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SCALPEL'S PRECISION: RESOLVING PYOGENIC GRANULOMA IN A YOUNG PATIENT

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Abstract

Pyogenic granuloma (PG) is a common benign vascular lesion of the oral cavity, characterized by rapid growth and bleeding. This case report describes the successful surgical management of an extensive PG in a 12-year-old female patient affecting the lower left incisor region. The lesion presented as a painless swelling, causing discomfort and aesthetic concerns. Diagnosis was confirmed by histopathological examination after conventional surgical excision using a scalpel and thorough mechanical debridement. The procedure aimed for complete removal and restoration of the gingival architecture. Post-operative care included antibiotics, meticulous oral hygiene instruction, and regular follow-up visits. The patient demonstrated excellent compliance and healing, with no signs of recurrence observed during the 6-month follow-up period. Surgical excision proved to be an effective treatment, providing complete resolution and restoring normal gingival contours. This case highlights the importance of surgical intervention combined with diligent post-operative care for managing extensive pyogenic granulomas in pediatric patients, ensuring long-term success and preventing recurrence.

Keywords: Pyogenic Granuloma, Oral Lesions, Surgical Excision, Pediatric Dentistry, Gingival Architecture

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Introduction

Pyogenic granuloma (PG) is a benign vascular lesion found predominantly in the oral cavity, characterized by rapid growth and a propensity to bleed and first described in 1897 by Poncet and Dor, who reported four patients with "vascular tumors" on the fingers and termed them "Botrichomycosis hominis" (Martinez et al., 2023). In 1904, Hartzell is credited with coining the current term "pyogenic granuloma" or "granuloma pyogenicum," although this term does not accurately reflect the clinical or histopathologic features (Kamal et al., 2012; Gomes et al., 2013).

Armitage et al. (1999) classified pyogenic granuloma as a dental plaque-induced gingival disease modified by systemic factors (associated with the endocrine system). According to the 2017 Classification of Periodontal and Peri-Implant Diseases and Conditions (AAP & EFP), it is classified as dental biofilm-induced gingivitis exacerbated by sex steroid hormones (such as pregnancy) and non-dental biofilm-induced gingivitis associated with reactive processes. Thus, the etiopathogenesis of pyogenic granulomas is varied; however, their primary etiology appears to be associated with pregnancy or systemic factors. Studies also suggest that localized trauma and poor oral hygiene play a role in its development (Kamal et al., 2012).

The management of oral pyogenic granuloma varies based on the specific characteristics of each patient. However, conventional surgical excision remains the preferred treatment modality. Additionally, several minimally invasive approaches have been proposed, including laser therapy, corticosteroid injections, cryosurgery, and sclerotherapy (Aoun, 2023).

Therefore, this case report aims to present a case of pyogenic granuloma in the lower teeth treated with surgical excision, resulting in the restoration of gingival architecture.

Case Report

A 12-year-old girl presented with the chief complaint of a painless swelling in the 42, 43 region (buccal and lingual) that had been present for the past 2 months. The patient reported no underlying systemic conditions. Based on clinical findings, the swelling was diagnosed as pyogenic granuloma. Given the extensive nature of the lesion and the need for its complete removal, thorough mechanical debridement followed by surgical excision of the pyogenic granuloma was planned for the patient.



Figure 1 Pyogenic Granuloma in Buccal and Lingual Aspects of 42,43 Region (Preoperative)

During scaling, intermittent bleeding and discomfort associated with the lesion were observed. Surgical excision of the lesion using a scalpel was scheduled for one week later. Under local anesthesia, a scalpel with a 15C blade was used to surgically excise the lesion, extending up to the mucoperiosteum. Scaling and curettage were performed in the affected area to ensure the complete removal of the lesion. Sutures were placed, and a periodontal dressing was applied at the site. Antibiotics were prescribed. The patient was recalled one week later for suture removal and review.



Figure 2 Crevicular Incision Given in Outlining the Lesion and Lesion Excised



Figure 3 Full Thickness Mucoperiosteal Flap Raised and Debridement Done



Figure 4 Sutures Placed



Figure 5 Periodontal Dressing Given

The excised tissue was sent for histopathological analysis. Histopathological analysis revealed that the epithelium was para-keratinized, stretched in certain areas, and extended into the base

of the lesion. The underlying connective tissue stroma showed prominent dilated blood vessels, extravasated red blood cells, angiogenesis, a few inflammatory cells, and collagen fiber bundles. These findings confirmed the diagnosis of pyogenic granuloma. The patient was then recalled at 1-month, 3-month, and 6-month intervals. At all recall visits, the patient demonstrated good oral hygiene maintenance, and there was no recurrence of the lesion.



