



A Clinicopathological Study of Ossifying Fibromas and Comparison between Central and Peripheral Ossifying Fibromas

Santosh Hunasgi, Vandana Raghunath

ABSTRACT

Aims and objectives: To study the clinical, histological features of peripheral and central ossifying fibromas and also to compare between them.

Materials and methods: The sample comprised a total 50 cases of ossifying fibromas [25 central ossifying fibromas (COF) and 25 peripheral ossifying fibromas (POF)] inclusive of cemento-ossifying fibromas.

Results: The mean age is 28.2 years in POF and 24.7 years in COF. The male: female ratio was 1:1.5 in POF and 1:1.8 in COF. The size of the lesions varied from 0.45 to 2.75 cm in cases of POF and in COF, it ranged from 1.25 to 13.5 cm. COF showed more duration (1-8 years) when compared with POF (1-3). Majority of cases of COF showed radiolucent, mixed radiolucent and radiopaque unilocular lesions. The predominant cell type in both POF and COF was a combination of both ovoid and spindle cells. Regarding vascularity it showed mild, moderate and intense vascularity. On comparison of all stromal changes between POF and COF showed no statistically significant difference.

Conclusion: The clinical parameters and radiographic changes of POF and COF in our study were similar to the previous studies. Histopathological features like type of cells, cellularity and vascularity in POF and COF were similar to previous studies. However, when clinical and histopathological features were compared between POF and COF showed no statistical significance except for site of the lesion. These features signify the behavior of two lesions. Further research on larger sample might give more insights into these lesions.

Keywords: Ossifying fibroma, Central ossifying fibroma, Peripheral ossifying fibroma.

How to cite this article: Hunasgi S, Raghunath V. A Clinicopathological Study of Ossifying Fibromas and Comparison between Central and Peripheral Ossifying Fibromas. *J Contemp Dent Pract* 2012;13(4):509-514.

Source of support: Nil

Conflict of interest: None declared

INTRODUCTION

The term 'ossifying fibroma' (OF) has been used since 1927, and since 1968 cementum-containing tumors have been grouped together. In 1971 the World Health Organization (WHO) classified four types of cementum-containing lesions: Fibrous dysplasia, ossifying fibroma, cementifying fibroma and cemento-ossifying fibroma. However, the term 'cementifying ossifying fibroma' was reduced to OF in the new WHO classification in 2005.¹

The origin of OF is thought to be the periodontal membrane. Ossifying fibromas occur in both central and peripheral locations of the jaw bones.¹ Histologically, the lesion is composed of varying amounts of immature and mature bony trabeculae, cementum-like tissue, dystrophic calcifications, all in different configurations with varied stromal collagen content and cellularity.²

Peripheral ossifying fibroma (POF) is a lesion of the gingival tissues representing up to 2% of all oral lesions that are biopsied. POF mainly affects women in the second decade of life. The lesions are most often found in the gingiva, located anterior to the molars and in the maxilla.³

Central ossifying fibroma (COF) can occur at any age, however, many authors confirmed that COF of the jaw tended to occur in middle-aged patients. OF of the jaw bone shows a predilection for females.¹

The aim of the present research is to study the clinical and histological features of POFs and COFs and also to compare between them.

MATERIALS AND METHODS

The present study was conducted in the Department of Oral Pathology, SDM Dental College and Hospital, Dharwad. The total sample consisted of 50 cases of OFs (25 COFs

and 25 POFs) inclusive of cemento-ossifying fibromas. All the cases were reviewed for clinical features, such as age, sex, site, size, duration, radiographic features and recurrences. The histological features, such as cell type, vascularity, hyalinization and inflammation were seen.

The data was statistical analyzed using Chi-square (χ^2 test) test for comparison between small samples. p-value <0.05 was considered to be statistically significant.

RESULTS

The Clinical Findings of POF and COF

The mean age of occurrence was 28.2 years in POF and 24.7 years in COF. The male:female ratio was 1:1.5 in POF and 1:1.8 in COF. POF were found to occur more in maxillary region whereas COF occurred predominantly in mandibular posterior region. On comparison of location between POF and COF showed a statistically significant difference. The size of the lesions varied from 0.45 to 2.75 cm in cases of POF whereas in cases of COF, it ranged from 1.25 to 13.5 cm. Regarding duration of the lesions, COF showed more duration (1-8 years) when compared with POF (1-3). No significant radiographic changes were observed in POF. Majority of cases of COF showed radiolucent areas and only few cases showed mixed radiolucent and radiopaque areas. Two cases of COF showed recurrences after 6 months of follow-up and one case showed recurrence after 1-year duration. However, no recurrence was found in POF cases (Table 1).

