

Peripheral ossifying fibroma: a case series of patients reported at Islamic International Dental College and Hospital, Islamabad between 2013 to 2023

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ABSTRACT

Objectives: To analyze the demographic, clinical, and histopathological characteristics of histologically confirmed Peripheral Ossifying Fibroma (POF) cases diagnosed at Islamic International Dental College & Hospital (IIDC&H) over a 10-year period, with the aim of identifying prevalent patterns and enhancing diagnostic precision and clinical management.

Methods: This retrospective, cross-sectional study reviewed 20 histologically confirmed cases of POF diagnosed between 2013 and 2023 at the Department of Oral Pathology, IIDC&H Islamabad, Pakistan, after obtaining Ethical approval (Ref no: IIDC/IRC/2023/012/002). Demographic, clinical, and histological data were retrieved from institutional archives. Clinical parameters included age, gender, site, size, symptoms, and lesion characteristics. Histopathological evaluations included type of mineralized material, epithelial ulceration, inflammation, vascularity, and cellularity. Frequencies and percentages were calculated using SPSS version 24.

Results: Of the 20 patients, 55% were female and 65% were aged 15–30 years. The lesions were most frequently located in the anterior maxilla (45%) and anterior mandible (40%), with sizes ranging from <2 cm to 4 cm. The most common clinical presentation was gingival growth (60%). Histologically, 90% showed epithelial ulceration. Bone formation was the most prevalent calcified material (30%), followed by osteoid/cementoid (25%) and dystrophic calcifications (15%). Chronic inflammation (75%) and hypervascular stroma (65%) were common findings. Recurrence was observed in 10% of cases, both in females within one year.

Conclusion: This case-series highlights the diverse clinical and histopathological features of POF, with a female predominance, maxillary predilection, bone formation in 60% of cases, and chronic inflammation in 75%, emphasizing the need for careful diagnosis and management.

Keywords: Epulis (MeSH); Gingival Diseases (MeSH); Gingiva (MeSH); Peripheral ossifying fibroma (Non-MeSH); Ulceration (MeSH); Ulcer (MeSH); Pathology (MeSH); Histopathology (MeSH).

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INTRODUCTION

Epulis is a clinical term used to describe swelling of gingiva which does not specify the histopathology of the lesions. Epulides are believed to be reactive in nature hence classified based on etiology, pathogenesis, site, distribution, and size. They develop from the periodontal ligament (PDL) and the free gingival margin in reaction to trauma or various inflammatory conditions, as

plaque and calculus, orthodontic appliances, ill-fitting crowns, and overhanged fillings with high growth and recurrence rate.^{2,3} The most common lesions that constitute the differential diagnosis for epulides include peripheral fibroma, peripheral ossifying fibroma (POF), pyogenic granuloma, peripheral giant cell granuloma (PGCG), and epulis fissuratum.^{1,4,5}

Gardner described the term POF in 1982 as a reactive lesion that is not the

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extraosseous counterpart of the central ossifying fibroma of the jaws.⁶ POFs are mesenchymal lesions that present as slow growing swelling that are exophytic, firm, pink, ulcerated nodules, commonly occurring in teenage females on interdental papilla.^{1,3,4,7} POFs are mostly less than 2 cm in size however, larger lesions have also been reported.^{8,9} The histopathology of POF shows fibrous proliferations of spindle shaped cells and synthesis of bone, cementum, cementicles or calcifications as unique features.^{7,10} Presence of inflammatory cells, histiocytes and giant cells is also reported. Definitive treatment of POF includes resection, including PDL and periosteum with close follow-up due to high recurrence rate (8%-20%).^{10,11}

Despite the clinical relevance of POF, it remains frequently misdiagnosed as other reactive gingival lesions such as pyogenic granuloma, fibroma, or peripheral giant cell granuloma, emphasizing the necessity of histopathological confirmation for accurate diagnosis. In Pakistan, access to specialized oral histopathologic diagnostic services is severely limited, resulting in underreporting and inadequate understanding of such lesions. Furthermore, published data on the clinical and histological spectrum of POF within the local population is scarce.

To address the critical gap in local data and diagnostic resources related to POF, this case series presents a retrospective analysis of histologically confirmed cases diagnosed over a decade at the Department of Oral Histopathology, Islamic International Dental College & Hospital, Riphah International University, Islamabad. By documenting the demographic, clinical, and histopathological characteristics of POF, the study aimed to enhance understanding of its varied presentations and identify common patterns to support accurate diagnosis. In the context of Pakistan's limited access to specialized oral histopathologic services, these findings offer a timely and practical resource for dental students and clinicians, strengthening diagnostic accuracy and clinical decision-making while contributing valuable evidence to the national literature on oral pathologies.

