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# Ossifying fibrous epulis: case reports and diagnostic insights into gingival swellings

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## Abstract

Ossifying fibrous epulis, also known as peripheral ossifying fibroma in literature, is a relatively common, benign reactive lesion that exclusively affects the gingival tissue. It arises in response to chronic local irritation such as plaque accumulation, calculus, faulty restorations, or repeated trauma. Though non-neoplastic in nature, it can present as a slowly enlarging, firm, and fibrous mass, mimicking a range of other more aggressive or neoplastic conditions. Histopathological examination is paramount for achieving a definitive diagnosis. This report presents two cases occurring in young adults, highlighting the clinical features, diagnostic process, surgical management, and post-operative outcomes. The lesions, located in the anterior maxilla and mandibular gingiva respectively, shared common clinical traits including nodular appearance, surface colour resembling surrounding mucosa, and occasional bleeding upon provocation. Histopathological analysis in both cases revealed parakeratinised stratified squamous epithelium with focal degeneration, mineralized components such as trabeculae of bone and cementum-like materials, and chronic inflammatory cells infiltrate. Following surgical excision and removal of local irritants, healing was uneventful with no recurrence observed during short-term follow-up. This paper further elaborates on the histopathological spectrum, recurrence risk, and differential diagnosis of ossifying fibrous epulis, supported by a tabulated overview of similar gingival lesions. Recognising the clinical behaviour and key distinguishing features of this lesion is crucial in general dental practice to avoid misdiagnosis and ensure appropriate intervention. Early detection, thorough removal, and patient education are integral to effective management and prevention of recurrence.

***Keywords:*** *gingival swelling, ossifying fibrous epulis, peripheral ossifying fibroma, reactive lesion*

**Received:**
13 June 2025
**Revised:**
4 November 2025
**Accepted:**
5 November 2025
**Published Online:**
28 February 2026
**How to cite this article:**
Ibrahim, N. R., & Mohd Ali, M. N. H. (2026). Ossifying fibrous epulis: case reports and diagnostic insights into gingival swellings. *IIUM Journal of Orofacial and Health Sciences*, *7*(1), 81–90. https://doi.org/10.31436/ijohs.v7i1.413
**Article DOI:**
https://doi.org/10.31436/ijohs.v7i1.413
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## Introduction

Gingival tissues are frequently affected by various pathological conditions, often presenting clinically as localised or generalised swellings within the oral cavity. These lesions are among the most common findings during routine dental examinations and can arise due to various aetiological factors, including local trauma, microbial infections, or neoplastic processes (Effiom, Adeyemo & Soyele, 2011; Maturana-Ramírez *et al.*, 2015; Zhao *et al.*, 2023). The differential diagnoses of gingival enlargements are extensive, encompassing both reactive and neoplastic lesions (Agrawal, 2015; Brierley *et al.*, 2019).

Reactive lesions of the gingiva such as pyogenic granuloma, fibrous epulis, ossifying fibrous epulis, and peripheral giant cell granuloma constitute many cases encountered in daily clinical practice. These lesions typically develop in response to persistent local irritation from factors like dental plaque, calculus, faulty restorations, or ill-fitting prostheses (Zhao *et al*., 2023). Although non-neoplastic in nature, their clinical presentation may mimic more serious conditions, necessitating histopathological examination for definitive diagnosis.

In contrast, true neoplastic lesions involving the gingiva are relatively rare but hold significant clinical importance. Benign neoplasms, such as peripheral counterpart of odontogenic tumours and metastatic deposits, may occasionally present as gingival swellings. Malignant lesions, including primary squamous cell carcinoma and metastatic tumours from distant sites like the breast or lung, though uncommon, must also be considered in the differential diagnosis, especially in cases of unexplained rapidly growing masses (Brierley *et al*., 2019).

The clinical evaluation of gingival lesions should involve a comprehensive assessment, including a detailed medical and dental history, thorough clinical examination, radiographic analysis, and biopsy when indicated. Due to the overlapping clinical features of reactive, benign, and malignant lesions, a multidisciplinary approach is often necessary for definitive diagnosis and appropriate treatment planning.

