Original article

OROFACIAL BIOPSIES IN PORT HARCOURT: A Review of 532 Cases seen over a 12-Year Period

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ABSTRACT

Background

Knowledge of the prevalence and distribution of orofacial lesions in a specific geographic region is important in diagnosis and treatment planning. This study aimed to determine the prevalence and distribution of biopsied orofacial lesions in Port Harcourt.

Methods

This retrospective study reviewed orofacial histopathology reports over 12 years, with data extracted from the histopathology reports. Lesions were categorized into non-neoplastic and neoplastic. The non-neoplastic lesions were grouped into inflammatory/reactive, cystic, and others, while the neoplastic lesions were divided into benign and malignant. The data were analyzed using SPSS version 23. $p \leq 0.05$ was considered significant.

Results

A total of 566 orofacial biopsies were done during the period under review, of which 532 were analyzed. Non-neoplastic lesions accounted for 39.5%, and most of them were reactive/inflammatory lesions (62.9%). The mean age was 27.7 ± 17.1 years, and they were more common in the third decade, in females (57.6%), and in the mandible (29.0%). The most common non-neoplastic lesions were dentigerous cyst (8.1%) and pyogenic granuloma (7.9%).

Neoplastic lesions accounted for 60.5% of orofacial biopsies, with a mean age of 34.9 ± 19.8 years, and a peak from the 2nd to 4th decades of life. They were more common in females (53.1%) and in the mandible (40.1%). Benign lesions (69.9%) were more common than malignant lesions. The most common benign odontogenic lesion was ameloblastoma (18.6%), whereas fibroma (4.5%) was the most common benign non-odontogenic lesion. Of the malignant lesions, carcinomas were by far the most frequent (68.0%), with squamous cell carcinoma (5.3%) being the most common.

Conclusion

Orofacial biopsies in Port Harcourt consist mainly of neoplastic lesions, with the most frequent lesions being ameloblastoma, dentigerous cyst, pyogenic granuloma and squamous cell carcinoma.

Keywords: Biopsy, Neoplastic, Non-neoplastic, Orofacial, Port Harcourt

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INTRODUCTION

A wide range of lesions with diverse origins and heterogeneous characteristics can affect the orofacial region.[1] Arriving at a diagnosis can sometimes be challenging, and a biopsy is often required to reach a definitive diagnosis.

The prevalence and distribution of orofacial lesions vary from one population to another. Knowledge of their prevalence in a specific geographic region is important because it can aid in diagnosis, treatment planning, as well as in the formulation of preventive strategies through identification of possible aetiologic factors.[2] More so, it helps oral health practitioners in making accurate clinical assessments of the orofacial lesions by highlighting the lesions they are more likely to encounter in clinical practice.[1,3] Analysis of orofacial biopsies may also help to provide an insight into the utilization of diagnostic oral histopathology services.[4]

In Nigeria, there are few specialists, Oral Pathologists, with most of them in tertiary health institutions affiliated to dental schools. As such, orofacial biopsy services are not available in many centres providing oral health care.[5] The city of Port Harcourt is located in Rivers state, and is the most densely populated city in the South-South region of Nigeria. Orofacial biopsy services in the city commenced in 2008, following the establishment of a dental school at the University of Port Harcourt, and the employment of specialists in the field of Oral and Maxillofacial Pathology. Before this time, orofacial biopsy services were provided by General Pathologists. The Oral Pathology laboratory of the University of Port Harcourt/University of Port Harcourt Teaching Hospital serves as an important oral pathology reference centre, receiving specimens from general dental practitioners and specialists within Port Harcourt, as well as from neighbouring cities within and outside Rivers state.

Some Nigerian studies[5-9] have described the prevalence of all biopsied orofacial lesions, with one of such conducted in the city of Port Harcourt. However, this study reviewed a period of just one year (2008), to create a baseline data for histologically diagnosed orofacial lesions in the region. The aim of this study therefore was to determine the prevalence and distribution of biopsied orofacial lesions in Port Harcourt, South-South Nigeria, over a period of 12 years (2008 to 2019), and to compare these with the previous baseline data, and with other reports from the literature.