Stromal Contents in POF and COF

The predominant cell type in both POF and COF was a combination of both ovoid and spindle cells (i.e. 20 POF and 15 COF cases; Figs 3 and 4). Predominantly ovoid cells were observed in 5/25 POF and 9/25 cases of COF (Fig. 5). Only one case of COF showed predominantly spindle cells (Fig. 6). Predominant cases showed mild cellularity (i.e. 11 POF and 10 COF cases). Regarding vascularity predominant cases showed moderate vascularity (i.e. 14 POF and 16 COF cases; Fig. 7). Only one case of POF showed hyalinization, but it was not seen in any of the COF cases. Majority of cases showed mild chronic inflammatory cell infiltrate (i.e. 17 POF and 14 COF cases; Fig. 8), moderate inflammation was noted only in 2 cases of POF (Fig. 9) and none in COF. On comparison of type of cell, cellularity, vascularity, hyalinization and chronic inflammatory cell infiltrate between POF and COF showed no statistically significant difference (Table 2, Figs 1 and 2).

DISCUSSION

Ossifying fibroma occurs mostly in craniofacial bones and is generally categorized into two types, COF and POF.⁴

The peripheral type shows a contiguous relationship with the periodontal ligament (PDL), occurring solely on the soft tissues overlying the alveolar process. On the other hand, the central type arises from the endosteum or the PDL adjacent to the root apex and expands from the medullary cavity of the bone. Despite confusing terminology, POF is

Table 1: Clinical findings in POF and COF

Clinical findings		POF	COF	χ^2 -value	p-value
Age (years)	Range	12-60	7-65		
	Mean	28.2	24.7		
Male:Female ratio		1:1.5	1:1.8		
Location	Mandibular anterior	5	4	0.135	0.99
	Mandibular posterior	1	12	10.135	0.0008
	Maxillary anterior	10	2	5.37	0.018
	Maxillary posterior	9	7	0.091	0.76
Size (cm)	Range	0.45-2.75	1.25-13.5		
	Mean	1.55	4.56		
Duration (years)	Range	1-5	1-8		
	Mean	3	4.5		
Pedunculated/sessile	Pedunculated	22			
	Sessile	3			
Ulcerated/nonulcerated	Nonulcerated	25			
	Ulcerated	5			
X-ray findings	RL (ML)*		5		
	RL (UL)*		7		
	RL-RO* (UL)		3		
	RO*		7		
	NA*		3		
	Total		25		
Recurrences		Nil	2		

*RL: Radiolucency; RO: Radiopacity; ML: Multilocular; UL: Unilocular; NA: Not available. p > 0.05 is not significant; while p < 0.05 is significant

Table 2: Comparison of stromal contents in POF and COF

Stromal contents	Particulars	POF (no. of cases)	COF (no. of cases)	χ^2 -value	p-value
Type of cell	Ovoid and spindle	20	15	2.381	0.123
	Predominantly ovoid	5	9	1.587	0.208
	Predominantly spindle	0	1	1.02	0.99
Cellularity	Intense	8	9	0.089	0.765
	Moderate	6	6	0.0001	0.99
	Mild	11	10	0.082	0.774
Vascularity	Intense	9	6	0.857	0.355
	Moderate	14	16	0.333	0.564
	Mild	2	3	0.22	0.99
Hyalinization		1	0	1.02	0.99
Chronic inflammatory cell infiltrate	Intense	6	11	2.228	0.136
	Moderate	2	0	0.5208	0.49
	Mild	17	14	0.762	0.382

