

Evaluation of Maxillofacial Biopsy Results in the Paediatric Population: A Single Centre Retrospective Study

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ABSTRACT

Background: Children are also affected by diseases. The oral and maxillofacial region is exposed to various harmful and carcinogenic agents, leading to lesions. Biopsies are required to make a definitive diagnosis of these lesions. Biopsies help the surgeon plan concise treatment. The objective of this study was to evaluate the distribution of oral and maxillofacial biopsy results in the paediatric population.

Methods: This study was a 14-year retrospective study. Paediatric biopsy results from 2012 to 2025 were evaluated. The statistical package for the social sciences (SPSS, IBM) version 25 was utilised for data analysis. Percentage, mean, and standard deviation were utilised to represent numerical variables. Categorical variables were evaluated using frequency and percentage. Chi-square was employed to test for association. P-value <0.05 was considered statistically significant.

Results: 268 biopsy results were analysed in this study. There were more males (58.6%) than females, and the majority of lesions biopsied were benign (63.81%). Odontogenic tumours were the most common benign lesions, with ameloblastoma (17.54%) accounting for the majority. Sarcoma was the most common malignant lesion, with rhabdomyosarcoma (5.59%) being the most frequent subtype.

Conclusion: Children are a unique population, and tumours can also affect them. It is of utmost importance that the clinician maintains a high index of suspicion, given the uniqueness of children, and when doubt exists, a biopsy can be performed.

Keywords: Benign, Malignant, Odontogenic Tumour, Paediatric Biopsy, Sarcoma

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INTRODUCTION

Diseases that affect children vary in type; however, some, such as haemangioma, lymphoma, leukaemia, and Langerhans cell histiocytosis, are more common among this specific group in the general population¹. Children are generally small in size, and because of their stature, they present with a wide range of oral diseases that, although they also occur in adults, can differ in clinical behaviour, histopathology, and management². Diagnosing oral and maxillofacial diseases in the paediatric population can sometimes be quite challenging. These conditions can also vary significantly from those seen in adults, and as children grow and develop, noticeable changes can occur in these lesions; therefore, careful consideration should be given to them³.

Presentation of lesions in children also differs considerably among themselves, taking into account their race, environment, and lifestyle, as these factors may influence the prevalence of these diseases among children in different locations and regions⁴. The oral and maxillofacial region, due to its position and function, is exposed to a lot of harmful and carcinogenic substances that can cause a variety of diseases, some of which require a biopsy to make a definitive diagnosis⁵. A biopsy helps the surgeon to give a concise treatment that is specific to that lesion. Biopsy is an important aspect of surgical practice because it serves as a guide to diagnosis, treatment planning, prognosis assessment and carries a significant medicolegal relevance⁶.

Reports of maxillofacial diseases in the paediatric population vary across studies. Krishnan *et al.*¹, in their study conducted in India on the evaluation of paediatric oral biopsies, reported that 95.9% were benign lesions, while 4.1% were malignant lesions, with odontogenic cysts being the most common benign lesion and malignant connective tissue tumours the most common malignant lesion. Similarly, Soyele *et al.*², in their study conducted in sub-Saharan Africa, reported a prevalence of 4.76% of malignant lesions, with the rest being benign. Odontogenic tumours were the most common benign lesions, and carcinomas the most common malignant lesions in their study². Gorkem Tekin *et al.*³, in their study conducted in Turkey evaluating benign oral and maxillofacial lesions in the paediatric population, reported that odontogenic cysts were

the most common lesions, followed by odontogenic tumours, with dentigerous cysts accounting for the highest number of odontogenic cysts.

Diagnosis and treatment of oral and maxillofacial lesions can be quite challenging in the paediatric population due to their unique nature. It is important to note that children, like adults, also suffer from oral and maxillofacial lesions, and the distribution of these lesions depends on race, environment, and even lifestyle. There are conflicting reports on the distribution of oral and maxillofacial biopsy results in the paediatric population, and children are a unique population in those diseases affecting them require careful attention; hence, this study seeks to evaluate the distribution of oral and maxillofacial biopsy results in the paediatric population.

MATERIALS AND METHODS

The study was conducted in the Department of Oral and Maxillofacial Surgery and Oral Pathology, and Molecular Biology at Lagos University Teaching Hospital, Idi-Araba, Lagos State.

