Original Article

Ossifying Fibroma of the Jaws: Review of 57 Cases in Enugu and of Global Literature

Chukwubuzor Udokwu Okwuosa[1], Mark Chukwuemeka Nwoga[2], Akinyele O. Adisa[3]

[1]Department of Oral Pathology and Oral Medicine, University of Nigeria Teaching Hospital, [2]Department of Oral Pathology and Oral Medicine, Faculty of Dentistry, University of Nigeria, Enugu, [3]Department of Oral Pathology, College of Medicine, University of Ibadan, Ibadan, Nigeria

Abstract

Background: There are very few reports of the clinicopathological features of ossifying fibroma (OF) of the jaws in Enugu, South-east Nigeria. **Aims:** To study the prevalence and clinicopathological features of OF in Enugu. **Patients, Materials and Methods:** An eight-year retrospective study of patients with OF of the jaws was carried out in a tertiary hospital in Enugu, Nigeria. The clinical records, radiographs, histopathology reports, and slides of 87 patients with fibrous lesions, archived in the department of oral pathology and oral medicine were identified and examined. The cases diagnosed with OF by histological examination were retrieved and studied. The data were analysed using the descriptive statistics and presented in the form of frequency tables. The test for a statistical association was carried out using the Chi-square statistics. **Results:** There were 644 orofacial lesions and 13.5% (87) of these were fibro-osseous tumours. OF constituted 8.9% (57) of the orofacial lesions and 65.5% (57) of fibro-osseous tumors. The male-to-female ratio was 1:1.7. The overall mean age at tumour-onset was 24.1 ± 13.1 years, (range: 5–60 years). The age group at which OF occurred most frequently (43.9%) was 11–20 years. The mandible was the most common site of occurrence, 64.9% (37), while the radiographic features were well-circumscribed opacity 24.6% (14), and mixed lucency–opacity, 22.8% (13). Conventional 54 (94.7%) and juvenile-psammamatoid 3 (5.3%) subtypes were identified. **Conclusion:** OF is the most prevalent fibro-osseous lesion, occurred mostly in the second decade and exhibits a lower mean age of onset in male patients.

Keywords: Fibro-osseous lesion, juvenile psammamatoid, orofacial lesion, ossifying fibroma

Introduction

Fibro-osseous lesions are a group of poorly defined lesions that include fibrous dysplasia, ossifying fibroma (OF),[1] and osseous dysplasia.[2] OF (70%) is the most common benign fibro-osseous neoplasm of the craniofacial region.[3] It is characterised by the replacement of the normal bone and marrow with a connective tissue matrix, and mineralisation with woven bone or acellular structures.[4,5]

OF was first described by Menzel in 1872 but was reported by Montgomery in 1927.[6] Various classifications have applied the term "OF,"[7] while in the 3rd edition of WHO classification 2005, the term "cementifying OF" was reduced to OF.[8] However, the 4th edition of the WHO classification 2017 and the most current, reclassified cement-OF as benign messenchymal odontogenic tumour, clearly distinguishing it from OFs that are classified under benign fibro- and chondro-osseous lesions.[9]

Access this article online

Quick Response Code:

Website: www.njmonline.org

DOI: 10.4103/NJM.NJM_87_22

Peripheral OF is the extraosseous variant while the intraosseous OF is subdivided into conventional and juvenile clinicopathological subtypes.[10] The term juvenile OF (JOF) is used to describe two distinct clinicopathological entities: Juvenile trabecular OF (JTOF) and juvenile psammamatoid OF (JPOF). Conventional OFs are usually slow-growing and generally seen in the third and fourth decades of life.[3,11,12] They predominantly affect females,[3,13,14] with a female:male ratio of 5:1.[15] OF presents with the expansion of the buccal and lingual cortices and may involve the inferior border of the mandible.[1] It is locally aggressive, with

Address for correspondence: Dr. Mark Chukwuemeka Nwoga, Department of Oral Pathology and Oral Medicine, Faculty of Dentistry, University of Nigeria, Nsukka, Enugu, Nigeria.
E-mail: mark.nwoga@unn.edu.ng

How to cite this article: Okwuosa CU, Nwoga MC, Adisa AO. Ossifying fibroma of the jaws: Review of 57 cases in Enugu and of global literature. Niger J Med 2022;31:535-9.

