CASE REPORT

Laser Holocaust for Pyogenic Granuloma in Autism Spectrum Disorder: A Novel Approach

Nischitha Naik[1], Srinivas Y Naidu[2], Vijayendra Kamath[3], Hridya M Menon[4], Keerthana Dr[5], Dhanu G Rao[6]

Received on: 21 August 2025; *Accepted on:* 10 February 2026; *Published on:* xxxx

Abstract

Pyogenic granuloma (PG) is a benign vascular lesion found predominantly in the oral cavity. It can be identified by its fast growth and tendency to bleed and is difficult to diagnose because of its significant proliferation and similarity in appearance with other lesions. In order to prevent discomfort, it is crucial to diagnose and treat PG as soon as possible. It typically requires procedural treatment that can be difficult for patients with intellectual disabilities or behavioral concerns to tolerate. Photobiomodulation (PBM) is one of the best treatment modalities in such cases where the child has a particular medical condition, as it is noninvasive. This report describes a case of aggressive PG in a 6-year-old autistic child treated with PBM as a less-invasive approach.

Keywords: Autism spectrum disorder, Case report, Photobiomodulation, Pyogenic granuloma.

Journal of South Asian Association of Pediatric Dentistry (2026): 10.5005/jp-journals-10077-3418

Introduction

Pyogenic granuloma (PG), also called lobular capillary hemangioma, is a frequent, acquired, benign vascular growth of the skin and mucous membranes.[1]

Oral PG commonly affects women more than men. It is more common in the second and fifth decades of life. However, some researchers have proposed that this condition primarily affects men under the age of 18 and females between the ages of 18 and 39, with elderly patients showing an equal distribution of both genders.[2]

It usually manifests as a single, red, painful, fast-growing, pedunculated papule or nodule with a collarette of normal, distinct epithelium surrounding it. The surface is friable, smooth, and frequently ulcerative or erosive. Prolonged bleeding might result from minor trauma.[3]

Although the exact pathophysiology of PGs is unknown, progesterone and estrogen have been proposed to affect growth, possibly *via* controlling growth factor for vascular endothelium (VEGF). Some drugs and persistent low-grade local irritation, trauma, bacterial origin, poor oral hygiene, and genetic component are among the other pathogenic causes.[4,5]

Complete surgical excision with linear closure is considered the standard therapy, given that it has the lowest recurrence rate. A common complication of surgery is scarring, which is unavoidable, and a surgical excision will always require local anesthesia—possibly even general anesthesia in young children.[3]

Thus, less-invasive therapeutic options have been proposed in such conditions, such as sclerotherapy, cryosurgery, laser, and corticosteroid injections.[6]

Providing comprehensive treatment to a kid with special healthcare needs is one of the biggest problems a pediatric dentist faces. More attention has recently been paid to autism spectrum disorders (ASD), a group of illnesses that were previously thought to be relatively rare. However, according to recent reports from all across the world, the rising incidence of ASD has drawn the attention of the dental community as yet another possible problem.[7]

Children with ASD may experience difficulties receiving dental treatment and have their oral health impacted. It is well known that, compared to healthy children, children with ASD have worse periodontal diseases and worse oral hygiene.[3,5,8,9]

[1,3,4]Department of Pediatric and Preventive Dentistry, Subbaiah Institute of Dental Sciences, Shivamogga, Karnataka, India

[2,6]Department of Pediatric and Preventive Dentistry, Subbaiah Institute of Dental Sciences, Shivamogga, Karnataka, India

[5]Department of Oral Pathology, Subbaiah Institute of Dental Sciences, Shivamogga, Karnataka, India

Corresponding Author: Nischitha Naik, Department of Pediatric and Preventive Dentistry, Subbaiah Institute of Dental Sciences, Shivamogga, Karnataka, India, Phone: +91 9845791741, e-mail: drnischithanaik@gmail.com

How to cite this article: Naik N, Naidu SY, Kamath V, *et al.* Laser Holocaust for Pyogenic Granuloma in Autism Spectrum Disorder: A Novel Approach. J South Asian Assoc Pediatr Dent 2026;https://doi.org/10.5005/jp-journals-10077-3418.

