

# Peripheral Ossifying Fibroma- A Clinical and Histological Evaluation of 51 Cases

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## Abstract:

The present retrospective study was carried out to investigate the clinical and histological features of 51 cases of peripheral ossifying fibroma (POF). The clinical information such as age, sex, location, color of the lesion, pedunculated/ sessile was recorded. The lesion was found more frequently in females (62.75%) and 2<sup>nd</sup> decade. It had a predilection for the maxillary gingiva (68.63%) and the incisor/cuspid region (72.55%). The average age of occurrence was 38.5 years. Histologically, the surface epithelium was ulcerated in 15(29.41%) cases and in the rest, it was non-ulcerated. The lesion exhibited highly cellular fibroblastic tissue in 12(23.53%) cases, and in the remaining cases it showed more fibrous tissue. Mineralized products in the form of trabeculae of woven and/ or lamellar bone (61%), cementum like material (12%) and dystrophic calcification (27%) were noticed.

**Key Words:** Peripheral ossifying fibroma, Mineralization, Trabeculae, Dystrophic calcification, Cementum like material.

## Introduction:

There are histologically different types of focal overgrowths which may occur on the gingiva. These are usually the result of a reactive response to local irritation rather than neoplastic in nature. Many of these lesions can be identified as specific entities on the basis of characteristic morphology. They are peripheral giant cell granuloma, pyogenic granuloma, fibrous hyperplasia, and peripheral ossifying fibroma (Buchner & Hansen, 1987). Peripheral ossifying fibroma (POF) is a gingival nodule composed of a cellular fibroblastic connective tissue stroma associated with the formation of randomly dispersed foci of a mineralized product consisting of either bone (woven and lamellar), cementum like material and dystrophic calcifications. (Buchner & Hansen, 1987; Cuisia & Brannon, 2001). Earlier many names have been proposed for this lesion including peripheral cemento-ossifying fibroma, peripheral odontogenic fibroma with cementogenesis, peripheral fibroma with osteogenesis, fibrous epulis, calcifying fibroblastic granuloma and peripheral fibroma with calcification. (Bhaskar & Jacoway, 1966; Kumar et al, 2006). Gardner in 1982 suggested that the peripheral ossifying fibroma and peripheral odontogenic fibroma are two distinct lesions, the former being a common reactive lesion and the latter a rare lesion. He also suggested that the name peripheral ossifying fibroma should be retained for this lesion.

The aim of the present retrospective study was to investigate the clinical and histological features of 51 cases of peripheral ossifying fibroma.

## Material and Methods:

The clinical and histological data of 51 cases of peripheral ossifying fibroma were retrieved from the records of Department of Oral pathology and Microbiology, A.B. Shetty Memorial Institute of Dental Sciences, Mangalore. Lesions diagnosed as peripheral odontogenic fibroma was excluded from the study. Only lesions that exhibited mineralized components were included in the study.

The clinical information such as age, sex, location, presence /absence of pain, color of the lesion, whether pedunculated/ sessile were obtained from the submitted biopsy requisition forms. Site of lesion for the maxillary and mandibular gingival was divided into 2 regions as anterior (incisor/cuspids) and posterior (premolars/molars). A lesion encompassing more than one region was assigned the location it occupied the most. Follow up information was based solely on recurrent lesions submitted to the department of Oral Pathology and Microbiology.

In histological evaluation, the presence/ absence of ulceration was noted. The different mineralized products observed in the lesions were divided into the following 3 groups: a- Bony trabeculae (woven and/or lamellar bone): b- Circumscribed amorphous, almost acellular mineralized bodies closely resembling acellular cementum or cementum like droplets: c- Granular foci of mineralization described

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as dystrophic calcification. The data collected was statistically evaluated using Chi-Square test.

### Results:

The clinical presentation was assessed on the basis of histopathological requisition form. In the present study, 35(69%) cases were from the maxilla and 16 (31%) cases from the mandible. Of the total number of the lesions; 37 (73%) cases occurred in the incisor/cuspid region and 14 (27%) cases occurred in the premolar/molar region. Out of 37 cases which occurred in incisor/cuspid region; 27(73%) cases were seen in the maxilla and 10 (27%) cases in the mandible. Out of the total number of 14 cases which occurred in the premolar/molar region, 8 (57.1%) cases were observed in the maxilla and 6 (42.9%) cases were seen in the mandible. Thus, location of the peripheral ossifying fibroma did not differ significantly in maxilla and mandible ( $p=0.277$ )

The age range was from 12 years to 65 years with a mean age of 38.5 years. Of the total 51 cases, 19 (37%) were males and 32(63%) were females. In the present study, there was no significant association between the age group & gender (Table I).