MATERIALS AND METHODS

This was a retrospective study that reviewed all the orofacial histopathology reports from the Department of Oral Pathology and Oral Biology, University of Port Harcourt Teaching Hospital (UPTH) over 12 years (January 1, 2008 to December 31, 2019). Relevant data were extracted from the reports, including: age, gender, site of lesion, duration of symptoms at initial presentation, and the final histopathologic diagnosis. The haematoxylin and eosin (H & E) stained slides were then retrieved and reviewed independently by the two authors. In cases where there was a difference in opinion, a joint session was held to reach a consensus. Where the H & E slides could not be retrieved or were of poor quality, fresh sections were prepared from the formalin-fixed paraffin-embedded (FFPE) tissue blocks, and stained with H & E.

The lesions were categorized into two broad groups: non-neoplastic and neoplastic. The non-neoplastic lesions were grouped into inflammatory/reactive, cystic, and others, while the neoplastic lesions were divided into benign and malignant.

The data collected were entered into a spreadsheet and analyzed using SPSS for Windows, version 23 (SPSS Inc, Chicago, Illinois, U.S.A). The mean age of the non-neoplastic and neoplastic lesions was compared using an independent samples T-test, while test of association was done using Chi square test, with the level of significance set at $p \leq 0.05$.

RESULTS

There was a total of 566 orofacial biopsies during the period under review, with the number of biopsies each year shown in Figure 1. The highest number of orofacial biopsies was performed in 2013 (93) while the least numbers

were recorded in 2014 (23) and 2008 (27). Of these, 34 had incomplete data, missing slides and/or badly damaged FFPE tissue blocks and were excluded from further analysis, leaving a remainder of 532 cases. There were 240 (45.1%) males and 292 (54.9%) females, giving a male to female ratio of 1:1.2. The patients' age ranged from 4 months to 95 years, with a mean age of 32.1 ± 19.1 years, and a peak in the 20 -29 years age group (22.3%). (Table 1) The mandible (35.7%) was the most common site. (Table 2)

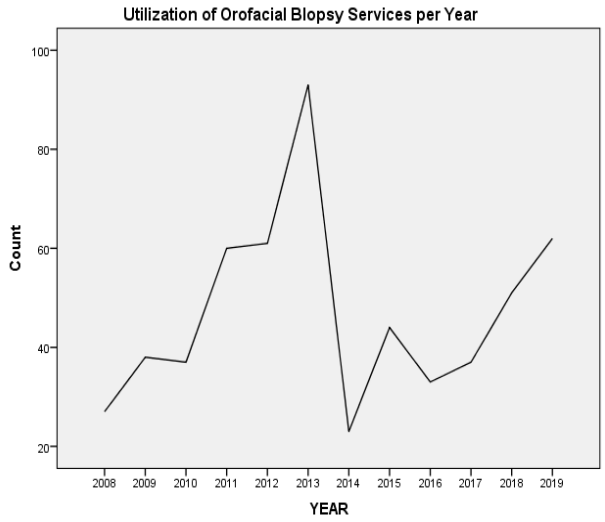

Figure 1. A line chart showing the utilization of orofacial biopsy services yearly

Non-neoplastic lesions accounted for 39.5% of the total number of orofacial biopsies. They were more common in the 20 – 29 years age group, with a mean age of 27.7 ± 17.1 years. Females accounted for the majority of cases (57.6%), with the most commonly affected sites being the mandible (29.0%) and gingivae (25.7%) (Table 2). The most frequently diagnosed lesions were dentigerous cyst (20.5%) and pyogenic granuloma (20.0%), and the most common category of non-neoplastic lesions was inflammatory/reactive lesions (62.9%).

Pyogenic granuloma was the most common reactive lesion, accounting for 31.8% of all reactive/inflammatory lesions, and 7.9% of all biopsied orofacial lesions. (Table 3) It occurred over a wide age range, with a peak in the 2nd decade of life. Females (69.0%) were affected twice as often as males, and cases were seen almost exclusively in the gingiva (90.5%).