Submitted: 23-Jul-2022 **Revised:** 04-Sep-2022
Accepted: 21-Sep-2022 **Published:** 29-Nov-2022

mandibular predilection, and often associated with significant esthetic and functional disturbances.[7,14]

Radiologically, OF appears as a well-circumscribed unilocular or multilocular radiolucencies or present as a mixed radiolucent-radiopaque mass with root resorption or displacement of adjacent teeth.[3,12] Central OF often presents with well-demarcated borders.

The precise global frequency of OF still poses a challenge due to the dearth of reported epidemiological studies and various terminologies that have been ascribed to the lesion.[6-8] There is a paucity of studies on the histopathology of OF from South-east Nigeria. This study will bridge the gap in knowledge and add to literature on the prevalence and clinicopathological features of OF in Enugu, Nigeria.

Patients, Materials and Methods

This is a retrospective study of the clinicopathological features of patients diagnosed with OF in a tertiary hospital in Enugu, over an eight-year period. Patients' clinical records, histopathology reports, and slides in the department of oral and maxillofacial surgery were reviewed from January 2012 to December 2019. Inclusion Criteria: Patients included in the study were those diagnosed as OF by histopathology study, and those with additional information from radiographs and slides from existing formalin-fixed paraffin-embedded tissue blocks.

Exclusion criteria

Cases confirmed with OF by histology but with missing or damaged paraffin blocks or without adequate clinical records were excluded. Information collected includes age at presentation, sex, site of lesion, and histological diagnosis of the lesion. Other data collected were duration of the lesion and age at tumour onset obtained by subtracting the duration of the lesion from the age at presentation.

The age-at-onset of symptoms is different from the age-at-presentation in the clinic. The age-at-onset is when the patient became aware of the initial swelling or other associated symptoms before presentation to the clinic. The duration of the lesion is obtained from this point by the patient. The clinician obtains the age-at-onset by subtracting the duration stated by the patient from the age-at-presentation.

There was no interface with patients, but with archival documents, tissue blocks, and other records, and the Helsinki Declaration was followed for this investigation. An institutional approval was obtained for the study.

The data were analysed using the descriptive statistics and presented in the form of frequency tables. The test for a statistical association between the variables at a 95% confidence interval was carried out using the Chi-square statistics. The level of significance was set at 95% ($P < 0.05$). All statistical tests were done using IBM SPSS Statistics for Windows, version 24.0. (Armonk, New York:IBM Corp., United States).

Results

A total of 644 orofacial lesions were identified, out of which 13.5% (87) were fibro-osseous lesions. OF cases constituted 8.9% (57) of orofacial lesions and 65.5% (57) of fibro-osseous lesions, respectively. The overall mean age at tumour onset was 24.05 ± 13.14 years. The range of ages at the onset of the lesion was 5–60 years. The mean duration of OF at presentation was 3.4 ± 3.5 years, while the range of duration of lesions was from 0.2 months to 16 years. Table 1 shows the frequency of age group of patients at the onset of the tumour. The majority of OF (43.9%) occurred in the 11–20 years' age group.

Female patients constituted 63.2% (36) and 36.8% (21) were male, with a male-to-female ratio of 1:1.7. The mean age at onset for female patients was 25.2 ± 13.5 years and 22.1 ± 12.6 years for male patients.

The mandible was the site with the most frequent occurrence 64.9% (37) and followed by the maxilla 35.1% (20), while the mandible: maxilla ratio was 1.9:1. Table 2 shows the frequency distribution of OF on anatomic sides and association with jaw locations. The majority of lesions, 49.1% (28) were located on the right side. There was no significant association.

There was also no significant association side of the jaw affected by OF and the presence of ulceration ($P = 0.24$), nor with complaint of pain ($P = 0.88$), nor tooth mobility ($P = 0.47$).

