



Incidence and Management of Odontogenic Cysts in A Private Dental College

Dhakshinya.M, Department of oral and Maxillofacial surgery, Saveetha Dental college & Hospitals, Saveetha Institute of Medical and technical Science, Saveetha University, Chennai, Tamil Nadu.

* **M. P. Santhosh Kumar**, Department of oral and Maxillofacial surgery, Saveetha Dental college & Hospitals, Saveetha Institute of Medical and technical Science, Saveetha University, Chennai, Tamil Nadu.

* **Corresponding author:**

(Received: 05 November 2023

Revised: 12 December

Accepted: 07 January)

KEYWORDS

Cyst; Dentigerous;
Innovative
technique;
Odontogenic
keratocyst;
Periapical

ABSTRACT

Introduction: The odontogenic keratocyst (OKC) calcifying cyst and the newly identified glandular odontogenic cyst are examples of odontogenic cysts that might be problematic due to recurrence and/or aggression. The OKC occasionally indicates the nevus basaloid carcinoma syndrome and possesses a significant growth capacity and recurrence potential. Notwithstanding the significance of these lesions, little is known about the demographic makeup of the various communities. Therefore, the purpose of this study is to determine how often odontogenic cysts are in patients who attend a private dental college.

Methods: A Prospective study was conducted and the case records of the patients diagnosed with odontogenic cysts were collected by reviewing patient records who got admitted to our outpatient from January 2023 to June 2023. The collected data was subjected to statistical analysis and correlation using SPSS software for evaluating the P value and chi square value, where $P < 0.05$ was statistically significant.

Results: Among the total number of patients 56.52% were males and 43.48% were females. Majority of them were 31-45 years old (43.48%) followed by 6-19 years (21.74%). Majority of the cysts were found in the upper arch (67.39%) and 32.61% of the cysts were found in the lower arch. After evaluating the Chi square test values, it was understood that an odontogenic keratocyst was most commonly found in the upper arch and this difference was found to be statistically significant ($p=0.017 < 0.05$).

Conclusion: Inside the confines of this research, we discovered that radicular cysts were more common than OKC and dentigerous cysts, with a male predilection where odontogenic cysts were found more frequently between the ages of 31 and 45. The most common site for radicular and OKC cysts was the upper arch, whereas the lower arch was more common for dentigerous cysts due to common impaction of the third molars.

INTRODUCTION

It is possible to distinguish between odontogenic cysts, which are diseased cavities lined with epithelial cells, and tumors, which are solid masses that are not always malignant(1). A class of lesions known as odontogenic tumors is defined by the reason that they originate from odontogenic tissue. They can originate from the ectomesenchymal or epithelial, or from both, portions of the tooth germ(2). Although the majority of odontogenic mandibular lesions are benign, some may behave aggressively and destructively in the immediate area(3). Furthermore, a lot of these processes are inadvertently

found during routine dental radiography and are asymptomatic in the early stages. Pain is the most typical symptom, It might or might not have swelling attached to it. Paresthesias and tooth displacement or movement are further symptoms and indicators that have been documented(4).

An unerupted or impacted tooth's crown is where the dentigerous cyst forms. The tooth and cyst epithelium are joined at the cervical region(5). It makes up roughly 16% of oral cysts and often manifests in the first three decades of life, however age ranges are broad(6). The canine, maxillary, and mandibular third molar areas are where it



most frequently appears. Although it rarely causes symptoms, it can lead to tooth displacement, bone enlargement, and resorption of nearby teeth roots. A well-circumscribed, unilocular, radiolucent lesion connected to the crown of an unerupted or impacted tooth, typically with a sclerotic edge, is how the dentigerous cyst appears radiographically(7).

Odontogenic keratocysts, a type of developing odontogenic cyst, are unique due to their aggressive biologic nature, unique histopathologic traits, and high recurrence rate(8). The World Health Organization has recently suggested renaming it as "keratocystic odontogenic tumor" (KCOT) instead of "cyst" and defining it as a benign uni-or multicystic intraosseous neoplasm of odontogenic origin with a distinctive lining of parakeratinized stratified squamous epithelium. Numerous investigations have shown that the posterior mandibular body and ramus are the most often affected areas with KCOT(9). A study on the nature of odontogenic keratocyst revealed 28 cysts (26%), with numerous recurrences in 7 cysts (6%). Furthermore, it was discovered that the enucleation approach yields a higher recurrence rate than any other therapy modality when adjuvant treatments are used, aside from Carnoy's solution. Numerous factors, including the lesion's size, location, potential involvement of nearby anatomical tissues, and damage to dental structures, influence the best course of treatment(10).

Some odontogenic cysts are classified as "developmental" and others as "inflammatory" in terms of their pathophysiology. Both inflammatory and developmental odontogenic cysts are epithelial lesions that have a propensity to expand and grow slowly. Lesions known as radicular cysts are thought to be inflammatory in nature because they are the result of pulpal necrosis. A study found that the most common OC was apical radicular cyst (64.3%), which was followed by dentigerous cyst (25.1%).