METHODS

In this retrospective, cross-sectional study, 20 histologically confirmed cases of POF were reviewed. These cases were retrieved from the archives of the Department of Oral Pathology at Islamic International Dental College & Hospital, Riphah International University, Islamabad, Pakistan and represent biopsy specimens received over a 10-year period from 2013 to 2023. Ethical approval for the study was obtained from the Institutional Review Board of Islamic International Dental College (Reference No: IIDC/IRC/2023/012/002) prior to data collection.

The inclusion criteria comprised all biopsy-proven cases POF, while cases that were clinically suspected as POF but diagnosed otherwise upon histopathological examination were excluded. Patient records were thoroughly reviewed to extract demographic information, including age and gender. For ease of data presentation, patient age was categorized into the following strata: 15–30 years, 31–45 years, and 46–60 years.

The presenting complaint associated with the lesion, and other clinical findings such as the size, site with associated teeth (if any), duration and clinical presentation (shape, color, consistency, insertion) were retrieved.

The clinical and histological differentials as well as the type of biopsy received along with other parameters of clinical relevance such as recurrence were also documented. For reporting size, two categories were defined i.e. < 2 cms and 2–4 cms in their greatest dimension.

For the histopathological analysis, consensus was achieved among multiple oral pathologists. The evaluation focused on several parameters, including the type of mineralized material, which was categorized into three distinct types:

- a) Dystrophic calcifications, characterized by irregular, small, basophilic globules;
- b) Osteoid/cementoid material, consisting of unmineralized matrix suggestive of early bone or cementum-like basophilic calcifications; and
- c) Woven and lamellar bone, representing more mature forms of mineralization.

Additional histopathological features assessed included the presence or absence of surface ulceration; the type of inflammatory infiltrate (acute, chronic, or mixed), along with its intensity (focal, patchy, or diffuse); the presence of multinucleated giant cells; and the overall cellularity and vascularity of the lesion. The presence of hemosiderin deposition was also documented as part of the vascular assessment.

Statistical analysis was performed using SPSS software version 24.0. Frequency and percentages were calculated for qualitative variables.

RESULTS

The data for this case series was collected over a period of 10 years and 20 patients were included in this study. Demographic and significant clinical parameters are presented in Table I.

Ten (50%) lesions were reported in the maxillary arch (9 in anterior region while 1 in posterior), 9 (45%) in the mandibular arch (8 in anterior region while 1 in posterior) while 1 (5%) remained unspecified with respect to site. With respect to dentition, majority of the lesions 8 (40%) were associated with anterior mandibular teeth, 1 (5%) with posterior mandibular tooth. Equal number of lesions 4 (20%) each were

found in maxillary anterior and posterior teeth while 2 (10%) were found to be extending from maxillary anterior to posterior teeth. 1 (5%) lesion remained unspecified with respect to exact association with teeth.

Further clinical evaluation of POF lesions included features such as consistency, shape, and color. Five (25%) of the lesions clinically presented as soft masses with the same number of lesions appearing firm to hard (n=5, 25%). Five (25%) of the lesions were round and well-circumscribed, 1 (5%) elliptical while 1 (5%) appeared irregular. Four (20%) lesions were red, 2 (10%) reddish-white, 1 (5%) pink, and 1 (5%) had a purplish-red hue.

Clinical differential diagnoses of the cases revealed 14 (70%) cases clinically diagnosed as pyogenic granuloma. In the remaining cases, the differential diagnoses included PGCG, POF, calcifying odontogenic fibroma (COF), fibroma, epulis, central giant cell granuloma (CGCG), pregnancy tumor, and oral squamous cell carcinoma (OSCC).

In the scrutiny of histopathological features, all lesions were lined by stratified squamous epithelium with 18 cases (90%) exhibiting epithelial ulceration. In this study, 12 (60%) of the cases exhibited bone formation either alone or in combination with other mineralized products (Figure 1a) followed by osteoid/cementoid (n = 5, 25%) [Figure 1b], and dystrophic calcifications (n=3, 15%) [Figure 1c].

Analysis of the mesenchymal component demonstrated hypercellularity in 9 cases (45%) and hypocellularity in an equal number (n = 9, 45%). Regarding the nature of inflammation, chronic inflammatory infiltrates were observed in 15 cases (75%), while 3 cases (15%) exhibited a mixed inflammatory response. In terms of inflammatory intensity, 11 cases (55%) showed patchy or scattered infiltration, 5 cases (25%) exhibited dense inflammation.

