To evaluate the frequency and demographic profile of jaw cysts, oral soft tissue cysts, and odontogenic tumors in a tertiary center

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ABSTRACT

Aim

To determine the morphological variations of odontogenic lesions and cysts of the jaw and oral soft tissue in our setup.

Materials and Methods

A retrospective study was conducted at the Basic Medical Sciences Institute, Jinnah Postgraduate Medical Centre, during the time period between January 2019 and December 2022. Data was entered on a pre-built pro forma. The prevalence of different odontogenic lesions of the jaw and cysts of oral soft tissue with age, gender, and site was calculated.

Results

In total, 27 patients were included in this study. Mucocele (33.3%) was the most reported lesion, followed by periapical cysts (18.5%). In addition, the majority of the patients (66.6%) were male.

Conclusion

Among the odontogenic lesions of the jaw and cysts of the oral soft tissue, mucoceles and periapical cysts were more frequent in our study. To find out the prevalence of jaw cysts, oral soft tissue cysts, and odontogenic tumors, more studies need to be done.

Title: To evaluate the prevalence and demographic profile of jaw cysts, oral soft tissue cysts, and odontogenic tumors in a tertiary center.

Objectives: To study the prevalence of jaw cysts, oral soft tissue cysts, and odontogenic tumors retrospectively.

Keywords: Jaw cysts, oral soft tissue cysts, odontogenic tumors, mucocele, periapical cyst, demographic profile, tertiary center

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Introduction:

A cyst can be described as an epithelium-lined sac that contains liquids, semiliquids, or gaseous material except pus. Almost all cysts have an epithelial layer. However, mucous extravasation cysts of the salivary gland, aneurysmal bone cysts, and solitary or traumatic bone cysts are considered oral cysts that are mostly not covered with epithelium. (1) Cysts, which are observed in the jawbone and adjacent tissues, can be situated in both soft tissue and bone. (2) The human jaw is considered the most common site for the occurrence of various types of cysts and tumors. A few of them, like odontogenic tumors and cysts, appear as tissue remnants that are involved in tooth-producing mechanisms or as a product of inflammation. (3) In March 2022, the latest online 5th version of the World Health Organization (WHO) for odontogenic lesions was released. This new classification of odontogenic lesions is not conceptually very different from the earlier one. (4) Cysts of oral soft tissue were categorized by Soames and Southam in the 4th edition of the Oral Pathology academic book. (5) Among all oral soft tissue cysts, salivary mucoceles are very common. (5) In the American population, the prevalence of mucocele is 2.5 out of every 1000

individuals. However, in Brazil and Sweden, the frequency is 0.8% and 0.11%, respectively. (6)

Locally as well as internationally, multiple studies have been conducted on the prevalence of odontogenic cysts and tumors of the jaws. In addition to odontogenic lesions of the jaw, we collect data on the cysts of oral soft tissue. Therefore, it is of interest to document the frequency of histologically diagnosed cases of various types of odontogenic lesions of the jaw and oral soft tissue cysts by age, gender, and anatomic site over a period of 4 years in a tertiary care center in Karachi, Pakistan.

Materials and Methods: This retrospective study was carried out at the Basic Medical Sciences Institute, Jinnah Postgraduate Medical Centre, with the approval of the Institutional Review Board (NO.F.2-87/2021-GEN/JPMC), during the time period between January 2019 and December 2022. All patient records were assessed for the classification of odontogenic lesions according to the latest 5th online version of the World Health Organization published in March 2022 and cysts of oral soft tissue according to the 4th edition of the Oral Pathology Book by Soames and Southam. (4, 5) All information, such as age, gender, and anatomic distribution, was recruited from records pertaining to patients with odontogenic jaw lesions and cysts of the oral soft tissue. Data entry and analysis were done in Excel. Data was represented in the series of tables.

Results: From the 27 patients recruited in this study, 2 (7.4%) had odontogenic keratocysts, 9 (33.3%) patients presented with mucocele, 5 (18.5%) patients had periapical cysts, 2 (7.4%) patients were detected with epidermoid cysts, 1 (3.7%) patient was identified with calcifying epithelial odontogenic tumors, and 4% each had dentigerous cysts and ameloblastoma, respectively (Table 1).

