with laser, no recurrence was observed till one year follow up. The irritating factor i.e., calculus was removed and hygiene was reinforced.

Additionally, lasers provide a stress-free dental environment and helps inculcate positive dental attitude in youngsters. Since scalpels and sutures are usually not necessary, stress and fear are reduced during surgical operations [7]. In the present case, the patient did not demonstrate any feeling of pain and anxiety intra-operatively.

CONCLUSION

In this paper, we reported the surgical excision of a recurrent pyogenic granuloma through soft tissue diode laser, in a pediatric patient. This is significant because this technique proves to be minimally invasive without needing post-operative sutures and antibiotics; along with being more acceptable by the young patient. It can be concluded that laser can be used as a therapeutic technique to remove oral vascular lesions such as a pyogenic granuloma in an effective and well-tolerated approach to treatment. Additionally, lasers speed up recovery and enable conservative, site-specific, minimally invasive procedures without the need for sutures and with less intraoperative hemorrhage.

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