Table I: Distribution of Peripheral Ossifying Fibroma between gender in different age groups.

		Gender		Total	Chi-square	p-value
		Male	Female			
Age	11-20yrs	Number	7	12	0.139	0.998
		% within Gender	(36.8%)	(37.5%)		
	21-30yrs	Number	4	7	0.139	0.998
		% within Gender	21.1%	21.9%		
	31-40yrs	Number	2	4	0.139	0.998
		% within Gender	10.5%	12.5%		
	41-50yrs	Number	3	4	0.139	0.998
		% within Gender	15.8%	12.5%		
	>50yrs	Number	3	5	0.139	0.998
		% within Gender	15.8%	15.6%		
Total		Number	19	32	0.139	0.998
		% within Gender	100.0%	100.0%		

The POF was described as a localized, exophytic lesion on the gingiva with a sessile base in 32 cases and pedunculated base in 14 cases. The lesion was like a 'cauliflower' in 5 cases. The colour of the lesion ranged from pink to reddish pink. In 8(16%) cases, the clinician suspected it to be originating from the interdental papilla of the adjacent tooth. In remaining cases, it was not specified.

Clinicians reported that 10(19.6%) cases were associated with chronic local irritation such as periodontally involved tooth gingivitis or calculus accumulation, while in 2(4%) cases orthodontic appliance was believed to be the etiological factor. No information was provided for the remaining 38 cases. The information on size and duration of the lesion has been shown in Table II. The provisional clinical diagnosis was provided for all the 51 cases (Table III).

Table II: Size and duration of the lesion.

Clinical Feature	Number of cases	Percentage
<b>Size of the lesion</b>		
<1cm	35	68%
1-2cm	8	16%
3cm	8	16%
<b>Duration of the lesion</b>		
3 weeks-8 months	33	64%
9 months-24 months	10	20%
>24 months	2	4%
Not mentioned	6	12%

Table III: Provisional clinical diagnoses submitted for 51 cases of POF.

Provisional clinical diagnosis	Number of cases	Percentage
Pyogenic granuloma	30	59%
Irritational fibroma	12	24%
Papilloma	4	7%
Peripheral giant cell granuloma	3	6%
Inflammatory hyperplasia	2	4%

Out of 51 cases of POF, in 15 (29%) cases discontinuity in the surface epithelium was observed indicating ulceration. Although in most of the cases, surface epithelium appeared to be of normal thickness, some cases exhibited increased number of spinous cell layer, leading to hyperplastic epithelium. In the presence of ulceration, the surface epithelium was covered with fibrinous exudate with acute inflammatory cells (polymorphonuclear neutrophils) and very few chronic inflammatory cells. The adjacent epithelium was parakeratinized/orthokeratinized and was also hyperplastic in some cases. In 12(24%) cases, lesion exhibited highly cellular fibroblastic tissue and scanty collagen fibres with mineralized products. Remaining were fibrous lesions composed of moderate to dense collagenous connective tissue with areas of fibroblastic activity and mineralization. The fibroblasts exhibited round/ oval /spindle shaped nuclei. In some cases, the fibroblasts showed the arrangement of fascicles in the form of small fibre bundles. Chronic inflammatory cells mainly lymphocytes and plasma cells were observed

in the connective tissue and the vascularity varied in different cases.

Different types of mineralizations were observed as shown in Fig.I. Trabeculae of woven and/or lamellar pattern were noticed in 31 (61%) cases (Fig. II). Lacunar spaces were also present in some of these trabeculae. The connective tissue surrounding the bony trabeculae appeared to be less cellular. The dystrophic calcification was observed in 14 (27%) cases and the mineralized material ranged from small clusters of basophilic granules to large, solid and irregular masses. Cementum like droplets were usually basophilic, having a smooth border and ranged in size from small spherical or oval bodies (Fig. III) to very large globules and were present in 6(12%) cases.

According to the biopsy requisition forms, the lesions were treated by excisional biopsy or surgical excision. In this series of 51 cases, 2 cases had recurrence in a period of 3 years while no information regarding recurrences was available for the remaining cases.

