

Use of Diode Laser for Surgical Management of Recurrent case Pyogenic Granuloma in a Pediatric Patient: A Case Report

Abstract:

Pyogenic granuloma is a frequently seen primary reactive hyperplasia which is seen in the oral cavity as an overgrowth of tissue due to physical trauma or hormonal factors & irritation. It is a non specific gingival overgrowth seen as a response to underlying irritating factors. Soft tissue enlargements of the oral cavity often present a diagnostic challenge because a diverse group of pathologic processes can produce such lesions. Within these lesions is a group of reactive hyperplasias, which develop in response to a chronic, recurring tissue injury that stimulates an exuberant or excessive tissue repair response. This article aims to present a case of recurring pyogenic granuloma in a 12 year old pediatric patient.

Key-words: Angiogenesis, Granuloma Pyogenicum, Lasers

Introduction:

Pyogenic granuloma (PG) is a common inflammatory exophytic lesion that is usually seen in the oral cavity[1]. The most common cause for the lesion to develop is chronic irritation, which may occur due to “excess” proliferative tissue repair. Dental restorations, infectious agents, trauma, hormonal variables, and dental plaque are the main etiological factors of pyogenic granulomas[2]. Pyogenic granuloma having a prevalence of 1.85% of all oral diseases, according to Bhaskar and Jaco way[3] and Kamal et al[4]. Pyogenic granuloma can occur at any age but is mainly seen in young age group and especially in individuals with poor oral hygiene. The age ranges from 4.5 to 93 years, but it appears to be more frequent in the second decade of life and is more common in females, with a ratio of 2: 1, probably due to the vascular effects of female hormones and is having a greater predilection for the maxillary gingivae (50.23%). Additionally, it is more prevalent in the anterior than the posterior segments on the maxillary gum level compared to the mandibular gum[5].

Pyogenic granuloma manifests clinically as an exophytic tumor with a lobed or smooth surface. Its size can range between a few millimeters and a few centimeters (rarely surpassing 2.5 cm), its color might be pink or red, and it typically has no symptoms[6]. Even after slight touch, the erythematous papule might bleed spontaneously and its base is typically sessile or pedunculated and easily compressible [7]. Pyogenic granuloma manifests on the keratinized gingiva in 75% of the cases and lips, tongue, buccal mucosa, and palate in the remaining 25% of cases[8]. The excised lesion and a subsequent histological investigation are used to

¹MAHENDRA KUMAR JINDAL,

²PRANSHU VARSHNEY, ³ASHI MOHAMED V.N.

¹⁻³Department of Pediatric and Preventive Dentistry
Dr. Ziauddin Ahmad Dental College,
Aligarh Muslim University, Aligarh

Address for Correspondence: Dr. Pranshu Varshney
PG Student

Department of Pediatric and Preventive Dentistry
Dr. Ziauddin Ahmad Dental College,
Aligarh Muslim University, Aligarh
Email: pranshu1581@gmail.com

Received : 22 Sep., 2023, **Published :** 30 November, 2023

Access this article online	
Website: www.ujds.in	Quick Response Code 
DOI: https://doi.org/10.21276/ujds.2023.9.4.12	

How to cite this article: Mahendra Kumar Jindal, Pranshu Varshney, & Ashik Mohamed VN. (2023). Use of Diode Laser for Surgical Management of Recurrent case Pyogenic Granuloma in a Pediatric Patient: A Case Report. UNIVERSITY JOURNAL OF DENTAL SCIENCES, 9(4). 57 -61

determine the final diagnosis. Other exophytic lesions with a similar appearance may also be considered during differential diagnosis, such as peripheral giant cell granuloma, traumatic fibroma, hemangioma, Kaposi sarcoma, mucocele, metastatic carcinoma, and other malignant tumors.

Excision of pyogenic granulomas has been performed using a variety of surgical methods. The criteria standard of care is believed to be conservative surgical excision with a cold blade and removal of the irritant or trauma source that caused the condition[9]. Pyogenic granuloma, however, can bleed excessively during surgical excision techniques since it is typically a highly vascularized lesion. Other methods, such as cryosurgery, absolute ethanol injection, intralesional steroids, electric cauterization, and laser surgery using neodymium-doped yttrium aluminum garnet (Nd: YAG) laser, erbium-doped yttrium aluminum garnet (Er: YAG) laser, and diode laser, have been used to reduce intraoperative bleeding and simplify surgical excision[10].

Dental lasers have been successfully introduced and used in clinical settings since the early 1990s. They were first integrated into oral surgery then for other branches of dentistry. Numerous tissue interactions that occur with lasers, including microbial growth inhibition and death, hemostasis, and vaporization, as well as biological impacts including biostimulation, result in a range of therapeutic benefits and biological reactions[11]. Due to its compact size and simplicity of operation for modest soft tissue surgeries, the diode laser has grown in popularity in dentistry[12].

As the laser therapy is so minimally invasive and less time consuming, parents and pediatric patients both accept it. Studies have shown that employing a laser during restorative, pulpal, and surgical procedures make pediatric patients more cooperative, which considerably improves the standard of care and enhances the healing process[13]. This case is about the recurrent case of pyogenic granuloma, which was excised with diode laser.

Case Report:

A 12-year-old male patient, with normal general health status, visited the Department of Pediatric and Preventive Dentistry for the evaluation of a swelling in his left upper front tooth region for the past 2 weeks. The clinical presentation of the lesion was a solitary sessile, exophytic mass, red in color and soft in consistency having the dimensions about 14×11mm. It

was seen on the left maxillary buccal gingiva between canine and 1st premolar region. The lesion was lobulated with a smooth surface which was ulcerated and covered with exudate on some areas. It also bled on touch but was not painful. (Figure 1A).The lesion had anatomical and vascular continuity with the gingival portion of the upper buccal gingiva. History and clinical examinations indicate the diagnosis of pyogenic granuloma. Treatment with a diode laser was chosen as a minimally invasive procedure to excise the lesion. Written informed consent was obtained from the patient's parents for excising the lesion by diode laser.

