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Idiopathic Gingival Fibrous Hyperplasia in a Paediatric Patient Managed with Scalpel and Diode Laser: A Case Report

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Abstract: ***Idiopathic gingival fibromatosis is a rare benign condition characterized by progressive gingival enlargement with unclear etiology, often presenting during childhood. This case report describes the clinical management of a 7-year-old female diagnosed with severe idiopathic gingival fibromatosis. The aim of this report is to evaluate the clinical outcomes of a combined scalpel and diode laser gingivectomy approach in a paediatric patient. Surgical treatment was performed using a combined scalpel and diode laser gingivectomy, and histopathological examination confirmed fibrous gingival hyperplasia. Postoperative healing was uneventful, and no recurrence was observed during one year of follow-up. The combined surgical approach demonstrated effective tissue removal, improved hemostasis, and favorable functional and esthetic outcomes. These findings support the potential clinical utility of hybrid surgical techniques in paediatric gingival fibromatosis management.***

Keywords: Idiopathic gingival fibromatosis; Gingival enlargement; Paediatric dentistry; Diode laser, gingivectomy, case report

1. Introduction

Idiopathic gingival fibromatosis (IGF), characterized by progressive gingival enlargement involving marginal, attached, and interdental gingiva. It may present as an isolated entity or as part of syndromic conditions. Clinically, the gingiva appears firm, non-hemorrhagic, and may cover significant portions of the clinical crowns, leading to functional and esthetic concerns. [1] According to reports, the overall incidence of IGF is roughly 1 in 750,000 people, with no discernible gender bias. [2] The illness may manifest as a separate clinical entity or as a component of a number of conditions, including Cowden syndrome, Rutherford syndrome, Murray-Puretic-Drescher syndrome, and Zimmermann-Laband syndrome. [3] Gingival hypertrophy usually appears during the emergence of the primary or permanent dentition in non-syndromic situations and may progressively worsen over time. [1,4] Clinically, the afflicted gingiva typically covers a significant amount of the clinical crowns and appears pink, firm, and non-hemorrhagic. [4] Delays in tooth eruption, malocclusion, phonetic difficulties, mastication issues, and poor oral hygiene can all result from severe enlargement. [5]

IGF has been associated with abnormal fibroblast function that results in elevated deposition of extracellular matrix components, particularly collagen; however, the precise pathophysiology remains unclear. [6] Genes like SOS-1, REST, and CAMK4 have been identified as mutated in hereditary forms of the condition. [7] Gingival fibromatosis has been addressed using various methods, including electrosurgery, laser-assisted excision, and conventional gingivectomy. [8] Because of its simplicity and availability, traditional scalpel surgery is still frequently carried out. Nevertheless, advantages such as enhanced tissue contouring, reduced post-operative pain, and superior bleeding control have increased the popularity of laser surgery. [9]

In the present case study, a paediatric patient with severe idiopathic gingival fibromatosis was successfully treated using a combined scalpel and diode laser method over a one-year follow-up period.

Thus, the aim of this case report is to evaluate the clinical outcomes of combined scalpel and diode laser gingivectomy in the management of paediatric idiopathic gingival fibromatosis.

2. Case Report

Patient Data

A 7-year-old female patient presented with a chief complaint of progressive gingival enlargement involving both maxillary and mandibular arches. The enlargement had gradually increased in size and was associated with

difficulty in mastication, speech, and lip closure. Because of the significant gingival growth, the patient experienced difficulty in speaking and eating, and she was unable to fully close her mouth.

After reviewing the patient's medical, medication, and family histories, it was determined that none of them were contributing.

Clinical Examination

A convex facial profile, inadequate lips, gingival tissue extending beyond the oral cavity, partial occlusion of the nostrils, and bilateral loss of the nasolabial folds were among the distinctive facial traits identified by extraoral inspection. All of these results led to the patient's functional impairment and facial disharmony. An intraoral examination revealed widespread gingival enlargement affecting the mandibular and maxillary arches. Upon inspection, the gingival tissues had a hard, leathery quality, were pink in color, and were not hemorrhagic. Nearly two-thirds of the diagnostic crowns of numerous teeth were covered by the expanded gingiva, with several cusps just partially visible. Furthermore, the enlargement resulted in plaque accumulation in pseudo-pockets and the vestibular sulcus to be completely destroyed. It was diagnosed as idiopathic gingival fibromatosis and Grade III according to the Angelopoulos and Goaz classification.

