Fibro-osseous lesions of the jaws in Ibadan, Nigeria

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Abstract

Background: Fibro-osseous lesion is a broad term for a diverse group of jaw disorders characterized by the replacement of normal bone by a benign fibrous connective tissue matrix. The present study reviewed the clinico-pathologic characteristics of all biopsied cases of fibro-osseous lesions at our hospital from 1990 to 2011, which we hope will serve as a reference database regionally.

Methods: A retrospective clinicopathological review of all histologically diagnosed cases of jaw fibro-osseous lesions seen at our Hospital between January 1990 and December 2011.

Results: A total of one hundred and twenty one fibro-osseous lesions of jaws were histological diagnosed in the 22-year period. The lesions documented included ossifying fibroma (62%), fibrous dysplasia (37.2%) and florid cemento-osseous dysplasia (0.8%). Fibro-osseous lesions of jaws were more in females (61.2%) than males (38.8%), giving a male to female ratio of 1:1.6.

Conclusion: Fibro-osseous lesions of jaw are a diverse group and since it may not be possible to adequately separate them histologically, the development of a more rigorous clinical algorithm as indicated in this study is essential in reaching a final diagnosis especially in resource-limited settings.

Introduction

Fibro-osseous Lesion (FOL) is a broad term for a diverse group of jaw disorders characterized by the replacement of normal bone by a benign fibrous connective tissue matrix [1]. The fibrous connective tissue usually presents with an admixture of mineralized products, including osteoid, mature bone, and/or cementum-like calcifications [2]. These pathologic conditions can be categorized as developmental lesions, reactive or dysplastic diseases and neoplasms [2]. FOLs may be asymptomatic and recognized only on routine radiographs, or they may be associated with significant aesthetic and functional disturbances [3].

The present study reviewed the clinico-pathologic characteristics of all biopsied cases of FOLs at our hospital from 1990 to 2011, which we hope will serve as a reference database regionally.

Material and Methods

Biopsy records of all histologically diagnosed cases of jaw FOLs seen at the department of Oral Pathology, University College Hospital, Ibadan, between January 1990 and December 2011 were retrieved and included. The WHO (2005) classification of benign fibro-osseous lesions of jaws was used. Data on histological diagnosis, age, sex and site were analyzed descriptively using frequencies, ranges and means ± SD. Variables were compared using Chi square and ANOVA tests as appropriate. All patients below 16 years were regarded as children.

Results

A total of one hundred and twenty one FOLs were histological diagnosed in the 22-year period (*Table 1*). The lesions documented included 75 cases of ossifying fibroma (OF) (62%), 45 cases of fibrous dysplasia (FD) (37.2%) and a case of florid cemento-osseous dysplasia (FCOD) (0.8%). There was no incidence of periapical or focal cement-osseous dysplasia recorded.

FOLs were more in females (61.2%) than males (38.8%), giving a male to female ratio of 1:1.6; OF (M: F=1:1.9), FD (M: F=1:1.1). The only case of FCOD recorded also occurred in a female. All histological types of FOL were more common in females than males (*Figure 1*). However, there was no statistically significant difference in the distribution of FOLs according to gender (n=121, p=0.502). The overall mean age for all FOL's was 28.3 ± 12.3 years with a range from 6 to 66 years. FD had a mean age of 24.0 ± 10.2 years and a range of 8 to 50 years. OF had a mean age of 30 ± 12.5 years and a range of 6 to 66 years. There was a statistically significant difference in the mean ages of OF and FD (p=0.004). OF and FD had the highest prevalence in the third decade of life, while the only case of FCOD recorded was present in the sixth decade (*Figure 2*). FOL were located in the mandible [n=63, (52.1%)] more than the maxilla [n=58, (47.9%). However, FD involved the maxilla [n=33, (73.3%)] more than the mandible [n=12, (26.7%)], while OF involved the mandible [n=50, (66.7%)] more than the maxilla [n=25, (33.3%)]. In addition, distribution of lesions by quadrants showed that most FOL's were located in the left maxilla [n=36, (29.8%)], followed by the right mandible [n=32, (26.4%)] (*Figure 3*). Most of the OF's occurred in the right mandible [n=25 (33.3%)], while the least number of OFs was seen in the right maxilla [n=11 (14.7%)]. Most of the FD occurred in the left maxilla [n=22 (48.9%)], while the least number of FD were seen in the left mandible [n=2 (4.4%)].