Source of support: Nil

Conflict of interest: None

Patient consent statement: The author(s) have obtained written informed consent from the patient's parents/legal guardians for publication of the case report details and related images.

Although PGs and autism are not directly related, people with autism may have trouble treating PGs because of behavioral problems or sensory sensitivity.

When patients with ASD and other neurodevelopmental problems have trouble enduring treatments, many treatment modalities are taken into account. Cryotherapy and surgical removal are two therapies that people with autism may find difficult to accept.[4]

Photobiomodulation (PBM) is a noninvasive, noncutting treatment procedure using low-level laser light therapy (LLLT), producing low-intensity energy light to provide pain relief by producing an analgesic effect, by inhibiting nociceptive signals, decreasing inflammation, and promoting subsequent healing. PBM affects susceptible stem cells and progenitor cells, and its potential in enhancing differentiation improves the healing ability of tissues.[10]

This article presents a case of a male autistic child with PG, successfully treated with a less invasive technique of PBM.

Case Description

A boy of 6 years old from Shivamogga reported to the outpatient department (OPD) of our department with a chief complaint of a

rapidly swelling mass with associated pain in the upper right back tooth gingiva for 10 days. The patient was a known case of autism based on previous medical history. On oral examination, grade III mobility and proximal caries were noticed in relation to 54. The gingival swelling was soft in consistency, and bleeding on probing was noticed.

All of the readings in the blood picture were within the usual range. According to the history and intraoral findings, PG was the provisional diagnosis.

Extraction of 54 along with an incisional biopsy of 0.6 × 0.6 cm^2 was performed under local anesthesia (Figs 1 and 2). Histopathological analysis revealed atrophied discontinuous stratified squamous epithelium with fibrinous exudate. Subepithelial areas showed numerous endothelial-lined budding blood capillaries. Endothelial cell proliferation along with extravasated red blood cells (RBCs) was noted. Dense chronic inflammatory infiltrate predominantly consisting of lymphocytes, plasma cells, eosinophils, and few neutrophils was seen throughout the section. Osteoid-like formation was also seen. Special stain [periodic acid–Schiff (PAS)] was done to rule out presence of fungal organisms. Immunohistochemistry (IHC) with CD34 marker showed positive for endothelial cells and blood capillaries. This confirmed the diagnosis of PG (Fig. 3).

Fig. 1: This image shows the lesion after the extraction of 54 and incisional biopsy was done