Table 1: Frequency of different types of odontogenic tumors and cysts

Type of odontogenic tumors and cysts	Frequency n (%)
Odontogenic keratocyst	2 (7.40)
Mucocele	9 (33.3)
Dentigerous cyst	4 (14.8)
Epidermoid cysts	2 (7.40)
Ameloblastoma	4 (14.8)
Periapical cyst	5 (18.5)
Calcifying epithelial odontogenic tumor	1 (3.70)
Total	27 (100)

n = Number of patients, % = Percentage

The age of patients ranges between 1 and 50 years. The highest frequency of patients was between 21 and 30 years of age. We found equivalent frequencies (n = 4) of ameloblastoma and mucocele, but ameloblastoma tended to occur in the third to fourth decade, while mucocele had a peak incidence in the second decade. Variations were found in the frequency of different types of odontogenic cysts and tumors in different age groups (Table 2).

Table 2: **Frequency of odontogenic tumors and cysts with different age groups**

	Age groups (Years)				
Odontogenic tumors and cysts	1-10 n (%)	11-20 n (%)	21-30 n (%)	31-40 n (%)	41-50 n (%)
Odontogenic keratocyst (n=2)	0 (0)	1(50)	0(0)	1(50)	0(0)
Mucocele (n=9)	3(33.3)	4(44.4)	2(22.2)	0(0)	0(0)
Dentigerous cyst (n=4)	0(0)	1(25)	2(50)	0(0)	1(25)
Epidermoid cysts (n=2)	0(0)	0(0)	2(100)	0(0)	0(0)
Ameloblastoma (n=4)	0(0)	0(0)	0(0)	4(100)	0(0)
Periapical cyst (n=5)	0(0)	1(20)	3(60)	0(0)	1(20)
Calcifying epithelial odontogenic tumor (n=1)	0(0)	0(0)	0(0)	1(100)	0(0)
Total (n=27)	3(11.1)	7(25.9)	9(33.3)	6(22.2)	2(7.4)

n = Number of patients, % = Percentage

In gender-wise distribution, we found 18 were male (66.6%), and 9 were female (33.3%). Among male patients, the most prevalent lesions were mucoceles (n = 6), followed by periapical cysts (n = 4). While among female patients, an equal frequency (n=3) of mucoceles and dentigerous cysts was observed in Table 3.

Table 3: Frequency of odontogenic tumors and cysts according to gender distribution

Odontogenic tumors and cysts	Male n (%)	Female n (%)
Odontogenic keratocyst (n=2)	2 (100)	0(0)
Mucocele (n=9)	6 (66.6)	3(33.3)
Dentigerous cyst (n=4)	1(25)	3(75)
Epidermoid cysts (n=2)	2(100)	0(0)
Ameloblastoma (n=4)	2(50)	2(50)
Periapical cyst (n=5)	4(80)	1(20)
Calcifying epithelial odontogenic tumor (n=1)	1(100)	0(0)
Total (n=27)	18(66.6)	9(33.3)

n = Number of patients, % = Percentage

Table 4 shows the distribution of the odontogenic jaw lesions and cysts of the soft tissue according to the anatomic site. Odontogenic keratocysts (n = 2) and ameloblastoma (n = 2) were most prevalent in the mandible. Mucocele were more common in the lip region (55.5%). Dentigerous cysts showed an increased frequency of cases in the maxilla (50%). The periapical cyst has an equal frequency of cases (n = 2) in the mandible and palatal regions. Gingiva (n = 2) was the affected site for epidermoid cysts. Calcifying epithelial odontogenic cysts accounted for the least number of cases (n = 1) in the buccal mucosa.

Table 4: Distribution of lesions according to anatomical location

lesions	Anatomical location					
	Buccal Mucosa n (%)	Lip n (%)	Maxilla n (%)	Mandible n (%)	Gingiva n (%)	Palate n (%)
Odontogenic keratocysts (n=2)	0 (0)	0(0)	0(0)	2 (100)	0(0)	0(0)
Mucocele (n=9)	4(44.4)	5(55.5)	0	0(0)	0(0)	0(0)
Dentigerous cyst (n=4)	1(25)	0(0)	2(50)	0(0)	1(25)	0(0)
Epidermoid cysts (n=2)	0(0)	0(0)	0(0)	0(0)	2(100)	0(0)
Ameloblastoma (n=4)	2(50)	0(0)	0(0)	2(50)	0(0)	0(0)
Periapical cyst (n=5)	1(20)	0(0)	0(0)	2(40)	0(0)	0(0)
Calcifynin(g%) epitheli0a(l0) odontogenic tumor (n=1)	1(100)	0(0)	0(0)	0(0)	0(0)	0(0)
Total (n=27)	8(29.6)	5(18.5)	2(7.4)	7(25)	3(75)	

n = Number of patients, % = Percentage

Discussion:

