Original Article

Comprehensive Clinicopathological Observational Study of Orofacial Cysts: An Institutional-based Retrospective Assessment

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ABSTRACT

Background: Orofacial cysts are pathologic cavities. Most cysts, but not all, are lined by the epithelium. They could be symptomatic and may cause facial disfigurement. However, among orofacial cysts, odontogenic cysts constitute the major part of lesions as compared to non-odontogenic cysts. Thus, analysis of orofacial cysts aids in accurate diagnosis, treatment planning, and prevention of potential complications. **Aim:** This study aims to determine the prevalence and distribution of histopathologically diagnosed orofacial cysts in an Institution. **Materials and Methods:** An observational study of histopathologically proven orofacial cysts over a period of 11 years was analyzed regarding the prevalence, age, gender, site, radiographic features, and histopathological diagnosis. **Results:** A total of 3610 cases were histopathologically reported, of which 455 (13%) were orofacial cysts. Out of all the cysts, maximum cases of 123 (27%) were odontogenic keratocyst, followed by radicular cysts 109 (24%) and 96 (21.1%) mucous extravasation cysts. Most commonly occurring cases in the age group of 16–30 years were 212 (46.6%), with a male predominance of 279 (61.3%). The common site of occurrence was in the mandible with 170 (50.7%) cases, and overall orofacial cysts were located in the posterior region with 234 (51.4%) cases. Radiographically, unilocular radiolucency was observed in 312 (93.1%) cases and well-defined pattern in 327 (97.6%) cases. **Conclusion:** These findings emphasize the importance of routine dental evaluations for early detection and management. Further research is warranted to explore potential risk factors and improve preventive strategies.

Key words: Mucous extravasation cyst, Odontogenic keratocyst, Orofacial cyst, Radicular cyst

INTRODUCTION

Orofacial cysts are variably sized pathologic cavities observed in oral and maxillofacial tissues. Most cysts, but not all, are lined by the epithelium. They could be accompanied by swellings, pain, bone destruction, and loosening, along with displacement of teeth.[1] Cysts of jaw bones and soft tissue can be categorized on the basis of origin, i.e., those that arise from tooth-forming tissue are odontogenic cysts, where they arise from the remnants of epithelial rests of Serre, epithelial rest of Malassez, and reduced enamel epithelium, and others originate from non-tooth-forming tissues are non-odontogenic cysts.[1] The origin of other orofacial cysts is basal cells of oral epithelium, salivary duct trauma and obstruction, while some are of unknown etiology.

The presence of abundant epithelial remnants in the jaws makes the prevalence of cysts higher in the jaws than in any other human body part, resulting in significant jaw destruction without any obvious clinical symptoms most of the time and may be discovered accidentally.[2] Several studies have been carried out on the prevalence of orofacial cysts in various continents using histopathological data. Therefore, research-based biopsies are required in this regard to analyse the primary types of lesions that occur in a particular population and to provide information that can help pathologists, especially with the diagnosis and treatment of these lesions.[3]

Understanding the type and nature of the cyst is critical for early detection to prevent complications such as extensive bone destruction or secondary infections, or even tumorogenesis. Management of different cysts requires specific approaches to

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treatment.[4] Hence, this study aimed to determine the prevalence and distribution of histopathologically diagnosed orofacial cysts in an institution with respect to age, gender, site, clinical, and radiographical features.

MATERIALS AND METHODS

This observational study was carried out for 1 month (October 2024) in the Oral Pathology and Microbiology Department at the Institute of Dental Sciences, Bareilly. The study included all histopathologically verified orofacial cystic lesions from the year 2013 to 2023. However, cases with inadequate data were excluded. Before the beginning of the study, an Ethical Clearance Certificate was obtained from the Institutional Ethical Committee (Ref No. IEC/324/2024/11). The age, gender, site, radiographic features, and histopathological diagnosis were retrieved from the archives of the department and recorded on a customised case history pro forma.

Statistical analysis

All the data were entered into the Microsoft Excel spreadsheet. Descriptive statistics such as percentages and frequency distribution, were calculated. Statistical Package for the Social Sciences software, version 21 (IBM Corp. released 2011) was used.