Dentigerous cyst also occurred over a broad age group, with the youngest and oldest patients being 8 years and 95 years respectively. However, approximately three-quarter of cases of dentigerous cyst occurred in the second (23.3%), third (37.2%) and fourth (14.0%) decades of life. Females (53.5%) were slightly more affected than males. Majority of cases were seen in the mandible, with a mandible to maxilla ratio of 3.3 : 1.

Neoplastic lesions had a mean age of 34.9 ± 19.8 years, with a peak spanning from the 2nd to 4th decades of life. The mean age of occurrence of neoplastic lesions was significantly higher than that for non-neoplastic lesions (p=0.007) (Figure 2). The mean age of occurrence for malignant lesions (47.3 years) was also significantly higher than that for benign lesions (29.6 years) (p = 0.000) as shown in Figure 3. Females (53.1%) accounted for more cases than males. Most cases involved the mandible (40.1%) and maxilla (23.3%). Benign lesions accounted for 69.9% of the neoplastic lesions, with 55.6% of them being of odontogenic origin. The most common benign odontogenic lesion was ameloblastoma, whereas fibroma was the most common benign non-odontogenic lesion. (Table 3) Ameloblastoma occurred mainly in the second through sixth decades of life, with a peak in the third decade. There was a female predilection (57.6%), and the mandible (81.8%) was the most common site. Three percent of cases were seen in the gingiva.

Of the malignant lesions, carcinomas were by far the most frequent (68.0%), with squamous cell carcinoma being the most common, accounting for 5.3% of all biopsied orofacial lesions. It affected mainly the middle-aged and elderly, with an almost equal distribution from the fifth to ninth decade of life. Only one case (3.6%) occurred in an individual younger than 40 years of age. There was male predilection (57.1%), and two-thirds of all cases involved the mandible, tongue, maxilla and palate, in decreasing order.

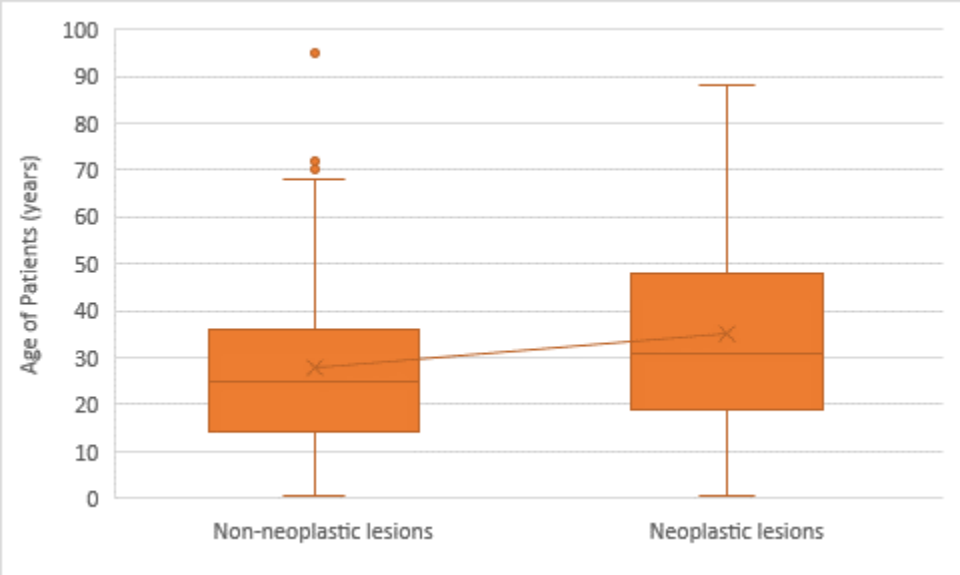

Figure 2. Boxplot showing a comparison of the ages (years) of patients with non-neoplastic lesions and neoplastic lesions. Mean, Median, and Quartiles are shown in the boxplot.