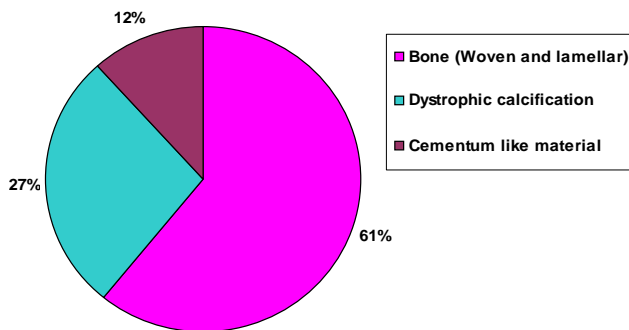


Fig 1. Distribution of different types of mineralization in POF

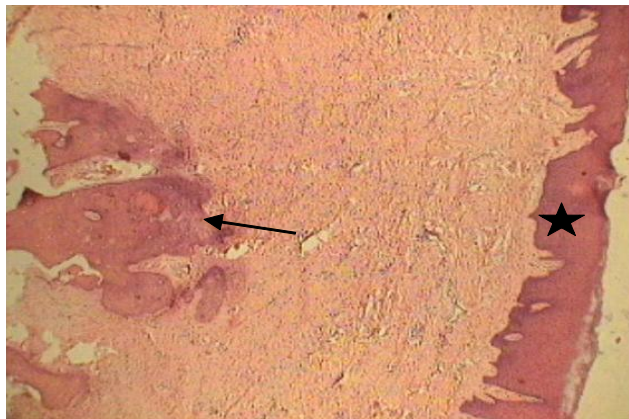


Fig II: Photomicrograph showing mineralization in the form of trabeculae of bone. (H & E Stain, X10). (Star indicating the surface epithelium and arrow showing trabeculae of bone).

## Discussion:

Peripheral ossifying fibroma elaborate bone, cementum and spheroidal calcifications, which has given rise to various terms for this reactive lesion



Fig III: Photomicrograph showing mineralization in the form of cementum like droplets. (H & E Stain, X10). (Star indicating the surface epithelium and arrow showing cementum like droplets).

including peripheral cemento-ossifying fibroma. When bone predominates, 'ossifying' is the appellation; while the term 'cementifying' has been assigned when curvilinear trabeculae or spheroidal calcifications are encountered. When bone and cementum-like tissues are observed, the lesions have been referred to as peripheral cemento-ossifying fibroma (Yadav & Gulati, 2009). The observation of identical cementum-like tissue in lesions in extra-gnathic sites suggest that this tissue may merely be a normal variant of bone and that dental cementum itself is a specialized form of "bundle-bone". The designation, ossifying fibroma is now regarded as more appropriate. (MacDonald-Jankowski, 2004; Speight & Carlos, 2006; Yadav & Gulati, 2009).

The etiology and pathogenesis of POF is not clear (Cuisia & Brannon, 2001; Gracia de Marcos et al, 2010). It has been suggested that these lesions originate in the cells of the periodontal ligament as it exclusively appears in the gingival tissue close to the periodontal ligament; (Kumar et al, 2006; Kenny et al, 1989; Miller et al, 1990). Oxytalan fibres are found within the mineralized matrix of some lesions (Wright & Jennings, 1979). The age distribution of the lesion is inversely proportional to the number of permanent teeth lost (Kumar et al, 2006; Miller et al, 1990). The fibrocellular response of POF is similar to that of other reactive gingival lesions originating in the periodontal ligament (Kumar et al, 2006). Further evidence of the fibroblastic-myofibroblastic nature of the lesion and a possible origin in the periodontal ligament has been provided. The immunohistochemical profile of 4 cases of POF indicated that the proliferating cells are of a myofibroblastic nature i.e., cells sharing morphological characteristics with fibroblasts and muscle cells

(Gracia de Marcos et al, 2010). Furthermore, high female predilection, rare occurrence in the first decade, and decline in incidence after 30 years of age suggests that hormonal influence may be a lesional growth factor (Kenny et al, 1989; Miller et al, 1990; Whitaker & Bouquot, 1994). However, an immunohistochemical study on 4 female cases of POF did not show estrogen or progesterone receptor positivity (Gracia de Marcos et al, 2010). Other factors that have been implicated in the etiopathogenesis of POF are trauma and local irritants such as plaque, calculus, ill fitting dental appliances and microorganisms (Cuisia & Brannon, 2001; Gracia de Marcos et al, 2010; Moon et al, 2007).

In the present study, the age ranged from 12 to 65 years. The majority of the lesions occurred in the second decade with a declining incidence in later years. (Kenny et al, 1989; Eversole & Rovin 1972; Skinner et al, 1986). Literature revealed 2 cases of POF presenting at birth, diagnosed clinically as congenital epuli (Yip & Yeow, 1973; Kohli et al, 1998). Cuisia & Brannon (2001) reported that only 134 out of 657 diagnosed cases of POFs were in the pediatric age group (0–19 years) with 8% of them being in the first decade. Some studies have shown peak incidence of POF in the fifth decade (Zhang et al, 2007; Shamim et al, 2008).