RESULTS

Biopsy specimens of 455 patients were diagnosed as orofacial cysts, and constituted 13% of the total 3610 oral and maxillofacial lesions during the study [Table 1]. Odontogenic cysts constitute the majority of orofacial cysts as observed in this study, with 174 (38.2%) occurrence [Table 2]. The most prevalent orofacial cyst was the odontogenic keratocyst with 123 (27%) cases, followed by the radicular cyst with 109 (24%) cases, and the mucous extravasation cyst with 96 (21.1%) cases [Table 3]. Orofacial cysts were mainly found in the age group between 16 and 30 (46.6%) years [Graph 1] with male predominance (61.3%) [Graph 2]. Based on the gnathic involvement (73.6%), both mandible (50.7%) and maxilla (49%) were almost equally affected. However, the lower lip (72.5%) in extra-gnathic region was the most common site of occurrence [Table 4]. Lesions were frequently located in the posterior region (51.4%) [Table 5]. Clinically, orofacial cysts were most commonly associated with swelling (65.1%), and the size ranged between 1 and 2 cm (60%) [Table 6]. Radiographically, most of them were presented as unilocular radiolucency (93.1%) [Graph 3] with well-defined margins (97.6%) [Graph 4]. Cortical expansion (1.8%), root resorption (2.7%), and impaction (8.7%) were occasionally seen [Graph 5].

DISCUSSION

Cysts occur in the jawbone and soft tissue, categorized as those arising from tooth-forming tissues and non-tooth-forming tissues, namely odontogenic and non-odontogenic cysts.[4,5] Odontogenic cysts are common lesions of the oral cavity with distinct histopathologic features.[2] Some cysts, such as odontogenic keratocysts (OKs), have a high recurrence rate and require long-term monitoring.[6] True cysts of the orofacial region are those lined with epithelium (e.g., dentigerous cyst), while those not lined by epithelium are referred to as pseudocysts (e.g., solitary and aneurysmal bone cyst).[7]

Orofacial cysts are lesions that surgeons, radiologists, and pathologists encounter, which are rarely symptomatic. Most jaw cysts behave similarly and usually grow slowly and expansively. Their radiographic features are usually good guides to their nature, but the diagnosis ultimately depends on histopathology.[8] In some cases, jaw cysts become very large and their removal results in facial asymmetry, adjacent neurovascular bundle damage, and permanent malfunction of the peripheral nerve. To date, marsupialization and enucleation are the most common treatment options for cystic lesions of the jaw, since they were first introduced by Partsch.[9,10]

The present study includes the comparative analysis of the prevalence of orofacial cysts in the various parts of the world. In this study, a total of 3610 cases of oral and maxillofacial lesions were assessed, of which 13% were orofacial cysts. Studies in Nigerian population by Nwoga[1] Fomete *et al.*,[7] and in Turkish population by Acikgoz *et al.*,[5] showed lower prevalence, whereas Indian study by Bafna *et al.*,[11] and the Brazilian investigators Farias *et al.*,[3] showed higher prevalence than the present study [Table 7].

Odontogenic cysts constituted the majority of orofacial cysts as observed in the present study, which is consistent with various investigators such as Nwoga[1] Farias *et al.*,[3] and Fomete *et al.*[7] A review of the literature revealed that odontogenic cysts account for between 0.8% and 45.9% of the lesions diagnosed in the oral cavity.[5] In the present study, odontogenic keratocyst was the most prevalent of the total orofacial cysts reported, which was similar to the study by Nwoga.[1] Contrastingly, studies by Baghaei *et al.*,[12] Mutio *et al.*,[10] Fomete *et al.*,[7] reported dentigerous cyst as the most common cyst, whereas majority of other investigators showed radicular cyst as the most common. This can be attributed to

Table 1: Annual frequency distribution of oral and maxillofacial lesions and orofacial cysts

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total (%)
Overall	256	412	454	303	336	258	301	260	384	401	245	3610 (100)
Orofacial cysts	27	17	31	25	44	31	29	48	46	73	84	455 (13)