p > 0.05 is not significant; whereas p < 0.05 is significant

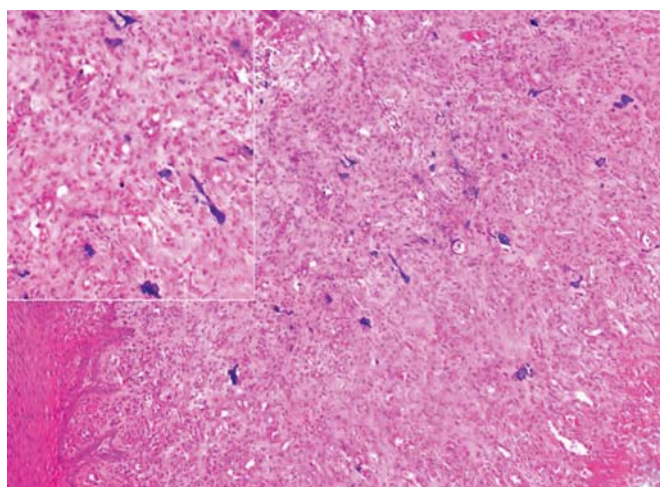


Fig. 1: POF showing stratified squamous epithelium and underlying fibrocellular connective tissue stroma with areas of calcification (H&E stain at 4x magnification). Inset showing calcifications (H&E stain at 20x magnification)

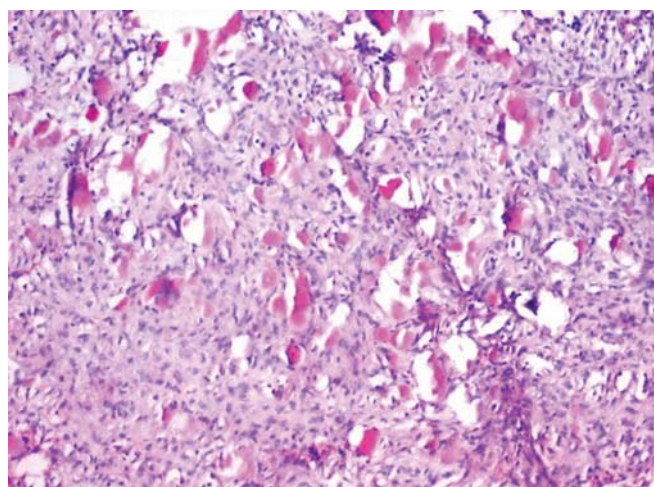


Fig. 3: POF showing combination of ovoid to spindle cells in connective tissue stroma with areas of calcification (H&E stain at 10x magnification)

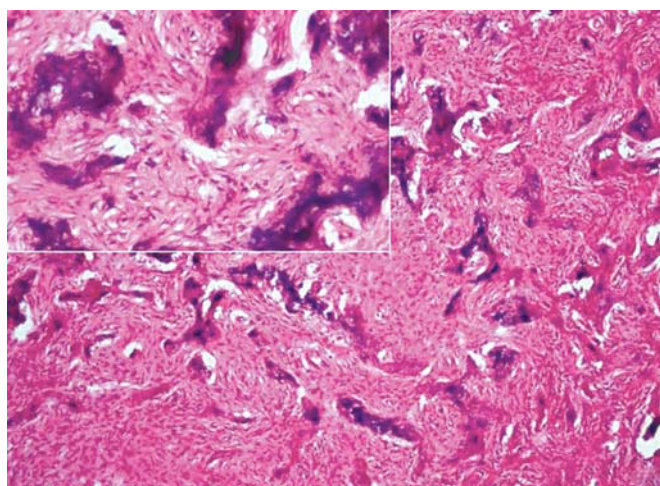


Fig. 2: COF showing fibrocellular connective tissue stroma with areas of ossifications and calcifications (H&E stain at 4x magnification). Inset showing central ossifications (H&E stain at 20x magnification)

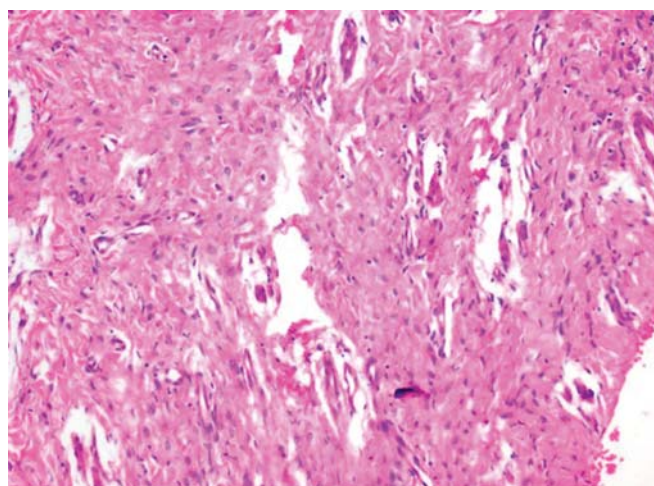


Fig. 4: COF showing combination of ovoid to spindle cells in connective tissue stroma (H&E stain at 10x magnification)