Table 3 shows the frequency of radiographic patterns of OF and association with gender. The well-circumscribed opaque pattern of 24.6% (14) and mixed lucency – opacity of 22.8% (13) were most frequent. There was no shown significant statistic association with gender. Tooth mobility was not a frequent occurrence and was observed only in 7% (4) of the cases. Pain was observed in 7% (4) of cases

Table 1: Frequency of age group of the patients at onset of ossifying fibroma

Age groups (years)	Frequency (%)
1-10	5 (8.8)
11-20	25 (43.9)
21-30	13 (22.8)
31-40	8 (14.0)
41-50	2 (3.5)
51-60	4 (7.0)

Table 2: Association of anatomic side of occurrence and jaw location

Side of jaw	Location		Total (%)	*P*
	Mandible	Maxilla		
Right	18	10	28 (49.1)	0.62
Left	13	9	22 (38.6)	
Anterior	1	0	6 (10.5)	
Bilateral	5	1	1 (1.8)	
Total	37	20	57 (100)	

with all lesions located in the mandible, $P = 0.127$. Ulceration was observed in 3.5% (2) of the cases. Three (5.3%) of the lesions were recurrent conventional OF cases referred from other centres. Conventional OF was the most common type of OF, 94.7% (54) followed by juvenile-psammamatoid type, 5.3% (3).

Figure 1 shows the gross excision specimen of OF. The definitive diagnosis of OF was made based on the histological examination of incisional and excisional surgical specimens. Figure 2 shows a photomicrograph with moderately cellular fibrous stroma and broad variation in mineralisation of the bone. Often, woven bone, lamellar bone, or metaplastic bone with peripheral osteoblastic rimming was seen in some cases. The diagnosis of JPOF was made based on additional histologic identification of moderate to dense proliferation of spindle-shaped cells within which were ossicles, spherules, or psammoma-like calcifications. Other criteria for the diagnosis include predominant extragnathic craniofacial bone occurrence.[9] No diagnosis of JTOF was made in this series.

All the cases were treated by surgical excision and there has been no case of recurrence after variable years of follow-up of three − ten years.

Discussion

The precise global prevalence of OF is yet to be determined due to dearth of reported epidemiological studies and array of terminologies previously used for its description.[6,8] The prevalence of OF among fibro-osseous lesions in Enugu South-east Nigeria was 65.5% which is higher than the 51% previously reported in Enugu,[13] but similar to the 68.3% reported in Port-Harcourt, South-South Nigeria.[16] Lasisi *et al*.[17] reported a prevalence of 50.4% in Western Nigeria. In published studies from the regions of Nigeria, OF is currently recognised as the most common benign fibro-osseous lesion.[13,16,17]

A lower overall mean age at tumour onset of 24.1 years was observed in this study in contrast to the 30.9 years reported by Lasisi *et al*.[17] in Western Nigeria. Higher mean age was reported by some other studies from Nigeria and Europe.[2,17,18] It is well documented that the lesion occurs most frequently in patients below the age of 40 years.[6] This was the case in this study where 89.5% of patients were below 40 years of age. The lower mean age in this study could be because the estimation was based on the more representative age at which the tumour was noticed by the patient, instead of the age at clinical presentation. The variable periods of duration reported by patients before the clinical presentation could run into years and thereby unduly extend the estimated mean ages.

A systematic review reported a higher mean age of OF in Asia than in Africa, and the 20–39 years age group was most frequently affected globally.[6] This variation may be attributed to geographic, racial factors, and differences in diagnosis. The most affected age group in the present study was the 11–20 years' age group. However, studies in Nigeria including Iyogun *et al*.[16] observed that OF was predominantly in the 21–30 years age category, in agreement with previous studies by other authors.[17,18] Sule *et al*.[19] also reported the second and third decades of life. Other studies have also reported the more cases of OF in the third and four decades of life.[3,12,20] These higher variations of the most affected age group may be attributed to geographic and racial factors and estimations of age group based on the patient's age at tumour presentation.