This paper presents two cases of ossifying fibrous epulis, detailing their clinical presentation, diagnostic evaluation, and surgical management. In addition, it discusses relevant differential diagnoses for gingival swellings and highlights their key features for accurate diagnosis and appropriate treatment planning.

## Case reports

### Case 1

A 24-year-old female presented to Kulliyyah of Dentistry undergraduate dental polyclinic with a chief complaint of a swelling on her upper right gum. She reported that the lesion had been present for approximately two years and had gradually increased in size over that period. She did not report any associated pain or systemic symptoms. However, she noted occasional bleeding during toothbrushing and a history of repeated trauma to the area, particularly from brushing. The patient mentioned that she had sought treatment on three separate occasions for the same condition and was advised each time that the lesion would resolve with improved oral hygiene. She is a university student, single, and denies any history of sexual promiscuity.

Extraoral examination revealed no significant findings. Intraoral examination showed a solitary, sessile, erythematous gingival nodule on the buccal aspect of tooth 12, measuring approximately 10 × 4 mm. The lesion was oval in shape, firm in consistency, and extended labially, covering nearly half of the crown of tooth 12 (Figure 1).

The lesion was surgically excised under local anaesthesia without complications. The excised tissue sample was immediately fixed in formalin and subsequently submitted to the laboratory for histopathological examination.

*Macroscopic examination:*
The specimen consisted of a single piece of brownish soft tissue measuring approximately 10 × 3 × 3 mm. The tissue was bisected and submitted entirely in one block.

*Microscopic examination:*
Histopathological sections revealed parakeratinised stratified squamous epithelium of variable thickness, with focal areas showing surface degeneration (Figure 2A and 2B). The underlying connective tissue exhibited high cellularity within a background of mature fibrous stroma.

Scattered throughout the specimen were trabeculae of mature bone, cementum-like material, and areas of dystrophic calcification (Figure 2C). Inflammatory cell infiltrate was noted scattered within the tissue sections, predominantly composed of chronic inflammatory cells including lymphocytes and plasma cells.

Final diagnosis of ossifying fibrous epulis was rendered for this case, consistent with its clinical appearance and histopathological findings.

*Follow up and outcomes:*
The patient was reviewed two weeks following surgical excision. Clinical evaluation revealed satisfactory healing of the surgical site, with no evidence of complications or recurrence (Figure 3). The patient expressed satisfaction with the outcome of the procedure and reported no discomfort or concerns. Oral hygiene instructions were reinforced, and she was advised to maintain meticulous plaque control.

Figure 1. Intraoral photograph showing a reddish, sessile lesion on the labial gingiva of tooth 12.

**Case 2**

A 20-year-old Malay male presented to the undergraduate dental polyclinic with a chief complaint of a growth on his lower anterior gingiva. He reported that the lesion had been present for approximately three years. Initially appearing as a mild gingival swelling, the lesion gradually increased in size and became firmer after the first year. The patient noted mild discomfort associated with the lesion and ultimately sought treatment due to its unaesthetic appearance, particularly noticeable when smiling.

The patient was medically fit and had no history of significant systemic illness. He was a non-smoker, denied any parafunctional habits or high-risk behaviours and described himself as leading a generally healthy lifestyle. He is currently a university student.

Extraoral examination revealed no significant findings. Intraoral examination showed a slightly reddish swelling on the labial gingiva in the interproximal region between teeth 41 and 42 (Figure 4). The lesion was firm in consistency, ovoid in shape with a leaf-like appearance, and arose from the keratinised gingiva. It measured approximately 5 × 7 mm. Mild bleeding was observed upon manipulation of the lesion. The patient's overall oral hygiene was suboptimal, with evident supragingival calculus deposits on the lower anterior teeth.

