

Recurrent Peripheral Ossifying Fibroma Treated with Diode Laser: A Case Report on Precision, Comfort, and Recovery

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Abstract:

Peripheral ossifying fibroma (POF) is a reactive gingival lesion of probable origin from the periodontal ligament or periosteal tissues. Clinically, it manifests as a firm, nodular mass, most commonly arising on the interdental papilla in the anterior maxillary region. A notable characteristic of POF is its relatively high recurrence rate, often attributed to incomplete surgical excision or the persistence of local irritants. Traditionally, scalpel excision has been the treatment of choice; however, the advent of diode laser technology has introduced a minimally invasive alternative that provides superior precision, effective hemostasis, and enhanced postoperative comfort. Recurrent presentations require particular attention to both meticulous surgical management and the identification of predisposing local factors to minimize the risk of further recurrence.

Keywords: *recurrence prevention, precision, minimally invasive surgical procedures, diode laser therapy, peripheral ossifying fibroma*

Introduction:

Localized gingival overgrowths are among the most commonly encountered lesions in the oral cavity, with peripheral ossifying fibroma (POF) representing an important reactive tumor-like entity accounting for approximately 3.1% of all oral tumors and 9.6% of gingival lesions [1,2]. POF arises as a focal, non-neoplastic connective tissue hyperplasia, typically originating from the interdental papilla, and is thought to derive from periodontal ligament cells in response to chronic local irritants such as plaque, calculus, ill-fitting restorations, or minor trauma [3].

The condition predominantly affects young females, especially in the second and third decades of life, with a predilection for the anterior maxilla in the incisor–canine region. Clinically, POF presents as a firm, sessile or pedunculated gingival nodule, usually measuring less than 2 cm, colored pink to red, and occasionally ulcerated. Histopathologically, lesions display cellular fibrous stroma interspersed with variable amounts of mineralized tissue ranging from dystrophic calcifications to bone or cementum-like deposits [4].

Despite standard treatment of complete surgical excision down to periosteum along with removal of local irritants, POF exhibits a notable recurrence rate, reported to be between 8% and 20%, commonly within 12 months post-excision. The most frequent causes of recurrence include incomplete lesion removal, persistence of irritating factors, or anatomical challenges during excision [5]. Therefore, close and long-term postoperative follow-up is strongly advocated.

Recurrent POF poses a clinical challenge due to the potential for multiple surgical interventions and risk of functional or aesthetic compromise. Given the recurrent nature of peripheral ossifying fibroma, complete excision with minimal trauma is essential to prevent regrowth. Diode laser excision offers advantages such as precise tissue removal, superior hemostasis, reduced postoperative discomfort, and faster healing. Its sterilizing effect may further reduce recurrence risk.

This case report aims to highlight the clinical presentation, histopathological features, and successful diode laser-assisted surgical management of a recurrent peripheral ossifying fibroma (POF) in the anterior palate of a young female patient. It further emphasizes the importance of identifying and addressing underlying etiological factors such as deep bite through an interdisciplinary approach to reduce recurrence risk and ensure long-term treatment success.

Case presentation:

A 20-year-old female patient presented to the Department of Periodontology and Implantology with a complaint of a recurrent soft tissue growth in the anterior palatal region, located just posterior to the maxillary central incisors. She reported having undergone surgical excision of a similar lesion at the same site two years prior, but had noticed a gradual reappearance of the mass over the past 6–8 months. The lesion was asymptomatic, with no history of pain, ulceration, or bleeding; however, the patient expressed concern about the esthetic appearance and occasional discomfort during speech and mastication.

Intraoral examination revealed a solitary, firm, sessile nodular mass measuring approximately 2×1.6 cm on the midline of the anterior hard palate. The overlying mucosa was intact and pale pink, and there was no sign of erythema or surface ulceration. An indentation was visible on the superior surface of the lesion, corresponding to the incisal edge of the mandibular central incisors, indicating chronic occlusal trauma from a deep bite (Figure 1).