Among t2h(e50o)dontogenic lesions of the jaws and cysts of oral soft tissues, the most frequent lesion was a mucocel1e(2(03)3.3%) in our study. According to the results of local research conducted in Karachi, mucocel0e(0w) as found in five cases among the 50 participants. (7) Histological findings were mostly mucous-9fi(l3le3d.3)in a cavity that was encircled by granulation tissue without a lining of epithelium. (8) Mucocele can be presented either as a fluid-filled vesicle or blister in the superficial mucosa or appear as a fluctuant nodule if the collection lies in the submucosa. (9) Periapical cysts were the second most prevalent lesion in this study. Worldwide as well as local studies have observed the periapical cyst as the most common odontogenic cyst in their patients. (10, 11, 12, 13) Microscopically, it presents as a cyst surrounded by nonkeratinized stratified squamous epithelium organized in an arcading pattern and infiltrated by inflammatory cells, mainly lymphocytes and plasma cells. Russell's bodies were also seen in the periapical cyst. (14) In this present study, only one case of calcifying epithelial odontogenic tumor was found. A study by Ali et al. in Kuwait (15) and AlSheddi et al. in Riyadh (16) observed the lowest frequency of calcifying epithelial odontogenic tumors in their participants. (1) This variation may be due to differences in sample sizes. Biopsy of CEOT shows sheets of polyhedral epithelial cells, amyloid-like material, and calcifications. (17)

In the current study, patients with odontogenic lesions of the jaws and cysts of the oral soft tissues were most frequently affected in the second to fourth decade of life. A peak incidence of cases was seen in the second decade among mucoceles in our study. A couple of studies conducted in India and Spain assessed that the majority of their patients develop mucocele under the age of 25 0. (8,18) Patients of all ages are thought to develop oral mucoceles, with the incidence prevailing in the second decade of life. (19) Lip-biting and

chewing are the main etiological factors for mucocele as a result of the nervousness and anxiety seen in the younger age group. (7) The second most prevalent lesion in our study after mucocele was a periapical cyst, which showed the highest prevalence in the age range of 20–30 years. A previous study done in Rawalpindi agreed with the current research. (20) In the study by Luis et al., (21) periapical cysts were mostly seen in the 30- to 39-year-old age group in a Mexican population. The present study also observed the highest frequency of ameloblastoma in the fourth decade of life. In addition, a study of ameloblastoma cases carried out on the Goan population for 16 years observed that the maximum number of cases was found in the third to fourth decade. Ameloblastoma is a slow-growing odontogenic neoplasm that comprises epithelial cells, and its aggressive behaviour can result in facial and jaw anomalies. (22)

The current study observed that the frequency of males was higher than females, with a male-to-female ratio of 2:1. In our sample size of 27 cases, mucocele and periapical cysts were predominantly affected in male patients. A study conducted in India highlights an increase in the number of males in their mucocele patients. (8) In multiple studies, a higher proportion of periapical cysts among males has also been observed. (1, 10, 11) This is because males ignore their dental hygiene and are more prone to trauma compared with females. (10)

In this study, the most common anatomical location for mucocele was the lip. Yousuf et al. (7) reported that the lip was the predominant site among mucocele patients. This could be due to lip and cheek biting and sharp teeth causing trauma, often linked to stress and anxiety conditions. (7) Mucocele is the most prevalent oral soft tissue lesion. (21) The primitive goal of mucocele is to remove the entire lesion, associated and neighbouring glands, along with the surrounding lesion area, to prevent the recurrence of mucocele. Additionally, treatment options for mucocele include cryosurgery, micro-marsupialization, surgical removal, and laser procedures. (23)

Conclusion: The current study showed different types of odontogenic lesions of the jaw based on the 5th version of the WHO, and cysts of oral soft tissue were classified according to the description of the oral pathology textbook by Soames and Southam. Data evaluation of all cases was done according to ages, genders, and different locations. This brief paper addressed the high frequency of mucocele in our society. Despite the availability of different treatment modalities for mucocele, recurrence is common. New surgical interventions are required to prevent a recurrence rate. Furthermore, more extensive research with a larger sample size is required to understand the demographic knowledge among various odontogenic lesions of the jaw and cysts of oral soft tissue in our population.