Table 3: Association of radiographic pattern of ossifying fibroma and gender (n=45)

Radiograph	Sex		Total, n (%)	P
	Male	Female		
Well-circumscribed opacity	4	10	14 (31.1)	0.36
Mixed-lucency opacity	7	6	13 (28.9)	
Unilocular radiolucency	1	8	9 (20.0)	
Multilocular radiolucency	1	3	4 (8.8)	
Diffuse haziness	1	3	4 (8.8)	
Peripheral thick, central less dense	0	1	1 (2.4)	
Total	14	31	45 (100.0)	

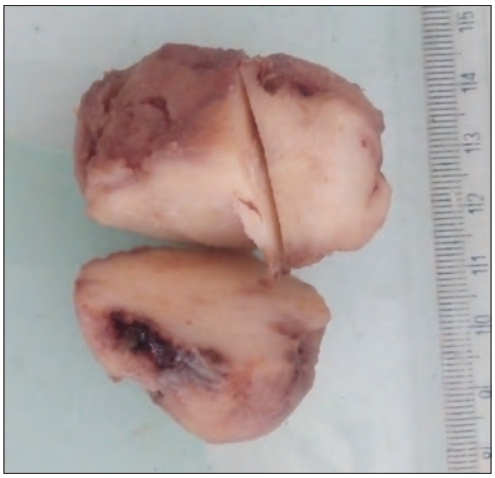

Figure 1: Gross specimen of ossifying fibroma. The tumour shelled out and felt gritty to cut

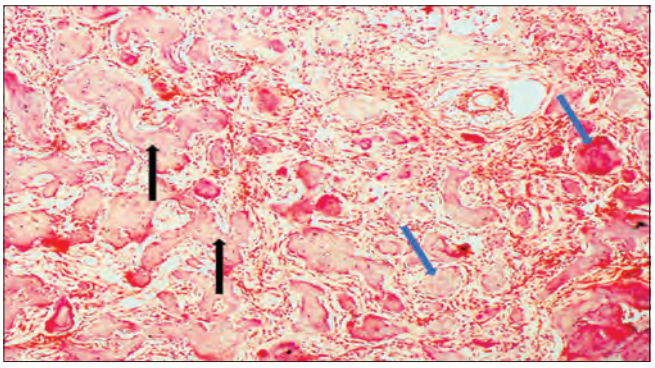

Figure 2: *Photomicrograph of ossifying fibroma of the jaw (H and E, ×100)*. Moderately cellular fibrous stroma with irregularly-shaped woven bone trabeculae (black arrows) and globules of bone (blue arrows)

The mandible was more commonly affected which is in agreement with most published reports on the subject.[2,7,17,21] Moshy *et al*.[22] and El-Gehani *et al*.[23] in contrast reported a slight maxillary predilection, whereas Ogunsalu *et al*.[24] reported no predilection for any jaw site. The clinicohistological types of OF show different anatomical site preferences, while conventional OF has predilection for the mandible, JOF was more frequently located on the maxilla.[9] It is of interest that the majority (49.1%) of OF in this study were located on the right side of the jaw, but there was no significant association between the jaw side affected and the presence of ulceration ($P = 0.24$), nor complaint of pain ($P = 0.88$), nor tooth mobility ($P = 0.47$).

The predilection of OF has frequently favoured the female gender.[2,7,21] This observation was also made in this study and reported by other authors.[3,18,25,26] However, Bassey *et al*.,[27] Mohanty *et al*.,[28] and Hamner *et al*.[29] reported a male preference. On the contrary, Alsharif *et al*.[11] and Moshy *et al*.[22] reported no gender affinity as it was found equally in their series. The reason for the reported higher female prevalence is presently unexplained.

The prevalence of JPOF in this study was 5.3%. JPOF is more commonly reported than the trabecular variety and occurs predominantly in the sino-nasal and orbital bones. Tumours in these sites could result in nasal obstruction, epistaxis, proptosis, and visual impairments including blindness, ptosis, and papilledema.[13,15] The cases of JPOF in this series did not exhibit any of these remarkable symptoms and the radiographic features were consistent with those described in literature such as expansile and well-circumscribed radiolucent lesion.[15,30,31] There was no case of JTOF recorded during the period of the study.