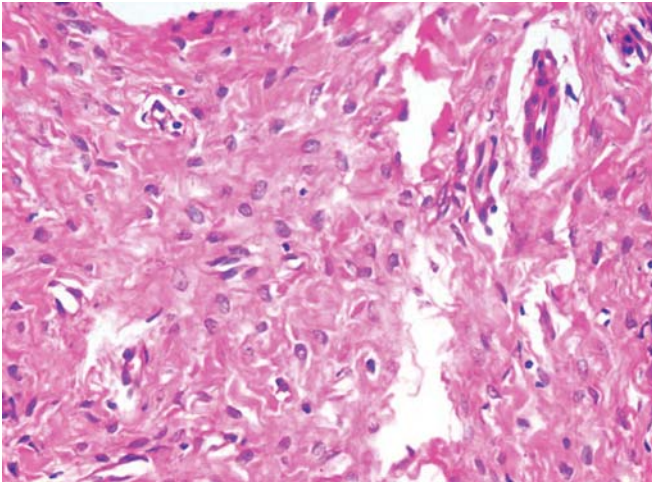


Fig. 5: COF showing predominantly ovoid cells in connective tissue stroma (H&E stain at 20x magnification)

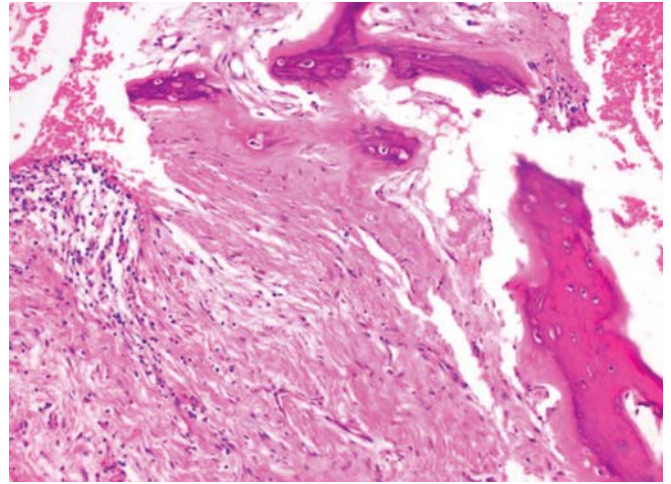


Fig. 8: COF showing mild patchy chronic inflammatory cell infiltrate in fibrocellular connective tissue stroma with areas of ossification (H&E stain at 10x magnification)

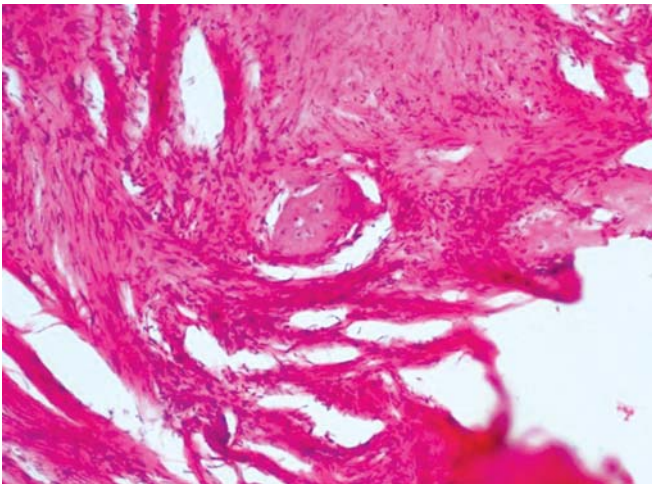


Fig. 6: COF showing predominantly spindle cells in connective tissue stroma (H&E stain at 10x magnification)

