

# A Retrospective Analysis of Trends in Oral and Maxillofacial Pathology Lesions: An Institutional Archival Study

Tajindra Singh Saluja<sup>1</sup> Ish Paul Singh<sup>1</sup> Adreana G. Creanga<sup>2</sup> Sonam Khurana<sup>3</sup>

<sup>1</sup> Department of Oral and Maxillofacial Pathology, Baba Jaswant Singh Dental College Hospital and Research Centre, Ludhiana, Punjab, India

<sup>2</sup> Department of Dental Diagnostic Science, Division of Oral and Maxillofacial Radiology, Rutgers School of Dental Medicine, Newark, New Jersey, United States

<sup>3</sup> Department of Oral and Maxillofacial Pathology, Radiology and Medicine, New York University College of Dentistry, 345 East, New York, United States

**Address for correspondence** Tajindra Singh Saluja, MDS, PhD., Department of Oral and Maxillofacial Pathology, Baba Jaswant Singh Dental College Hospital and Research Centre, Ludhiana 141010, Punjab, India (e-mail: salujatajindersingh@gmail.com).

Int J Health Environ Res 2023;1:60–64.

## Abstract

**Introduction** Oral mucosal pathology encompasses a wide spectrum of diseases. Evaluating the prevalence of oral diseases is essential for assessing their distribution among different age groups, identifying high-risk populations, and determining the statistical view of population. This study aimed to determine the prevalence and demographic distribution of histologically proven oral lesions.

**Materials and Methods** This retrospective study was performed on the departmental archives. Information on age, gender, and histopathological diagnosis was collected and analyzed. In cases with discrepancies, histological slides were reviewed. Cases with incomplete information or where the diagnosis was not given due to insufficient tissue samples were excluded. Data analysis was carried out to calculate frequency and percentages. Descriptive statistics were used to outline study characteristics.

**Results** A total of 576 cases with oral lesions were histopathologically diagnosed from 2015 to 2022. The mean age was 38.76 years (standard deviation  $\pm$  17.84), and a male predominance was observed (male: female -1.2:1). Most common oral lesions were of odontogenic origin (26.38%), followed by soft tissue tumors (22.39%), nonspecific inflammatory lesions (13.7%), and pulpal-periapical diseases (9.7%).

**Conclusion** Oral lesions can present a spectrum of different pathoses ranging from reactive lesions to benign tumors and malignancies. Benign epithelial and mesenchymal tumors and cysts and tumors of odontogenic origins are the most frequently encountered lesions.

## Keywords

- ▶ oral pathology
- ▶ biopsy
- ▶ histopathology
- ▶ retrospective
- ▶ soft tissue tumor
- ▶ odontogenic

## Introduction

Oral and maxillofacial pathology is a diversified dental science specialty that involves study of orodental diseases

and histopathological analysis of biopsied specimens. Conventionally, caries, periodontal diseases, and cancer were considered as oral disorders of primary concern. However, with advancements in dentistry, healthcare professionals

DOI <https://doi.org/10.1055/s-0043-1771472>.  
ISSN XXXX-XXXX.

© 2024. BJS Research Institute. All rights reserved.  
This is an open access article published by Thieme under the terms of the Creative Commons Attribution-NonDerivative-NonCommercial-License, permitting copying and reproduction so long as the original work is given appropriate credit. Contents may not be used for commercial purposes, or adapted, remixed, transformed or built upon. (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)  
Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India

have become more aware of the importance of identifying and treating oral mucosal pathologies. Evaluating the prevalence of all oral diseases is essential for assessing their distribution amongst different age groups, identifying high-risk populations, and determining the statistical aspect of the concerned population. Depending on the population studied, Rajendran<sup>1</sup> reported that oral diseases affect 20 to 50% of the population. This underscores the importance of collecting data on oral lesions in different regions. It also indicates the high incidence of oral diseases that often go unreported. Therefore, the incidence and demographic attributes of oral lesions should be studied to develop awareness among general practitioners, and such statistics could also be used for epidemiological and academic purposes.

The aim of this study was to analyze the distribution of oral lesions diagnosed histopathologically and to evaluate their demographic distribution. Processing of these biopsies was carried out in the Oral Pathology Department of Baba Jaswant Singh Dental College, Hospital and Research Institute, Ludhiana, over a period of 7 years.

