Peripheral ossifying fibroma — a clinical evaluation of 134 pediatric cases

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Abstract

Purpose: *Reported clinicopathologic studies on the peripheral ossifying fibroma (POF), a reactive gingival lesion, have not addressed the pediatric population in specific detail. This study, the first devoted to children, investigated the clinical features of a large number of POFs and compared the findings to cases reported in the English language literature.*

Methods: *Detailed clinical and historical information of 134 surgically removed POFs in patients aged 1-19 formed the basis of this study. Clinical manifestations, histogenesis, treatment rationale with pediatric considerations, and biologic behavior were emphasized.*

Results: *The POF was found more frequently in females (60%). It had a predilection for the maxillary gingiva (60%) and for the incisor/cuspid region. The average patient age was 14 years. Only 2 (1%) POFs were found to be unequivocally associated with primary teeth. The clinician seldom included the POF in the differential diagnosis. The recurrence rate after surgical excision was 8%.*

Conclusions: *This study revealed that a POF arising from the periodontal ligament of a primary tooth is most likely a rare event. However, the pediatric patient with a POF has special management considerations compared to the adult. Because of the POF behavior pattern, a proper treatment protocol is warranted with close postoperative follow-up. (Pediatr Dent 23:245-248, 2001)*

Solitary gingival enlargements in children are a relatively common finding and are usually the result of a reactive response to local irritation.[1] One such reactive lesion is the peripheral ossifying fibroma (POF), 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, cementumlike tissue, or dystrophic calcifications.[2] A combination of the aforementioned products is often found. Many comprehensive articles discussing large series of POFs do not single out other lesions, such as the peripheral odontogenic fibroma;[3,4] fibrous lesions without calcifications, such as the fibroma; or localized fibrous hyperplasias, such as the irritation fibroma, which is also known as fibrous nodule or traumatic fibroma.[3,5,6] Instead they include all of them in the POF category. Series that do focus strictly on the POF do not specifically address the pediatric population in any great detail.[7,11] Furthermore, there has never been a clinical study of POFs that was exclusively dedicated to a pediatric population. Reactive lesions like the POF do have pediatric significance that requires early recognition and treatment by the dentist. Therefore, the purpose of this paper is to investigate the clinical features of a large series of POFs occurring in children and to compare these findings with previously reported cases.

Methods

The clinical data of 134 biopsied cases of peripheral ossifying fibroma accessioned by the Louisiana State University School of Dentistry (LSUSD) Department of Oral and Maxillofacial Pathology from January 1, 1969, to September 30, 1999, were reviewed. All cases fulfilled the histologic criteria for POF as defined by Neville et al.[2] In this study the pediatric population was the patient group aged 1-19 years. To evaluate the anatomic site, we divided the maxillary and mandibular gingiva into 3 regions: (1) incisor/cuspid (mesial of central incisor to distal of cuspid); (2) premolar (mesial of 1st premolar to distal of 2nd premolar or mesial of primary 1st molar to distal of primary 2nd molar); and (3) molar (mesial of 1st molar to 3rd molar area). A lesion encompassing more than one region was assigned the location it occupied most. Follow-up information was based solely on recurrent lesions submitted to the LSUSD Oral Biopsy Service. The possibility of recurrences developing beyond age 19 was taken into account.

Results

Incidence

There were 657 POFs in the 43,362 accessioned cases. Of these 657 cases, 134 (20%) were in the pediatric age group.

Age, sex, race

Table 1 shows the age and gender distribution. The age range was 6 months to 19 years, with a mean age of 14 years. The overall female-to-male ratio was 1.48:1. Of 126 patients for

Table 1. Age and Sex Distribution

Age	*Male*	*Female*	*Total*
0 – 4	0	1	1
5 - 9	5	5	10
10 - 14	25	40	65
15 – 19	24	34	58
Total	54 (40%)	80 (60%)	134

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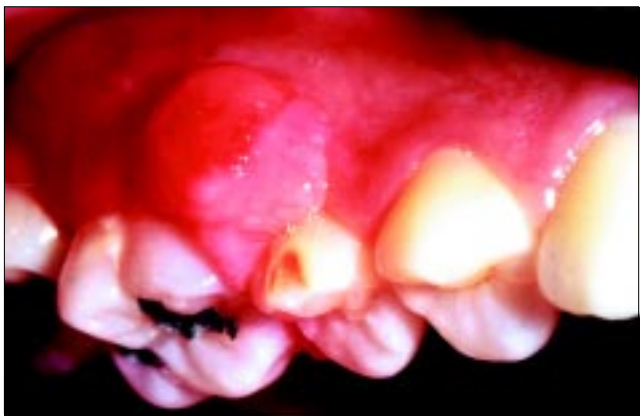

Fig 1. An exophytic, sessile nodule involving the interdental gingival papilla between a maxillary permanent second premolar and first molar.

whom the race was known, 90 (71%) were white and 36 (29%) were black.