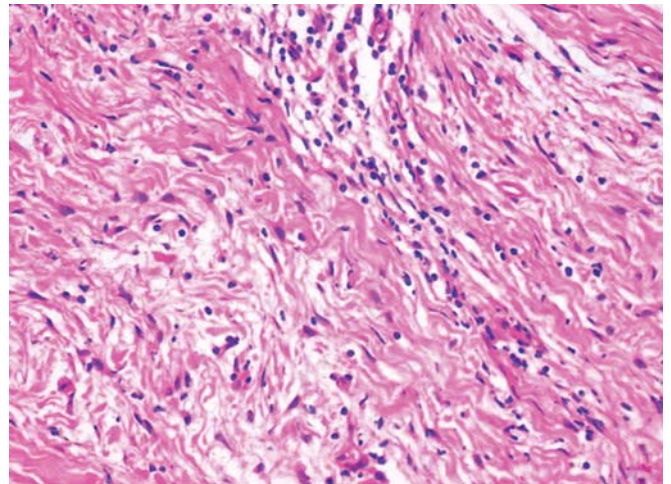


Fig. 9: POF showing moderate chronic inflammatory cell infiltrate in fibrocellular connective tissue stroma (H&E stain at 20x magnification)

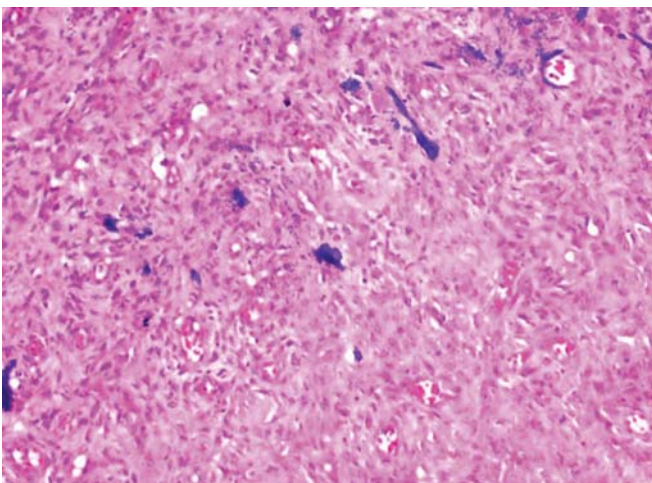


Fig. 7: POF showing moderate amount of vascularity in fibrocellular connective tissue stroma with areas of calcification (H&E stain at 4x magnification)

not the peripheral counterpart of the COF of the mandible and maxilla, but instead is a reactive gingival lesion known under the generic name of epulis.⁴

Ossifying fibroma and cementifying fibroma are now considered to be the two extremes of the same spectrum.⁵ The previous nomenclature of OF or cementifying fibroma was based upon the histopathology which displayed predominately bone-like or cementum-like tissue, characterized by osteoblasts and cementoblasts respectively. Taking account of the wide range of histological manifestations, the WHO in 1992 revised its nomenclature to refer to the hitherto separate lesions of the cementifying fibroma and the OF as a single entity termed the cemento-ossifying fibroma.⁶

COFs and POFs show varied clinical and histological features. However, the literature regarding the comparison

of clinical and histological features between COF and POF is scant. Hence, an attempt is made here to study the clinical and histological features of POF and COF and also to compare between them.

The present study showed clinical findings, such as mean age of occurrence was 28.2 years (12-60 years range) in POF and 24.7 years (7-65 years range) in COF. Male: Female ratio was 1:1.5 in POF and 1:1.8 in COF, and POF occurred predominantly in maxilla and COF in the mandible and it is mostly seen in posterior region. Similar observations regarding age in POF cases were observed.^{7,8} Our observations of age of occurrence in COF were similar to other studies between 8 and 69 years age range.^{9,10} However, other studies showed an age range of 3rd to 4th decade^{2,7,11} and wide age range.¹² Thus, OFs vary considerably in their age of occurrence. Regarding sex predilection these lesions occur more commonly in females^{8,13} but we did not observe any significant difference. Sixty percent of POF cases were noted in maxilla¹⁴ and are in accordance with our study, but few cases reported equal site predilection. OFs usually occurred more in mandible which is similar to our study of COF cases.^{7,9} However, comparison of location between POF and COF showed a statistically significant difference.