Fig. 2: Postbiopsy picture showing the lesion

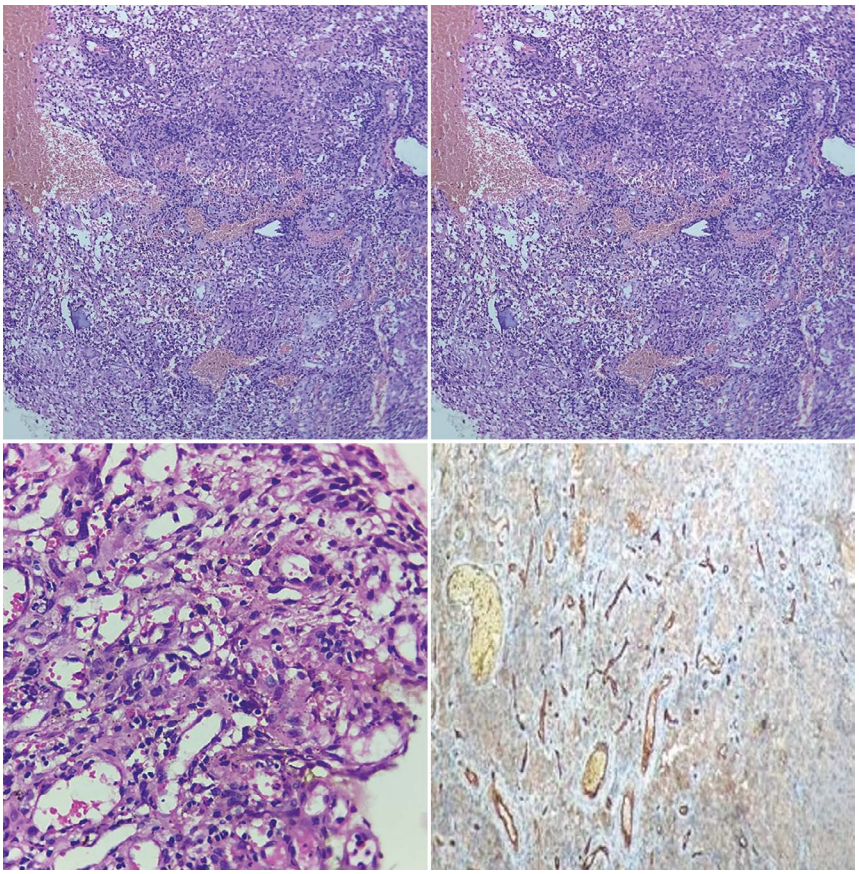

Fig. 3: Histopathological features showing budding capillaries and endothelial cell proliferation. IHC shows CD34 positive for endothelial cells

The lesion was treated with noninvasive approach considering the medical and psychological impairment. The patient underwent PBM in respect to the lesional area. PBM involves using low-powered lasers or light-emitting diodes (LEDs) to deliver light energy to the affected area. Diode laser system (NovoLase Gold) (wavelength of 810 nm with 300 mW power) (as per the manufacturer's guidelines) was used, and the procedure was carried out in noncontact mode, 1 cm away from the concerned site, at the canine, first molar, and second molar region around the tooth surface for 30 seconds per tooth each on the buccal and lingual aspects (a total of 180 seconds).

Following the extraction of 54, the patient was prescribed antibiotics and analgesics for 7 days. The patient reported 10 days after extraction, and not much healing was observed. The patient was advised 1st session of PBM therapy and recalled after 15 days considering their financial constraint and distance (Fig. 4). The patient responded to the PBM therapy very well, and complete healing was observed within two sessions. Follow-up after 6 months was done. Complete healing of the lesion was observed with no recurrence (Fig. 4).

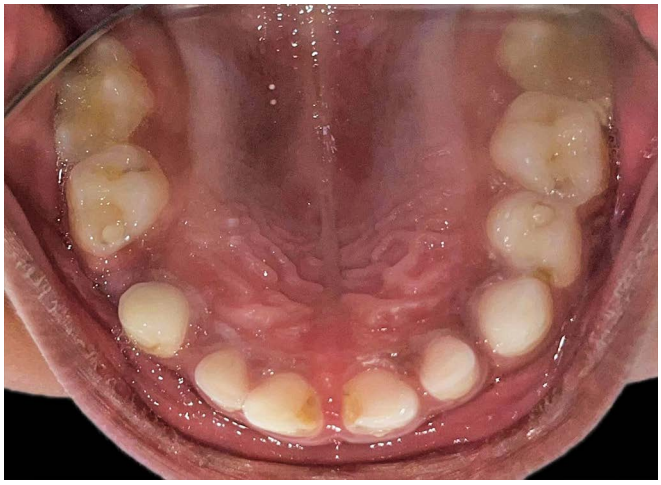

Fig. 4: Follow-up where lesion has healed

Discussion

Granuloma pyogenicum, another name for PG, is a common benign vascular tumor that develops in tissues, including the skin and mucous membranes. In gross view, the lesion looks like a single red, pedunculated, extremely friable papule. A sessile plaque is a less frequent presentation. It grows exophytically quickly and has a surface that frequently becomes ulcerated.