Microscopic diagnosis of OF had relied on characteristic demonstration of encapsulation and mineralisation of lamellar bone and woven bone with peripheral osteoblastic rimming.[13-15] These features were observed in this study, although some of the cases occasionally exhibited the absence of osteoblastic rimming. However, combining the histologic with clinical and radiologic features always helped in reaching the diagnosis of OF.

Adjuvant diagnostic tools based on immunohistochemistry are useful in some cases with diagnostic challenges in differentiating OF from fibrous dysplasia. The quantification of immunoexpression of osteocalcin exclusively secreted by osteoblasts as a biomarker for bone formation process, and Runx2 has been suggested to be helpful in differentiating both lesions.[32-34] The osteocalcin was quantitatively more in fibrous dysplasia than in OF,[32,33] and both lesions differ in the composition of the bone matrix based on osteocalcin immunohistochemistry.[34]

The cases of JOF in this study were not histologically remarkable and posed no diagnostic challenges. These cases were similar to those described in other reports and characterised by a proliferation of spindle shaped-fibroblastic cells with the presence of small multiple cementum-like ossicles (psammomatoid bodies).[15,35,36] Other studies reported that multinucleated osteoclast-like giant cells (similarly seen in giant cell tumour, giant cell granuloma, and brown tumour of hyperparathyroidism) may be seen together with occasional normal mitotic figures, without cytologic atypia.[15,31] Some studies have also documented concurrent aneurysmal bone cyst or traumatic bone cyst formation with JPOF.[30,31] Fibrous dysplasia remains the most remarkable differential diagnosis of OF because it shares similar clinical, radiological, and histologic features though both are distinct lesions.[8]

OF is variably treated with excision, curettage and resection depending on the level of aggressiveness and history of recurrence.[37,38] The recurrent rate of cases received from peripheral hospitals in this study was low at 5.3%, there was no case of recurrence in this series after treatment. JOF could recur if local resection is incomplete.[30] Long-term follow-up is therefore necessary owing to its locally aggressive nature and high recurrent potentials, with rates of 30%–56% for JPOF.[36,39] Although malignant transformation is rare,[30] transformation of OF to osteosarcoma has been reported,[40,41] as well as sarcomatous transformations in long-term recurrent lesions.[42]

The significance of this study is in its being the second study of the subject in Enugu South East Nigeria and thereby contributing to the scant literature. This study presented a larger data set, covered a longer period of study and focused on the histopathology of OF.

This study limited it's focus to the clinicopathological features and prevalence of the lesion. The absence of any case of juvenile trabecular variant of OF among the reported tumours during the period of the study also limited the extent of the study. The translational value is the improvement in understanding the patterns of OF in Enugu, the awareness of it's earlier age of onset, rarity of the juvenile trabecular type, and absence of malignant transformation. Further studies are required on immunohistochemical studies to facilitate a more accurate diagnosis.

Conclusion

OF is the most prevalent fibro-osseous lesion in this study and only conventional and juvenile-psammamatoid histologic variants were observed. It is the most common bone-related lesion in the second decade of life with a lower mean age of onset in this series.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Toyosawa S, Yuki M, Kishino M, Ogawa Y, Ueda T, Murakami S, *et al*. Ossifying fibroma veraus fibrous dysplasia of the jaw: Molecular and immunological characterization. Mod Pathol 2007;20:389-96.
2. Prado Ribeiro AC, Carlos R, Speight PM, Hunter KD, Santos-Silva AR,