Notwithstanding the significance of these lesions, little is known about the demographic makeup of the various communities. Therefore, the purpose of this study is to determine how often odontogenic cysts are in patients who attend a private dental college.

MATERIALS AND METHODS

Study design and study Setting:

This is a prospective study conducted on patients who have visited the outpatients ward of Oral and maxillofacial surgery department of Saveetha Dental

College and Hospitals in between January 2023- June 2023. Approval for this study was obtained from the Institutional human ethical committee. 46 patients made up the sample size, and the use of photos for verification reduced sampling bias. In dentistry, the primary goal of photography is to record clinical data inside the oral cavity. Two reviewers evaluated the study, and their reviews were cross-checked. The data analysis includes all patient records with odontogenic cyst diagnosis. The study did not include cases where the system had incomplete record input.

Data Collection:

The case records of patients diagnosed with odontogenic cysts were collected by reviewing the patient visiting the outpatient. The data of these patients was collected and tabulated. The factors included the patient's ID, age, gender, the arch that was affected, the kind of cyst, and the kind of treatment that was carried out. There were four age groups: 6–19 years, 20–30 years, 31–45 years, and over 45 years. The three types of treatment that was noted were ostectomy, marsupialization, and enucleation.

Statistical Analysis:

All the parameters were tabulated and assessed for statistical significance using the SPSS software. The relevance of age, gender, affected arch, kind of cyst, and type of therapeutic approach was determined using the Chi square test. P-values below 0.05 were regarded as statistically significant.

RESULTS

Of the total number of participants, 43.48% were between the ages of 31 and 45, 21.74% were between the ages of 20 and 30, 26.09% were between the ages of 6 and 19, and 8.70% were beyond the age of 45[Figure 1]. Of the individuals involved, 43.48% were female and 56.52% were male [Figure 2]. Odontogenic cysts were seen in 67.39% of the upper arch and 32.61% of the lower arch of the patients [Figure 3]. Among all the individuals with odontogenic cysts, 58.70% of the patients had periapical cyst, 17.39% of them had odontogenic keratocyst and 23.91% of them had a dentigerous cyst [Figure 4]. Of all the patients having odontogenic cysts, 60.87% of them underwent enucleation, 28.26% of them were treated by marsupialization and 10.87% of them underwent osteotomy [Figure 5].



Using chi square analysis, it was discovered that all dentigerous cysts were located in the lower arch, while the majority of periapical cysts and odontogenic keratocysts were located in the upper arch [Figure 6]. There were totally 17 and 10 periapical cysts found in the upper and lower arch respectively (tabulation:1) and It was determined that there was a statistically significant difference ($p < 0.05$). The majority of periapical cysts were treated by enucleation, followed by marsupialization and ostectomy; similarly, the majority of odontogenic keratocysts were treated by enucleation and marsupialization; and all dentigerous cysts were

treated by enucleation, according to the results of a chi square test [Figure 7]. Enucleation of mostly done in management of periapical cyst, from our case report 18 patients were treated with enucleation (tabulation:2). The majority of periapical, dentigerous, and odontogenic keratocysts were identified more frequently in males, and this finding was statistically not significant ($p > 0.05$) when the relationship between gender and the cysts was examined. [Figure 8]. Males were mostly affected by periapical cyst which was around 21 patients and in females only 6 patients were noted to be affected by periapical cyst (tabulation:3).