In our study, the sizes of the lesion varied from 0.45 to 2.75 cm in cases of POF where as in cases of COF it ranged from 1.25 to 13.5 cm respectively. Study reported a size range of 1 to 6 cm both in POF and COF cases.^{7,15} Our study is in accordance to the above mentioned observations. COF cases showed a size range of 8 to 15 cm, which included 8 cases of giant OF.¹⁶ Our study also included a case of giant OF that measured 13.5 cm. Duration of 1 to 5 years in POF cases and 1 to 8 years in COF cases was noted in our study and this is in accordance with 4 years duration² and 18 months duration¹⁷ reported in COF cases. Most of the POF cases presented as pedunculated masses (22/25) and remaining three were sessile. Similar findings were observed in other previous studies.^{8,13}

In our study, there were no radiographic changes observed in POF cases. However, superficial erosions of the bone could be found in few cases.⁸ In COF, 12 were entirely radiolucent (RL) with five cases showing multilocular (ML) and seven cases showed unilocular (UL), and other three cases showed mixed RL and radiopaque (RO) lesions, and other seven cases were UL, RO lesions. In remaining three cases radiographic details could not be obtained. Most of the COF cases presented as RL lesions with or without central opacities.⁹ Multiloculated lesions showed with multitrabeculated areas, punched out radiolucency,¹¹ radiopaque masses involving entire mandible,¹⁸ RL lesions in 28%, RL with focal areas of

opacity in 42%, ML expansile lesions in 7%, RL interposed between contiguous teeth in 5%, RL with opaque foci interposed between contiguous teeth in 9%, and expansile lesions with opacification in 9% and unilocular RL/target lesions or ML,² well-demarcated lesions with smoke screen appearance and irregular radiolucent areas.¹⁶ Thus, the radiographic findings in our cases form a part of the myriad appearances, reported by various authors as detailed above.

The present study showed stromal features, such as in majority of the POF (20/25) and (15/25) COF cases, both ovoid and spindle cells were noted. The finding of both population of cells that is ovoid and spindle, has been reported.² However, other authors reported only spindle to stellate cell population, without any emphasis on the presence of ovoid cells.² Predominantly ovoid cells were noted in 5/25 POF cases and 9/25 COF cases and were similar to observations² in COF noticed.

Predominantly spindle cells, were observed in one case of COF in our study and, also found cells with elongated nuclei, closely resembling the cells seen in the periodontal membrane¹⁹ and considered some cells to be transitional forms of osteoblasts.² The presence of plump ovoid cells generally reflects proliferative and more active lesions and spindle cells usually are considered to be resting cells. However, neither clinical significance/correlation exist in our study nor have been reported by others. Multinucleated giant cells were also observed.⁷ However, no giant cells were found in our study. In our study, the degree of cellularity varied in both POF and COF. Mild degree of cellularity was seen in 11/25 cases of POF and 10/25 of COF; moderate in 6/25 cases of POF and COF each; intense cellularity was observed in 8/25 and 9/25 cases of POF and COF respectively. High cellularity was noted in COF^{12,18} and in POF.⁷ Though many authors observed hypercellularity in lesions, our study showed only 17 out of 50 cases (34%).

A moderate degree of vascularity was chiefly noted in 14/25 POF cases and 16/25 cases of COF. This is in accordance with cases of COF.¹⁸ But other studies showed less vascularity,⁷ increased vascularity.² Our cases showed mild vascularity was seen in only three COF cases. There appears to be no significance regarding vascularity. Inflammatory changes varied in our study, we found predominantly mild degrees of inflammation in POF cases, intense and mild degrees in COF cases. This observation reflects the degree of infection/trauma and host resistance.

Three cases of COF showed recurrences, like after 6 months, 1 year²⁰ and 6 years² respectively. In our study POF cases showed no recurrence, but 16% recurrence in 365 POF cases,⁸ and 20% recurrence in 50 POF cases studied.⁹ Thus, adequate surgical excision carried out in

our cases could explain the minimal amount of recurrence only 8% in our COF and none in POF.

On comparison of all stromal changes between POF and COF showed no statistically significant difference. This shows that POF and COF show varied amount of stromal components. Hence, considerable difference is observed in clinical behavior, aggressiveness and recurrences between POF and COF.

CONCLUSION

The clinical parameters and radiographic changes of POF and COF in our study were similar to the previous studies. Histopathological features like type of cells, cellularity and vascularity in POF and COF were similar to previous studies. However, when clinical and histopathological features were compared between POF and COF showed no statistical significance except for site of the lesion. These features signify the behavior of two lesions. Further research on larger sample might give more insights into these lesions.