Discussion

Fibro-osseous lesions of the jaws comprise a group of pathologic conditions that have undergone various classifications by different authors. Cooke [4] classified these lesions as developmental, neoplastic, dystrophic and inflammatory, while others [5-7] have classified them as being of periodontal ligament origin or of medullary origin. The grouping and classification of FOL's is dynamic and constantly changing, for example, Eversole et al. [8] grouped FD under bone dysplasia but there are studies which classify FD as a neoplasm based on recent molecular findings [9-11]. A classification system for FOLs by Waldron [12] is widely accepted but even this has been slightly modified [2,12].

The histological diagnosis of FOL's of the jaws is relatively straightforward and uncomplicated. The challenge is reaching histological specificity as to which FOL is being reviewed. Therefore, combining the clinical and histological features of FOL's plays a critical role in their final diagnosis [13].

The most common FOL documented in this study was OF (50.4%) followed by FD (37.2%) and COF (11.6%). In an earlier

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Table 1. *Clinicopathologic features of fibro-osseous lesions.*

Histological diagnosis	M:F	Mean age ± SD, range (years)	Site (Mandible/Maxilla)	Total
Ossifying fibroma	26:49	30.5 ± 12.5, 6 – 66	50/25	75
Fibrous dysplasia	21:24	24.02 ± 10.2, 8 – 50	12/33	45
Florid cemento-osseous dysplasia	1 (F)	55 (age)	1 (mandible)	1