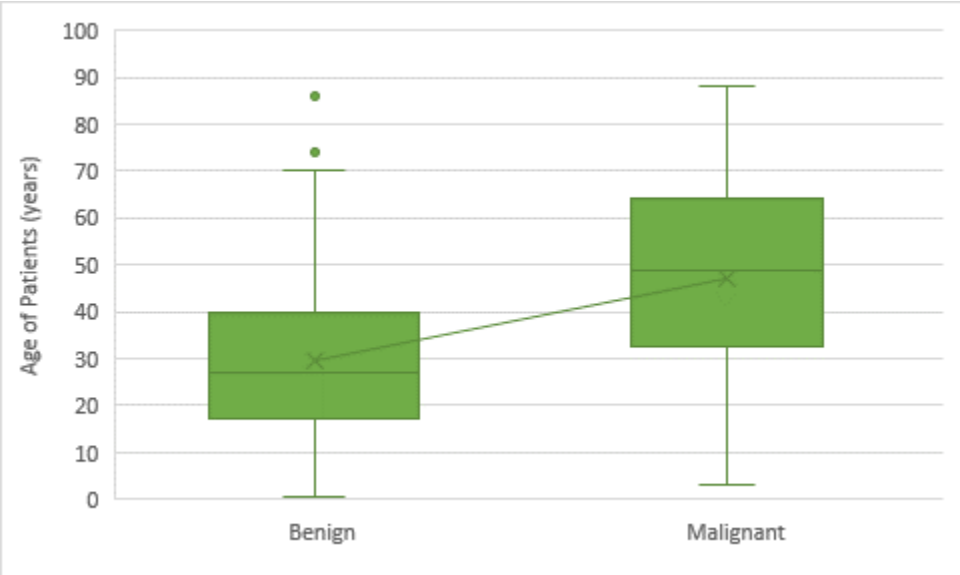

Figure 3. Boxplot showing a comparison of the mean ages (years) of patients with benign neoplastic lesions and malignant neoplastic lesions. Mean, Median, and Quartiles are shown in the boxplot.

Table 1. Age and Gender distribution of Non-neoplastic and Neoplastic Orofacial lesions

Age group(years)	Non-Neoplastic Lesions		Neoplastic Lesions		Total (Percentage)
	Male	Female	Male	Female	
0 – 9	13	13	13	8	47 (8.8)
10 – 19	24	21	37	25	107 (20.1)
20 – 29	20	38	26	35	119 (22.3)
30 – 39	18	19	26	35	98 (18.4)
40 – 49	7	9	22	21	59 (11.1)
50 – 59	4	12	11	18	45 (8.5)
60 – 69	2	6	7	21	36 (6.8)
70 – 79	1	2	6	1	10 (1.9)
80 – 89	0	0	3	7	10 (1.9)
90 – 99	0	1	0	0	1 (0.2)
Total	**89**	**121**	**151**	**171**	**532 (100)**

Table 2. Site distribution of Non-neoplastic and Neoplastic Orofacial lesions

Site	Non-Neoplastic Lesions			Neoplastic Lesions		Total (Percentage)
	Reactive	Cystic	Others	Benign	Malignant	
Mandible	13	45	3	111	18	190 (35.7)
Maxilla	12	25	1	48	27	113 (21.2)
Gingiva	54	0	0	24	4	82 (15.4)
Lip	14	0	0	12	2	28 (5.3)
Tongue	6	0	2	6	7	21 (3.9)
Palate	1	0	0	1	17	19 (3.6)
Buccal mucosa	7	0	0	6	6	19 (3.6)
Cheek	2	0	0	7	5	14 (2.6)
Floor of the mouth	7	2	0	0	1	10 (1.9)
Lymph node	2	0	0	0	3	5 (0.9)
Submandibular region	3	0	0	2	0	5 (0.9)
Others*	11	0	0	8	7	26 (4.9)
Total	**132**	**72**	**6**	**225**	**97**	**532 (100)**

Key: Others* include Preauricular = 4, Retromolar = 4, Adenoids/Tonsils = 3, Alveolus = 3, Neck = 3, Alveolar mucosa = 2, Forehead = 2, Vestibule, Face, Scalp, Ear and Infraorbital = 1 each