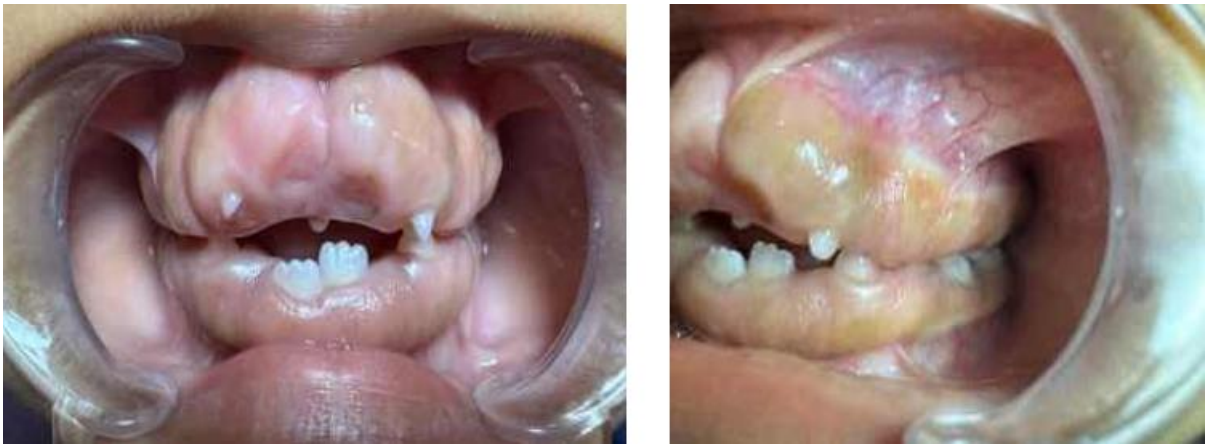

Figure 1: Preoperative intraoral view showing generalized gingival enlargement covering significant portions of the clinical crowns

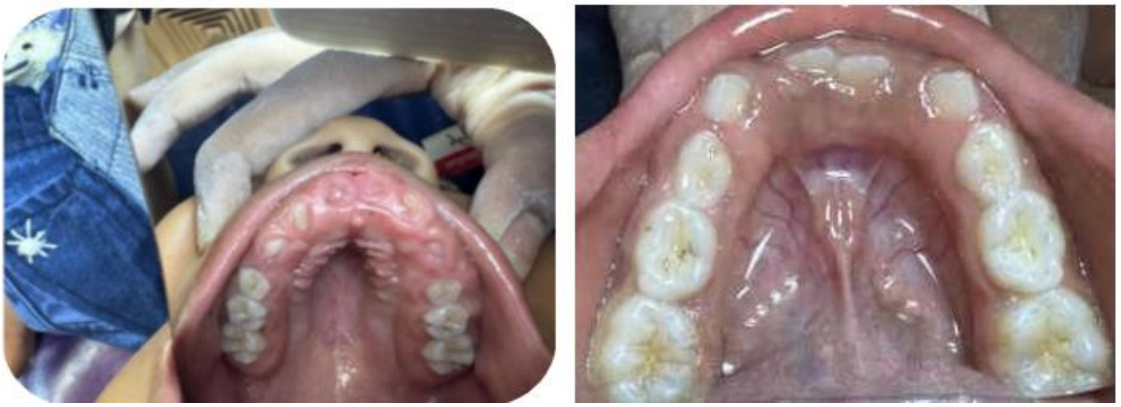

Figure 2: Occlusal view demonstrating extent of gingival overgrowth and pseudo-pocket formation

Investigations

A radiographic assessment was conducted using an orthopantomogram, and the findings revealed developing permanent teeth with no noticeable loss of alveolar bone. Laboratory tests were conducted to eliminate systemic causes of gingival enlargement. A complete blood count, thyroid tests, parathyroid hormone measurements, serum calcium levels, and an assessment of alkaline phosphatase were investigated. All test outcomes were within standard physiological limits.

