

## Pattern of Distribution of Biopsied Oral Lesions In A Tertiary Health Care Centre – A 10 Year Retrospective Study

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### Abstract

**Background:** Aim of this study is to investigate the relative prevalence of different types of oral and maxillofacial biopsied lesions in a tertiary health care centre in south Kerala.

**Materials and Methods:** Biopsy records of all oral lesions from the archives of the Department of Oral Pathology and Microbiology, Government Dental College, Thiruvananthapuram, from the year 2006 to 2015 were retrospectively analysed. Descriptive statistical analysis was performed using the computer software, Statistical Package for Social Sciences (SPSS).

**Results:** A total of 4013 cases were reviewed. Out of these 2058 (51.3%) were males and 1955(48.7%) were females. Regarding the diagnostic categories, the largest numbers of cases were from tumour and tumour like lesions followed by inflammatory and cystic category.

Mucocele was the most common inflammatory lesion followed by irritation fibroma. Among cystic lesions periapical cyst was the most common followed by dentigerous cyst.

**Conclusions:** The present study reviewed the prevalence and characteristics of oral lesions in a tertiary dental health-care setting in southern Kerala. The difference in reported frequency of oral lesions from other studies could be due to geographic or ethnic difference. The prevalence and characteristics of the lesions prevailing in this population in this geographic area, will be useful for the dentist in diagnosing and managing these lesions appropriately.

**Keywords:** Dentigerous cyst, Mucocele, Odontogenic tumor, Retrospective, Tumor and tumor like lesions

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### I. Introduction

Despite the advancement in medical research field in the past 10 years, there has been an increase in the incidence of oral diseases which may be attributed to the lifestyle changes. When comparing the frequency of oral lesions in different population, major and minor differences regarding to age, gender, site and geographic distributions would be found[1]. Different sites in oral cavity show predilection for different types of lesions[2]. Interaction between genetic, epigenetic and environmental factors in the oral mucosa leads to the formation of a lesion[3]. These interactions are different in different diseases. Of the variable factors involved in the etiopathogenesis of a lesion, site is an important one[4]. Knowledge of site predilection for different diseases will be useful in acknowledging the factors responsible for the same[5,6]. Similarly a knowledge about the relative frequency of oral lesions in a geographic location helps in better control of diseases and initiation of preventive measures. Retrospective studies to assess the distribution of oro-mucosal lesions are thus helpful and important in estimating the prevalence of a disease in the population and identifying high risk sub-population and help in preventive and curative services.

The purpose of this study was to investigate the relative prevalence of different types of oral and maxillofacial biopsied lesions in our population and to review the literature on this subject. Here we reviewed all the histopathology records during the year 2006 to 2015 in a tertiary health care centre. The information obtained from this review will help in further epidemiological studies and to know the predilection of different oral and maxillofacial diseases in a given population and geographical area. The age, sex, incidence, prevalence and the site of occurrence of common pathologies will also be reviewed. This study will throw some light

regarding the prevalence and characteristics of the lesions prevailing in this population in this geographic area, which in turn will be useful for the dentist in diagnosing and managing these lesions appropriately.

## **II. Material And Methods**

A hospital based retrospective descriptive study was carried out from 1st January 2006 till 31st December 2015 at Govt Dental College, Trivandrum, Kerala. Only the biopsies performed in the hospital were considered. A total of 4013 biopsy reports were studied. Distribution and prevalence of oro-mucosal lesions among the data were analyzed using SPSS software package version .Biopsies was grouped under 6 categories. Recurrent lesions were counted as a single case to avoid reduplication.

### 1) Inflammatory/reactive lesions,

Mucocele, inflammatory fibrous hyperplasia, irritation fibroma, inflammatory papillary hyperplasia, peripheral giant cell granuloma, pulp polyp, granulation tissue, and gingival hyperplasia,

### 2) Cystic lesions

Periapical cysts, residual cyst, dentigerous cyst, eruption cyst, lateral periodontal cyst, and soft tissue cyst.

