CASE REPORT

Peripheral ossifying fibroma: A series of four cases
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Abstract
Peripheral ossifying fibroma (POF) is composed of fibroblastic connective tissue stroma which is associated with the formation of randomly dispersed foci of mineralized products which consists of bone, cementoid-like substance, or dystrophic calcification. The color of the lesion ranges from red to pink and is frequently ulcerated. Either sessile or pedunculated the size is <2 cms. POF shows a striking female predilection occurring mostly between 2nd and 3rd decades of life. It occurs exclusively on gingiva, frequently on maxilla than mandible, around incisors and canines. Adjacent teeth are usually not affected. Microscopically, POF appears as combination of mineralized product and fibrous proliferation. Highly developed bone or cementum is more likely to be present in long-standing lesions. The objectives of this current case series are to discuss the clinical manifestations, and histopathological presentations of four cases of POF, which were on regular follow-up along with a minireview on the same.

Keywords: Oral tumors, periodontal membrane, peripheral ossifying fibroma, pyogenic granuloma

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Introduction
Gingival tissues are highly susceptible to changes in the form of reactive and neoplastic lesions.[¹] Reactive lesions of gingiva are clinically more common benign lesions and histologically non-neoplastic nodular swellings that develop in response to chronic and recurring tissue injury which stimulates an exuberant tissue response. These mainly include focal fibrous hyperplasia, pyogenic granuloma, peripheral ossifying fibroma (POF), and peripheral giant cell granuloma. Clinically, these lesions mimic various groups of pathologic processes and therefore often present a diagnostic challenge.[²]

POF develops in response to subgingival plaque and calculus and other associated local factors favoring plaque accumulation like dental appliances and poor-quality dental restorations as well as in response to trauma.[¹-⁷] It is thought to arise from the gingival corium, periosteum, and the periodontal membrane.[¹¹] Clinically, POFs are sessile or pedunculated, ulcerated or exhibiting a color similar to the surrounding gingiva.[³-⁸] Migration of teeth with the destruction of interdental bone destruction has been reported in some cases.[¹] Most lesions are <2 cm in size, although larger ones occasionally occur.[²-⁷] When bone predominates, “ossifying” is the appellation, while the term “cement-ossifying” is assigned when bone and cementum-like structures are observed.[¹] These lesions have female predilection with a predilection ratio of 2:1–3:2 due to hormonal influences[²-⁹] and are more commonly seen in the anterior maxilla of young individuals between the second and third decades of life with average age around 28 years[²,⁵,⁷] with most of them occurring in the incisor-cuspid region.[³,⁷] With respect to race, there is a predominance in Caucasians (71%) compared to Asians (36%).[¹⁰] Due to the highest possibility of misdiagnosis of POF as pyogenic granuloma, peripheral giant cell granuloma, or odontogenic tumors, histopathological examination along with the clinical findings is essential for a definitive diagnosis.[³,⁷] Recurrence rate is almost 16–20%, the reasons being incomplete removal of the lesion, failure to eliminate local irritants, and difficulty in access during surgical manipulation due to intricate location of POF usually in interdental areas.[³,⁶] Deep excisions have been preferred for recurrent lesions.[⁶] In this case series, we have compiled 4 cases of POF with brief review of literature.
Case Report

Case 1
A 28-year-old female patient reported to the department with a chief complaint of growth in gums in the upper left back teeth region for 3 months. The patient gave a history of bleeding from the growth on toothbrushing and gradual increase in its size. The patient also gave a history of being under medication for conception for the past 1 year. On clinical examination, a solitary, sessile, lobulated, firm, painless mass of gingiva roughly ellipsoid in shape measuring approximately 1.5 cm × 1 cm with irregular margins and ulcerated surface at the center was seen on palatal gingiva in relation to the upper left first and second premolar region extending into the interdental region between the upper left canine, first and second premolars. The periphery of the lesion had color similar to that of the surrounding normal mucosa. [Figure 1a]. Intraoral periapical radiograph did not show any abnormalities [Figure 1b].