Differential Diagnosis

Conditions considered during the diagnostic process included drug-induced gingival enlargement, inflammatory gingival hyperplasia, systemic disorder-related gingival enlargement, leukemic gingival enlargement, and neoplastic gingival lesions. A preliminary diagnosis of idiopathic gingival fibromatosis was established after a detailed evaluation of the clinical appearance, test findings, and absence of any systemic disease or medication history

Treatment Plan

Surgery to remove the excess gingival tissue was planned since the gingival overgrowth was causing problems with how the mouth functioned, making it difficult to keep clean, and generating esthetic concerns.

Phase One Treatment

The initial phase of treatment concentrated on cleaning the mouth thoroughly and reducing gingival enlargement-causing factors. This included providing comprehensive oral hygiene advice as well as expert cleaning, which included

scaling and removing plaque. This technique was intended to reduce gingival enlargement and enable a clearer, better view of the fibrous, enlarged gingiva prior to surgery.

Surgical Treatment

Local anesthesia was administered using 2% lignocaine with 1:100,000 epinephrine via infiltration technique in both maxillary and mandibular arches. Adequate anesthesia was confirmed prior to initiation of the procedure.

A technique that combined diode laser cutting and scalpel gingivectomy was used to effectively treat the issue. A diode laser unit (SiroLaser Blue, Dentsply Sirona, Germany) with a wavelength of 445 nm was used in contact mode for gingivectomy in the anterior region. The laser was operated at a power setting of 2.0 W using a fiber-optic tip. The 445 nm blue diode laser demonstrates higher absorption in hemoglobin compared to conventional diode wavelengths, contributing to improved cutting efficiency and hemostasis. After marking bleeding points with a pocket marker, laser incisions were made to excise the enlarged gingival tissue in a controlled manner. The use of the 445 nm wavelength provided excellent soft tissue ablation with superior hemostasis and enhanced surgical precision, thereby improving intraoperative visibility. Granulation tissue was curetted, the wall of the wound pocket was removed, and the laser created a blood clot to stop the bleeding. During the procedure, the diode laser enhanced surgical field visibility and ensured that adequate hemostasis was achieved.

The procedure was performed in a sequential manner, beginning with the anterior region using diode laser for precise contouring, followed by conventional scalpel gingivectomy in posterior regions for bulk tissue removal.

A standard external bevel gingivectomy was performed in the posterior region using Bard-Parker blades (No. 12 and 15), Orban knife, and Kirkland knife. Incisions were placed at a 45-degree angle to the tooth surface to achieve physiologic gingival contour and remove pocket walls. The excised tissue was removed, and the area was thoroughly debrided. Following the removal of the swollen gingival tissue, the surgical site was thoroughly irrigated with povidone iodine and saline. Any leftover gritty tissue was scraped away, and the surgical site was covered with gingival tissue. This combined method allowed for the efficient removal of a large amount of fibrous tissue while ensuring sufficient control over the surgical procedure.