### 3) Tumour and tumour like lesions

#### 3a) Epithelial cancer and precancerous lesion

Leukoplakia, oral submucous fibrosis, verrucous hyperplasia, verrucous carcinoma, squamous papilloma, squamous cell carcinoma

#### 3b) Connective tissue tumours

Fibroma, neurofibroma, pyogenic granuloma (lobular capillary hemangioma), hemangioma, lipoma, lymphangioma, leomyoma

#### 3c) Odontogenic tumours

Odontoma, ameloblastoma, odontogenic keratocyst, adenomatoid odontogenic tumour, calcifying epithelial odontogenic tumour, odontogenic myxoma, odontogenic fibroma, and malignant tumours

#### 3d) Salivary gland tumours

Pleomorphic adenoma, mucoepidermoid carcinoma, adenoid cystic carcinoma, acinic cell carcinoma

### 4) Bone pathologies, fibrous dysplasia, Central giant cell granuloma, osteoma, cherubim, and osteosarcoma.

### 5) Others

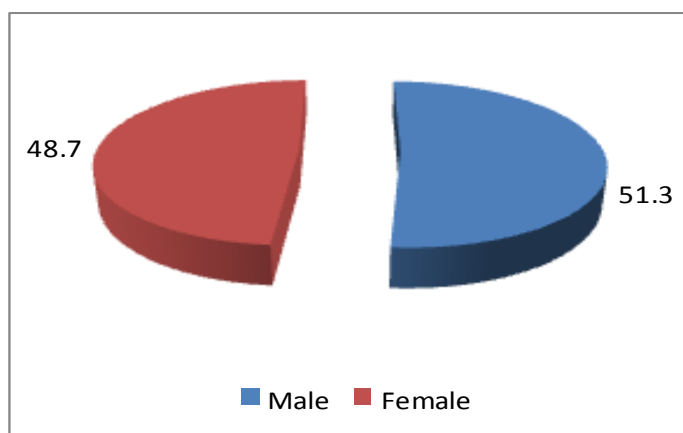
Autoimmune diseases, dental follicle and other tooth-related pathologies.

## **III. Statistical Analysis**

Data were recorded and analyzed by descriptive statistics using the Statistical Package for Social Sciences statistical package

## **IV. Results**

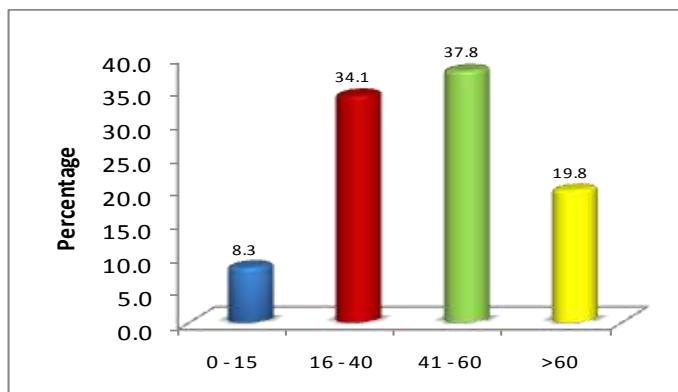
The number of patients studied were 4013, excluding patients with incomplete records or those who had more than one biopsy at the same time. Out of 4013 patients 2058 (51.3%) were males and 1955(48.7%) were females (Fig 1).



**Fig 1.** Percentage distribution of the sample according to sex

8.3% (333 patients) of the study subjects were in the age group of 0 to 15 years, 34.1% (1368 patients) were in the age group of 16 to 40 years, 37.8% (1516 patients) were in the age group of 41 to 60 years, 19.8%

(796) patients were above 60 years and rest 41.5% (187 patients) were in the age group of 41 to 80 years ( Fig 2).



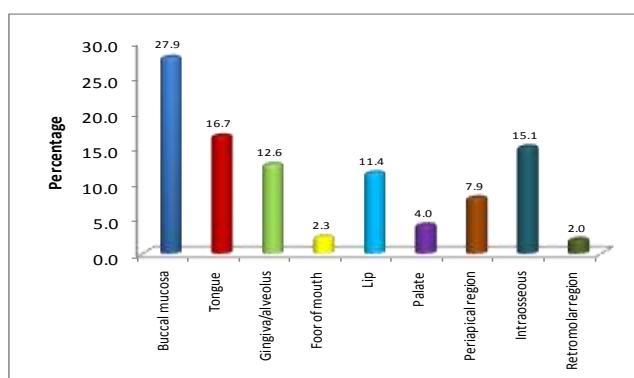
**Fig 2.** Percentage distribution of the sample according to age