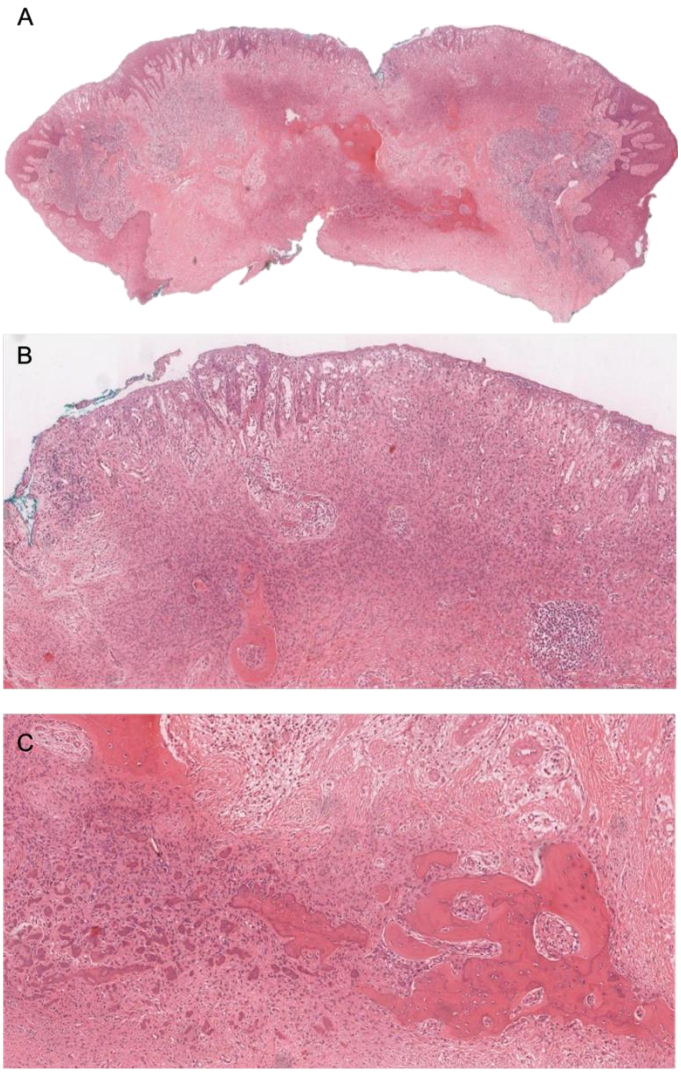


Figure 2. Histopathological features of the lesion under haematoxylin & eosin staining. (A) Low magnification image showing a sessile lesion with central ossification. (B) Areas of degenerated surface epithelium. (C) Ossified hard tissue of multiple sizes present at the central of the lesion surrounded by cellular fibrous connective tissue with occasional inflammatory cell infiltrates.

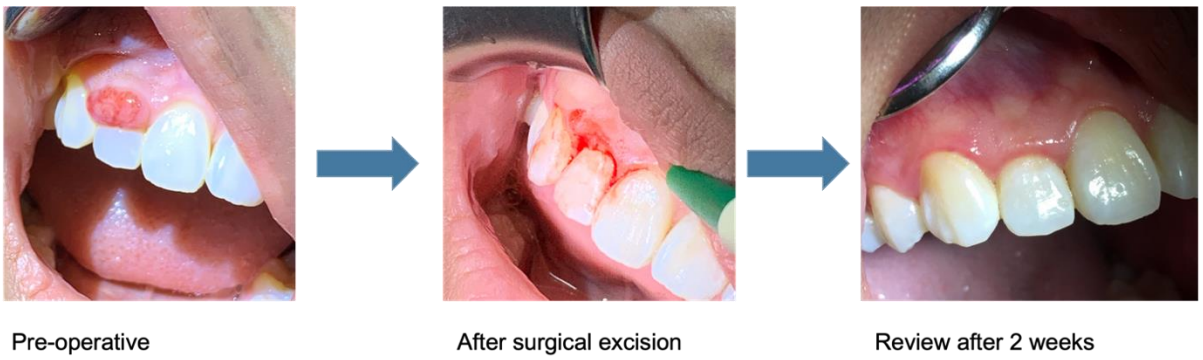


Figure 3. Clinical images illustrating the treatment sequelae of this case, including the preoperative presentation, immediate post-excision appearance, and postoperative healing outcomes.