## Materials and Methods

In this retrospective study, the data of patients biopsied for oral lesions from 2015 to 2022 was retrieved, and information on age, gender, and histopathological diagnosis was collected and analyzed. Histological slides were reviewed in cases with discrepancies. For each case, descriptive data such as age, gender, and type of lesion were obtained. Gender was classified as male or female. Age was categorized into four groups: children and young adults (1–20 years); adults (21–40 years), middle age (41–60 years), and old age (>60 years). After obtaining preliminary details, cases were categorized as odontogenic lesions, benign and malignant epithelial neoplasm, potentially malignant disorders, soft tissue tumors, bone and vascular lesions, fibro-osseous lesions, giant cell lesions, mucocutaneous diseases, salivary gland lesions, bacterial/viral/mycotic infections, and nonspecific inflammation. Cases without descriptive information and/or with inconclusive diagnoses were excluded.

Data analysis was carried out using Microsoft Excel (2019) to calculate frequency and percentages. Descriptive statistics were used to outline the study characteristics.

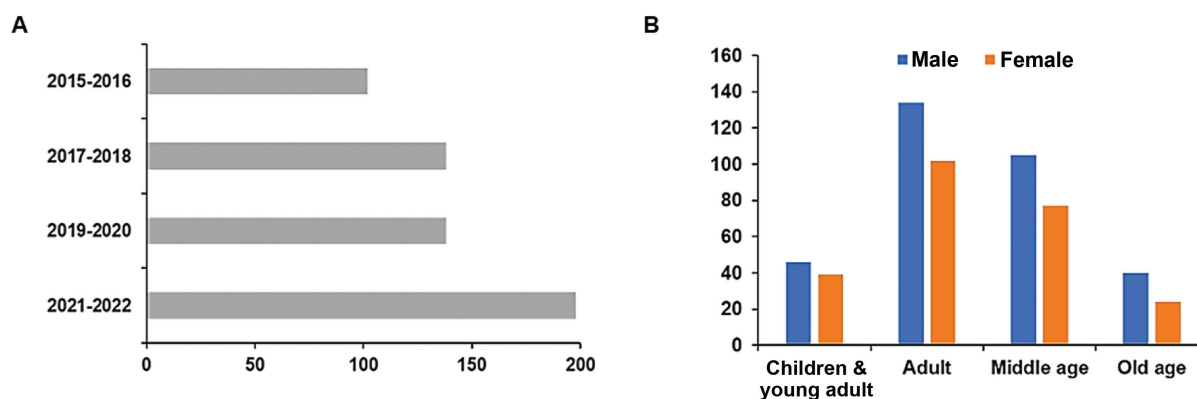
## Results

This retrospective study analyzed a total of 576 cases with oral lesions that were histopathologically diagnosed over a period of 7 years (►Fig. 1A). More than 300 cases were males (55%), and around 265 cases were females (45%). The age of the patients varied from 5 to 90 years, with a mean age of 38.76 years (standard deviation [SD] ± 17.84). In all age groups, male predominance was observed (►Fig. 1B). Most common oral lesions were of odontogenic origin (26.38%), followed by soft tissue tumors (22.39%), nonspecific inflammatory lesions (13.7%), and pulpal-periapical disease (9.7%; ►Fig. 2).