The high female predilection in the present study is supported by similar findings in the literature (Cuisia & Brannon, 2001; Kenny et al, 1989). The female to male ratio reported in the literature ranges from 1.22:1 (Zhang et al, 2007) to 4.3:1. (Eversole & Rovin, 1972).

The lesion may be present for months to years before the treatment, depending on the degree of ulceration, discomfort and interference with function (Buchner & Hansen, 1987; Bhaskar & Jacoway, 1966). Approximately 60% of POFs occur in the maxilla (Kenny et al, 1989; Zhang et al, 2007). They occur more often in the anterior than the posterior area (Kenny et al, 1989; Zhang et al, 2007; Das & Das, 1993) with 55%–60% presenting in the incisor-cuspid region (Cuisia & Brannon, 2001; Eversole & Rovin, 1972; Zhang et al, 2007). Cuisia & Brannon (2001) reported 2 cases, which were intimately associated with primary teeth. Kendrick & Waggoner (1996) reported a case involving the interdental papilla, between the mandibular left second primary molar and first permanent molar.

Peripheral Ossifying Fibroma can be pedunculated, or it may be sessile (Cuisia & Brannon, 2001; Bhaskar & Jacoway, 1966). This lesion can be

pink to reddish pink in colour and its surface may be smooth or irregular; it may be ulcerated or nonulcerated. In the present study, size varied from <1 cm to 3 cm. Some studies have reported a range from 0.2–3.0 cm (Buchner & Hansen, 1987; Cuisia & Brannon, 2001), 4 mm–8 cm (Bhaskar & Jacoway, 1966; Bodner & Dayan, 1987), and some lesions may be as large as 9 cm in diameter (Poon et al, 1995). In the present study, 15(29%) cases were ulcerated in contrast to other studies which reported ulceration in more than 50% of the cases (Buchner & Hansen, 1987; Cuisia & Brannon, 2001). Ulceration has been observed as a common finding because of its exophytic growth, gingival location and its presence in trauma prone region.

The gingival lesions that closely resemble POF are pyogenic granuloma, peripheral giant cell granuloma, fibroma and peripheral odontogenic fibroma (Cuisia & Brannon, 2001). Many investigators have reported the clinical similarity and distinguishing features between POF and above mentioned lesions (Flaitz, 2000; Brown & Houston, 1990).

Histologically, the POF consists of fibrocellular tissue with areas of more delicate fibrovascular tissue. Within the cellular areas, ossification is usually present, which vary both in quality and quantity (Buchner & Hansen, 1987). In the initial stage, when the lesion is composed of cellular fibroblastic tissue with minute granular foci of mineralization, it might be misdiagnosed as pyogenic granuloma. They suggested that the lesion usually starts with an ulcerated phase, showing highly cellular fibroblastic connective tissue containing areas of dystrophic calcification. As the ulcer heals, the cellular fibroblastic connective tissue matures and dystrophic calcification turns into bone. Similar process of maturation was suggested by other authors (Moon et al, 2007; Southam & Venkataraman, 1973). Mineralization can vary between cementum-like material, bone (woven and lamellar) and dystrophic calcification (Buchner & Hansen, 1987; Zain & Fei, 1990). Small islands of odontogenic epithelium have been reported in some cases (Bhaskar & Jacoway, 1966; Kenny et al, 1989) which may be representing remnants of the dental lamina.

To avoid recurrence, treatment requires proper surgical intervention that ensures deep excision of the lesion including periosteum. Thorough scaling and root planing of adjacent teeth and/or removal of other sources of irritants should be accomplished (Cuisia & Brannon, 2001). Walters et al (2001) suggested that

several different surgical approaches may potentially be used to repair the resultant gingival defect with due aesthetic concerns for the patient. Recurrence rates have been reported from 7% to 45% (Buchner & Hansen, 1987; Kenny et al, 1989; Eversole & Rovin, 1972). In the present study, only 2 (3.92%) cases had recurrence in a period of 3 years, no information regarding recurrence was available for the remaining case.

### Conclusion:

The result of the present study shows that the peak incidence of occurrence of POF is in the 2<sup>nd</sup> decade, and it is more common in females. POF occurs most often in the maxillary incisor-cuspid region but may occur at any gingival site. Clinically it is difficult to differentiate between most of the reactive gingival lesions particularly in the initial stages and the tissue has to be histologically examined for confirmation.

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