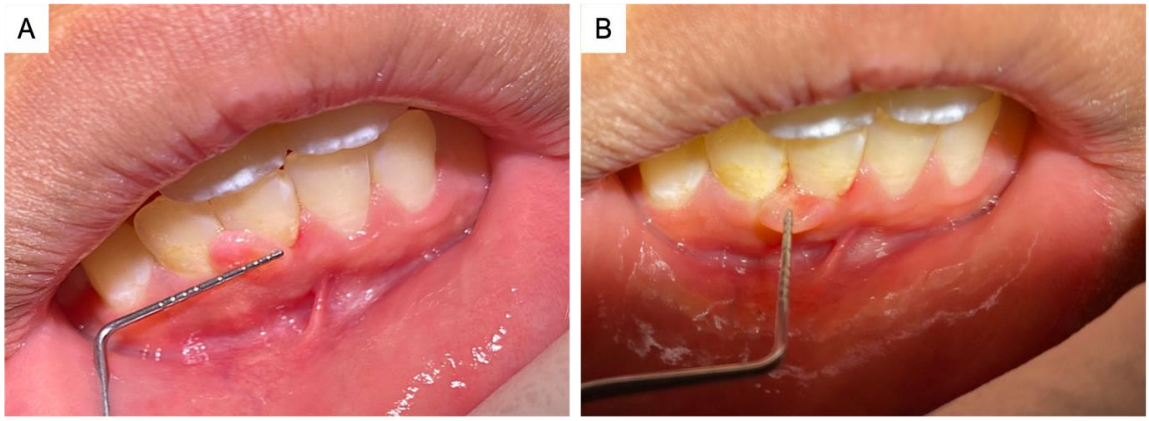


Figure 4. (A&B). Intraoral photograph showing the leaf-like appearance of a gingival swelling on the labial aspect of 41 and 42.

The lesion was surgically excised under local anaesthesia using a sterile scalpel blade. Digital pressure was applied with sterilised gauze to achieve haemostasis. A periodontal dressing (Coe-Pak) was placed over the surgical site to protect the area and facilitate healing. The excised tissue was immediately immersed in 10% buffered formalin and submitted to the histopathology laboratory for analysis.

*Macroscopic examination*:
A firm, whitish soft tissue specimen measuring approximately 4 × 5 × 3 mm. The sample was bisected and entirely submitted in one cassette for routine processing and embedding.

*Microscopic examination:*
Demonstrates mature fibrous connective tissue covered by parakeratinised stratified squamous epithelium (Figure 5A). In certain areas, the surface epithelium exhibited degeneration with focal neutrophilic infiltration (Figure 5B). The underlying stroma consisted of trabeculae of woven bone and areas of dystrophic calcification, dispersed within a fibrous matrix (Figure 5C). A dense inflammatory cell infiltrate, predominantly composed of chronic inflammatory cells such as lymphocytes and plasma cells, was observed throughout the connective tissue.

Based on the clinical presentation and histopathological features, the final diagnosis established for this case was ossifying fibrous epulis.

## Discussion

Ossifying fibrous epulis (OFE) is a reactive, non-neoplastic lesion of mesenchymal origin that arises exclusively on the gingiva. Regarding its nomenclature, this entity has been described in the literature under various terms, including "peripheral ossifying fibroma", "peripheral fibroma with calcifications", "calcifying fibroma", "calcifying fibroblastic granuloma", and "fibrous epulis with ossification" (Takagi *et al*., 2024). Although "peripheral ossifying fibroma" (POF) is widely accepted, it is important to distinguish this lesion from central ossifying fibroma, which is a true neoplasm originating within the jawbone. To reduce terminological ambiguity and avoid conflating it with intraosseous neoplasms, we have opted to use the term ossifying fibrous epulis in this report, reflecting both its reactive nature and its peripheral gingival location. OFE typically develops in response to chronic local irritation or trauma, such as plaque accumulation, calculus, faulty dental restorations, or repeated mechanical injury during oral hygiene practices. It is believed to originate from cells within the periodontal ligament and periosteum, which possess the capacity to undergo metaplastic transformation into hard tissue-forming cells, such as osteoblasts or cementoblasts, under persistent inflammatory stimuli.