Pyogenic granuloma primarily affects children and young people, and its cause is currently unknown. Predisposing variables include hormonal imbalance, extended use of drugs such as cyclosporine, aggressive toothbrushing, occlusal interference, and recurrent damage to the gingival crevice. Hormonal influences, poor oral hygiene, and foreign body irritation are causes of reactive hyperplastic lesions in children.[11]

Pyogenic granuloma may be difficult to differentiate from other vascular lesions because of its possible similarity. Lobular capillary hemangiomas must be differentiated from benign lesions such as fibromas, peripheral ossifying fibroma (POF), peripheral giant cell granuloma (PGCG), granulation tissue, nevi, warts, fibrokeratomas, hemangiomas, Kaposi's sarcoma, bacillary angiomatosis, and angiosarcoma.[6,12]

The specific traits that each patient presents will determine how oral PG is treated or managed. Surgical excision is the standard mode of treatment to remove a PG. Other therapeutic options include cryosurgery, flash lamp pulsed dye laser, sclerotherapy, Nd:YAG laser excision, and corticosteroid or ethanol injection.[1]

Table 1: Benefits of laser-assisted management of PG in children

Author/year	*Age/sex*	*Site*	*Laser used and wavelength*	*Treatment*	*Outcome*	*Remarks*
Pisano et al., 2021[13]	11 year/ F	Lower lip	Diode laser (980 nm)	Excision	Rapid healing; no scarring	Excellent compliance; 1 month follow-up
Khan and Jindal, 2021[14]	11 year/M	Anterior hard palate/gingiva (central incisors)	GaAlAs diode laser, 808 ± 10 nm Contact fiber tip	Excision at ~5 W, pulsed mode (26 µs, 20 kHz)	Successful surgery, faster healing, good behavior change. Specific to pediatric patient; minimally invasive, less anxiety	1 year follow-up
Ahmad et al., 2024[15]	9 year/M	Lower anterior gingiva	Diode (~810 nm)	Excision	Good healing, helps to inculcate positive dental attitude in youngsters	1 year follow-up, excellent results
Asnaashari et al. 2015[16]	6 year/M	Gingiva	Wavelength 808 nm (±10), output energy 0.1–7.0 W, and input power 300 VA	Excision	Less invasive, a better field of view for the surgeon and sutureless, minimal postoperative discomfort	13 months follow-up, no recurrence and no scarring

Autism spectrum disorder is a complicated neurodevelopmental disorder that first manifests in infancy or early childhood. Social interaction difficulty, communication impairment, and limited, repetitive, or stereotyped activities are the hallmarks of this condition.

Even though the exact cause of autism is still unknown, a mix of genetic and nongenetic factors that can operate alone or in combination, postencephalitic infection, and autoimmune factors are frequently suggested risk factors. The risk of autism does not appear to be influenced by lifestyle, education, or family income.[8]

Children with autism face problems with language, conduct, and social skills. These problems may complicate dental care and increase the risk of oral illnesses in the affected youngsters.[8]

When patients with ASD and other neurodevelopmental problems present with such lesions and have trouble enduring standard treatments, many other treatment modalities, such as noninvasive methods, are taken into account.

We treated such unusual case of PG in an autistic patient using PBM method. Advantage of PBM, using specific wavelengths of light, can promote tissue healing and reduce inflammation, making it a potential treatment option for PGs. Several authors have mentioned the benefits of laser-assisted management of PG in children, which have been summarized in Table 1.

The PBM uses LEDs or low-power lasers to activate biological processes, which may aid in inflammation reduction and tissue repair. PBM can be used to target the lesion in the case of PGs, thereby lowering its size and accelerating healing. PBM has a mechanism known to reinforce neuronal and mitochondrial function and is known for stimulating a range of protective pathways and improvements in clinical signs. Diode laser is safe and well indicated for soft-tissue healing in oral tissues for cutting, vaporization, curettage, blood coagulation, and hemostasis in the oral region. The chromophore in diode lasers is in pigmented tissues, specifically melanin, hemoglobin, and oxyhemoglobin. The diode is efficient for treating the patient's soft tissues because the gingival tissues have a concentration of these chromophores.[10]

Conclusion

Photobiomodulation therapy represents a promising, minimally invasive modality for the management of oral PG, particularly in patients with ASD. Given the unique sensory sensitivities and behavioral considerations in this population, conventional surgical approaches may be poorly tolerated and often necessitate sedation or general anesthesia. PBM offers a patient-centered alternative by promoting lesion regression through nonthermal, atraumatic means, while enhancing tissue healing and reducing inflammation. Our preliminary findings suggest that PBM can be safely and effectively applied in a dental setting, improving patient cooperation and clinical outcomes. Further controlled studies are recommended to standardize treatment protocols and validate its long-term efficacy in special care dentistry.