Figure 1: Pre-operative clinical photograph

There was no evidence of tooth mobility, underlying bone involvement, or regional lymphadenopathy (Figure 2). Based on the clinical history, location, and recurrence pattern, a provisional diagnosis of irritational fibroma was made.



Figure 2: Orthopantomogram view

Written informed consent was obtained from the patient after a detailed explanation of the possible differential diagnosis, treatment plan, and possible outcomes. The patient was informed about the nature of the lesion and the rationale for choosing diode laser excision as a minimally invasive and precise surgical option. The benefits, risks, and postoperative expectations, including healing time and the potential need for further interdisciplinary management, were clearly discussed. Furthermore, the patient was made aware that her clinical information, including photographs and histopathological findings, would be used for clinical histopathological correlation.

Treatment:

The lesion was excised under local anesthesia using a diode laser operating at a wavelength of 976 nm with a power setting of 2.5 watts in continuous mode, delivered through a 400 μ m fiber tip (Figure 3).

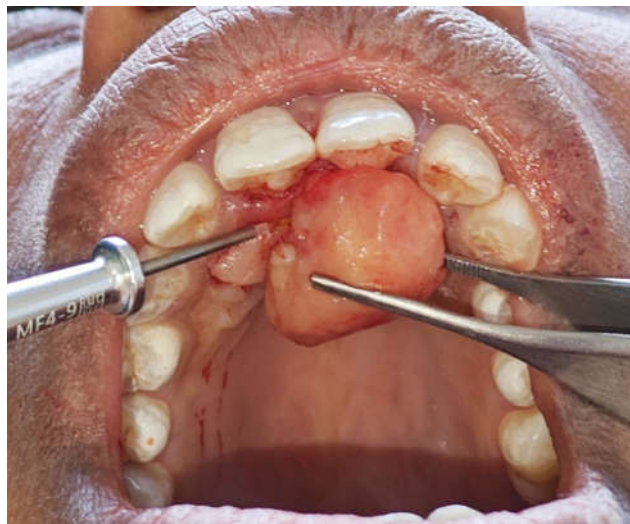


Figure 3: LASER assisted excision of peripheral ossifying fibroma

The laser provided a clean and bloodless surgical field with minimal collateral tissue damage, and suturing was not required (Figure 4).



Figure 4: Immediate post-operative

The excised specimen was fixed in 10% neutral buffered formalin and submitted for histopathological analysis (Figure 5).