de Almeida OP, *et al*. Peritrabecular clefting in fibrous dysplasia of the jaws: An important histopathologic feature for differentiating fibrous dysplasia from central ossifying fibroma. Oral Surg Oral Med Oral Pathol Oral Radiol 2012;114:503-8.
3. Ojo MA, Omoregie OF, Altini M, Coleman H. A clinico-pathologic review of 56 cases of ossifying fibroma of the jaws with emphasis on the histomorphologic variations. Niger J Clin Pract 2014;17:619-23.
4. Waldron CA. Fibro-osseous lesions of the jaws. J Oral Maxillofac Surg 1993;51:828-35.
5. Soyele O, Effiom O, Odukoya O. Masson's trichrome and AgNOR study of fibrous dysplasia and ossifying fibroma in Lagos University teaching hospital patients. World J Pathol 2013;2:94-101.
6. MacDonald-Jankowski DS. Ossifying fibroma: A systematic review. Dentomaxillofac Radiol 2009;38:495-513.
7. Liu Y, Wang H, You M, Yang Z, Miao J, Shimizutani K, *et al*. Ossifying fibromas of the jaw bone: 20 cases. Dentomaxillofac Radiol 2010;39:57-63.
8. Barnes L, Eveson JW, Reichart P, Sidransky D. Pathology and Genetics of Head and Neck Tumours. 3rd ed. Lyon: IARC; 2005. p. 163-75.
9. El-Naggar AK, Chan JK, Grandis JR, Takata T, Slootweg P. WHO Classification of Head and Neck Tumours. 4th ed. Lyon: IARC; 2017. p. 204-60.
10. Gupta K. Juvenile ossifying fibroma. Int J Med Heal Res 2017;3:6-8.
11. Alsharif MJ, Sun ZJ, Chen XM, Wang SP, Zhao YF. Benign fibro-osseous lesions of the jaws: A study of 127 Chinese patients and review of the literature. Int J Surg Pathol 2009;17:122-34.
12. Gulati A, Rao NN, Radhakrishnan RA. Fibrous dysplasia and ossifying fibroma-an advent in their diagnosis. J Clin Exp Dent 2011;3:297-302.
13. Okechi UC, Anyanechi CE, Saheeb BD. A clinical audit of histopathologically diagnosed ossifying fibroma of the Jaws in a Nigerian population. Niger J Clin Pract 2021;24:1397-403.
14. Mintz S, Velez I. Central ossifying fibroma: An analysis of 20 cases and review of the literature. Quintessence Int 2007;38:221-7.
15. El-Mofty S. Bone lesions. In: Diagnostic Surgical Pathology of the Head and Neck. 2nd ed. Philadelphia: Saunders Elsevier; 2009. p. 729-84.
16. Iyogun CA, Dirisu N, Omitola OG, Sule A. Pattern of fibro-osseous lesions of Jaws in Port Harcourt in South-South Nigeria. Ann Med Heal Sci Res 2018;8:186-8.
17. Lasisi TJ, Adisa AO, Olusanya AA. Fibro-osseous lesions of the Jaws in Ibadan, Nigeria. Oral Health Dent Manag 2014;13:41-4.
18. Soyele OO, Braimah RO, Ibikunle AA, Taiwo AO, Gbotolorun MO, Aregbesolad SB. Ossifying fibroma : Clinico-pathologic and immuno-histochemical investigation of 157 cases in a tertiary referral Centre. J Dent Sci 2017;5:45-50.
19. Sule AA, Iyogun CA, Adeyemi T. Pattern of fibro-osseous lesions of the Jaws in Kano, Northern Nigeria. J Dent Oral Health 2017;3:2015-7.
20. Lee RS, Weitzel S, Eastwood DM, Monsell F, Pringle J, Cannon SR, *et al*. Osteofibrous dysplasia of the tibia. Is there a need for a radical surgical approach? J Bone Joint Surg Br 2006;88:658-64.
21. Ajagbe HA, Daramola JO. Fibro-osseous lesions of the Jaw: A review of 133 cases from Nigeria. J Natl Med Assoc 1983;75:593-8.
22. Moshy J, Dimba E, Ocholla T, Chindia M. Characteristic radiological and histological patterns of fibrous dysplasia and ossifying fibroma of the Jaws at University of Nairobi dental teaching hospital. Surg Sci 2012;3:189-93.
23. El-Gehani R, Orafi M, Elarbi M, Subhashraj K. Benign tumours of orofacial region at Benghazi, Libya: A study of 405 cases. J Craniomaxillofac Surg 2009;37:370-5.