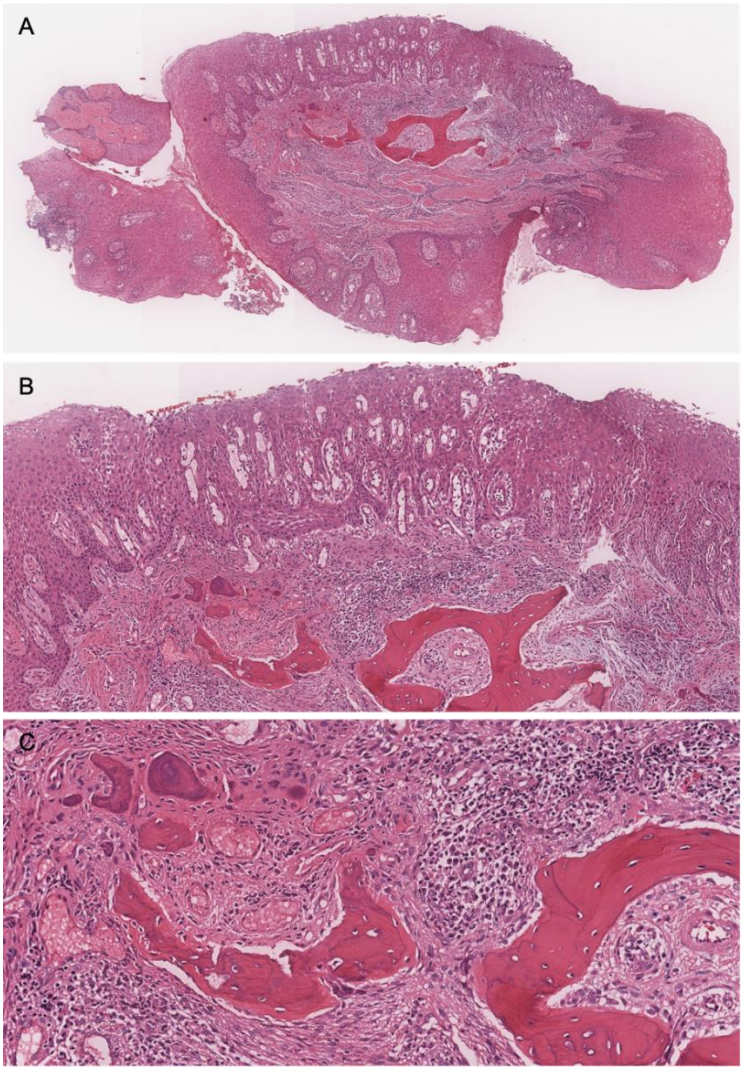


Figure 5. Histopathological features of the lesion under haematoxylin & eosin staining. (A) Low magnification image shows a soft tissue lesion covered by acanthotic surface epithelium. (B) Areas of degenerated surface epithelium with intense inflammatory cell infiltrates. (C) Ossified hard tissue of multiple sizes present within underlying connective tissue.

These lesions are most commonly localised to the interdental papilla or marginal gingiva, the areas particularly susceptible to both mechanical and inflammatory insult.

Demographically, OFE exhibits a marked predilection for females, particularly in the second and third decades of life, which may suggest an underlying hormonal influence, although the exact pathophysiological mechanisms remain unclear. This gender and age-related distribution have been consistently reported across multiple studies (Zhao *et al*., 2022), reinforcing the need to consider patient demographics in clinical suspicion and diagnosis. While the anterior maxilla is the most commonly affected site, likely due to its anatomical and functional exposure to irritants, lesions have also been documented in other areas of the oral cavity, including the posterior maxilla, mandible, and even edentulous ridges, albeit less frequently (Katanec *et al*., 2022; Krishna *et al*., 2022; Deepthi *et al*., 2024).