Study Design

This was a 14-year retrospective study evaluating biopsies in the paediatric population from 2012 to 2025. The biopsy results were collected and categorised into benign, malignant and reactive lesions. The lesions were further categorised into their specific and general names.

Subject Eligibility.

All paediatric biopsies received from 2012 to 2025 were included in the study. Duplicate biopsy results and results that were not clearly written were excluded from the study.

Ethical approval was obtained from the Health Research and Ethics Committee (HREC) of Lagos University Teaching Hospital, Idi-Araba, with assigned number ADM/DSCST/HREC/APP/8042.

A proforma was used in the evaluation (Appendix 1).

Data Analysis

The statistical package for the social sciences (SPSS, IBM) version 25 was utilised for data analysis.

Percentage, mean, and standard deviation were utilised to represent numerical variables. Categorical variables were evaluated using frequency and percentage. Chi-square was employed to test for association. P-value <0.05 was considered statistically significant.

RESULTS

268 participants had their biopsies evaluated in this study. Ages ranged from 10 days to 17 years with a mean age of 10.22 ± 4.31 years. There were more males (58.6%) than females, with a ratio of 1.4:1 in this study. More than half of the lesions occurred in the mandible (55.60%). Soft and hard tissue lesions were equally represented. About two-thirds of the lesions were benign (Table 1). Ameloblastoma (17.54%) was the most common benign lesion, while rhabdomyosarcoma (5.59%) was the most common malignant lesion (Table 2).

Odontogenic tumours (26.49%) were the most common benign lesions in this study. Sarcomas (11.19%) were the most common malignant lesions (Table 3). The occurrence of benign tumours was higher in the 11-17-year age group than in the 0-10-year age group, although this difference was not statistically significant. Both benign and malignant lesions were more common in males; however, this was not statistically significant. Even though hard and soft tissue lesions were equally represented, there were more benign lesions among the hard tissue, and this was statistically significant (0.001) (Table 4).

Table 1: Demographic characteristics

Variable	Frequency (n=268)	Percentage
Age (Years)		
0-10	121	45.15
11-17	147	54.85
Mean age	10.22±4.31 years	
Gender		
Male	157	58.6
Female	111	41.4
Site		
Mandible	149	55.60
Maxilla	87	32.46
Lip	9	3.36
Tongue	7	2.61
Neck	7	2.61
Cheek	5	1.87
Gingivae	4	1.49
Type of tissue		
Soft	134	50
Hard	134	50
Nature of tissue		
Benign	171	63.81
Malignant	45	16.79
Inflammatory/Reactive	52	19.4

DISCUSSION

Children are distinct in nature; however, like adults, they are also affected by tumours. Biopsy results in children can aid diagnosis in clinical practice and are also useful in research and forensic audit. Tumours in children range from inflammatory/reactive through benign to malignant. Most previous studies of biopsies have focused on the adult population. This study however, evaluated biopsies in the paediatric population. A total of 268 biopsies were evaluated. This is similar to Bhaskar *et al.*⁷, who reported 293 biopsy results. On the other hand, Skinner *et al.*⁸ reported 1525 biopsies in their study in Louisiana.

Krishnan *et al.*¹ also reported 97 biopsies, which was much lower than in our study. The age range in this study was 10 days to 17 years. There were more maxillofacial tumours among the 11-17-year-old population. Soyele *et al.*², in their study conducted in Nigeria, also noted an increase in tumours among the older paediatric age group. Other studies have reported a similar trend^{3,9}. The reason for this occurrence might be that most of the tumours were benign/reactive, and attainment of puberty may be sought before treatment, which may delay presentation².

Table 2: Frequency of lesions by their specific names

Variable	Frequency (n=268)	Percentage
Specific name		
Adenomatoid Odontogenic Tumour	4	1.49
Rhabdomyosarcoma	15	5.59
Ameloblastoma	47	17.54
Haemangioma	6	2.24
Developmental cyst	7	2.61
Cemento-ossifying fibroma	16	5.97
Chondrosarcoma	3	1.12
Cystic hygroma	3	1.12
Dentigerous cyst	6	2.24
Epithelial hyperplasia	22	8.20
Eruption cyst	3	1.12
Mucocele	12	4.48
Fibrosarcoma	5	1.87
Fibrous dysplasia	10	3.73
Hodgkin's lymphoma	4	1.49
Non-Hodgkin's lymphoma	3	1.12
Lingual cyst	3	1.12
Osteosarcoma	5	1.87
Lympho-proliferative disorder	13	4.85
Metastatic malignant glandular tumour	3	1.12
Ranula	5	1.87
Mucosa neuroma	2	0.75
Odontogenic Myxoma/myxofibroma	8	2.98
Neurofibroma	4	1.49
Odontogenic cyst	7	2.61
Pleomorphic adenoma	8	2.99
Pyogenic granuloma	12	4.48
Retinoblastoma	2	0.75
Others	30	11.19