Table 3. The most frequent histologically diagnosed orofacial lesions

Group	Histological diagnosis	Frequency (Percentage in group)	Overall percentage
Reactive/Inflammatory lesions	Pyogenic granuloma	42 (31.8)	7.9
	Mucocoele	16 (12.1)	3.0
	Chronic inflammation	14 (10.6)	2.6
	Periapical granuloma	12 (9.1)	2.3
	Peripheral ossifying fibroma	7 (5.3)	1.3
Cystic lesions	Dentigerous cyst	43 (59.7)	8.1
	Radicular cyst	12 (16.7)	2.3
	Odontogenic keratocyst	9 (12.5)	1.7
	Epidermoid cyst	2 (2.8)	0.4
	Glandular odontogenic cyst	2 (2.8)	0.4
Benign tumours	Ameloblastoma	99 (44.0)	18.6
	Fibroma	24 (10.7)	4.5
	Ossifying fibroma	17 (7.6)	3.2
	Fibrous dysplasia	8 (3.6)	1.5
	Osteoma	8 (3.6)	1.5
	Pleomorphic adenoma	8 (3.6)	1.5
Malignant tumours	Squamous cell carcinoma	28 (28.9)	5.3
	Mucoepidermoid carcinoma	15 (15.5)	2.8
	Polymorphous Low-Grade Adenocarcinoma	11 (11.3)	2.1
	Rhabdomyosarcoma	6 (6.2)	1.1
	Lymphoma	5 (5.2)	0.9
	Fibrosarcoma	5 (5.2)	0.9

DISCUSSION

Biopsy of orofacial lesions is very important because it is often required to make a definitive diagnosis. Analysis of orofacial biopsies can help clinicians improve their clinical assessments by highlighting the lesions they are more likely to encounter in clinical practice.

There was a steady increase in the number of annual orofacial biopsies, with a peak in 2013, followed by a drastic decrease in 2014 due to industrial actions that plagued the health sector in Nigeria. However, since then, there has been another steady increase, but the previous peak is yet be reached. This shows that there is still sub-optimal utilization of oral histopathology services in Port Harcourt. Only 566 orofacial biopsies were performed in the 12 years under review, giving an average of forty-seven orofacial biopsies yearly (47/year). This figure pales in comparison to those reported in countries such as Australia (175/year),[4] Portugal (234/year),[1] Brazil (1352/year),[10] UK (1782/year)[11] and USA (3983/year).[3]

However, other Nigerian studies as well as a study from Kuwait, have also reported similarly low frequencies of orofacial biopsies with 28/year,[9] 39/year,[12] 43/year,[13] 63/year,[6] and 80/year[8] reported by different authors. This reflects a low level of utilization of diagnostic oral histopathology services in various parts of Nigeria, and the reason for this is two-fold. Firstly, many orofacial lesions requiring biopsy are asymptomatic, and it has been reported previously that the major reason for presentation to the dental clinic in our environment is pain.[14] Secondly, many orofacial lesions in this part of the world are diagnosed and treated clinically without submission of specimen for confirmatory histopathological diagnosis.[15] Thus, there is need for improved awareness of dentists about the need to submit all excised tissue in the orofacial region for histopathological analysis, regardless of whether the diagnosis is apparent clinically or not.

This study showed that more females had orofacial biopsies compared to males, similar to the trend in most other studies, including previous Nigerian studies.[2,4,7,8,11] It is however in contrast to the previous baseline data for Port Harcourt[5]. The current study may reflect the true pattern because of its longer duration compared to the baseline study. The mean age of patients in this study was 32.1 years, with a peak in the third decade of life. In previous Nigerian studies by Akinyamoju et al,[8] Soyele et al,[7] and Ibikunle et al,[6] the mean age recorded for biopsied orofacial lesions was 36.7 years, 36.1 years, and 33.3 years respectively, and the most frequent age group was the third decade. This trend shows that orofacial biopsies in Nigeria are mostly performed in young adults. This may be because they are more conscious of their appearance due to attention from the opposite gender, and hence are more likely to present to the clinic when they notice lesions or swellings that may require biopsy.