REFERENCES

1. Liu Y, You M, Wang H, Yang Z, Miao J, Shimizutani K, Koseki T. Ossifying fibromas of the jaw bone: 20 cases. *Dentomaxillofac Radiol* 2010;39:57-63.
2. Eversole LR, Leider AS, Nelson K. Ossifying fibroma: A clinicopathologic study of sixty-four cases. *Oral Surg Oral Med Oral Pathol* 1985;60:505-11.
3. Garcia de Marcos JA, Garcia de Marcos MJ, Rodríguez SA, Rodrigo JC, Poblet E. Peripheral ossifying fibroma: A clinical and immunohistochemical study of four cases. *J Oral Sci* 2010;52(1):95-99.
4. Alam T, Dawasaz A, Thukral N, Jangam D. Surgical diode laser excision for peripheral cemento-ossifying fibroma: A case report and literature review. *J Oral Laser Applications* 2008;8:43-49.
5. MacDonald-Jankowski DS. Fibro-osseous lesions of the face and jaws. *Clin Radiol* 2004;59:11-25.
6. MacDonald-Jankowski DS. Cemento-ossifying fibromas in the jaws of Hong Kong Chinese. *Dentomaxillofac Radiol* 1998;27:298-304.
7. Neville BW, Damm DD, Allen CM, Bouquot JE. *Oral and Maxillofacial Pathology*. WB Saunders Company, 1995.
8. Shafer, Hine, Levy. *A text of oral pathology, Benign and malignant tumours of the oral cavity*. WB Saunders Company, Philadelphia 1993;2:181-85.
9. Eversole LR, Sabes WR, Rovin S. Fibrous dysplasia: A nosologic problem in the diagnosis of fibro-osseous lesions of the jaws. *J Oral Pathol* 1972;1:189-220.
10. Hamner JE, Scofield HH, John C. Benign fibro-osseous jaw lesions of periodontal origin. *Cancer* 1968;22:861-78.
11. Waldron CA, Giansanti JS. Benign fibro-osseous lesions of the jaws: A clinical radiologic histologic review of sixty-five cases. Part II. Benign fibro-osseous lesions of periodontal ligament origin. *Oral Surg* 1973;35:340-50.
12. Soames JV, Southams JC. *Oral Pathology*. Oxford Medical Publications, New York 1998.
13. Regezi JA, Sciubba JJ. *Oral Pathology—Clinical Pathologic Correlations* (3rd ed). WB Saunders Co, 1999;357-60.
14. Buchner A, Hansen LS. The histomorphologic spectrum of peripheral ossifying fibroma. *Oral Surg Oral Med Oral Pathol* 1987;63:452-61.
15. Langdon JD, Rapidis AD, Patel MF. Ossifying fibroma—one disease or six? Analysis of 39-fibro-osseous lesions of the jaws. *Br J Oral Surg* 1976;14:1-11.
16. Van Heerden WFP, Raubeen HEJ, Weir RG, Kredler J. Giant ossifying fibroma: A clinicopathologic study of 8 tumors. *J Oral Pathol Med* 1989;18:506-09.
17. Carlisle JE, Hamner WB. Giant central ossifying fibroma of the mandible: Report of case. *Oral Surg* 1979;37:206-11.
18. Bradley ES, Leake D. Ossifying fibroma involving maxilla and mandible. Report of case. *Oral Surg Oral Med Oral Pathol* 1968; 605-14.
19. Yin WY, Pederson GT, Bartley MH. Multiple familial ossifying fibromas: Relationship to other osseous lesions of the jaws. *Oral Surg Oral Med Oral Pathol* 1989;68:754-58.
20. Amies A, Fleming WE. Central ossifying fibroma of the jaws. *Oral Surg Oral Med Oral Pathol* 1962;15:1409-14.

ABOUT THE AUTHORS

Santosh Hunasgi

Professor, Department of Oral Pathology, Navodaya Dental College Raichur-584103, Karnataka, India, e-mail: drsantosh31@gmail.com

Vandana Raghunath

Professor and Head, Department of Oral Pathology, Narayana Dental College, Nellore, Andhra Pradesh, India