Table 2: Frequency distribution of overall orofacial cysts

Orofacial cysts	Frequency	Percentage
Epithelial lined cyst with developmental origin		
Odontogenic cysts	174	38.2
Non odontogenic cyst	3	0.7
Inflammatory origin	149	32.8
Non-epithelial lined cyst	4	0.9
Cyst of soft tissues	123	27
Others	2	0.4
Total	455	100

Table 3: Lesion-wise frequency distribution of orofacial cysts

Classification of jaw cysts	Frequency	Percentage
Epithelial-lined cysts with developmental origin		
Odontogenic cyst		
Odontogenic keratocyst	123	27.0
Dentigerous cyst	29	6.4
Lateral Periodontal cyst	3	0.7
Glandular/sialo odontogenic cyst	9	2.0
Calcifying odontogenic cyst	10	2.2
Non-odontogenic cyst		
Nasopalatine duct cyst	3	0.7
Inflammatory origin		
Radicular cyst	109	24.0
Residual cyst	11	2.4
Inflammatory/infected cyst	29	6.4
Non-epithelial-lined cyst		
Traumatic bone cyst	2	0.4
Aneurysmal bone cyst	2	0.4
Cysts of soft tissue of mouth, face, neck		
Dermoid cyst	1	0.2
Epidermal cyst of skin	19	4.2
Thyroglossal duct cyst	1	0.2
Mucous extravasation cyst	96	21.1
Mucous retention cyst	6	1.3
Others		
Cystic chondromalacia	1	0.2
Vellous hair cyst	1	0.2
Total	455	100.0

the region's embryological development and the potential for remnants of the dental lamina, from which OKCs originate.

In the present study, the most prevalent age group of occurrence was 16–30 years with male predominance, which was in agreement with multiple investigators[1-3,5,7,8,10-14] except studies by Savithri *et al.*,[2] and Farias *et al.*,[3] who showed female predominance. This

Table 4: Frequency distribution of orofacial cysts based on site

Site	Frequency	Percentage
Jaw/gnathic (hard tissues)	335	73.6
Extra gnathic (soft tissues)	120	26.4
Total	455	100.00
Jaw/gnathic		
Both	1	0.3
Mandible	170	50.7
Maxilla	164	49.0
Total	335	100.0
Extra gnathic		
Buccal mucosa	6	5.0
Floor of mouth	5	4.2
Tongue	2	1.7
Ear	3	2.5
Head	6	5.0
Face	3	2.5
Lower Lip	87	72.5
Nose	2	1.7
Cheek	3	2.5
Neck	1	0.8
Upper lip	1	0.8
Uvula	1	0.8
Total	120	100.0

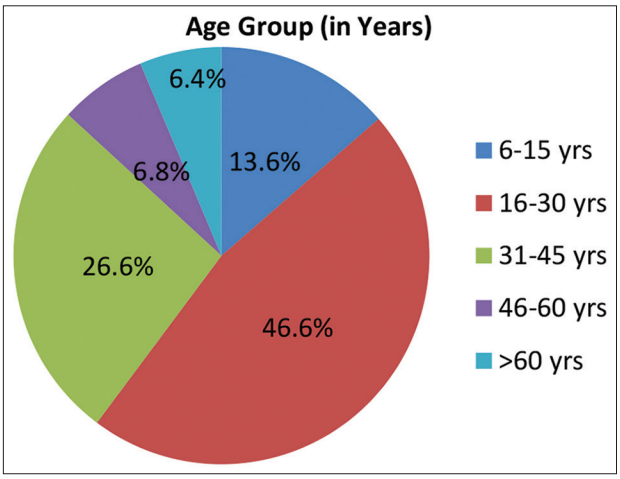
Table 5: Frequency distribution of orofacial cysts based on location

Location	Frequency	Percentage
Anterior	215	47.3
Both	6	1.3
Posterior	234	51.4
Total	455	100