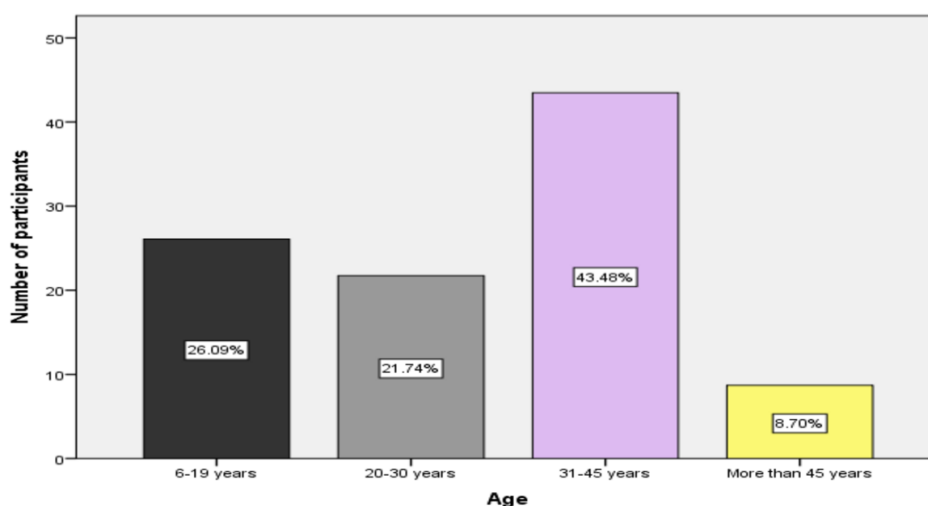


Figure 1: Odontogenic cysts occurring in patients across various age groups

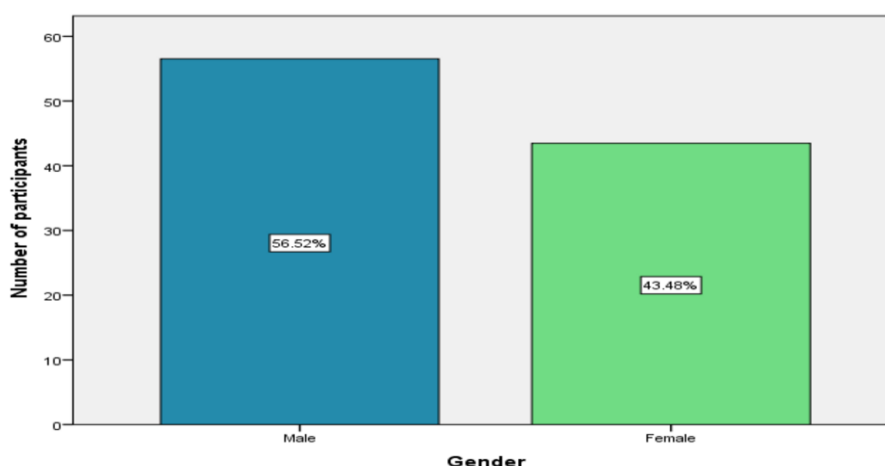


Figure 2: Occurrence of odontogenic cysts in patients by patients' gender.

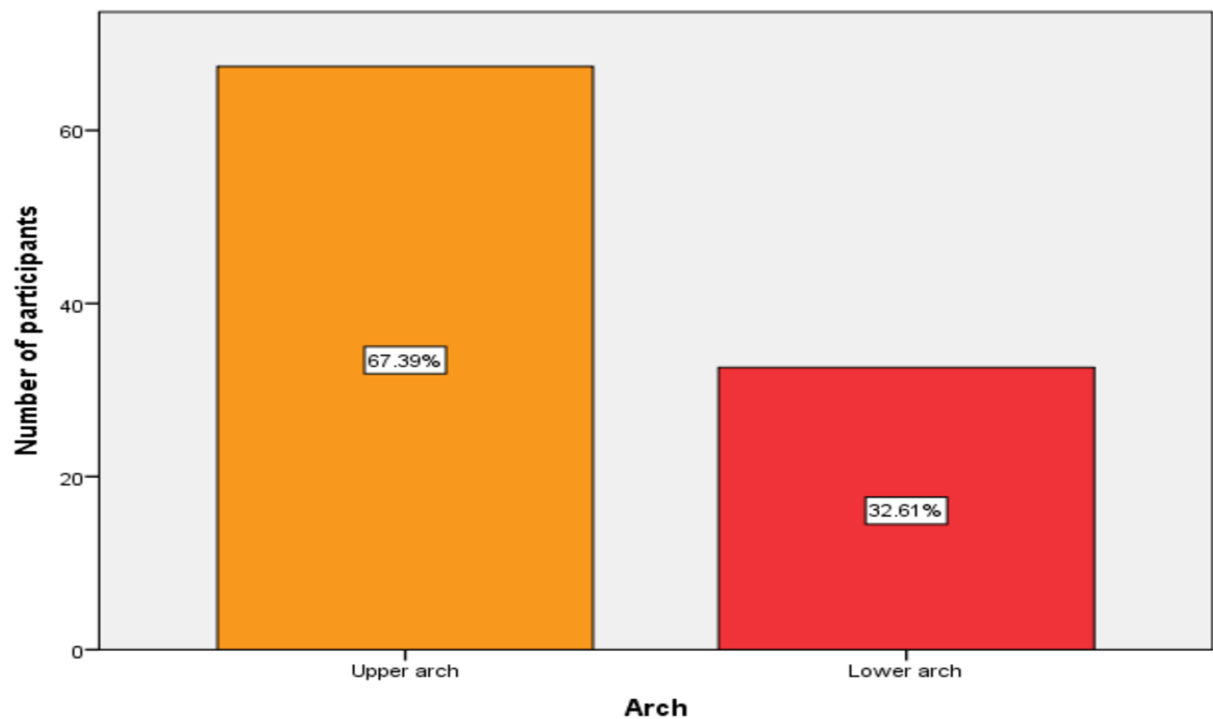


Figure 3: Occurrence of Odontogenic cysts on various dental arches.