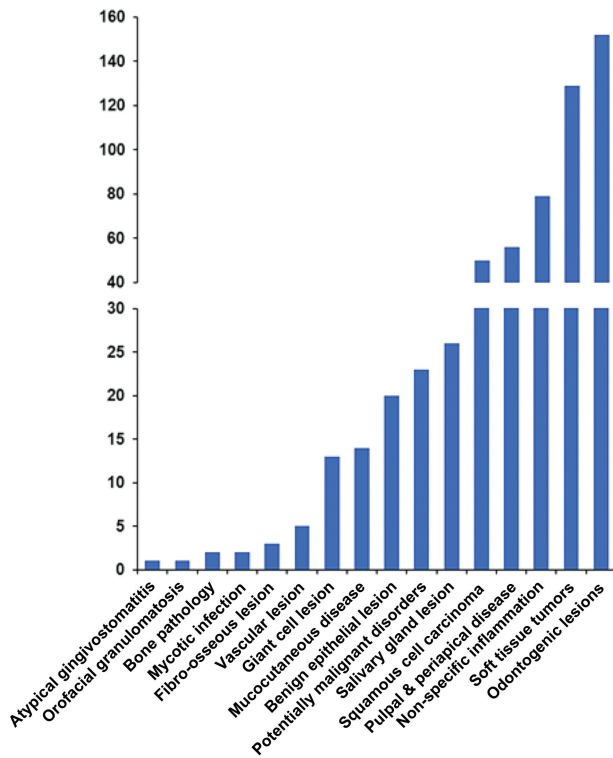
Odontogenic lesions comprised approximately 81% odontogenic cysts and 15.7% odontogenic tumors, while the rest were enlarged and inflamed dental follicles. The most common cystic lesion was radicular cyst (51.2%), followed by odontogenic keratocyst (OKC) (26.82%) and dentigerous cyst (20.3%), while ameloblastoma was the most common odontogenic tumor (45.83%). Unicystic ameloblastoma and adenomatoid odontogenic tumor constituted 25 and 12.5% of odontogenic tumors, respectively. The distribution of odontogenic lesions is depicted in ►Fig. 3 and 4.

Among soft tissue pathologies, only 1 to 2% were malignant, while the remaining 98 to 99% of lesions were benign, with fibroma being the most frequently encountered lesion (50%; ►Fig. 5). About 65.8% cases of fibroma were seen in females and 34.2% in males. In diseases of pulp and periapical tissue, more than 3/4th cases were diagnosed with periapical granuloma, while remaining 1/4th cases were of osteomyelitis. Salivary gland lesions constituted only 4.5% of all cases and mucocele was the most common lesion reported.

Among potentially malignant disorders of oral mucosa, leukoplakia was the most common clinical diagnosis. In few cases of leukoplakia epithelial cell dysplasia was evident. Mild dysplasia was seen in 78% cases, while mild-to-moderate and severe dysplasia was seen in 18 and 4% cases,

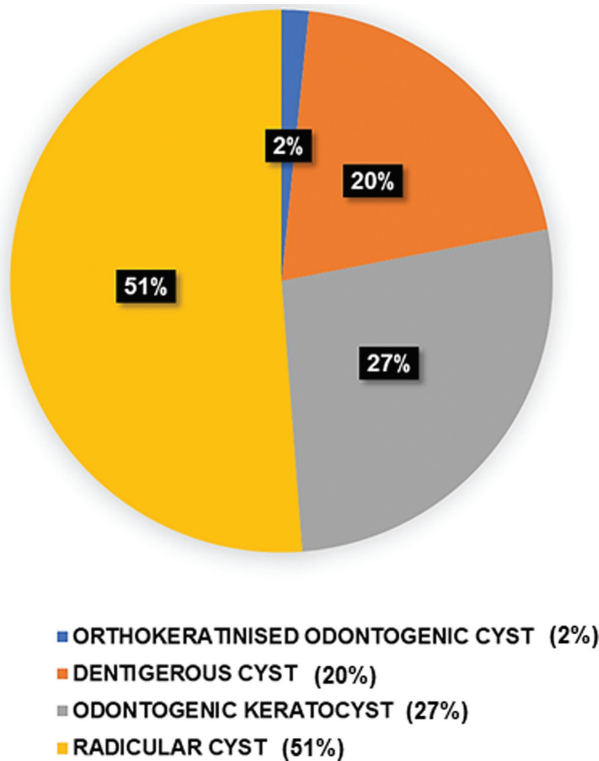


**Fig. 1** (A) Bar graph representation of the total number of oral biopsies reported. (B) Age- and gender-based distribution of cases with oral lesions.