After establishing local anesthesia with an infiltration of 2% lignocaine with epinephrine 1: 80,000, the excision of the lesion was performed with a Diode laser (ELEXION, Germany) at 810 nm wavelength and continuous wave mode with a power output of 3 watt and a 0.4-mm diameter fiber optic was set for excising the lesion. (Figure 1B-1D).The patient reported no pain during surgery and discharged in comfortable state. No discomfort in the following days and postoperative complications observed. A histopathological examination was subsequently performed. Hematoxylin and eosin staining revealed numerous engorged blood vessels (high vascular proliferation) with intense inflammatory cell infiltrate and areas of fibrous connective tissue. These features confirmed the diagnosis of pyogenic granuloma.

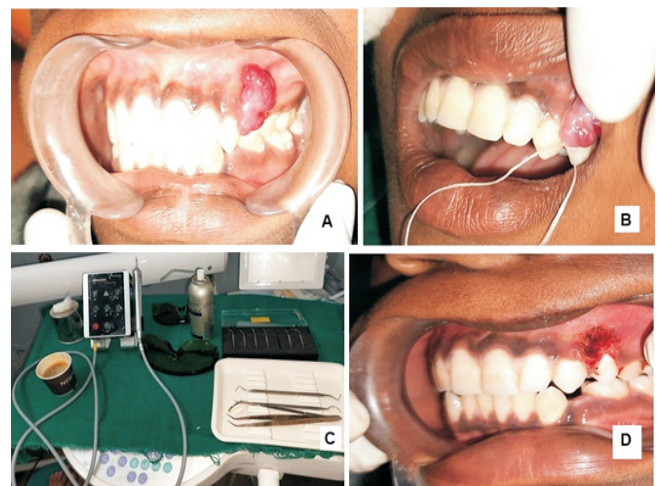


Fig. No.1: A,B. Exophytic mass with smooth surface and sessile base, C. Armamentarium, D. Excision of the lesion with diode laser.

Fig. No. 2: A. One week Follow up, B. One month follow up
The patient was followed up 24 hours, one week, two weeks and one month after the excision (Figure 2A and B). A complete healing of the wound and absence of scars was observed.

Discussion:

The conventional management for the pyogenic granuloma is surgical excision, and cautious curettage of the adjacent tissues is suggested. When the location of the lesion is on gingiva, the lesion should be excised up to the periosteum of the alveolar process periosteum and the nearby dentition should be carefully inspected and if any source of chronic irritation is present, it should be removed[14]. In this case report, diode laser therapy was chosen for the surgical excision of the pyogenic granuloma localized in the upper anterior gingiva. Diode laser is a precise instrument which is compact in size which is economical than other types of dental lasers present in the market and has a high affinity for both dark pigments and hemoglobin. The cutting and hemostatic actions were optimal for evaluating the histological and vascular characteristics of the lesion and the anatomical area in which it had developed. The outcome of the procedure showed optimal healing, which occurred without any complications and discomfort for the pediatric patient.

In children, the laser presents as an option which is less invasive than the scalpel and is readily accepted by the young patient. The use of lasers, eliminates the administration of nerve block anesthesia and placement of a suture at the end of the operation, thus, reducing the duration of operation. In cases of surgical removal of simple benign lesions, whether sessile or pedunculated, in both children and adults, the laser can be considered as a useful tool[15].

The surgical removal of pyogenic granuloma has been suggested in the literature using a number of different techniques. A number of authors advocated the use of the laser because it can make precise, deep incisions, achieve hemostasis, allow for less invasive treatments, and reduce patient suffering[16]. For many soft tissue lesions, laser therapy has been suggested as the preferred treatment method. Comparing the use of the laser to other surgical procedures, there is a lower risk of bleeding and no pain during or following the procedure[17].

Ize-Yyamu et al.[18] conducted a clinical comparison of an 810-nm diode laser and traditional surgery for the treatment of soft tissue muco-gingival surgery, and they found that the diode laser had less intraoperative bleeding and required fewer sutures than cold blade surgery. The use of a diode laser

was compared to traditional surgery using a cold blade in the study conducted by Medeiros Junior et al.[19], and they concluded that the laser was related with a shorter mean surgical duration across all presurgical, intraoperative, and postsurgical clinical parameters. When compared to cold blade surgery, the diode laser produced improved gingival healing and reduced intraoperative hemorrhage.

The benefits of using a laser in the treatment of patients who are medically impaired have been discussed by many authors [20]. According to Fekrazad et al.[21], the use of laser for pyogenic granuloma excision is an efficient and secure method with low invasiveness and a number of clinical benefits, including less intraoperative bleeding, improved hemostasis, decreased pain, and quicker healing. In a case report by Kocaman et al.[22], pyogenic granuloma was treated with a Nd: YAG laser. According to the authors, there was no discomfort or scarring after the procedure, and the bleeding time and operating time were both reduced. The pyogenic granuloma recurs roughly in 16% of the cases[4,18]. Incomplete removal of etiological components, insufficient excision, and other factors could cause recurrence. It must be emphasized that gingival lesion cases present with a much higher recurrence rate than lesions from other oral mucosal sites.

Conclusion:

The use of laser for soft tissue surgeries such as removal of pyogenic granuloma would lessen stress and fear of pediatric patients and would also minimize discomfort during and after surgery.

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