Case 2
A 17-year-old female patient reported to the department with a chief complaint of growth in gums in the upper front teeth region for 6 months. On clinical examination, a well-circumscribed, solitary, lobulated, pedunculated, painless mass measuring approximately 1.5 cm × 2.5 cm with mildly ulcerated overlying mucosa was seen on the labial aspect of gingiva in relation to the upper left central and lateral incisors and canine [Figure 2a]. It was seen originating from the interdental papillae between the central and lateral incisors and canine and involving the marginal and attached gingival and obscures the crown of upper left lateral incisor. Intraoral periapical radiograph did not show any abnormalities [Figure 2b].

Case 3
A 36-year-old female patient reported to the department with a chief complaint of growth in the upper right back jaw region for 10 months. Initially, the growth was the size of a pea which gradually increased to the present size. The patient also gave a history of gradual increase in the size of the growth and multiple extractions. On clinical examination, a solitary, irregular, pedunculated, firm, painless mass measuring approximately 3.5 cm × 2.5 cm was seen on the buccal aspect of right posterior alveolar mucosa [Figure 3a]. The overlying mucosa was similar to the adjacent normal mucosa. On palpation, the mass was found to be hard in consistency. Intraoral periapical radiograph and orthopantomography showed calcification within the mass [Figure 3b and c].

Case 4
A 22-year-old female patient reported to the department with a chief complaint of growth in the gums of upper right back teeth region for 1 month. Initially, the growth was the size of a pea which gradually increased to the present size. The patient also gave a history of bleeding from the growth on toothbrushing. On clinical examination, a well-circumscribed, solitary, dome-shaped, firm and fibrous, painless mass measuring approximately 1.5 cm × 1 cm with a broad base and arising from the interdental papilla of upper right first and second molar was seen on the buccal aspect [Figure 4a]. There was presence of plaque and calculus. The overlying mucosa was normal and pink in color. Mild bleeding was seen on manipulation of the mass with a probe. Intraoral periapical radiograph did not show any abnormalities [Figure 4b].

Blood investigations (hemoglobin count, bleeding time, and clotting time) were carried out for all the four patients and were found to be in the normal range. The treatment consisted of deep surgical excision of the lesion under local anesthesia in...
the department of periodontics. The biopsy specimens were submitted for the histopathological examination. The healing was uneventful in all the four patients. Patients were kept under regular follow-ups for 1 and 2 months.

**Histological Findings**

The stroma of the submitted specimens from patients 1 and 3 consisted of loose bundles of collagen peripherally. Dense bundles of collagen at deeper parts along with endothelial lined blood vessels and few budding capillaries were seen. At one focus, bony trabeculae with osteocytes were seen suggestive of dystrophic calcification [Figure 5a-d]. The impression was suggestive of POF.

Hematoxylin and eosin-stained section of specimen from patients 2 and 4 showed fibrocellular stroma which comprised loose bundles of collagen fibers juxta epithelially in the form of fascicles and cords with chronic inflammatory infiltration and plump stellate-shaped fibroblast. Cementum-like calcification was seen interspersed within the stroma. One focus showed trabecular pattern of bone [Figure 6a-d]. The impression was suggestive of peripheral cement-ossifying fibroma.

**Discussion**

Menzel was the first to describe ossifying fibroma in 1872 while in 1927 Montgomery was the first to term it. Ossifying fibroma is categorized into two types: Central and peripheral. The central variant originates from the endosteum or the periodontal ligament (PDL) adjacent to the root apex and expands within the medullary cavity of the bone while the peripheral variant occurs on the soft tissues overlying the alveolar process.\[4,6\]

Shepherd, in 1844, described POF as an alveolar exostosis. Bhaskar and Jacoway\[11\] in 1966 termed it as peripheral fibroma with calcification. Later two lesions were examined by Arnott microscopically for which he gave the diagnosis of ossifying fibroma. Eversole and Robin coined the term POF.\[12\]

The term peripheral odontogenic fibroma (PODF) is still synonymously used by many for POF as the lesion is thought to be derived from the PDL and hence to be odontogenic.