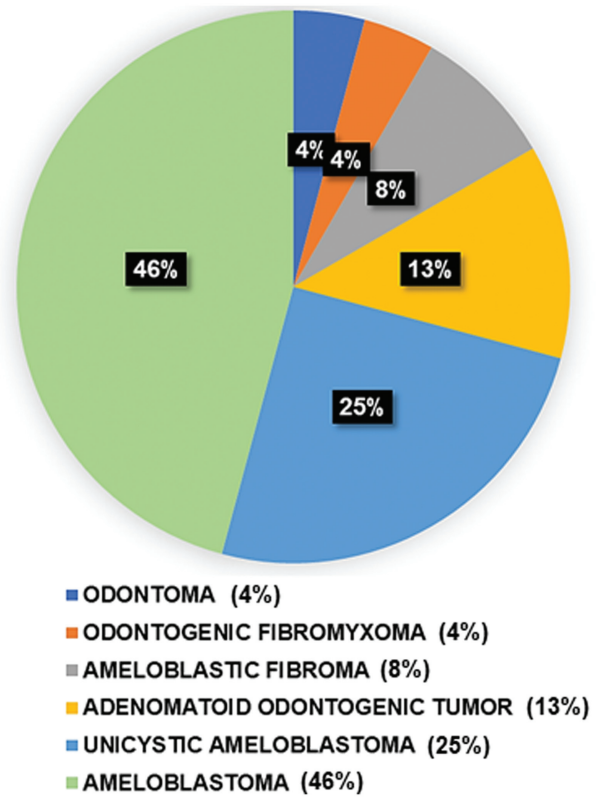


**Fig. 2** Graphic representation of the prevalence of oral lesions according to their category.

respectively. Squamous cell carcinoma (SCC) was the most frequently reported oral malignancy. Eighty-one percent of cases of SCC were seen in males and 19% in females. Maxi-



**Fig. 3** Distribution of different types of odontogenic cysts.



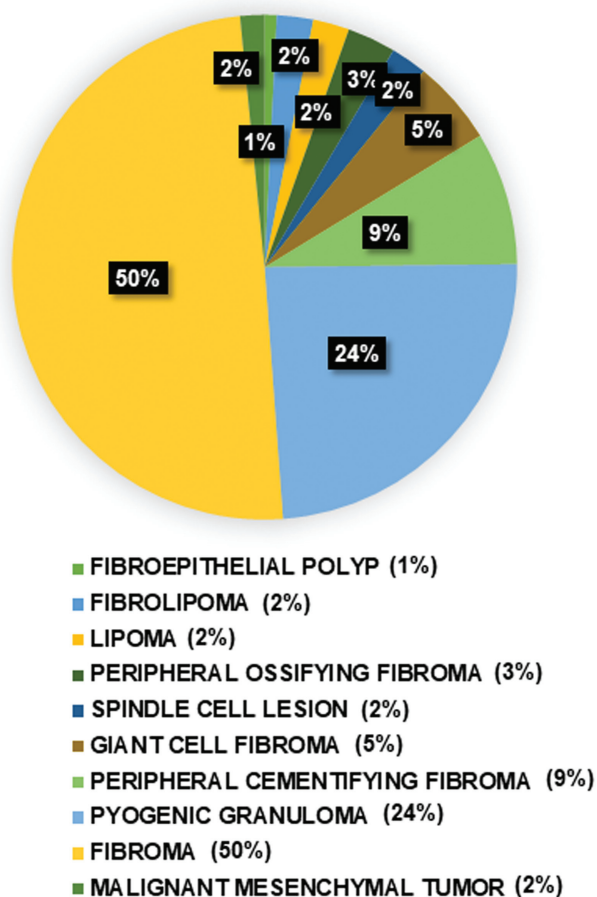
**Fig. 4** Distribution of different types of odontogenic tumors.

num number of SCC cases (44%) were reported between year 2020 and 2022. The well-differentiated histological pattern was evident in 84% of cases, while moderate-poorly differentiated SCC was seen in remaining 16% cases. All cases were habituated to alcohol and/or tobacco use.

Fourteen cases of mucocutaneous lesions were reported, of which 78.6% were oral lichen planus, and 21.4% were pemphigus vulgaris. Most of these cases were reported in females (64.2%), which agree with the literature data.<sup>2</sup> Giant cell lesions constituted 2% of all the cases, of which 62% were peripheral giant cell granuloma and 38% were central giant cell granuloma. We reported only two cases of infectious pathology and both were mucormycosis reported in the year 2021. Their occurrence was linked with coronavirus disease 2019 infection, where excess corticosteroid use appears to be the underlying cause.<sup>3</sup> Only one case of atypical gingivostomatitis and orofacial granulomatosis was reported.