Table 3 shows the lesion's respective groups

Variable	Frequency (n=268)	Percentage
General name		
Odontogenic tumour	71	26.49
Vascular tumour	11	4.10
Carcinoma	6	2.24
Cyst	21	7.84
Fibroosseous lesion	25	9.33
Giant cell lesion	1	0.37
Inflammatory/Reactive	37	13.81
Lymphoproliferative disorder	17	6.34
Nerve tumour	6	2.24
Salivary gland tumour	28	10.45
Sarcoma	30	11.19
Soft tissue tumour	11	4.10
Others	4	1.49

Table 4 shows the association between demographics and the lesions

Variable	Frequency (n=268)			X ²	p-value
Age (Years)	Benign	Malignant	Reactive/Inflammatory		
0-10	69	25	27	323.832	0.061
11-17	102	20	25		
Gender					
Male	104	27	26	9.870	0.542
Female	67	18	26		
Nature of tissue					
Soft tissue	63	27	44	464.456	0.001
Hard tissue	108	18	8		

There were more males than females in this study. This is similar to a study conducted by Arotiba *et al.*¹⁰, who reported more biopsies among males. Contrary to this, other studies have also reported a female predominance.² The majority of lesions occurred in the mandible, with benign lesions accounting for more than half of the lesions in this study. Odontogenic tumours were the most frequent benign lesions in this study, with ameloblastoma accounting for more than half of the odontogenic tumours. Krishnan *et al.*¹ also reported that the majority of lesions were located in the mandible. Other studies have reported the maxilla as the most frequently affected site^{11,12}. In a similar study conducted by Soyele *et al.*² in South West Nigeria, odontogenic tumours were the most common lesions, with ameloblastoma as the most frequently seen. Even though children differ from adults, a study conducted among the adult population also noted odontogenic tumours as the most common benign lesions, with ameloblastoma accounting for the majority⁶. Contrary to these findings, Barbosa *et al.*⁴ reported reactive/inflammatory lesions as the most common in the paediatric population. Tekin *et al.*³ reported dentigerous cyst as the most common in their study. Other studies have reported odontoma as the most common benign paediatric tumour^{12,13}. The reason for this difference might be due to differences in environmental factors and lifestyle.

Malignant lesions were the least common in this study. Although they were the least common, they accounted for about 16.79% of the total biopsies, which was relatively high. Sarcoma was the most prevalent of the malignant lesions, with rhabdomyosarcoma accounting for the most common sarcomas. Soyele *et al.*² reported a malignancy rate of 4.76% in their study, which was lower than in our study. Krishnan *et al.*¹ also reported a 4.1% prevalence of malignant lesions, with a

malignant connective tissue tumour being the most common.

CONCLUSION

Children are a unique population, and tumours can affect them as well. Both benign and malignant lesions have been shown to affect the paediatric population. Ameloblastoma is the most common benign lesion, while sarcoma is the most common malignant lesion. It is of utmost importance that the clinician should have a high index of suspicion, and where doubt exists, a biopsy can be performed.

LIMITATION

The study is a single-centre study.

RECOMMENDATION

A multi-centre study needs to be done to give a representative conclusion

Source of Support

Nil.

Conflict of Interest

None declared

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DATA CAPTURE FORM

1. AGE:
2. SEX: a) Male b) Female

SECTION 2

3. Side of tumour (a) right (b) left
4. Site of tumour
5. Location (a) anterior maxilla (b) posterior maxilla (c) anterior mandible (d) posterior mandible (e) anterior posterior maxilla (f) anterior posterior mandible
6. Type of tissue (a) bony (b) soft tissue
7. Organ involved
8. Specific name of tumour
9. General name of tumour
10. Type of tumour (a) benign (b) malignant (c) inflammatory/reactive (d) others