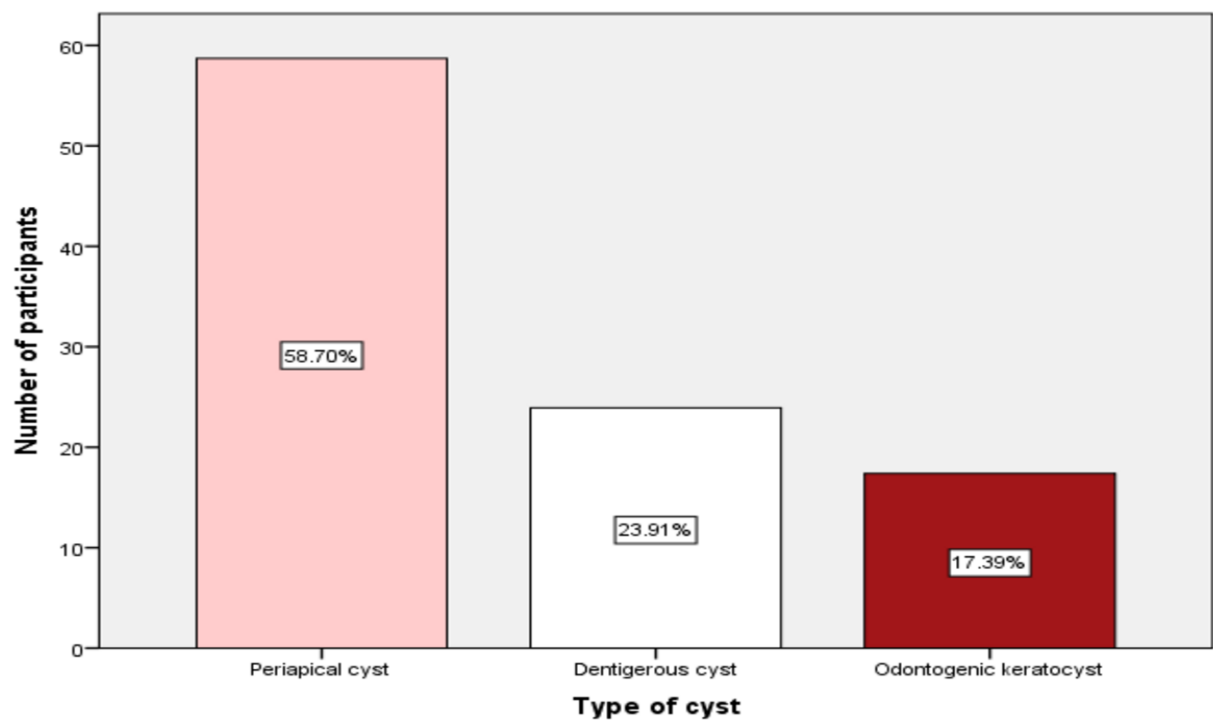


Figure 4: Prevalence of different types of odontogenic cysts

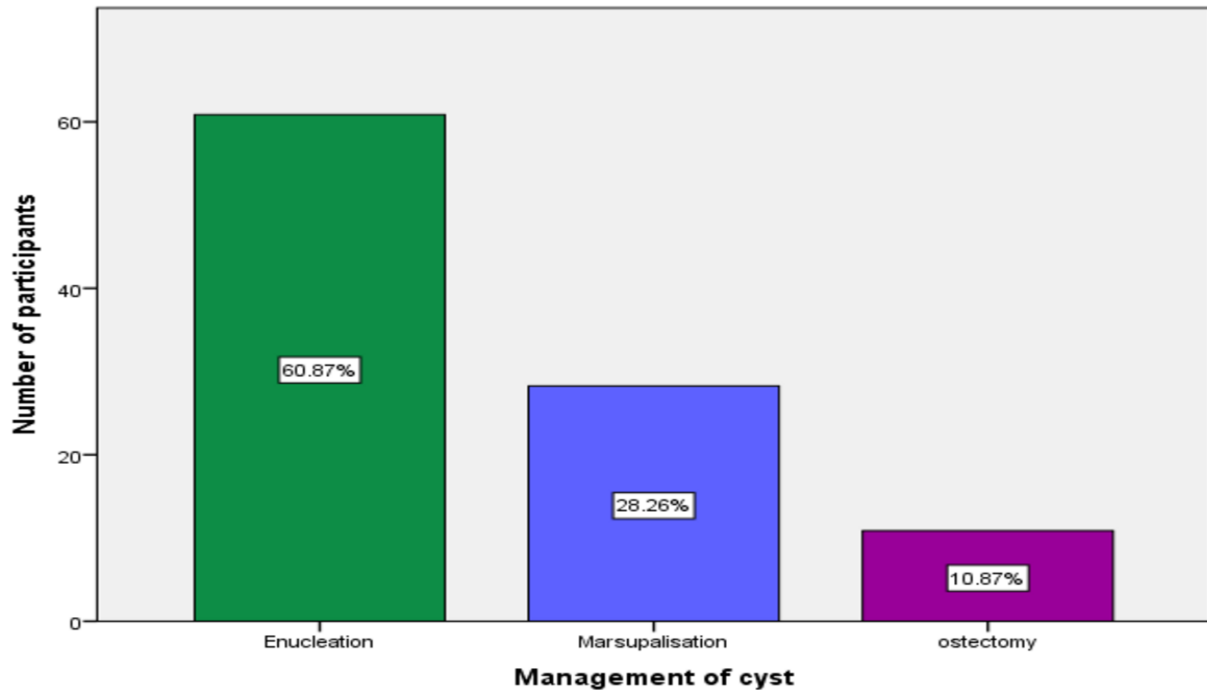


Figure 5: Prevalence of different types of treatment for management of odontogenic cysts