### Discussion

The total number of oral biopsies reported yearly in the past 7 years was approximately 80. Our data demonstrated a high prevalence of oral lesions in males of all age groups. Gender-based data obtained on group analysis was in agreement with the literature. There are few Indian studies compared to the international literature,<sup>4-9</sup> which have evaluated the prevalence of oral lesions in rural, semiurban, or urban areas. In a study reported from Vidisha (Central India), the prevalence of oral lesions was 8.4%.<sup>10</sup> In a similar study from Sangli (Maharashtra), the prevalence of oral lesions was reported to



**Fig. 5** Distribution of different types of soft tissue tumors.

be 2.5%.<sup>11</sup> In both studies, males were affected more than females. Majority of these studies evaluating oral lesions have focused predominantly either on specific age groups or on a particular category, such as odontogenic cysts, odontogenic tumors, potentially malignant disorders, reactive lesions, and oral cancer.<sup>12–20</sup> Few international studies have also delineated the frequency and spectrum of biopsied oral lesions. Their results are almost in consensus.<sup>5–7,21–26</sup> Lesions of odontogenic origin, soft tissue tumors, and benign epithelial or mesenchymal tumors were their most frequent finding. In this study, we observed similar results.

Odontogenic cyst and tumor group constituted the most commonly reported lesions in our analysis. In a study by Kambalimath et al,<sup>13</sup> prevalence of odontogenic cysts was reported over a 10-year time period. Radicular cyst (48.67%) was their most frequent finding. In a similar study, Savithri et al<sup>18</sup> noted radicular cyst as the most common cyst, followed by OKC and dentigerous cyst. We also found radicular cyst, OKC, and dentigerous cyst to be the most commonly reported odontogenic cyst. Only one case of OKC in our study reported recurrence. The frequency of odontogenic tumors in our study was 15.78%, of which approximately 46% were ameloblastoma. The plexiform type of ameloblastoma was the most common histopathological variant similar to that reported by Chawla et al,<sup>27</sup> Patsa et al,<sup>28</sup> and Nalabolu et al.<sup>29</sup> However, Adebiji

et al,<sup>30</sup> Goh et al,<sup>31</sup> and Milman et al<sup>32</sup> reported higher rates of follicular ameloblastomas.

Soft tissue tumors constituted the second most common encountered oral pathology. Most common soft tissue tumor in this study was fibroma, also known as focal fibrous hyperplasia, and was seen predominantly in females. The mean age of fibroma was 44.34 years (SD ± 17.51). It usually occurs in response to local irritation or trauma. This finding is unsurprising as the oral cavity is frequently subjected to several microtraumatic stimuli and irritants such as faulty brushing, fractured teeth, calculus, malocclusion, and related dental problems and prosthesis. Following fibroma, pyogenic granuloma was the second most common soft tissue lesion seen with a mean age of 38.9 years (SD ± 19.48) and slight male predominance (1.2:1). This is in contrast to literature<sup>1,20,29</sup> where female predilection is usually reported.

A report by Mehrotra et al<sup>33</sup> assessed the prevalence of oral premalignant and malignant lesions in a tertiary hospital in Allahabad (North India). As tobacco usage is rampant in several states of India,<sup>34</sup> mucosal pathologies associated with its use are frequently seen. It is the most common cause of oral premalignant lesions and cancer. Oral cancer poses a major health problem in developing countries like India. According to the GLOBOCAN report, lip and oral cavity cancer is the second most common cancer affecting both males and females in India.<sup>35</sup> It is invariably preceded by premalignant lesions or conditions such as leukoplakia, erythroplakia, lichen planus, and oral submucous fibrosis. These lesions frequently show different degrees of dysplasia microscopically. In our study, the overall prevalence of dysplasia in potentially malignant disorders of oral mucosa was 0.41 and oral cancer was 0.083, which differs from other studies.<sup>10</sup> The reason for this discrepancy could be due to geographic variation and/or frequency of tobacco usage.<sup>33,34</sup> Reported prevalence of oral lichen plus varies from 0.02 to 2.6%.<sup>2,9,19</sup> In our study, it was 0.019, and none of the cases showed dysplastic features.