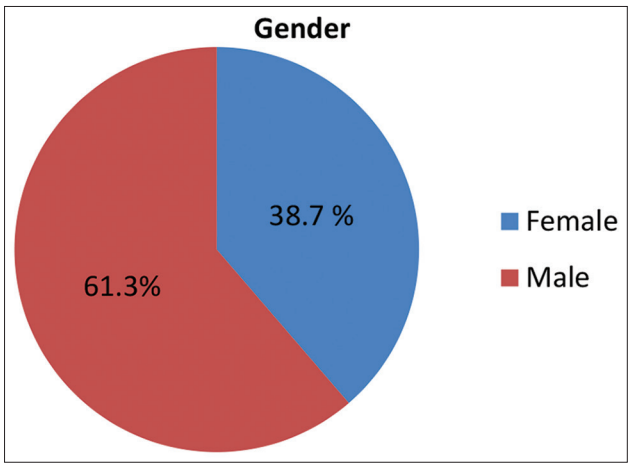
may suggest a possible hormonal or behavioral influence (stress or adverse habits) on cyst development.

In the present study, the prevalence of orofacial cysts was higher in jaw/gnathic (hard tissue) region as compared to the extragnathic (soft tissue) region. Posterior aspect of mandible was the most common site of occurrence in the gnathic region and lower lip in the extragnathic region, alike to the reports by other investigators.[1-3,5,9-11,14] Contrastingly, studies by Bafna *et al.*,[11] Shaikh *et al.*,[13] and Bataineh *et al.*,[8] reported the maxilla as the most common site of occurrence. According to literature, the jaw retains many odontogenic rests, thus possessing a higher tendency for activation and initiation of a plethora of cystic pathologies.[6]

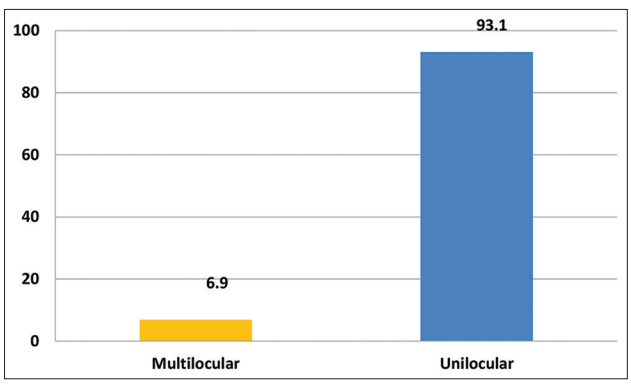
In the present study, most of the orofacial cysts were clinically associated with swelling, which is in agreement with Savithri *et al.*[2]



Graph 1: Percentage distribution of orofacial cysts based on age

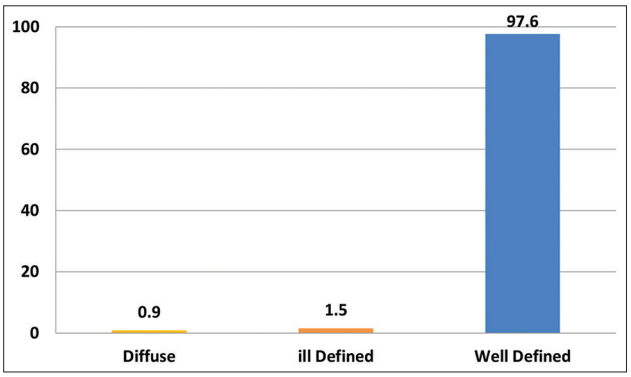


Graph 2: Percentage distribution of orofacial cysts based on gender

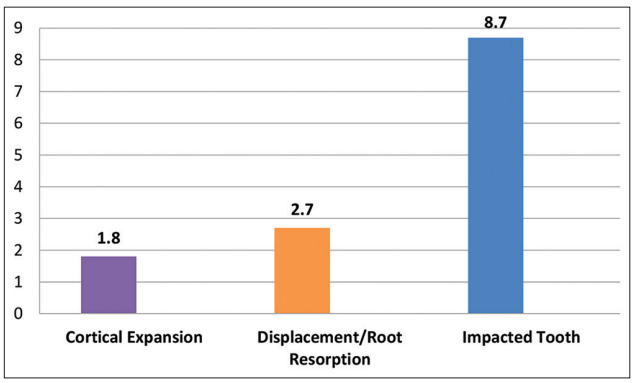


Graph 3: Percentage distribution of orofacial cysts based on radiographic features

Radiographically, most of the orofacial cysts were presented as unilocular radiolucency with well-defined margins, as reported by Savithri *et al.*,[2] Nwoga,[1] Acikgoz *et al.*[5] Radiography has been the most commonly used imaging technique in this environment for intraosseous cysts. Imaging investigations were not provided for most of the soft tissue cysts nor documented at the period of specimen submission, especially for mostly small-sized cysts such as mucoceles, dermoid cysts, epidermoid cysts, thyroglossal duct cysts, and similar lesions.