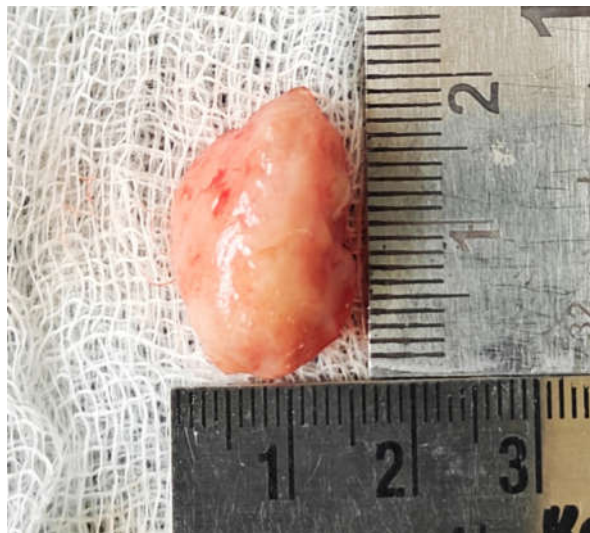
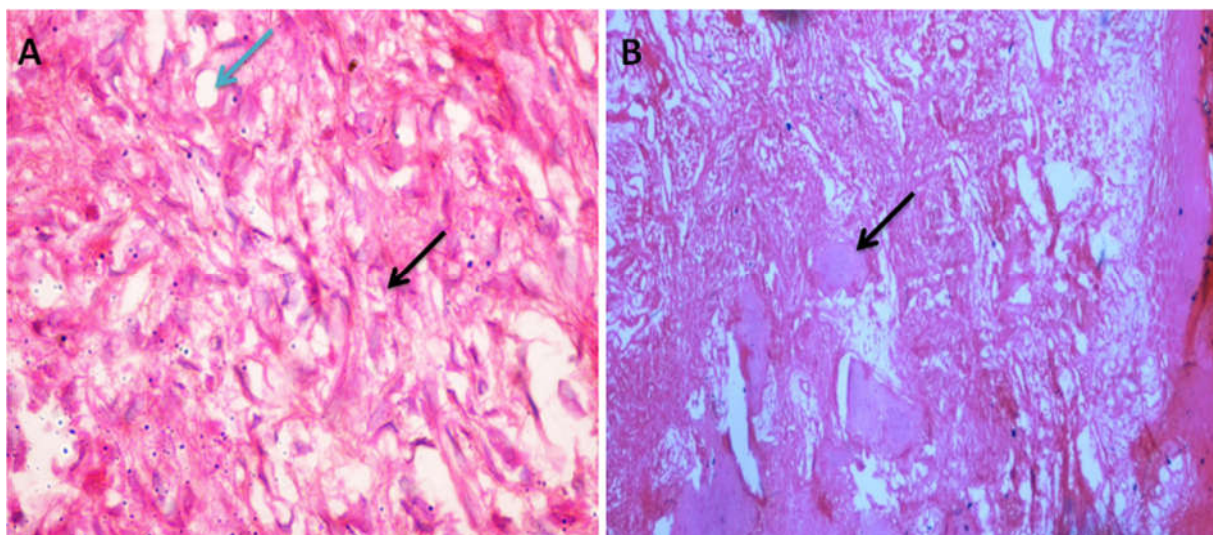


Figure 5: Excisional biopsy

Histological examination of hematoxylin and eosin (H&E)-stained sections revealed a highly cellular fibrous connective tissue stroma composed of densely arranged collagen fibers, numerous blood vessels of varying shapes and calibers, and chronic inflammatory infiltrates predominantly consisting of lymphocytes and plasma cells. Proliferating endothelial cells were

also observed. The central areas exhibited intense fibroblastic proliferation along with focal zones of calcification, consistent with the diagnosis of peripheral ossifying fibroma (Figure 6).



(A) Blue arrow indicates proliferating endothelial cells, while black arrow indicates proliferating fibroblasts within a highly cellular fibrous connective tissue stroma. (B) Black arrow indicates focal areas of calcification within the fibrocellular stroma

Figure 6: Histopathology

The postoperative course was uneventful. At one-week follow-up, healing was satisfactory, and the patient reported no discomfort. By the end of the fourth week, complete epithelialization was noted (Figure 7).

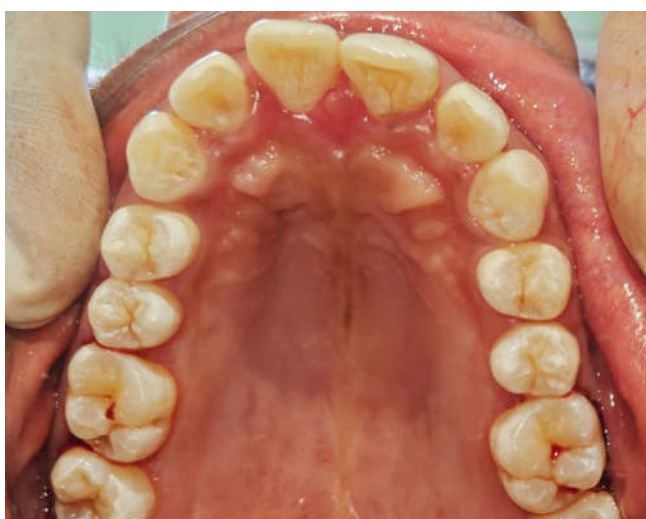


Figure 7: Post-operative at 4th week

To address the contributing factor of chronic trauma from the deep bite and to minimize the risk of recurrence, the patient was referred to the Department of Orthodontics for occlusal evaluation and correction of the malocclusion. The interdisciplinary management aimed to provide long-term stability and prevent further reactive lesions in the affected site.