Neoplastic lesions affected significantly older individuals than non-neoplastic lesions in the current study, as has been reported previously in the literature. In the previous study done in Port Harcourt there was no statistically significant difference between the two groups, which may be due to the small sample size. Malignant neoplastic lesions were seen more in older individuals than benign neoplastic lesions. This is in agreement with most reports in the literature.[3,5,6,12]

The most frequent histologic diagnosis in this study was ameloblastoma, followed by dentigerous cyst, pyogenic granuloma and squamous cell carcinoma. Ameloblastoma was also the most common lesion in the previous baseline study in Port Harcourt, and in other previous Nigerian studies.[7,8,9] Akinyamoju et al[8] reported that the most frequently biopsied orofacial lesions were ameloblastoma, squamous cell carcinoma and pyogenic granuloma. In an Australian population, Kelloway et al[4] reported that the most commonly biopsied lesions were fibrous hyperplasia, periapical granuloma and radicular cyst. Jones and Franklin[11] had an identical finding in the United Kingdom. In the USA however, the most prevalent orofacial lesions on were benign keratosis, chronic apical periodontitis, and radicular cyst.[3] This difference may be attributed to geographical variations. It may also be the result of underdiagnosis/under-

reporting since many reactive lesions in our environment are diagnosed clinically and excised without submission of the tissue for histological confirmation of diagnosis.

Pyogenic granuloma is a reactive lesion that commonly affects the skin and oral mucosa. It results from chronic irritation and is seen mostly in young adults, especially females, and the maxillary gingiva is the most common site. Although many cases are asymptomatic swellings, bleeding on mild provocation is often seen. [16] In this study, pyogenic granuloma was the most frequently biopsied reactive lesion, similar to the trend in other Nigerian studies,[8] but contrasting with studies from other parts of the world where fibrous hyperplasias were more common.[4,11] Unlike fibrous hyperplasia which is asymptomatic, pyogenic granuloma may cause gingival bleeding, which may be alarming to the patient. This may explain the greater proportion of pyogenic granuloma seen in this study.

Dentigerous cyst was the most common cystic lesion in this study, and this trend is similar to previous studies from Nigeria, [15] Kenya[17] Kuwait[12] and India.[18] However, the bulk of the scientific literature reports that radicular cyst is the most frequent cyst of the jaws.[3,15] The greater frequency of dentigerous cysts in this part of the world has been attributed to the fact that many cases of radicular cysts are not sent for histopathological examination following tooth extraction because the diagnosis is often clinically obvious.[15]

Malignant lesions in this study represented 18.2% of orofacial biopsies which is far higher than figures from UK (0.1%),[19] USA (1.97%),[3]Australia (2.7%),[4] Kuwait (3.6%),[12] Spain (3.9%)[20] and Brazil (6.32%)[10] It is however similar to findings in Saudi Arabia (15.8%),[2] Iraq (16.2%),[21] Taiwan (16.2%)[22] and Portugal (15.0%)[1] . Previous Nigerian studies by Akinmoladun et al[9] (29.6%) and Ibikunle et al[6] (36.7%) have also found a high proportion of malignant neoplasms amongst orofacial biopsies. Squamous cell carcinoma was the most common malignant orofacial lesion in this study, similar to the trend in the scientific literature.[1-6,11, 20-23] The high proportion of malignant neoplasms in this study may be because of their relatively rapid growth and propensity for invasion and metastasis, which may be alarming to affected individuals, thus increasing the likelihood of presentation to the clinic. It may also be the result a higher incidence of orofacial malignancies in this environment due to increased exposure to carcinogens, poverty and its consequences.[23] More studies investigating the influence of environmental factors on the incidence of orofacial malignancies in a Nigerian population are encouraged.

CONCLUSION

Orofacial biopsies in Port Harcourt consist mainly of neoplastic lesions, with the most frequent lesions being ameloblastoma, dentigerous cyst, pyogenic granuloma and squamous cell carcinoma. The findings of this study vary slightly from the previous baseline data for Port Harcourt, but are largely in keeping with the findings of other Nigerian studies. There is a need to submit all excised tissue in the orofacial region for histopathological analysis, regardless of whether the diagnosis is apparent clinically or not.

Limitation

Direct comparison with similar studies were somewhat limited due to differences in the categorization of the lesions.

Conflict of The authors declare no conflict of interest in the conduct of this research.

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