Location

Table 2 shows the gingival location of 134 POFs; 127 (95%) of the POFs were specifically stated to be associated with a permanent tooth or between a primary and permanent tooth. Unequivocal association with a primary tooth was documented in 2 (1%) cases. Primary tooth involvement occurred in a 6-month-old female (mandibular primary central incisor) and a 5-year-old female (interproximal of maxillary first and second primary molars). POFs located distal to first permanent molars numbered 14 (10%). The specific site was not specified in 5 (4%) cases.

Clinical features

The POF was usually described as a localized, exophytic lesion with a sessile or pedunculated base (Fig 1). In a few cases, "cauliflower-like" was the descriptor. Color ranged from pink (normal) to slightly red to red. 85 (63%) of the lesions were ulcerated (confirmed by histologic findings in the pathology reports). The size of 134 lesions ranged from 0.3cm to 3.0cm in diameter with an average size of 1.2cm. Many clinicians suspected an origin from the interdental papilla of the adjacent tooth (Fig 1).

As for suspected etiologic factors, the clinicians reported that 35 (26%) of the lesions were associated with chronic local irritation, such as a periodontally involved tooth, gingivitis, or calculus accumulation. In 10 (7%) cases they believed the lesions arose secondary to an orthodontic appliance. Similarly, 10 (7%) cases were attributed to some form of trauma or injury in the area, which was not further specified. Information was not submitted for the remaining 79 (59%) cases.

Lesions were reported to be painless in 32 (24%) cases and painful in 2 (1%). No data regarding pain was recorded for the remaining 100 cases.

Table 2. Number and Percentage of Peripheral Ossifying Fibromas by Location

Jaw	Incisor/Cuspid	Premolar*	Molar	Not stated**	Total
Maxilla	50	6	21	3	80
Mandible	26	17	9	2	54
Total	76 (57%)	23 (17%)	30 (22%)	5 (4%)	134

*Includes 1st and 2nd primary molar region
**Specific site involving maxilla or mandible not specified

In 85 (63%) cases, information on the duration of the lesions was provided. In 67 (79%) cases the duration was 2 weeks to 6 months. In 17 (20%) it was 7 months to 25 months. One case exceeded 25 months. Duration was not provided for 49 (37%) cases.

Provisional clinical diagnosis

Of the 134 POFs submitted, provisional clinical diagnoses were offered for 127. These are listed in Table 3.

Treatment and prognosis

According to the biopsy request forms, the lesions were treated by excisional biopsy or surgical excision.

In this series of 134 patients, 10 had single recurrences, and one had multiple recurrences (3 over a 4.7-year period), for a total of 11 patients with recurrent POFs. The recurrence rate for these patients with POFs was 8%. Among all of the cases of recurrent POFs in this series, the average time interval for the first recurrence was 12 months. Of these, seven cases recurred within 6 months and 5 between 12 and 29 months. The first, second, and third recurrences in the multiple-recurrence case occurred at 7 months, 22 months, and 27 months, respectively.

Discussion

POF is a reactive proliferation exclusive to gingival mucosa. It has been referred to by many terms, all synonymous, including peripheral fibroma with calcification,[3] ossifying fibrous epulis,[6] and calcifying fibroblastic granuloma.[7] POF has also been used interchangeably with peripheral odontogenic fibroma. However, the peripheral odontogenic fibroma is now considered to be the extraosseous counterpart of the neoplastic central odontogenic fibroma[10,12] and therefore should not be used synonymously with POF. In order to escape this confusing nomenclature, many investigators advocate the term peripheral ossifying fibroma.[8,10-12]