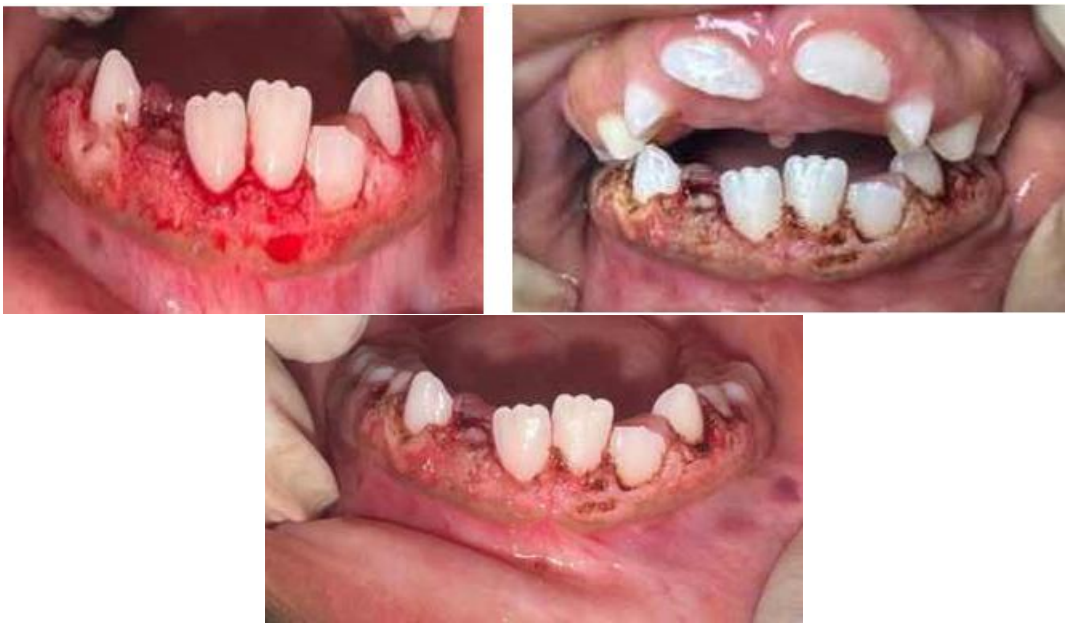

Figure 3: Intraoperative view showing diode laser-assisted gingivectomy with adequate hemostasis

Figure 4: Intraoperative view showing conventional scalpel gingivectomy in the posterior region

Postoperative instructions were provided to the patient and parents. The patient was prescribed analgesics (ibuprofen 10 mg/kg) for pain management and advised to use 0.12% chlorhexidine mouth rinse twice daily for 1 week. Gentle brushing with a soft toothbrush was recommended, avoiding trauma to the surgical site. The patient was instructed to maintain optimal oral hygiene and adhere to regular follow-up visits.

Histopathological Analysis

The removed tissue sample was sent for histological examination measured approximately 1.5 × 4.5 × 0.5 cm. The parakeratinized hyperplastic stratified squamous epithelium with elongated rete ridges, abundant collagenous connective tissue stroma, and mild chronic inflammatory cell infiltration were all visible under a microscope. The diagnosis of fibrous gingival hyperplasia was supported by these histological results. [6]

Follow-up

Postoperative healing was uneventful. The patient was recalled for periodic evaluation at 3 months, 6 months and 12 months. Recurrence was assessed clinically based on absence of gingival overgrowth, maintenance of normal gingival contour, absence of pseudo-pocket formation, and improved oral hygiene status. The gingival tissues showed no signs of recurrence at the one-year follow-up visit, and their architecture was stable. In addition, the patient demonstrated significant improvement in oral hygiene maintenance.