Graph 4: Percentage distribution of orofacial cysts based on radiographic features (radiolucency)



Graph 5: Percentage distribution of orofacial cysts based on radiographic features

Table 6: Frequency distribution of orofacial cysts based on clinical features

Clinical features		
Clinical sign	**Frequency**	**Percentage**
Pain	88	19.3
Swelling	296	65.1
Both	70	15.4
Asymptomatic	1	0.2
Clinical size		
1–2 cm	273	60.0
3–4 cm	119	26.2
>4 cm	63	13.8
Total	455	100.0

Table 7: Literature review showing geographical and clinical prevalence of orofacial cysts

Prevelance	Present study	Savithri *et al.*[2]	Nayak *et al.*[14]	Bafna *et al.*[11]	Shaikh *et al.*[13]	Bataineh *et al.*[8]	Jeong *et al.*[9]	Baghaei *et al.*[12]	Acikgoz *et al.*[5]	Mutio *et al.*[10]	Nwoga *et al.*[1]	Fomete *et al.*[7]	Farias *et al.*[3]
Continents					**Asia**						**Africa**		**South America**
Year	2024	2020	2020	2017	2014	2024	2019	2014	2012	2024	2024	2016	2024
Country			India			Jordan	Korea5	Iran	Turkey	Kenya	Nigeria		Brazil
Total no. of cases studies	3610	-	-	6509	-	-	-	-	12,350	-	897	1162	290
Orofacial cysts	455 (13)	-	-	1242 (19)	-	-	544	-	459 (3.7)	-	85 (9.5)	64 (5.5)	138 (47.5)
Odontogenic cysts	174 (38.2)	-	-	1064 (85.6)	-	-	-	-	452 (98.5)	-	56 (65.9)	50 (36.2)	134 (97.1)
Odontogenic keratocyst (%)	123 (27)	10 (15)	12 (17)	146 (12)	37 (6)	39 (6)	19 (4)	13 (19)	15 (3)	287 (33)	22 (26)	3 (5)	15 (11)
Dentigerous cyst (%)	29 (6.4)	9 (13)	17 (24)	126 (10)	65 (10)	162 (25)	160 (29)	19 (27)	122 (27)	468 (54)	12 (14)	21 (33)	26 (19)
Radicular cyst (%)	109 (24)	28 (42)	42 (59)	591 (48)	320 (51)	273 (42)	259 (48)	13 (19)	251 (55)	96 (11)	6 (7)	10 (16)	66 (49)
Age (years)	16–30	21–40	7–72	21–30	29–34	30–59	41–87	20–40	11–49	11–20	1–79	11–30	31–40
Gender	Male	Female	Male	Male	Male	Male	Male	Male	Male	Male	Male	Male	Female
Site	Mandible	Mandible	Mandible	Maxilla	Maxilla	Maxilla	Mandible	Mandible	Mandible	Mandible	Mandible	-	Mandible
Clinical features	Swelling (65.1)	Swelling (52.2)	-	-	-	-	-	-	-	-	-	-	-
Radiolucency	Unilocular (93.1)	Unilocular (59.7)	-	-	-	-	-	-	Unilocular (93.7)	-	Unilocular (62.5)	-	-
Time duration (years)	11	-	-	35	-	-	5	-	9	-	10	10	12

CONCLUSION

The study underscores the importance of accurate diagnosis through histopathological evaluation to differentiate between various cystic lesions. To reduce the need for significant surgery, these lesions must be identified early and treated promptly. In addition, patients, particularly those with OKC, should be evaluated on a regular basis to track any potential recurrences. Future research should focus on the molecular and genetic underpinnings of orofacial cysts to enhance diagnostic precision and therapeutic approaches, ultimately improving patient care in oral and maxillofacial health.

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