The etiology of POF is unknown. However, trauma or local irritants, such as dental plaque, calculus, ill-fitting dental appliances, and poor quality dental restorations, play a significant role in the etiology and pathogenesis and was recorded in 41% of the LSUSD cases. Inflammatory hyperplasia originating in the superficial periodontal ligament (PDL) is considered to be a factor in the histogenesis of the POF,[8] and Miller et al.[13] have enumerated findings supportive of a PDL origin. These findings include the exclusive occurrence on the gingiva, the proximity of gingiva to PDL, and the inverse correlation of age distribution of lesions with the number of lost teeth and their corresponding PDL. Furthermore, high female predilection, rare occurrence in the first decade, and decline in incidence after age 30 suggest that hormonal influence may be a lesional growth factor.[11,13]

In this study a 2% incidence of POFs among 43,362 biopsies from all oral sites of all age groups was observed. This incidence compares favorably to the incidence of POFs involving biopsies restricted to children. In pediatric patient studies the incidence of POFs in biopsied lesions from all oral sites has ranged from 1% to 2%.[14,15] In surveys limited to gingival biopsy specimens that have included both adults and children, the reported incidence is in the 9% to 10% range.[16,17]

Table 3. Provisional Clinical Diagnoses Submitted for 127 Peripheral Ossifying Fibromas*

Provisional Clinical diagnosis	Number of Cases
Pyogenic Granuloma	58
Fibroma	22
Peripheral Giant Cell Granuloma	20
Peripheral Ossifying Fibroma	12
Irritation Fibroma	12
Papilloma	7
Peripheral Odontogenic Fibroma	5
Inflammatory Hyperplasia	3
"Neoplasm"	2
Eosinophilic Granuloma	2
Granuloma	1
Exostosis	1

*Provisional clinical diagnoses for recurrent lesions were not included in the tabulation.

This study represents to date the only detailed series of POFs in an exclusively pediatric population. Therefore, the LSUSD data were compared to published series that have included adults and children with the exception of the occasional case report. Collective data from four studies[8-11] that totaled 681 POFs indicate a peak incidence in the 2nd decade followed by a decrease in incidence with ensuing age. In those studies, only 23 (3%) patients were in the first decade. In the current study, 11 (8%) were between the ages of 1-9 years, with one patient 6 months old. Kohli et al.[18] have reported a POF associated with an anterior mandibular neonate tooth in a 2-hour-old female. However, the histologic findings are not well documented. Buchner and Hansen[10] reported a POF in a 7-month-old infant in their histologic study of 207 cases. Yip et al.[19] have reported an atypical lesion that exhibited combined histologic features of a congenital granular cell epulis of the newborn and a POF. The lesion was on the crest of the alveolar ridge in the maxillary right first primary molar area in a 7-day-old Chinese female. Cases have also been reported in a 7-year-old black female[20] and a 10-year-old female of unknown race.[21]

The high female affliction in the current study is in keeping with similar findings in the literature.[8,10,11] A minimum of 36 (29%) of the patients in this study were black, which is similar to the findings of Kenney et al.[11] Kenney et al[11] indicate that their findings are somewhat higher than what other investigators have found. These findings suggest the possibility of an increased incidence of POFs in black children and may warrant further study; however, the reason for this increase is not clear.

In agreement with most previous studies, the results in the series in this paper found that the majority of POFs were maxillary lesions (60%) with a high percentage (57%) in the incisor/canine region of the jaws and a low incidence (10%) distal to permanent first molar teeth. Interestingly, despite the reported occurrence of POF in children with primary or mixed dentition, there is very little documentation addressing the lesion's specific occurrence with primary teeth. The paucity of cases in surgical oral and maxillofacial pathology services may be, in part, because it is not uncommon for children with behavioral problems to be hospitalized for oral surgical procedures. In these cases the specimens bypass the oral pathology service and are submitted to the hospital service.

In this study, 2 cases were intimately associated with primary teeth. Excluding the poorly documented[18] and atypical[19] cases, two of the reported cases involved primary teeth. The tooth was not specified in Buchner and Hansen's[10] 7-month-old patient, nor were photomicrographs presented. The POF reported by Kendrick and Waggoner[20] involved the interdental papilla between the mandibular left second primary molar and first permanent molar. They speculated that the origin of the lesion was associated with the eruption of the first permanent molar. In this study, many POFs were between a permanent and primary tooth, thereby precluding an unequivocal origin from the PDL of the primary tooth.

If inflammation of the superficial PDL is indeed a factor in the development of a POF, why are so few cases seen in association with primary teeth? As Eversole and Rovin[8] have theorized, the constant irritation present in the exfoliation of primary teeth and the eruption of permanent teeth should result in an increased incidence of reactive lesions that are presumed to arise from PDL. However, other factors must be involved since none of the reactive proliferations, including POF, occurs frequently with this age group.