Clinically, reactive gingival lesions, particularly OFE are typically characterised by slow, progressive growth, a painless nature, and presentation as sessile or pedunculated swellings. Their benign appearance may lead to misdiagnosis or underestimation, especially during the early stages. However, the clinical presentation of OFE often overlaps with other gingival

enlargements such as fibrous epulis, pyogenic granuloma, and even early-stage neoplastic lesions. This underscores the importance of histopathological evaluation in establishing a definitive diagnosis and distinguishing reactive lesions from more serious pathologies.

In some cases, reactive gingival lesions may reach considerable sizes, and several reports in the literature have documented gingival overgrowths that clinically mimic malignant tumours (Sacks, Amrani & Anderson, 2012; Gulati *et al*., 2019; Takagi *et al*., 2024). Such exaggerated growth, particularly when associated with ulceration, rapid progression, or surface irregularities, may raise suspicion of malignancy and prompt further diagnostic work-up. In the present cases, the lesions had been persistent for over a year, demonstrating gradual enlargement and episodic bleeding, especially during tooth brushing. These clinical findings, along with a history of local trauma and absence of systemic symptoms, are consistent with chronic reactive gingival lesions. Despite their non-neoplastic nature, such lesions may pose aesthetic and functional concerns and therefore require timely surgical excision and appropriate follow-up.

OFE is a peripheral lesion confined to the soft tissues, with no involvement of the underlying alveolar bone. Accordingly, radiographic investigations typically reveal no osseous changes. Nevertheless, imaging remains a valuable adjunct to rule out bone involvement, assess the lesion's relationship to adjacent structures, and exclude other intraosseous conditions.

In general, gingival swellings or "lumps and bumps" are among the most commonly encountered lesions in routine dental practice (Brierley *et al*., 2019). They may present as localised or generalised enlargements and can arise from a wide spectrum of aetiologies, including reactive lesions, developmental anomalies, neoplastic growths, and infectious or inflammatory conditions. Accurate diagnosis is essential, not only to establish appropriate treatment but also to exclude malignant or aggressive pathologies that may mimic benign lesions in their early presentation.

A structured clinical approach is critical in differentiating among various gingival lesions. Important parameters include the lesion's duration, growth rate, colour, surface texture, consistency, bleeding tendency, and associated symptoms such as pain or discomfort. In addition, a thorough medical, dental, and social history, along with a focused extra- and intraoral examination, provides critical context for narrowing the differential diagnosis. Clinical differentiation from other gingival overgrowths remains a challenge due to overlapping presentations of these lesions.

Both cases presented in this report involved gingival swellings that were chronic, firm, and asymptomatic over extended periods, eventually prompting intervention due to aesthetic concerns or progressive enlargement. Although the lesions initially resembled fibrous epulis or pyogenic granuloma clinically, the definitive diagnosis of ossifying fibrous epulis (OFE) was established based on the histopathological identification of mineralised components, including bone, cementum-like material, and dystrophic calcifications.

The key to distinguishing OFE from other similar gingival lesions lies in histopathological evaluation, which typically reveals a fibrocellular connective tissue matrix interspersed with mineralised foci and chronic inflammatory infiltrates (Buchner & Hansen, 1987). For instance, fibrous epulis lacks calcification, peripheral giant cell granuloma is characterised by numerous multinucleated giant cells in a vascular stroma, and pyogenic granuloma features prominent capillary proliferation and inflammatory cells. Drug-induced gingival overgrowth, in contrast, is typically generalised, fibrotic, and associated with systemic medications such as phenytoin, cyclosporine, or calcium channel blockers. Table 1 tabulates an overview of differential diagnoses that clinicians should consider when evaluating gingival swellings.