A hypervascular stroma was identified in 13 cases (65%), whereas 5 cases (25%) showed hypovascularity. Among these, 5 cases (25%) displayed a stroma rich in red blood cells (RBCs), and another 5 cases (25%) exhibited a typical vascular pattern. Notable findings included multinucleated giant

Table I: Demographic and clinical profile of peripheral ossifying fibroma cases

Features		Frequency (n=20)	Percentage
Gender	Male	9	45
	Female	11	55
Age (years)	15-30	13	65
	31-45	5	25
	46-60	2	10
Site	Anterior Maxilla	9	45
	Posterior Maxilla	1	5
	Anterior Mandible	8	40
	Posterior Mandible	1	5
	Unspecified	1	5
Duration	Up to 6 months	10	50
	>6 months to 1 year	3	15
	> 1 year to 2 years	1	5
	Unspecified	6	30
Size	< 2 cm	10	50
	2- 4 cm	10	50
Presenting Complaint	Gingival Growth	12	60
	Irritation	2	10
	Pain and Swelling	1	5
	Unspecified	5	25
Insertion	Pedunculated	8	40
	Sessile	9	45
	Unspecified	3	15

cells and hemosiderin pigment deposition, each observed in 2 cases (10%). Histopathological evaluation could not be performed in two cases due to non-availability of tissue blocks, which were retrieved by the patients (Table II).

As management strategy, excisional biopsy was conducted in all the cases and recurrence was reported among 2 (10%) of these cases. Both recurrent cases were reported in female patients within one year of initial presentation.

Out of 20 cases, slides and blocks for two cases were taken back by the patients hence in-depth microscopic slide examination could not be conducted. Nonetheless, gross and

microscopic findings have been gleaned from the biopsy reports.

DISCUSSION

This case series discusses demographics, clinical and histopathological aspects of 20 cases of POF reported over a period of 10 years. In this study, male and female ratio was in line with the data reported previously showing female predilection.¹ Third decade was the most prevalent age frame in this study which in conflict with the previously reported data where lesions were most prevalent in the 2nd decade.^{12,13} With respect to the site of the lesions, anterior maxilla was the most prevalent site for POF which is in

line with previous studies.⁷ Half of the cases in this study were > 2 cm in greatest dimension which is in contrast to previous studies where the lesions do not exceed 1.5 cm in their greatest dimension.^{14,15} This study reinforces the fact that duration of lesion varies from a month to years.¹⁶

The variability shown in type of insertion (sessile/pedunculated) in this case series is comparable with literature review of 41 cases of POF reported in 2019 which may have implications for lesion management.⁴ Color changes in POF can be indicative of degree of vascularity and fibrous component in the lesion.³ Other recorded characteristics as texture and shape can provide valuable insights for clinicians during the diagnostic process. These findings were consistent with previously reported studies.^{2,11}

In this case series majority of the lesions were clinically considered to be pyogenic granuloma, a common benign vascular lesion of the gingiva. However, it is essential to consider alternative diagnoses such as PGCG, COF, fibroma, CGCG, pregnancy tumor and OSCC to ensure appropriate management.^{8,9}

With regards to mineralized material, studies suggest that dystrophic calcifications are more common in early, ulcerated lesions while older, non-ulcerated lesions are more likely to demonstrate well-formed bone or cementum.^{11,17} No such correlation with respect to duration, ulceration or mineralization was found in our study. Kulkarni RR, et al., in 2014, revealed predominance of cementicles with a microlamellar pattern, characterized by a high collagen density and immature stromal fiber content.¹⁸ This study showed a balance of hypocellularization and hypercellularization of the mesenchymal component which is in contrast to findings reported in literature with a higher frequency of hypercellular content.^{19,20} Bhasin M, et al., reported findings of a connective tissue stroma showcasing a highly cellular mass of proliferating fibroblasts intermixed with fibrillar tissues.²¹

Majority of our study cases showed chronic inflammation with fewer mixed inflammatory infiltrate which is in line with recent findings by Cavalcante IL, et al., with 240 POF cases predominantly

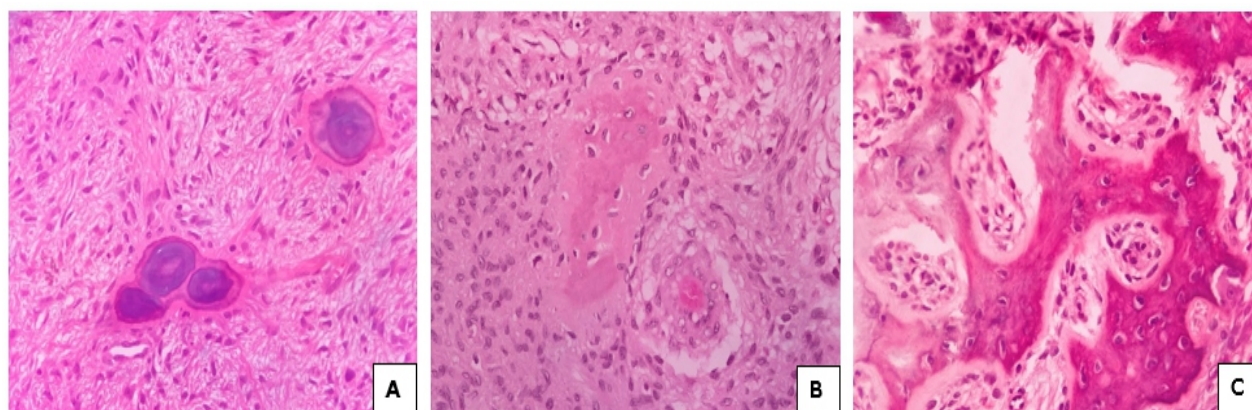
Table II: Histopathological features of peripheral ossifying fibroma cases