Vascular, fibro-osseous, infectious pathology, and bone lesions constituted less than 1% of all reported cases.

## Conclusion

Odontogenic lesions, benign epithelial and mesenchymal tumors, premalignant lesions and conditions, and oral cancer are usually the most frequently encountered oral lesions. Histopathological analysis remains the gold standard for diagnosing these lesions. As clinicopathological correlation is often essential for recognizing specific lesions and developing differential diagnoses, a comprehensive clinical and/or radiological knowledge of these lesions is essential for dental practitioners for their early detection, diagnosis, and intervention.

Since collected data was based on review of records and data was not originally entered with the aim of conducting research, some information may be missing. Despite this limitation of using retrospective data the potential of our data with respect to the distribution of oral pathologies in

our population emphasizes the need to understand the prevalence of oral lesions and their timely diagnosis.

#### Conflict of Interest

None declared.

#### References

- Rajendran R. Shafer's Textbook of Oral Pathology. 6th ed. Noida, India: Elsevier; 2009:126–127
- Krupaa RJ, Sankari SL, Masthan KM, Rajesh E. Oral lichen planus: an overview. *J Pharm Bioallied Sci* 2015;7(Suppl 1):S158–S161
- Singh AK, Singh R, Joshi SR, Misra A. Mucormycosis in COVID-19: a systematic review of cases reported worldwide and in India. *Diabetes Metab Syndr* 2021;15(04):102146
- Jorge Júnior J, de Almeida OP, Bozzo L, Scully C, Graner E. Oral mucosal health and disease in institutionalized elderly in Brazil. *Community Dent Oral Epidemiol* 1991;19(03):173–175
- Ikeda N, Handa Y, Khim SP, et al. Prevalence study of oral mucosal lesions in a selected Cambodian population. *Community Dent Oral Epidemiol* 1995;23(01):49–54
- Espinoza I, Rojas R, Aranda W, Gamonal J. Prevalence of oral mucosal lesions in elderly people in Santiago, Chile. *J Oral Pathol Med* 2003;32(10):571–575
- Shulman JD, Beach MM, Rivera-Hidalgo F. The prevalence of oral mucosal lesions in U.S. adults: data from the Third National Health and Nutrition Examination Survey, 1988-1994. *J Am Dent Assoc* 2004;135(09):1279–1286
- Crivelli MR, Domínguez FV, Adler IL, Keszler A. [Frequency and distribution of oral lesions in elderly patients]. *Rev Asoc Odontol Argent* 1990;78(01):55–58
- McCartan BE, Healy CM. The reported prevalence of oral lichen planus: a review and critique. *J Oral Pathol Med* 2008;37(08):447–453
- Mehrotra R, Thomas S, Nair P, et al. Prevalence of oral soft tissue lesions in Vidisha. *BMC Res Notes* 2010;3:23
- Byakodi R, Shipurkar A, Byakodi S, Marathe K. Prevalence of oral soft tissue lesions in Sangli, India. *J Community Health* 2011;36(05):756–759
- Sriram G, Shetty RP. Odontogenic tumors: a study of 250 cases in an Indian teaching hospital. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2008;105(06):e14–e21
- Kambalimath DH, Kambalimath HV, Agrawal SM, et al. Prevalence and distribution of odontogenic cyst in Indian population: a 10 year retrospective study. *J Maxillofac Oral Surg* 2014;13(01):10–15
- Nuñez-Urrutia S, Figueiredo R, Gay-Escoda C. Retrospective clinicopathological study of 418 odontogenic cysts. *Med Oral Patol Oral Cir Bucal* 2010;15(05):e767–e773
- Bansal S, Desai RS, Shirsat P, Prasad P, Karjodkar F, Andrade N. The occurrence and pattern of ameloblastoma in children and adolescents: an Indian institutional study of 41 years and review of the literature. *Int J Oral Maxillofac Implants* 2015;44(06):725–731