Table 1. Comparative overview of differential diagnoses for a gingival swelling.

| Condition | Clinical Features | Histopathological Features |
|---|---|---|
| **Fibrous Epulis** | Firm, painless, sessile swelling on gingiva; normal mucosal colour | Dense fibrous connective tissue with minimal inflammation |
| **Pyogenic Granuloma** | Red, lobulated, soft, bleeds easily; often associated with pregnancy or trauma | Granulation tissue with abundant capillaries and inflammatory cells |
| **Ossifying fibrous epulis (OFE)** | Firm, pink-red gingival mass; may be ulcerated; often in anterior region | Fibrous stroma with varying amounts of bone, cementum-like material, calcifications |
| **Peripheral Giant Cell Granuloma (PGCG)** | Bluish-red gingival lump; may cause "cupping" resorption of alveolar bone | Multinucleated giant cells in cellular fibrovascular stroma with haemorrhage, haemosiderin deposits |
| **Parulis (Gumboil)** | Soft, fluctuant swelling near non-vital tooth apex; purulent drainage; often painful | Inflamed granulation tissue with pus and neutrophilic infiltrate |
| **Peripheral Ameloblastoma** | Rare; firm, nodular gingival swelling; slow growing | Islands of ameloblastoma proliferation in connective tissue |
| **Kaposi Sarcoma** | Reddish-purple gingival nodules; often multifocal; associated with immunosuppression | Spindle cell proliferation with slit-like vascular spaces and extravasated RBCs |
| **Drug-Induced Gingival Hyperplasia** | Generalised gingival enlargement; often firm and fibrotic | Dense fibrous connective tissue; minimal inflammation |

Microscopically, OFE is characterised by a parakeratinised stratified squamous epithelial surface, a cellular fibrous stroma, and varying degrees of mineralised material, including bone and cementum-like deposits. The surface epithelium may present as ulcerated in some cases, although it remains intact in others. In ulcerated lesions, the underlying connective tissue typically appears highly cellular, whereas lesions with an intact epithelial surface tend to show a more collagenised stroma. Buchner and Hansen (1987) provided a comprehensive description of the histomorphological spectrum of this lesion (referred to as peripheral ossifying fibroma (POF) in their report) which remains relevant to current diagnostic practice. The presence of mineralised components is a key histopathological feature that distinguishes OFE from other non-ossifying fibrous proliferations and supports its classification within the group of reactive ossifying lesions.

Management of OFE typically involves surgical excision with removal of local irritants and regular follow-up to monitor for recurrence. OFE is treated by complete excision down to the periosteum. Surgical care of the gingival tissue should be carefully handled especially to not damaging the interdental papilla for aesthetic postoperatively. Studies report recurrence rates between 8% and 20% (Zhao *et al*., 2022). Patient education and hygiene

reinforcement are critical steps in reducing recurrence of OFE. Evidence suggests that regular supportive periodontal therapy including thorough oral hygiene instruction, scaling, and root surface debridement plays a significant role in reducing the recurrence rate of reactive gingival lesions when compared to patients who do not receive such maintenance care. Poor oral hygiene has been consistently identified as a major contributing factor to lesion recurrence, emphasizing the importance of effective plaque control in long-term management. Individual oral hygiene practices are critical for preserving periodontal health over time, reinforcing the need for continuous patient education and follow-up (Zhao *et al*., 2023; Chien *et al*., 2024).

## Conclusion

OFE is a benign, reactive lesion of the gingiva that necessitates accurate diagnosis and management to prevent recurrence. The cases presented in this paper underscores the importance of considering OFE in the differential diagnosis of gingival swellings and highlights the role of histopathological examination in establishing a definitive diagnosis. Complete surgical excision and elimination of local irritants, coupled with diligent oral hygiene practices, are pivotal in ensuring favourable outcomes.

## Acknowledgment

We would like to express our sincere gratitude to Dr. Nurina Sabaznur and Dr. Khairul Syahmi Ismail for their valuable contribution in providing the clinical information essential to this report.

## Conflict of Interest

The authors declare no conflicts of interest related to this publication.

## Funding

No external funding was received for the conduct of this study.

## Ethical Considerations

Consent was obtained from the patient for the publication of clinical data and images included in this report.

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