Histological Features		Frequency (n=20)	Percentage
Type of Calcified Material	Dystrophic calcifications only	3	15
	Osteoid/cementoid	5	25
	Bone only	6	30
	Bone & cementum	4	20
	Bone & dystrophic calcifications	1	5
	Bone & osteoid	1	5
Cellularity	Hypo-cellular	9	45
	Hyper-cellular	9	45
Inflammation Type	Acute	0	0
	Chronic	15	75
	Mixed	3	15
Inflammation Intensity	Focal	2	10
	Scattered	11	55
	Dense	5	25
Vascularity	Hypo-vascular	0	0
	Normal	15	25
	Hyper-vascular	3	65
Ulceration	Present	18	90
	Absent	2	10
Giant Cells	Present	18	90
	Absent	2	10
Hemosiderin	Present	18	90
	Absent	2	10

showing chronic inflammatory infiltrate.¹⁹ In contrast to our findings, Godinho GV, et al., highlighted intense mononuclear inflammatory infiltrate as a noteworthy aspect in their observations.²² Lázare H, et al., reported variation in submucosal inflammatory infiltrate including lymphocytes, histiocytes and multinucleated giant cells in a study of 41 cases on clinicopathological features of POF.⁴ Mild/ focal inflammatory infiltrate was observed in the previously reported studies which is in contrast to our findings showing majority POF cases with patchy/ scattered followed by dense and focal inflammatory infiltrate.¹⁹ In our study, giant cells were present in only two cases observed. Lázare H, et al., reported presence of giant cells in 23 out of 41 cases showing remarkable variation in amount as well as distribution.⁴

Due to ulcerated epithelium and fibroblastic proliferation, pyogenic granuloma has the closest resemblance to POF.¹¹ The vascular nature of POF was further contextualized by Godinho GV, et al., who noted that POF shows scarce to abundant vascularity and hypercellularity in comparison to pyogenic granuloma.²² Moreover, absence of giant cells, odontogenic epithelium, dysplastic dentin, and epithelial islands distinguishes POF, as elucidated by Mokrysz J, et al.¹⁶

This study reported 13 cases exhibiting hypervascularity, which is in contrast to previous studies which showed variation in size and frequency of blood vessels.^{16,20} Similarly, Godinho GV, et al., observations of lamina propria showed proliferation of endothelial cells,

Figure 1: Types of mineralized material; **A:** Dystrophic calcifications, **B:** Osteoid/cementoid, **C:** Bone

opening of vascular space, intense cellularity, and chronic inflammatory infiltrate and hemorrhagic areas.²² Areas with clusters of hemosiderin pigment were found in a case of an atypical POF as documented by Katanec T, et., al similar to our study findings with presence of hemosiderin pigmentation.²³

Conventional treatment protocol was followed for all POF cases involving complete surgical excision/ excisional biopsy. Given the high recurrence rate of POF, surgical excision including the removal of periodontal ligament and periosteal tissue at the base of the lesion with proper scaling, root planning and curettage can significantly minimize recurrence. Moreover, strict postoperative follow-up has been suggested by various studies to detect early recurrence.^{4,24} Recent studies implicate the use of electrocautery and diode laser as better treatment modalities as these are associated with less postoperative pain, rapid healing, minimizing intraoperative bleeding and mucogingival defects particularly in larger lesions.^{19,24}

CONCLUSION

This case series highlights the heterogeneity of POF in terms of clinical presentation, histopathological features, and potential differential diagnoses. Clinicians should be aware of the different clinical presentations which POF may manifest and exercise caution while diagnosing the lesion for proper treatment and management plan. As data for this study was extracted from archives of patient records, details on few parameters including removal of local irritants were not adequately documented. Due to lack of oral histopathological services in Pakistan, data was attained from single institute which warrants further research.

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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

MNK & SS: Conception and study design, acquisition, analysis of data, drafting the manuscript, critical review, approval of the final version to be published

SH: Analysis and interpretation of data, drafting the manuscript, approval of the final version to be published

AK & NZ: Acquisition, analysis and interpretation of data, critical review, approval of the final version to be published

RM: Conception and study design, critical review, approval of the final version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest, whether financial or otherwise, that could influence the integrity, objectivity, or validity of their research work.

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request



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