Conflicts of Interests: None

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References:

1. Awan MU, Babar A, Ibrahim MW. Pattern and presentation of odontogenic jaw cysts: A clinical experience. Pakistan Armed Forces Medical Journal. 2017;67(1):102-06.
2. Hill CM, Renton T. Oral surgery II: Part 3. Cysts of the mouth and jaws and their management. British dental journal. 2017;223(8):573-84.
3. Baghaei F, Zargaran M, Najmi H, Moghimbeigi A. A clinicopathological study of odontogenic cysts and tumors in hamadan, iran. Journal of Dentistry. 2014;15(4):167.
4. Soluk-Tekkesin M, Wright JM. The World Health Organization Classification of Odontogenic Lesions: A Summary of the Changes of the 2022 (5th) Edition. Turk patoloji dergisi. 2022;38(2):168-84.
5. Soames JV, Southam JC. Oral pathology. (4rth Edition). 2005 Feb 10.
6. More CB, Bhavsar K, Varma S, Tailor M. Oral mucocele: A clinical and histopathological study. Journal of oral and maxillofacial pathology. 2014 ;18(Suppl 1): S72.
7. Yousuf A L, Maria O. Frequency of mucocele in a Karachi sample.
8. de Brito Monteiro BV, Bezerra TM, da Silveira ÉJ, Nonaka CF, da Costa Miguel MC. Histopathological review of 667 cases of oral mucoceles with emphasis on uncommon histopathological variations. Annals of Diagnostic Pathology. 2016 Apr 1;21:44-6.
9. Baburaj PA. Oral mucocoele: A case report.
10. Rao K, Smitha, HS U, NS P. Clinicopathological study of 100 odontogenic

cysts reported at VS Dental College-A retrospective study. Journal of Advanced Oral Research. 2011;2(1):51-8.

11. Kambalimath DH, Kambalimath HV, Agrawal SM, Singh M, Jain N, Anurag B, Michael P. Prevalence and distribution of odontogenic cyst in Indian population: a 10 year retrospective study. Journal of maxillofacial and oral surgery. 2014;13:10-5.
12. Izgi E, Mollaoglu N, Simsek MB. Prevalence of odontogenic cysts and tumors on turkish sample according to latest classification of world health organization: A 10-year retrospective study. Nigerian Journal of Clinical Practice. 2021;24(3):355-61
13. Bataineh AB, Ma'amon AR, Qudah MA. The prevalence of inflammatory and developmental odontogenic cysts in a Jordanian population: a clinicopathologic study. Quintessence international. 2004;35(10).
14. Koju S, Chaurasia NK, Marla V, Niroula D, Poudel P. Radicular cyst of the anterior maxilla: An insight into the most common inflammatory cyst of the jaws. Journal of Dental Research and Review. 2019 Jan 1;6(1):26-9.
15. Jones AV, Craig GT, Franklin CD. Range and demographics of odontogenic cysts diagnosed in a UK population over a 30-year period. Journal of Oral Pathology & Medicine. 2006;35(8):500-7.
16. Grossmann SM, Machado VC, Xavier GM, Moura MD, Gomez RS, Aguiar MC, Mesquita RA. Demographic profile of odontogenic and selected nonodontogenic cysts in a Brazilian population. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2007;104(6):35-41.
17. Baral R, Bajracharya D, Ojha B, Karna G. Calcifying epithelial odontogenic tumor: a case report. JNMA: Journal of the Nepal Medical Association. 2020 Mar;58(223):174.
18. García JY, Tost AJ, Aytés LB, Gay-Escoda C. Treatment of oral mucocele-scalpel versus C02 laser. Medicina oral, patología oral y cirugía bucal. Ed. inglesa. 2009;14(9):12.
19. More CB, Bhavsar K, Varma S, Tailor M. Oral mucocele: A clinical and histopathological study. Journal of oral and maxillofacial pathology.2014 ;18(Suppl 1):72.
20. Naz II, Akhtar MK, Gillan SM. Clinicopathological analysis of Odontogenic Cysts in a selected Pakistani population. Biomedica. 2012;28(1):61-5.
21. Villasis-Sarmiento L, Portilla-Robertson J, Melendez-Ocampo A, Gaitan-Cepeda LA, Leyva-Huerta ER. Prevalence and distribution of odontogenic cysts in a Mexican sample. A 753 cases study. Journal of clinical and experimental dentistry.2017 ;9(4):531.
22. Deshmukh P, Lanjekar A, Sathawane, R, Chandak, R, Gaikwad, R, & Talatule D et al. Recurrence of mucocele- A case report. Archives of Dental Research. 2021;11(2):123-126.
23. Navya LV, Sabari C, Seema G. Excision of Mucocele by Using Diode Laser: A Case Report. J Sci Dent. 2016;6(2):30–5.