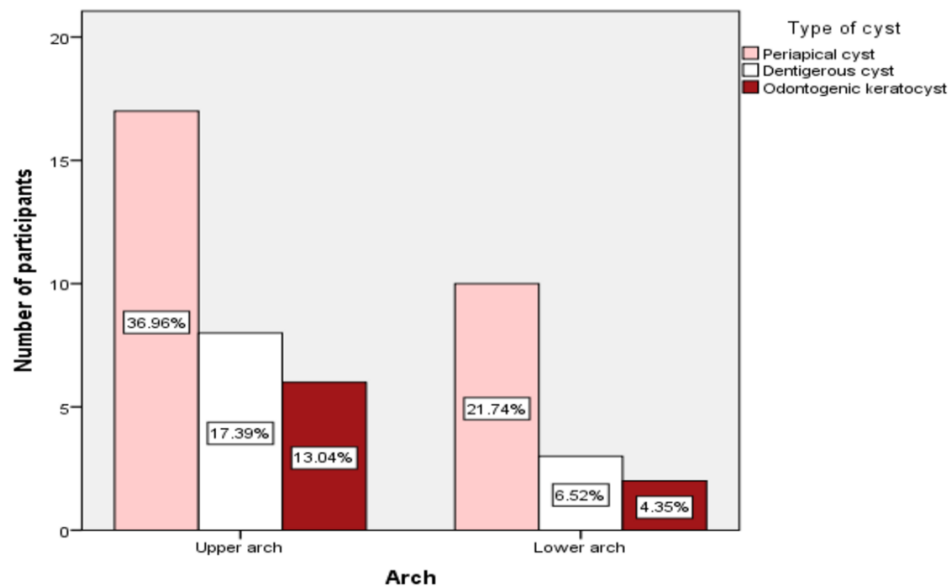


Figure 6: Association between Odontogenic cyst type and the dental arch involved. $p=0.071$, which was not statistically significant. Pearson Chi-Square value= 0.594. Tabulation: 1: Comparison dental arch and various types of Odontogenic cyst



Dental Arch	Periapical cyst	Dentigerous cyst	Odontogenic keratocyst	Total	Chi square test	p value
Upper arch	17	8	6	31	0.594	0.071
Lower arch	10	3	2	15		
Total	27	11	8	46		