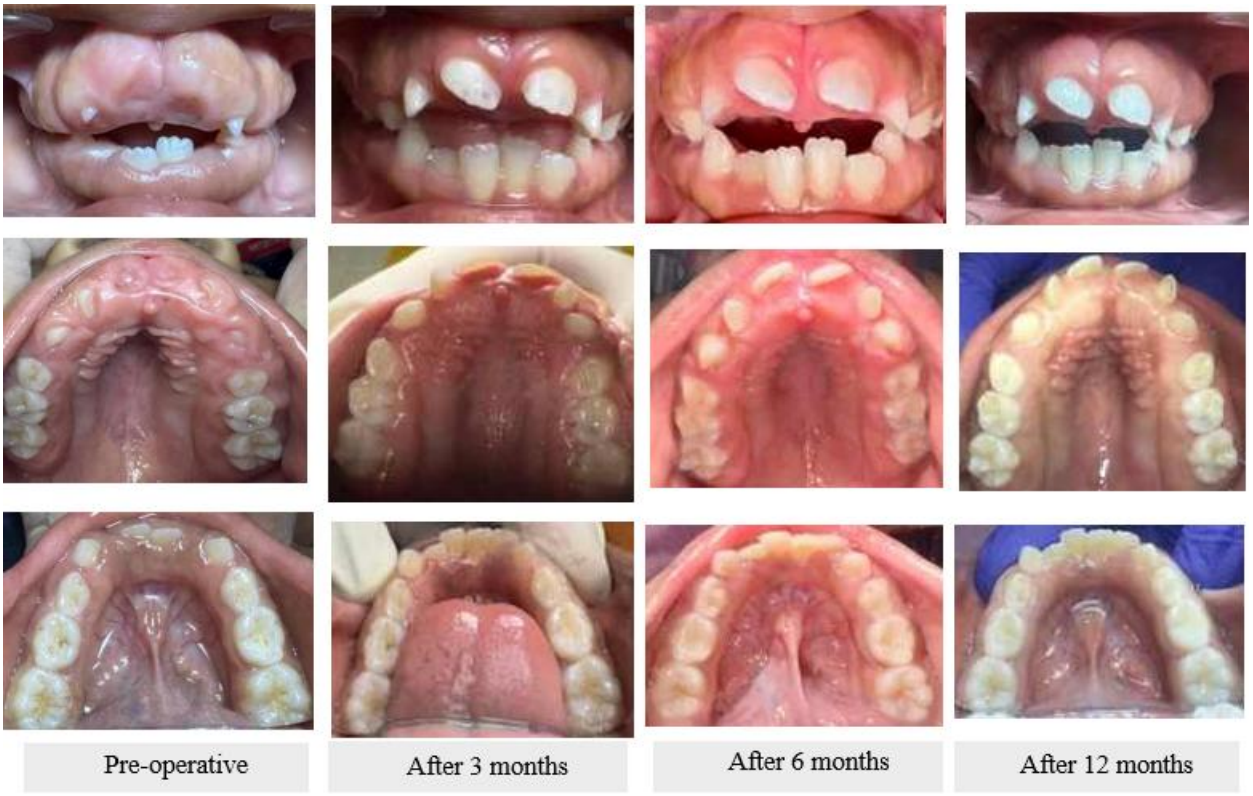

Figure 5: Postoperative intraoral view at 12 months follow-up showing normal gingival contour and absence of recurrence

3. Discussion

Idiopathic gingival fibromatosis is a rare but clinically significant condition, particularly in childhood. [1,2] Expansion of gingival tissues over time can interfere with normal eruption pattern, cause esthetic complications and make oral hygiene difficult. [4,5] Histology shows IGF compact collagen fibers in its connective tissue stroma and hyperplastic epithelium with elongated rete ridges. Enhanced fibroblast activation and excess deposition of extracellular matrix are believed to play a significant role in the pathogenesis of this disease. [6] When gingival enlargement is severe with functional and esthetic implications, surgical removal remains the mainstay of treatment. [8] Classic gingivectomy with scalpel devices has been widely used due to its simplicity and low cost. [9] However, this technique can also produce significant bleeding at the time of surgery that may hinder visualization.

In dentistry, laser-assisted surgery has become a useful substitute for soft tissue operations. Diode lasers have good hemostatic qualities because they are highly absorbed by blood and pigmented tissues. They usually operate at wavelengths between 810 and 980 nm. [9] Additionally, the laser creates a coagulation layer that lessens microbial contamination and postoperative irritation. To obtain advantages of both techniques, a combination surgical strategy was used for this instance. While the diode laser increased hemostasis and improved gingival tissue contouring, the scalpel approach enabled for the quick removal of large fibrotic tissue.

When comparing scalpel surgery with diode laser excision in a child with hereditary gingival fibromatosis, Aboujaoude et al. found similar results. According to the authors, laser surgery resulted in superior gingival contouring, improved visibility throughout the procedure, and mild postoperative discomfort. Because laser surgery causes less tissue damage, it is associated with reduced postoperative edema and discomfort. Additionally, wound healing has been associated with enhanced collagen remodeling after laser treatment. [10] Furthermore, early collagen remodeling after laser therapy may contribute to improved wound healing. This combined approach is particularly beneficial in paediatric patients, where reduced operative time, improved comfort, and better behavioral management are critical considerations. [9,10]

Recurrence remains a potential concern in gingival fibromatosis. Baptista et al. reported that recurrence of fibrous gingival hyperplasia may occur from one week to several years after surgical removal, depending on local irritants and tissue characteristics. [11]