Orcid

Srinivas Y Naidu https://orcid.org/0000-0002-9689-9086
Hridya M Menon https://orcid.org/0000-0002-9815-9807
Dhanu G Rao https://orcid.org/0000-0002-4032-4582

References

1. Kaleeny JD, Janis JE. Pyogenic granuloma diagnosis and management: a practical review. Plast Reconstr Surg Glob Open 2024;12(9):e6160. DOI: 10.1097/GOX.0000000000006160
2. Megaly M, Boshra N. Pyogenic granuloma-like Kaposi's sarcoma. Lancet 2022;399(10335):e38. DOI: 10.1016/S0140-6736(15)00467-5
3. Gex-Collet C, Itin PH, Hofmeier KS. Pyogenic granuloma treated with pulsed Nd:YAG (1064 nm) laser—a case series. Med Laser App 2008;23(3):115–119. DOI: 10.1016/j.mla.2008.02.004
4. Moustafa D, Neale H, Ostrowski SM, et al. Topical corticosteroids for noninvasive treatment of pyogenic granulomas. Pediatr Dermatol 2021;38:149–151. DOI: 10.1111/pde.14698
5. Akkarapatum A, Klanrit P, Sattayut S. Case report: interstitial-intralesional laser therapy and laser-assisted new attachment procedure for the treatment of alveolar bone loss provoked by an aggressive pyogenic granuloma. F1000Res 2022;11:883. DOI: 10.12688/f1000research.122693.3
6. Martinez SML, Contreras NGC, Sandoval JRG, et al. Oral pyogenic granuloma: a narrative review. Int J Mol Sci 2023;24(23):16885. DOI: 10.3390/ijms242316885
7. Bhandary S, Hari N. Salivary biomarker levels and oral health status of children with autistic spectrum disorders: a comparative study. Eur Arch Paediatr Dent 2017;18:91–96. DOI: 10.1007/s40368-017-0275-y
8. Al-Maweri SA, Halboub ES, Al-Soneidar WA, et al. Oral lesions and dental status of autistic children in Yemen: a case–control study. J Int Soc Prev Community Dent 2014;4(Suppl 3):S199–S203. DOI: 10.4103/2231-0762.149040
9. Qiao Y, Shi H, Wang H, et al. Oral health status of Chinese children with autism spectrum disorders. Front Psychiatry 2020;11:398. DOI: 10.3389/fpsyt.2020.00398
10. Sharma M. Diode laser applications in pediatric dentistry. J Appl Dent Med Sci 2016;2(1):131–138.
11. Sarwal P, Lapumnuaypol K. Pyogenic Granuloma. [Updated 2024 Sep 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025. Available from: https://www.ncbi.nlm.nih.gov/books/NBK556077/.
12. Kavitha M, Prathima GS, Vinothini V, et al. Recurrent episodes of oral pyogenic granuloma at different site in an 8-year-old girl: an unusual presentation. Int J Clin Pediatr Dent 2021;14(5):730–733. DOI: 10.5005/jp-journals-10005-2033
13. Pisano M, Sammartino P, Di Vittorio L, et al. Use of diode laser for surgical removal of pyogenic granuloma of the lower lip in a pediatric patient: a case report. Am J Case Rep 2021;22:e929690. DOI: 10.12659/AJCR.929690
14. Khan MK, Jindal MK. Diode laser as minimal invasive treatment modality for oral pyogenic granuloma in a pediatric patient: a case report. J Pediatr Dent 2021;7(3):178–183. DOI: 10.14744/JPD.2021.09_67
15. Ahmad N, Jindal MK, Khan SY, et al. Surgical removal of recurred pyogenic granuloma using diode laser in a pediatric patient: a case report. Saudi J Oral Dent Res 2024;9(4):63–68. DOI: 10.36348/sjodr.2024.v09i04.001
16. Asnaashari M, Mehdipour M, MoradiAbbasabadi F, et al. Expedited removal of pyogenic granuloma by diode laser in a pediatric patient. J Lasers Med Sci 2015;6(1):40–44.