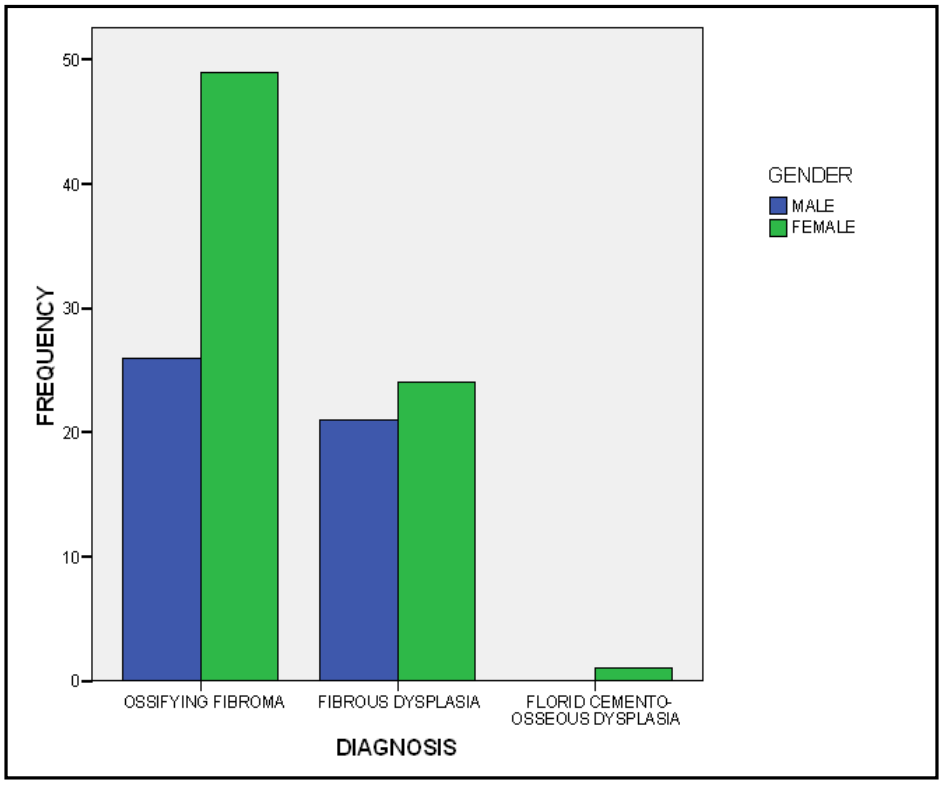

Figure 1. *The frequency of FOL according to gender.*

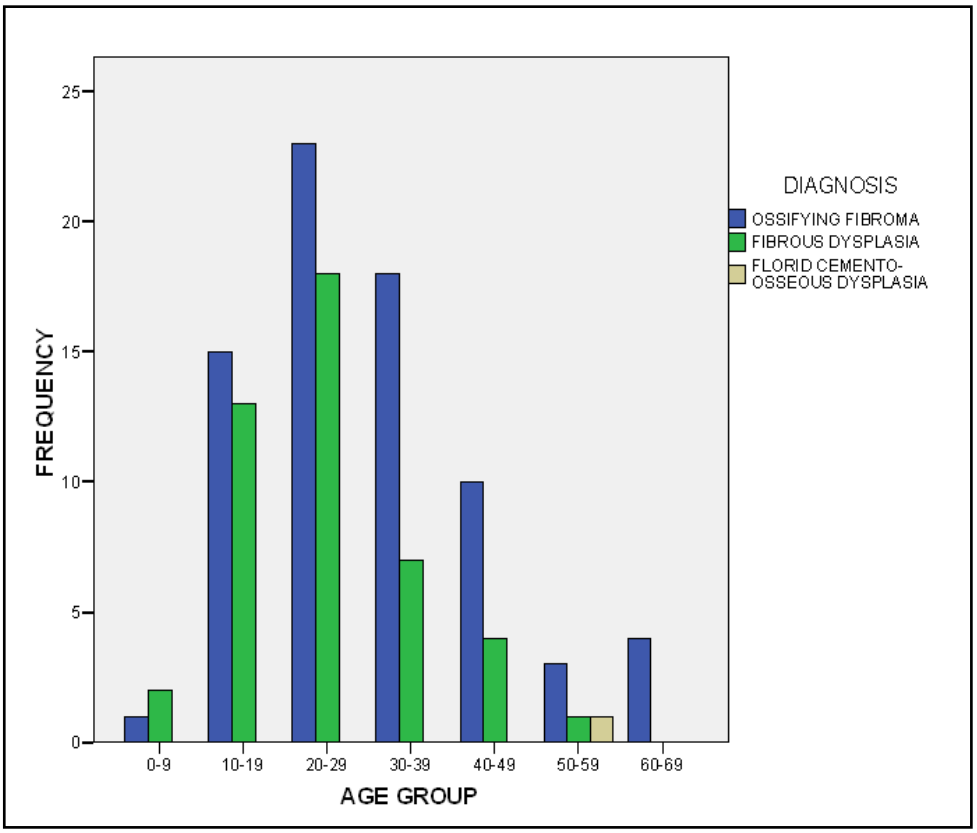

Figure 2. *The frequency of FOL according to age group.*

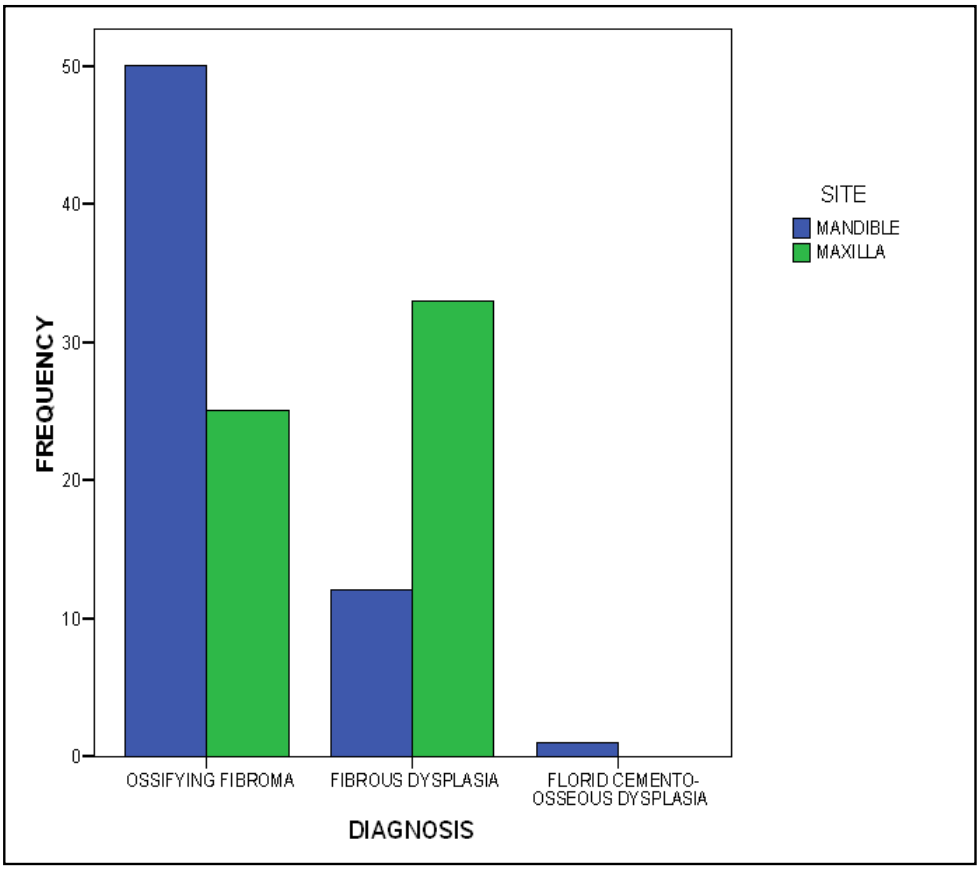

Figure 3. *The frequency of FOL according to site.*

Nigerian study by Williams et al. [14], FD and OF were reported as constituting 37.1% and 22.9% respectively. While Ajagbe et al. reported FD and OF as forming 73.7% and 20.3% of FOL's in their study [15]. The present study differs from others [14-16] in Nigeria regarding the prevalence of FD and OF, and the reasons for this are not clear: is the prevalence of FOL's changing in Nigeria? Or is the subjective manner of histology diagnosis of FOL's skewed in favor of OF among current Oral Pathologist? These questions highlight the importance of deploying an objective tool in assisting with the diagnosis of FOL's like immunohistochemistry or genetic profiling. A study by Toyosawa et al. [17] reported difference between FD and OF in the expression of Runx2 (which determines osteogenic differentiation from mesenchymal stem cells). Fibroblastic cells in FD and OF showed strong Runx2 expression in the nucleus. However, the bone matrices of both OF and FD showed similar expression patterns for Bone Morphogenic Protein 1 (BMP 1) and osteopontin. Immunoreactivity for osteocalcin has been shown to be strong in the calcified regions in FD, but weak in OF lesions [17,18]. Similarly, PCR analysis with Peptide Nucleic Acid (PNA) for mutations at the Arg-201 codon of the alpha subunit of the stimulatory G protein gene (GNAS) has been shown to be a marker for jaw FD [17]. These indicate that although FD and OF are similar disease entities, especially in the demonstration of the osteogenic lineage in stromal fibroblast-like cells, they show distinct differences that can be revealed by immunohistochemical detection of osteocalcin expression. Furthermore, molecular analysis for GNAS mutations is a useful method to differentiate between fibrous dysplasia and ossifying fibroma [17,19].

In the present study FOL's were more in females (61.2%) than males (38.8%) and this is in agreement with a study by Ajagbe et al. [15] in 1983 that reported 133 cases of FOLs at the same center and noted 60.1% of lesions in females and 39.9% in males. We however found that there was no statistical significant difference in the distribution of FOLs according to gender, and investigators like Alsharif et al. have reported equal gender predilection for OF and FD in Chinese patients [20]. FD in our study had a mean age of 24.0 ± 10.2 years and this was comparable to that reported by Maki et al. [21] but OF in our study had a mean age of 30.9 ± 13.4 years unlike that described by Maki et al. as 12.9 years [21].