In the present case, careful postoperative maintenance and regular follow-up visits contributed to favorable long-term outcomes. No recurrence was observed during the one-year follow-up period. The findings of the present case are consistent with previously published reports summarized in Table 1, where diode laser-assisted or combined approaches demonstrated superior hemostasis, reduced postoperative discomfort, and favorable healing outcomes. [12–18]

The present case highlights the clinical significance of a hybrid surgical approach combining scalpel and diode laser gingivectomy in paediatric idiopathic gingival fibromatosis. Compared to conventional scalpel techniques, the adjunctive use of diode laser offers advantages such as improved hemostasis, enhanced surgical visibility, reduced intraoperative bleeding, and better postoperative comfort. The absence of recurrence at one-year follow-up further supports the long-term effectiveness of this approach. Given the limited literature on combined surgical techniques in paediatric patients, this case contributes to existing evidence by demonstrating a minimally invasive and clinically effective treatment modality in paediatric periodontal management.

Table 1: Literature Review of Paediatric Gingival Fibromatosis Managed with Laser or Combined Techniques

Author	Year	Age	Diagnosis	Treatment Modality	Outcome
Gontiya & Galgali [12]	2011	8 years	Gingival enlargement	Diode laser gingivectomy	Minimal bleeding and satisfactory healing
Azma E, Safavi N [13]	2013	—	Soft tissue surgery (review)	Diode laser application	Reduced bleeding, minimal tissue trauma, improved healing
Tripathi AK et al. [14]	2015	Paediatric	Hereditary gingival fibromatosis	Conventional gingivectomy	Good healing with stable results over 2-year follow-up
Dureja D et al. [15]	2020	Paediatric (siblings)	Hereditary gingival fibromatosis	Diode laser gingivectomy	Effective tissue removal, minimal bleeding, improved patient comfort
Aboujaoud e S, Aoun G [16]	2022	Paediatric	Hereditary gingival fibromatosis	Surgical management (case report)	Successful functional and esthetic outcome
Barboza JVM et al. [17]	2025	Paediatric	Gingival fibromatosis with juvenile hyaline fibromatosis syndrome	Laser surgical excision	Successful management with good healing and functional improvement
Hamadah O et al. [18]	2025	—	Gingivect omy techniques (systemati c review)	Laser vs scalpel comparison	Laser showed superior hemostasis, reduced postoperative pain, and better patient comfort
Present Case	2026	7 years	Idiopathi c fibrous gingival hyperplas ia	Combined scalpel and diode laser gingivectomy	Excellent hemostasis, precise contouring, and stable outcome at 1-year follow-up

4. Conclusion

Idiopathic gingival fibromatosis may significantly impair oral function and esthetics in paediatric patients. This case demonstrates that combined scalpel and diode laser gingivectomy can provide effective tissue removal, improved intraoperative hemostasis, and favorable healing outcomes with no recurrence during one year of follow-up. Hybrid surgical approaches may represent a promising and minimally invasive management strategy in paediatric periodontal practice; however, long-term monitoring and larger clinical studies are required to further validate treatment predictability.

Declaration of Patient Consent

The authors certify that they have obtained appropriate patient consent. In the form, the patient's parent/legal guardian has given consent for clinical information and images to be reported in the journal. The guardian understands that the patient's name and initials will not be published and that due efforts will be made to conceal identity, although anonymity cannot be guaranteed.

References

[1] Coletta RD, Graner E. Hereditary gingival fibromatosis: A systematic review. J Periodontol. 2006;77(5):753-764. doi:10.1902/jop.2006.050379

[2] Gawron K, Łazarz-Bartyzel K, Potempa J, Chomyszyn-Gajewska M. Gingival fibromatosis: Clinical, molecular and therapeutic issues. Orphanet J Rare Dis. 2016; 11: 9. doi:10.1186/s13023-016-0395-1

[3] Hart TC et al. Genetic linkage of hereditary gingival fibromatosis to chromosome 2p21. Am J Hum Genet. 1998;62(4):876-883. doi:10.1086/301797

[4] Almiñana-Pastor, Pedro J et al. "Hereditary gingival fibromatosis: Characteristics and treatment approach." *Journal of clinical and experimental dentistry* vol. 9,4 e599-e602. 1 Apr. 2017, doi:10.4317/jced.53644

[5] Shetty, Arvind K et al. "Idiopathic gingival enlargement and its management." *Journal of Indian Society of Periodontology* vol. 14,4 (2010): 263-5. doi:10.4103/0972-124X.76935.