Clinically, the POF presented as an exophytic, smooth-surfaced, pink or red nodular mass that was sessile or on occasion on a pedicle. Involvement of the interdental gingival papilla was a frequent finding. Most were under 2.0 cm in diameter. Over one half of the cases were ulcerated, a finding almost identical to the findings in Buchner and Hansen's[10] 207 cases. They found that ulcerated lesions were much more common in the second decade and of shorter duration. Although some have attempted to correlate the significance of ulceration in the evolution of POF, it would seem that this nonspecific finding may in part be accounted for because it is exophytic, gingival in location, and in an area that is easily traumatized. Ulcerated lesions are more likely to be painful resulting in the patient seeking treatment sooner.

Provisional clinical diagnoses in this study were quite variable with POF considered in only 12 (9%) of 127 cases in which a clinical impression was offered. In children, gingival lesions that imitate the POF are the peripheral giant cell granuloma,[1,22] pyogenic granuloma,[1,22] fibroma,[22] and peripheral odontogenic fibroma.[23] Pyogenic granulomas and peripheral giant cell granulomas are more vascular, which is reflected by their tendency to bleed and their red or reddish-blue color. Several investigators[1,22,23] have provided excellent commentaries in the discussion and consideration of these aforementioned lesions and their clinical similarity to POF. Other peripheral (extraosseous) lesions to consider are the ameloblastoma, calcifying odontogenic cyst, and calcifying epithelial odontogenic tumor, but these are rare.

Based on the results of this study, the taking of radiographs is not part of most dentists' protocol in the formulation of a differential diagnosis for a soft-tissue gingival lesion. Flaitz[1] has stressed that radiographic evaluation of any gingival lesion is prudent in order to determine the extent and origin of the lesion. In addition, as Kendrick and Waggoner[20] reported, radiographs may detect the focal calcifications in a POF.

The recurrence rate of POFs is high for a benign reactive proliferation. Recurrence rates have varied from 7% to 45%.[7-11] In this LSUSD series, POF recurred in 11 of 134 patients for whom followup information was submitted, for a

recurrence rate of 8%. Because of the size and nature of this study, no attempt was made to determine how many patients with or without recurrent POFs were followed clinically and, if so, for how long. The information that was available in this series includes numerous patients with no postoperative followup; possibly, in some instances, if the patient was followed and did have a recurrence, it may have been sent elsewhere for diagnosis. Therefore, the overall recurrence rate of 8% represents a minimum rate of recurrence for children with POFs. One patient in this study had multiple recurrences. Eversole and Rovin[8] reported 12 recurrent POFs in 10 patients. The results presented in this paper suggest that although the average time interval for the recurrent lesion to appear is 12 months, it is not unusual (64% of LSUSD cases) for the lesion to recur within 6 months.

The treatment rendered in all of these cases consisted of excisional biopsy or surgical excision. Recurrences may occur following incomplete removal of the lesion and failure to eliminate local irritants. Treatment requires proper surgical intervention that ensures deep excision of the lesion including periosteum and affected PDL.[13,24] Thorough root scaling of adjacent teeth and/or removal of other sources of irritation should be accomplished. Tooth extraction is seldom necessary.

In children, reactive gingival lesions including POFs can exhibit an exuberant growth rate and reach significant size in a relatively short period of time. In addition, the POF can cause alveolar cuffing (erosion) of bone, can displace teeth, and can interfere or delay eruption of teeth. Early recognition and definitive surgical intervention result in less risk of tooth and bone loss. Kendrick and Waggoner[20] have reviewed the possible risks of a recurring POF in a child and listed the possible problems a recurrent POF could cause: (a) additional bone destruction leading to a periodontal defect or tooth loss; (b) an additional surgical procedure and resultant pain, which, in turn, could generate unnecessary emotional stress leading to dental-related fears; and (c) added cost and time for a second surgical procedure.

Conclusions

The following may be concluded from the results of this study regarding POFs in children (ages 1-19):

1. The POF is a well-defined pathologic entity among reactive gingival lesions.
2. The peak incidence is in the 2nd decade; the incidence of POFs in the first decade is very uncommon.
3. POFs are more common in females.
4. POFs are found most often in the maxillary incisor-cuspid region, but may occur at any gingival site.
5. A POF arising from the PDL of a primary tooth can occur, but is probably an uncommon event.
6. Because of the POF behavior pattern, a proper treatment protocol is warranted with close followup.

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