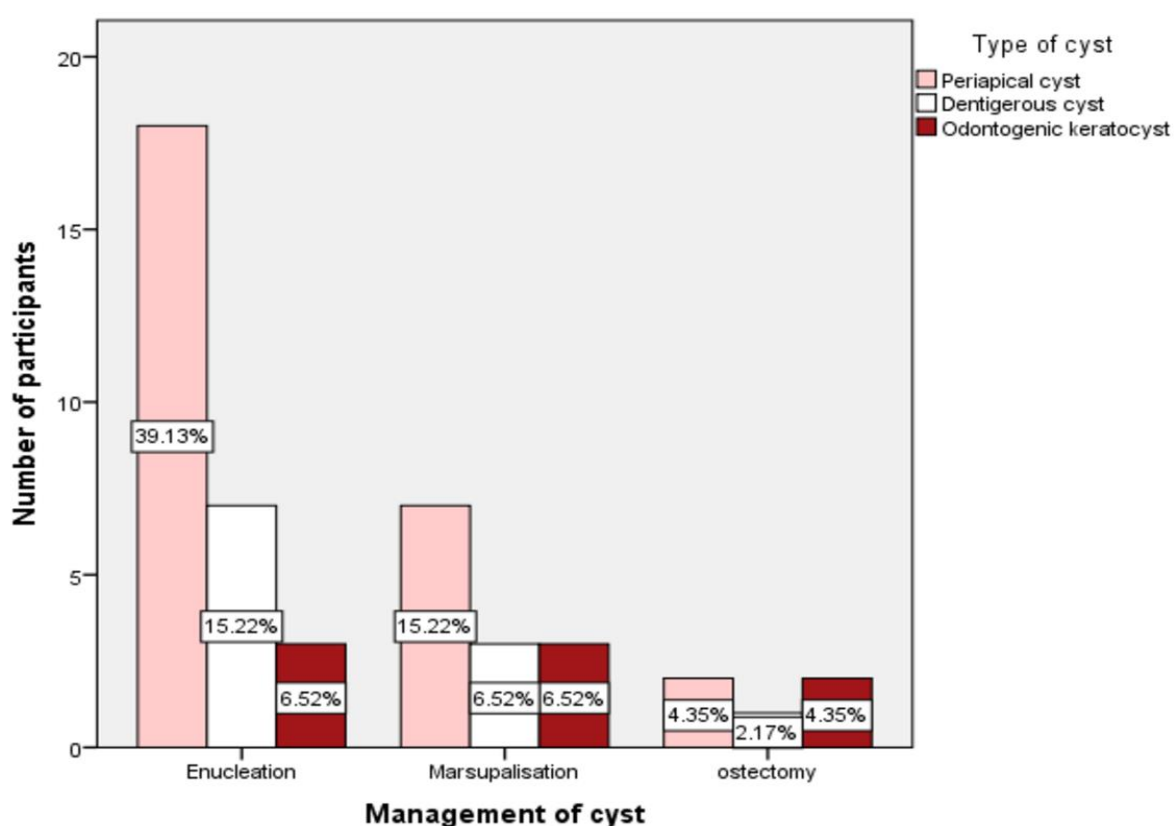


Figure 7: Association between various treatment modalities for odontogenic cyst and Odontogenic cyst type. $p=0.002$, which was statistically significant. Pearson Chi-Square value= 2.978.

Tabulation: 2: Comparison management and various types of Odontogenic cyst

Management	Periapical cyst	Dentigerous cyst	Odontogenic keratocyst	Total	Chi square test	p value
Enucleation	18	7	3	28	2.978	0.002
Marsupialisation	7	3	3	13		
Ostectomy	2	1	2	5		
Total	27	11	8	46		

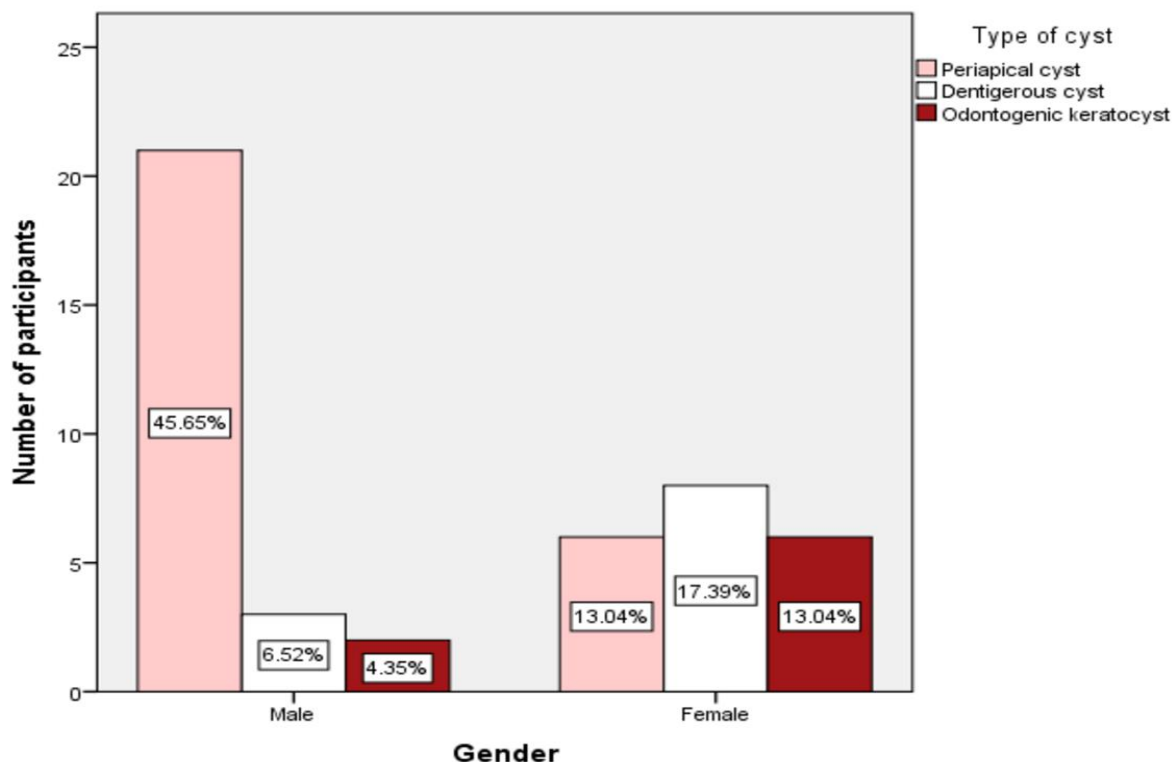


Figure 8: Association between Odontogenic cyst type and gender.

$p = 0.001$, which was statistically significant. Pearson Chi-Square value= 12.028.