[6] Trackman, P C, and A Kantarci. "Connective tissue metabolism and gingival overgrowth." *Critical reviews in oral biology and medicine: an official publication of the American Association of Oral Biologists* vol. 15,3 165-75. 4 Jun. 2004, doi:10.1177/154411130401500305.

[7] Hart TC, Zhang Y, Gorry MC, Hart PS, Cooper M, Marazita ML, Marks JM, Cortelli JR, Pallos D. A mutation in the SOS1 gene causes hereditary gingival fibromatosis type 1. Am J Hum Genet. 2002 Apr;70(4):943-54. doi: 10.1086/339689. Epub 2002

Feb 26. PMID: 11868160; PMCID: PMC379122.

[8] Lobão, Denise S et al. "Idiopathic gingival fibromatosis: a case report." *Quintessence international (Berlin, Germany : 1985)* vol. 38,8 (2007): 699-704.

[9] Parker S, Cronshaw M, Anagnostaki E, Mylona V, Lynch E, Grootveld M. Current Concepts of Laser-Oral Tissue Interaction. Dent J (Basel). 2020 Jun 28;8(3):61. doi: 10.3390/dj8030061. PMID: 32605215; PMCID: PMC7558496.

[10] Aboujaoude, Samia et al. "Diode Laser *Versus* Scalpel in the Treatment of Hereditary Gingival Fibromatosis in a 6-Year Old Boy." *Clinics and practice* vol. 6,4 895. 14 Nov. 2016, doi:10.4081/cp.2016.895.

[11] Baptista, Isabel Poiares. "Hereditary gingival fibromatosis: a case report." *Journal of clinical periodontology* vol. 29,9 (2002): 871-4. doi:10.1034/j.1600-051x.2002.290913.x.

[12] Gontiya, G et al. "Laser-assisted gingivectomy in paediatric patients: a novel alternative treatment." *Journal of the Indian Society of Pedodontics and Preventive Dentistry* vol. 29,3 (2011): 264-9. doi:10.4103/0970-4388.85839.

[13] Azma, Ehsan, and Nassimeh Safavi. "Diode laser application in soft tissue oral surgery." *Journal of lasers in medical sciences* vol. 4,4 (2013): 206-11.

[14] Tripathi AK, Dete G, Saimbi CS, Kumar V. Management of hereditary gingival fibromatosis: A 2 years follow-up case report. J Indian Soc Periodontol. 2015 May-Jun;19(3):342-4. doi: 10.4103/0972-124X.148643. PMID: 26229281; PMCID: PMC4520125.

[15] Dureja, Divya et al. "Hereditary Gingival Fibromatosis: A Report of a Rare Case in Siblings and Its Management Using Diode Laser." *Contemporary clinical dentistry* vol. 11,3 (2020): 290-293. doi:10.4103/ccd.ccd 133_19.

[16] Barboza JVM, Costa JCRS, Paula LM, Melo SMA, Botacin LA, Moreira FCL, Silva MAGS, Roriz VM. Laser for surgical treatment of generalized gingival fibromatosis associated with juvenile hyaline fibromatosis syndrome: case report. Braz J Health Rev. 2025;8(6):e84642. DOI: 10.34119/bjhrv8n6-361. Disponível em: https://ojs.brazilianjournals.com.br/ojs/index.php/BJHR/article/view/84642. Acesso em: 19 Mar. 2026.

[17] Aboujaoude, Samia, and Georges Aoun. "Hereditary Gingival Fibromatosis: A Report of a Severe Case." *Cureus* vol. 14,3 e23280. 17 Mar. 2022, doi:10.7759/cureus.23280.

[18] Hamadah O, Almahayni S, Ghazzawi R, Mounajjed R, Altayeb W, Khalil M. Effectiveness of laser-assisted gingivectomy compared to surgical methods: a systematic review. Explor Med. 2025; 6: 1001325. https://doi.org/10.37349/emed.2025.1001325