- Mishra SS, Kale LM, Sodhi SJ, Mishra PS, Mishra AS. Prevalence of oral premalignant lesions and conditions in patients with tobacco and tobacco-related habits reporting to a dental institution in Aurangabad. *J Indian Acad Oral Med Radiol* 2014;26(02):152–157
- Tandon A, Bordoloi B, Jaiswal R, Srivastava A, Singh RB, Shafique U. Demographic and clinicopathological profile of oral squamous cell carcinoma patients of North India: a retrospective institutional study. *SRM Journal of Research in Dental Sciences* 2018;9(03):114–118
- Savithri V, Suresh R, Janardhanan M, Aravind T, Mohan M. Prevalence of odontogenic cysts and its associated factors in South Indian population. *J Oral Maxillofac Pathol* 2020;24(03):585
- Varghese SS, George GB, Sarojini SB, et al. Epidemiology of oral lichen planus in a cohort of South Indian population: a retrospective study. *J Cancer Prev* 2016;21(01):55–59
- Singh S, Singh J, Chandra S, Samadi FM. Prevalence of oral cancer and oral epithelial dysplasia among North Indian population: a retrospective institutional study. *J Oral Maxillofac Pathol* 2020;24(01):87–92
- Tay AB. A 5-year survey of oral biopsies in an oral surgical unit in Singapore: 1993-1997. *Ann Acad Med Singap* 1999;28(05):665–671
- Dimba EA, Gichana J, Limo AK, Wakoli KA, Chindia ML, Awange DO. An audit of oral diseases at a Nairobi centre, 2000-2004. *Int Dent J* 2007;57(06):439–444
- Jones AV, Franklin CD. An analysis of oral and maxillofacial pathology found in adults over a 30-year period. *J Oral Pathol Med* 2006;35(07):392–401
- Monteiro LS, Albuquerque R, Paiva A, de la Peña-Moral J, Amaral JB, Lopes CA. A comparative analysis of oral and maxillofacial pathology over a 16-year period, in the north of Portugal. *Int Dent J* 2017;67(01):38–45
- Al-Khateeb T, Ababneh K. Oral pyogenic granuloma in Jordanians: a retrospective analysis of 108 cases. *J Oral Maxillofac Surg* 2003;61(11):1285–1288
- Jones AV, Craig GT, Franklin CD. Range and demographics of odontogenic cysts diagnosed in a UK population over a 30-year period. *J Oral Pathol Med* 2006;35(08):500–507
- Chawla R, Ramalingam K, Sarkar A, Muddiah S. Ninety-one cases of ameloblastoma in an Indian population: a comprehensive review. *J Nat Sci Biol Med* 2013;4(02):310–315
- Patsa S, Jadav RB, Halder GC, Ray JG, Datta S, Deb T. Demographic and histopathological variation of ameloblastoma: a hospital-based study. *J Oral Maxillofac Pathol* 2016;20(02):230–233
- Nalabolu GRK, Mohiddin A, Hiremath SKS, Manyam R, Bharath TS, Raju PR. Epidemiological study of odontogenic tumours: an institutional experience. *J Infect Public Health* 2017;10(03):324–330
- Adebiyi KE, Ugboko VI, Omoniyi-Esan GO, Ndukwe KC, Oginni FO. Clinicopathological analysis of histological variants of ameloblastoma in a suburban Nigerian population. *Head Face Med* 2006;2:42
- Goh YC, Siriwardena BSMS, Tilakaratne WM. Association of clinicopathological factors and treatment modalities in the recurrence of ameloblastoma: analysis of 624 cases. *J Oral Pathol Med* 2021;50(09):927–936
- Milman T, Ying GS, Pan W, LiVolsi V. Ameloblastoma: 25 year experience at a single institution. *Head Neck Pathol* 2016;10(04):513–520
- Mehrotra R, Pandya S, Chaudhary AK, Kumar M, Singh M. Prevalence of oral pre-malignant and malignant lesions at a tertiary level hospital in Allahabad, India. *Asian Pac J Cancer Prev* 2008;9(02):263–265
- Singh A, Ladusingh L. Prevalence and determinants of tobacco use in India: evidence from recent Global Adult Tobacco Survey data. *PLoS One* 2014;9(12):e114073
- Sung H, Ferlay J, Siegel RL, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin* 2021;71(03):209–249