When a FOL involving the mandible crossed the midline, it was an OF in 75% of cases and almost a third of all mandibular OF's in our study crossed the mid-line. The central giant cell granuloma is a lesion popular for crossing the midline of the mandible, our finding indicates that mandibular OF may also belong to this class. Most of the FD in this study occurred in the left maxilla. This is consistent with other studies [12-14]. Williams et al. reported that 53.8% of FD in their study [14] occurred in the maxilla but did not indicate the predominant quadrant. Since the histology of FD and OF cannot be used strictly to differentiate them distinctly, peculiar clinical presentations or biologic behavior will prove useful in reaching diagnosis; especially in a resource-limited setting where relatively costly further testing is not feasible.

This study recorded only one case of histologically diagnosed FCOD. Two cases of FCOD and a case of focal COD were previously reported from the same centre based only on clinical and radiographic presentations [22,23]. This may indicate the rarity of FCOD in our environment or the under-reporting of cases due to our lack of taking routine jaw radiographs for our patients. According to a systematic review [24] 64% of all focal COD cases were found incidentally on routine radiography of patients, although there are documented pronounced racial differences concerning incidence for FCODs of the jaws [3].

This study recorded no incidence of periapical or focal cement-osseous dysplasia. The reason for the zero incidences may be attributed to the fact that the review included hospital cases with clinically apparent lesions. In addition, FOLs, and in particular

osseous dysplasias that are categorized as; periapical, focal, florid and familial gigantiform cementoma which are not clinically apparent as jaw swellings would have been missed because jaw radiographic documentation is not routinely done for all attending patients at our center.

Conclusion

FOL's are a diverse group and since it may not be possible to adequately separate them histologically, the development of a more rigorous clinical algorithm is essential in reaching a final diagnosis especially in resource-limited settings.

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