The evidence for its odontogenic origin is circumstantial, being based partly on the demonstration of oxytalan fibers within its calcified structures and its exclusive occurrence on gingiva. However, oxytalan fibers have also been reported in the sites other than the PDL. A POF is more common in females and in the anterior maxilla, but PODF has a predilection for males and the posterior mandible.\[6,8,9\]

The etiopathogenesis remains controversial with two schools of thought proposed:

POF may initially develop as pyogenic granuloma that undergoes subsequent fibrous maturation and calcification. It represents the progressive stage of the same spectrum of 1. pathosis\[6,11,13\]

2. POF is due to inflammatory hyperplasia of cells of PDL/peristeum. Metaplasia of the connective tissue leads to dystrophic calcification and bone formation.\[5,11,13\]

POF is believed to comprise about 2–3% of all oral tumors\[10,11,14\] and 9–9.6% of all gingival growths.\[1-11\] Single lesions are the most frequent ones despite that Kumar et al.
have described a multisite case. Bhaskar and Jacoway reported that the common site to be involved is usually maxilla (58.5% in the maxilla and 41.5% in the mandible), anterior to molars, especially in incisor-canine regions (about 60% in anterior portion and about 40% in the posterior part). However, in our study, 3 patients had the involvement of posterior maxilla, and in 1 patient, the maxillary anterior labial gingiva was involved. Pal et al. described a lesion affecting the posterior portion of the mandible. According to Mulcahy and Dahl, and Cundiff, there is a high prevalence of ulceration of the overlying mucosa of the lesion, i.e., 62–65% and low prevalence of 22.5–36%, respectively. Kfir et al. reported that the size of the POF is usually smaller than 1.5 cm in diameter. However, a case of giant POF measuring 9 cm has been reported in the literature. Multicentric POF occurring in the oral and maxillofacial region is observed in genetic associated conditions such as nevoid basal-cell carcinoma syndrome, multiple endocrine neoplasia-Type II, neurofibromatosis, and Gardner syndrome.

Upon radiographic evaluation, in some cases, the presence of radiopaque diffuse calcifications is observed in a shadow of soft tissues, and rarely, there is associated bone destruction. Regarding radiographic appearance of tooth migration, it is present only in 5% of the cases, thus constituting a very rare finding, as well as radicular resorption. In the current series, radiopacity was observed only in one case.

The definitive diagnosis of POF is made by histopathologic evaluation of biopsy specimen. The histologic spectrum of POF is wide and has been described in detail by Buchner and Hansen. The features observed during microscopic evaluation include benign fibrous connective tissue with varying content of fibroblasts, myofibroblasts, and collagen and sparse to profuse endothelial proliferation and mineralized material which may represent mature, lamellar or woven osteoid, cementum-like material, or dystrophic calcifications. Acute or chronic inflammatory cells can also be identified in the lesions. In a study conducted by Brown et al. (1956), they reported that microscopically, bone or foci of calcification were seen in 20.7% of the patients in the reported cases. While in the study, Bhaskar and Jacoway reported almost 50 of the cases with foci of bone or other calcified material. In the current series, two patients were diagnosed with POF and two with peripheral cement-ossifying fibroma.

Cundiff reported 16% recurrence rate of POF while a series studied by Eversole and Robin reported 20% recurrence rate. Mesquita et al. reported a high proliferative activity of the lesion, which eventually influences the treatment modalities. Due to the high recurrence rates, the treatment of POF comprehends total exeresis of the lesion including periosteum and PDL at the base of the lesion, after elimination of local etiologic factors such as plaque, calculus, ill-fitting dentures, and poor quality restorations.

Conclusion
The etiopathogenesis of POF is yet to be delineated. It has a varied clinicopathological presentation. Surgical excision along with total elimination of local irritants is considered curative. It presents with a high rate of relapse. In the initial stages, it is difficult to differentiate most of the reactive gingival lesions clinically. Identification of any reactive lesions requires the formulation of differential diagnosis and histological evaluation for confirmation to enable accurate patient evaluation and management.

References

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