Tabulation: 3: Comparison gender and various types of Odontogenic cyst

Gender	Periapical cyst	Dentigerous cyst	Odontogenic keratocyst	Total	Chi square tes	p value
Male	21	3	2	26	12.028	0.001
Female	6	8	6	20		
Total	27	11	8	46		

DISCUSSION

Both odontogenic and non-odontogenic cysts are typically found by accident during routine dental exams; as a result, they may go undiagnosed for years if the dentist does not order dental imaging or if there are no symptoms that would indicate a pathology(11). In order to prevent further damage to the oral structures, patients need to see their dentists for checkups and follow-ups on a frequent basis. One patient in this study complained for almost 24 months before visiting a doctor(12). During follow-up, the patient had a favorable clinical course and compliance with the treatment. Nevertheless, the lesion returned a few months following treatment, and

ameloblastoma was the differential diagnosis. Thankfully, the tumor was effectively treated and managed after being histopathologically identified as a benign cyst, resulting in a favorable prognosis(13). There was a study conducted epidemiology, treatment and recurrence of Odontogenic cyst, The frequency of odontogenic cysts and tumors is significant because, in cases when radiographic lucencies are an unintentional finding on panoramic radiographs, patients should be given a realistic assessment of the likelihood of a diagnosis rather than focusing solely on uncommon but aggressive lesions(14). Odontogenic cysts exhibited more Male Predilection (56.52%) over girls (43.48%),



which is consistent with research from other nations that found frequency ranging from 52.5-65%. In contrast to these findings, the Brazilian population exhibited a female majority(15). Additionally, in a study done on the population of Luthiana, women outnumbered men 1:2:6. The enucleation approach yields a very less recurrence rate than any other therapeutic modality when combined with adjunctive procedures (except from Carnoy's solution)(16).

The majority of cyst treatments are based on the etiologies and localizations of the cysts, with each utilizing a unique approach to address the issue and stop malignant growth or recurrence. Partsch first reported surgical procedures for cysts in the early 1892s; these procedures, like marsupialization and enucleation, are still in use today(16,17). For the majority of instances, enucleation and curettage seem to be suitable therapy. To ensure an early clinical diagnosis, prompt treatment, and a good prognosis, it is essential to understand the biological properties, fundamental traits, and histological behaviors of cystic lesions in the OMF region(18). Because odontogenic and non-odontogenic cysts grow quiescently and share similar clinical and radiographic features, diagnosing them might be difficult in most situations. Because these cysts are asymptomatic in the early stages, it takes longer to diagnose and treat them, which encourages the cysts to grow aggressively and destroy nearby tissues like the mandibular nerve and maxillary sinus(19). Additionally, these elements may have detrimental impacts on oral and facial structures in terms of appearance and functionality. There are regional variations in the incidence of odontogenic tumors, which varies globally(20). Studies carried out in Europe and South America have revealed a higher incidence of odontogenic tumors with a frequency of less than 3%. Lesions represented 8.99% and 9.6% in Asia and Africa, respectively, although Brazil had 4.8% and an Iranian series 1.9% in frequency(21). As a result, the variation in odontogenic cyst prevalence around the globe indicates that ethnic and environmental factors are likely associated with the incidence of these lesions. The odontogenic tissue, which is the source of a variety of diseases, includes odontogenic cysts and tumors(22). These lesions reflect the variability in the formation of dental structures, as they arise from deviations from the typical pattern of odontogenesis(21). Given that many of these lesions have similar clinical and radiographic characteristics, the diagnosis of odontogenic cysts and

tumors should be made after a thorough study of the clinical, radiographic, and histological aspects.

LIMITATIONS: Study was limited to the regional population; the results may vary when compared to other populations.

CONCLUSION

Inside the confines of this research, we discovered that radicular cysts were more common than OKC and dentigerous cysts, with a male predilection where odontogenic cysts were found more frequently between the ages of 31 and 45 years. The most common site for radicular and OKC cysts was the upper arch, whereas the lower arch was more common for dentigerous cysts.

FUNDING SUPPORT

The present project is funded by Saveetha Institute of Medical and Technical Sciences, Saveetha Dental College and Hospitals Saveetha University and Dr. Murugesan Dental and Oral and maxillofacial surgery center, Chennai.

REFERENCES

1. Kalyanasundaram S, Kandasamy S, John RR. Evaluation of Expression of WNT1 and PTCH Genes in Peripheral Blood of Patients with Odontogenic Cysts and Tumours of the Jaws by Quantitative RT-PCR: A Pilot Study. *J Maxillofac Oral Surg*. 2023 Dec;22(4):1123–9.
2. Kadeh H, Saravani S, Jamshidi A. A Comparative Immunohistochemical Expression of TRAP in Odontogenic Cysts. *Iran J Otorhinolaryngol*. 2023 Nov;35(131):295–301.
3. Bhola R, Narwal A, Kamboj M, Devi A. Immunohistochemical Comparison of Ki-67 and MCM-3 in Odontogenic Cysts: An Observational Study. *Appl Immunohistochem Mol Morphol* [Internet]. 2023 Dec 8; Available from: <http://dx.doi.org/10.1097/PAI.0000000000001175>
4. Browne RM. *Investigative Pathology of Odontogenic Cysts*. CRC Press; 2019. 391 p.
5. Otonari-Yamamoto M, Nakajima K, Sato H, Wada H, Matsumoto H, Nishiyama A, et al. Dentigerous cysts suspected the other odontogenic lesions on panoramic radiography and CT. *Oral Radiol* [Internet]. 2024 Jan 2; Available from: <http://dx.doi.org/10.1007/s11282-023-00732-4>
6. Goswami M, Chauhan N. Radicular Cyst with Primary Mandibular Molar: A Rare Occurrence. *Int J Clin Pediatr Dent*. 2023 Sep-Oct;16(5):769–73.