Figure 6 6 Months Review

Conclusion and Discussion

Pyogenic granuloma is a commonly occurring inflammatory hyperplasia of the skin and oral mucosa (Gomes et al., 2013). It frequently arises due to local irritation, trauma, hormonal influences, or poor oral hygiene, with the gingiva being the most frequent site of occurrence. While the exact etiopathogenesis of PG remains unclear, factors such as chronic irritation, hormonal fluctuations, and certain medications have been implicated (Martinez et al., 2023; Sonar & Panchbhai, 2024). Epidemiologically, PG exhibits a higher incidence among females, particularly during the second and fifth decades of life, likely due to hormonal influences (Kamal et al., 2012; Gomes et al., 2013; Martinez et al., 2023; Meshram et al., 2023; Sonar & Panchbhai, 2024). In the present case, the patient was a 12-year-old female, consistent with studies indicating increased prevalence among younger individuals (Verma et al., 2012; Sonar & Panchbhai, 2024).

According to Verma et al. (2012), most pyogenic granulomas are found on the marginal gingiva, with only 15% occurring on the alveolar part. In this presented case, the lesion was predominantly present in the marginal gingiva, extending to the attached gingiva.

In conclusion, this case report demonstrates that pyogenic granuloma, a benign yet commonly occurring lesion, can be effectively managed with surgical excision. The use of a scalpel for complete excision remains the gold standard treatment, ensuring thorough removal and restoration of the gingival architecture. While alternative minimally invasive treatment options exist, such as scaling, root planing, and laser therapy, surgical excision is often preferred for larger or more extensive lesions. The patient in this case exhibited no recurrence up to 6 months post-treatment, highlighting the effectiveness of surgical excision in managing oral pyogenic granuloma. Regular follow-up and good oral hygiene are essential to ensure long-term success and prevent recurrence.

Management of PG is tailored to the lesion's characteristics and patient factors. Conventional surgical excision remains the gold standard due to its effectiveness in complete lesion removal and providing tissue for histopathological examination (Kamal et al., 2012; Verma et al., 2012; Martinez et al., 2023; Meshram et al., 2023). However, alternative minimally invasive treatment modalities have emerged. Laser therapy, particularly using diode and Nd:YAG lasers, offers advantages such as minimal bleeding, reduced postoperative discomfort, and faster healing (Meshram et al., 2023; Ahmad et al., 2024). In a comparative study of long-pulsed 1064 nm Nd:YAG laser and sclerotherapy in pediatric patients, both methods demonstrated comparable efficacy with no significant difference in recurrence over a six-month follow-up period, though sclerotherapy exhibited lower postoperative discomfort and

scarring (Cheng et al., 2025). Electrocautery and cryosurgery have also been employed but are associated with higher recurrence rates and postoperative complications (Meshram et al., 2023; Shirbhate et al., 2024). Topical therapies, such as timolol, have shown promising results, with complete resolution in 75% of cases and partial improvement in 21% (Widiatmoko, 2024). Chandrashekhar (2012) proposed a minimally invasive approach for treating oral pyogenic granuloma. This protocol involves performing scaling and root planing in the area of the lesion. Maintaining proper oral hygiene is essential, with recommendations to brush twice a day and use a 0.12% chlorhexidine rinse twice daily. The lesion should be monitored weekly, and if it persists, scaling and root planing should be repeated weekly for up to four consecutive weeks to continue the non-invasive treatment. Patients should also ensure consistent brushing and flossing twice a day. These non-invasive options may be suitable for smaller, painless lesions without significant bleeding. In this case report, surgical excision of the pyogenic granuloma was performed using a scalpel, which is considered the gold standard and was found to be effective. Other treatment options include corticosteroid injection into the oral PG, corticosteroid injection, and sodium tetradeccyl sulfate sclerotherapy (Martinez et al., 2023). Despite the variety of treatment modalities, recurrence remains a concern, with reported rates of approximately 16% (Verma et al., 2012). Recurrence is often attributed to incomplete lesion removal or persistent local irritants (Gomes et al., 2013). The present case employed conventional surgical excision combined with mechanical debridement to eliminate potential irritants. This approach resulted in no recurrence over a six-month follow-up period, underscoring the importance of thorough lesion removal and meticulous oral hygiene maintenance.

The significance of this study lies in highlighting the efficacy of conventional surgical excision in pediatric patients with extensive lesions. While minimally invasive techniques offer benefits in terms of patient comfort and reduced healing time, they may not be suitable for larger or recurrent lesions requiring complete removal (Martinez et al., 2023; Meshram et al., 2023). The methodology of combining mechanical debridement with surgical excision ensured comprehensive management of the lesion and its underlying causes.

This case report's strengths include detailed clinical, surgical, and histopathological documentation and consistent follow-up demonstrating long-term treatment success. However, limitations include the single-patient focus and lack of comparison with alternative treatment modalities. Potential biases may stem from operator technique and patient compliance with postoperative care.

While recent literature provides various treatment options, there remains a research gap in establishing standardized treatment protocols tailored to lesion size, location, and patient demographics (Kamal et al., 2012; Martinez et al., 2023; Meshram et al., 2023). Further comparative studies with larger sample sizes and longer follow-up periods are necessary to optimize PG management strategies and minimize recurrence rates.

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