Discussion:

Peripheral ossifying fibroma (POF) is a reactive gingival lesion thought to originate from the periodontal ligament, and is commonly seen in the anterior maxilla, particularly in the interdental papilla region of the incisor-canine area [6]. The recurrent nature of the lesion in this case highlights the importance of addressing not only the excision but also any contributing mechanical or occlusal trauma.

Our patient, a 20-year-old female, presented with a recurrent POF at the anterior palate, just posterior to the maxillary central incisors, an area frequently subjected to chronic mechanical irritation due to deep bite. As reported by Buchner and Hansen et al. (1987), POF tends to affect females in the second decade of life and commonly presents in the incisor region, supporting the clinico-histopathological correlation in this case [7].

Kenny JN et al. (1989) stated that, the exact pathogenesis of peripheral ossifying fibroma (POF) is not fully understood, it is widely believed to originate from the periodontal ligament. This hypothesis is supported by the lesion's confinement to gingival tissues, particularly the interdental papilla, its close anatomical relationship to periodontal structures, and the identification of oxytalan fibers within its mineralized areas. Excessive proliferation of fibrous connective tissue in response to persistent irritation such as from dental plaque, calculus, trauma, or foreign bodies can stimulate metaplastic changes, leading to calcification or bone formation. Contributing local irritants may include poor restorations, ill-fitting dentures, microbial biofilms, or masticatory stress. Additionally, the higher occurrence in females and its typical presentation during adolescence and early adulthood suggest hormonal involvement [8].

The lesion was excised using a 976 nm diode laser, which has been shown to offer significant clinical advantages over scalpel excision, including enhanced precision, reduced intraoperative bleeding, minimal postoperative discomfort, and better healing outcomes. In a study by **Jha et al. (2019)**, diode lasers were found to be particularly beneficial in the excision of oral soft tissue lesions, providing excellent hemostasis and reduced recurrence rates when compared to conventional methods. Moreover, laser-assisted excision eliminates the need for sutures in many instances, promotes secondary intention healing, and has been reported to reduce the risk of recurrence compared to scalpel excision in reactive lesions [9].

Histopathologically, the excised lesion displayed a highly cellular fibrous stroma with proliferative fibroblasts, endothelial cells, and calcified foci. These findings consistent with previous literature. According to **Giovanni mergoni et al. (2017)**, the presence of mineralized material in the stroma is a hallmark of POF, and the degree of cellularity can vary based on the lesion's age and chronicity [10]. The inflammation observed in our case, predominantly

lymphocytes and plasma cells aligns with a long-standing reactive lesion subjected to persistent irritation.

Recurrence is a known complication of POF, often attributed to incomplete excision or failure to eliminate the etiological factor. The patient in this report had a similar lesion excised two years prior without correction of her deep bite. We ensured thorough surgical excision and referred the patient to the orthodontics department for deep bite management to address the underlying mechanical trauma.

This interdisciplinary approach underscores the significance of comprehensive care in managing reactive lesions. Failure to remove the primary etiological factor predisposes patients to recurrence despite surgical intervention. As emphasized by **Farquhar et al. (2008)**, correcting underlying causes such as traumatic occlusion or dental appliances is critical in preventing lesion recurrence [11].

Conclusion:

This case underscores the significance of combining advanced surgical techniques with comprehensive interdisciplinary care in managing recurrent peripheral ossifying fibroma (POF). Diode laser excision proved to be an effective, minimally invasive approach that enhanced patient comfort, minimized intraoperative bleeding, and promoted rapid healing. Importantly, the post-surgical referral for orthodontic correction of deep bite addressed a key etiological factor, thereby reducing the likelihood of recurrence. Looking ahead, the integration of laser-assisted surgery with tailored occlusal rehabilitation represents a forward-thinking strategy for the predictable and sustainable management of reactive gingival lesions.

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