7. Mohanty S, Bansal N, Verma A, Urs AB. Mandibular primary intraosseous carcinoma arising from long-standing odontogenic keratocyst. *Oral Surg Oral Med Oral Pathol Oral Radiol* [Internet]. 2023 Jul 16; Available from: <http://dx.doi.org/10.1016/j.oooo.2023.07.012>
8. Akbarizadeh F, Garmabi J, Paknahad M. Concurrent Odontogenic Keratocyst and Odontoma: Report of an Unusual and Rare Entity. *J Dent*. 2023 Dec;24(4):438–43.
9. Krishnan RP, Pandiar D, Sagar S. Immunohistochemical Expression of CK14 and Bcl-2 in Odontogenic Keratocyst and Its Variants. *Appl Immunohistochem Mol Morphol* [Internet]. 2023 Dec 25; Available from: <http://dx.doi.org/10.1097/PAI.0000000000001182>
10. Li P, Zhao Y, You Y, Lin L, Yu D, Zhao W. Current Perspectives on Paradental Cyst: A Literature Review. *Dent J* [Internet]. 2023 Dec 5;11(12). Available from: <http://dx.doi.org/10.3390/dj11120281>
11. El-Beialy AR, BinRahima AM, Al Shhab M, Mostafa Y. Orthodontic management of a developing dentigerous cyst related to lower second molar: a case report. *BMC Oral Health*. 2023 Dec 14;23(1):1004.
12. Mohanty S, Shivanna DB, Rao RS, Astekar M, Chandrashekar C, Radhakrishnan R, et al. Development of Automated Risk Stratification for Sporadic Odontogenic Keratocyst Whole Slide Images with an Attention-Based Image Sequence Analyzer. *Diagnostics (Basel)* [Internet]. 2023 Nov 27;13(23). Available from: <http://dx.doi.org/10.3390/diagnostics13233539>
13. Jurt A, Stanowska O, Braun D, Schulze R. [Surgical removal of an atypically large extensive radicular cyst in the mandible: a case report.]. *Swiss Dent J*. 2023 Dec 4;133(12):810–5.
14. Berberi A, Aad G, Nassar M, Maalouf G, Nader N. Decompression of a Dentigerous Cyst Treatment in Mixed Dentition: A Case Report with 5 Years Follow-Up. *Case Rep Dent*. 2023 Sep 20;2023:8628326.
15. Kramer IRH, Pindborg JJ, Shear M. *Histological Typing of Odontogenic Tumours*. Springer Science & Business Media; 2013. 130 p.
16. Alharbi MA, Alghamdi A, Kattan SA, Austah O, Othman B, Haddad S, et al. The Incidence of Devitalization of Vital Teeth Associated with Pathologies of the Jaws Following Surgical Intervention: A Mixed-case Study. *J Contemp Dent Pract*. 2023 Oct 1;24(10):750–6.
17. Roman RC, Faur CI, Boțan E, Bidiga Ștefan, Moldovan MA. Radical resection of mandibular ameloblastoma and functional reconstruction with a fibula free flap. Report of two cases and review of the literature. *Ann Ital Chir* [Internet]. 2023 Dec 20;12. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/38140922>
18. Rašić M, Tropčić M, Karlović P, Gabrić D, Subašić M, Knežević P. Detection and Segmentation of Radiolucent Lesions in the Lower Jaw on Panoramic Radiographs Using Deep Neural Networks. *Medicina* [Internet]. 2023 Dec 9;59(12). Available from: <http://dx.doi.org/10.3390/medicina59122138>
19. Fukumura Y, Kuroda M, Yoshida S, Nakamura Y, Nakamitsu Y, Al-Hammad WE, et al. Characteristic Mean Kurtosis Values in Simple Diffusion Kurtosis Imaging of Dentigerous Cysts. *Diagnostics (Basel)* [Internet]. 2023 Dec 7;13(24). Available from: <http://dx.doi.org/10.3390/diagnostics13243619>
20. Albagieh H, Aldosari M, Alkathlan A, Alfawaz N, Almutairi M. Radiolucent lesions that may resemble inflammatory periapical lesions: A review article. *Saudi Dent J*. 2023 Dec;35(8):916–9.
21. Steffes K, Manasse J. Maxillary Cystic Ameloblastic Fibroma in a Dalmatian Mix. *J Vet Dent*. 2023 Dec 17;8987564231219100.
22. Al-Shayyab MH, Aldweik RH, Alzyoud M, Qteish A. Multiple dentigerous cysts in a patient showing features of Gorlin-Goltz syndrome: A case report. *Int J Surg Case Rep*. 2023 Dec 13;114:109156.