24. Ogunsalu CO, Lewis A, Doonquah L. Benign fibro-osseous lesions of the Jaw bones in Jamaica: Analysis of 32 cases. Oral Dis 2001;7:155-62.
25. Tabareau-Delalande F, Collin C, Gomez-Brouchet A, Bouvier C, Decouvelaere AV, de Muret A, *et al*. Chromosome 12 long arm rearrangement covering MDM2 and RASAL1 is associated with aggressive craniofacial juvenile ossifying fibroma and extracranial psammomatoid fibro-osseous lesions. Mod Pathol 2015;28:48-56.
26. Kilinc A, Saruhan N, Gundogdu B, Yalcin E, Ertas U, Urvasizoglu G. Benign tumours and tumour-like lesions of the oral cavity and Jaws: An analysis of 709 cases. Niger J Clin Pract 2017;20:1448-54.
27. Bassey GO, Osunde OD, Anyanechi CE. Maxillofacial tumours and tumour-like lesions in a Nigerian teaching hospital: An eleven year retrospective analysis. Afr Health Sci 2014;14:56-63.
28. Mohanty S, Gupta S, Kumar P, Sriram K, Gulati U. Retrospective analysis of ossifying fibroma of jaw bones over a period of 10 years with literature review. J Maxillofac Oral Surg 2014;13:560-7.
29. Hamner JE 3rd, Scofield HH, Cornyn J. Benign fibro-osseous jaw lesions of periodontal membrane origin. An analysis of 249 cases. Cancer 1968;22:861-78.
30. El-Mofty S. Psammomatoid and trabecular juvenile ossifying fibroma of the craniofacial skeleton: Two distinct clinicopathologic entities. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2002;93:296-304.
31. Bohn OL, Kalmar JR, Allen CM, Kirsch C, Williams D, Leon ME. Trabecular and psammomatoid juvenile ossifying fibroma of the skull base mimicking psammomatoid meningioma. Head Neck Pathol 2011;5:71-5.
32. Ibrahim FG, Sarkis SA, Jabbar S. Immunohistochemical expression of osteocalcin, transforming growth factor beta-1 and bone morphetic protein-7 in fibrous dysplasia and ossifying fibroma of the jaw bones (A comparative study). Int J Curr Res 2015;7:18487-91.
33. Mouselhy YY, Draz AI, El-shafei MM, El-rouby DH. Comparative immunohistochemical study on osteocalcin expression in fibrous dysplasia and ossifying fibroma. Int J Acad Res 2013;5:9-13.
34. Valenti MT, Serafini P, Innamorati G, Gili A, Cheri S, Bassi C, *et al*. Runx2 expression: A mesenchymal stem marker for cancer. Oncol Lett 2016;12:4167-72.
35. Barnes L, Eveson JW, Reichart P, Sidransky D. World Health Organization Classification of Tumours. In: Pathology and Genetics of Head and Neck Tumours. 3rd ed. Lyon: IARC; 2005. p. 283-328.
36. Osunde O, Iyogun C, Adebola R. Juvenile aggressive ossifying fibroma of the maxilla: A case report and review of the literature. Ann Med Health Sci Res 2013;3:288-90.
37. Titinchi F, Morkel J. Ossifying fibroma: Analysis of treatment methods and recurrence patterns. J Oral Maxillofac Surg 2016;74:2409-19.
38. Liu Y, Shan XF, Guo XS, Xie S, Cai ZG. Clinicopathological characteristics and prognosis of ossifying fibroma in the Jaws of children: A retrospective study. J Cancer 2017;8:3592-7.
39. Sarode SC, Sarode GS, Waknis P, Patil A, Jashika M. Juvenile psammomatoid ossifying fibroma: A review. Oral Oncol 2011;47:1110-6.
40. Abtahi J, Ajan A. Malignant transformation of ossifying fibroma into parosteal osteosarcoma with high-grade component: Presentation of an unusual case and review of the Literature. Open Dent J 2018;12:1059-8.
41. Lee YB, Kim NK, Kim JY, Kim HJ. Low-grade osteosarcoma arising from cemento-ossifying fibroma: A case report. J Korean Assoc Oral Maxillofac Surg 2015;41:48-51.
42. Brannon RB, Fowler CB. Benign fibro-osseous lesions: A review of current concepts. Adv Anat Pathol 2001;8:126-43.