There was no mention of habits in the biopsy reports of majority of cases. Out of the total 4013 biopsies, 27.9% (1118) were taken from buccal mucosa, 16.7% ( 670) were taken from tongue,12.6%(507) from gingiva/alveolus ,2.3% (94) from floor of mouth,11.4%(459)were taken from the lip,4% (162) from palate, 7.9%(317) from periapical region.15.1%(607) from intraosseous region 2% (79) from retromolar region. Regarding the diagnostic categories, the largest number of cases was from tumour and tumour like lesions followed by inflammatory and cystic category. Mucocele was the most common inflammatory lesion followed by irritation fibroma. Among cystic lesions periapical cyst was the most common followed by dentigerous cyst.( Table 1)

HPR	Count	Percent
Inflammatory/reactive lesions	816	20.3
Cystic lesions	485	12.1
Tumour and tumour like lesions	2394	59.7
Bone lesions	131	3.3
Others	187	4.7

**Table1:** Percentage distribution of the sample according to Histopathology report (HPR)

Buccal mucosa was the most common site of oral lesions followed by tongue and gingival. Mandible was the most common site for intraosseous lesions.( Fig 3) . Year wise distribution of all lesions based on histopathology report is shown in table 2 and 3.



**Fig 3:** Percentage distribution of the sample according to site

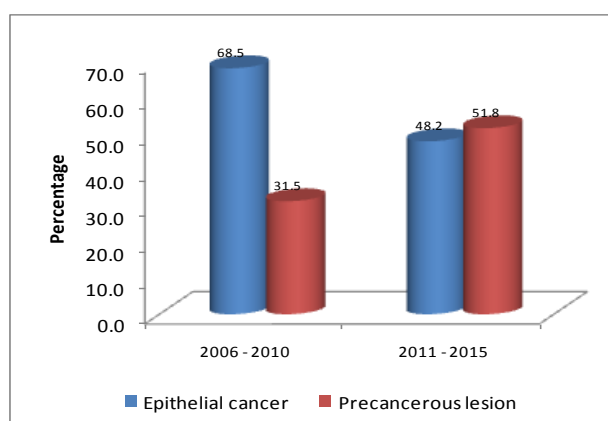
Year	Inflammatory/ reactive lesions	Cystic lesions	Tumour and tumour like lesions	Bone lesions	Others	$\chi^2$	P
2006 – 2010	316 (18.4)	158 (9.2)	1060 (61.6)	79 (4.6)	108 (6.3)	61.81**	0.000
2011 – 2015	500 (21.8)	327 (14.3)	1334 (58.2)	52 (2.3)	79 (3.4)		

**Table 2:** Year wise distribution of the sample based on HPR

Year	Inflammatory/ reactive lesions	Cystic lesions	Tumor and tumour like lesions	Bone lesions	Others	$\chi^2$	p
2006	74 (20.9)	10 (2.8)	243 (68.6)	5 (1.4)	22 (6.2)	225.5**	0.000
2007	58 (18.1)	14 (4.4)	214 (66.9)	14 (4.4)	20 (6.3)		
2008	77 (22.5)	13 (3.8)	192 (56.1)	20 (5.8)	40 (11.7)		
2009	46 (13.1)	76 (21.7)	202 (57.5)	20 (5.7)	7 (2)		
2010	61 (17.2)	45 (12.7)	209 (59)	20 (5.6)	19 (5.4)		
2011	110 (24.5)	57 (12.7)	257 (57.2)	12 (2.7)	13 (2.9)		
2012	110 (24)	58 (12.7)	265 (57.9)	12 (2.6)	13 (2.8)		
2013	75 (18.2)	63 (15.3)	250 (60.5)	7 (1.7)	18 (4.4)		
2014	81 (18)	78 (17.3)	267 (59.2)	6 (1.3)	19 (4.2)		
2015	124 (23.8)	71 (13.6)	295 (56.6)	15 (2.9)	16 (3.1)		

**Table 3:** Year wise distribution of all lesions

Out of 2394 tumour and tumour like lesions 1316 cases were epithelial cancer and precancerous lesion in which epithelial cancer (49.5%) outnumbered the precancerous lesion (37.2%) . But during the year 2011-2015 there was an increase in the incidence of precancerous lesion and decrease in the incidence of epithelial cancer compared to the year 2006-2010 as shown in fig 4.



**Fig 4:** Comparison of distribution of epithelial cancer and precancerous lesion over 5 year time period

The most common odontogenic tumour was ameloblastoma which constituted 68.9% of odontogenic tumours in the year 2006-10 and 55.8% in the year 2011-15 .KCOT formed the second most common tumour, comprising 31.3% of odontogenic tumours in the year 2006-11 and 44.8% in the year 2011-15. The year wise distribution of ameloblastoma and KCOT are shown in fig 5. and Table 4

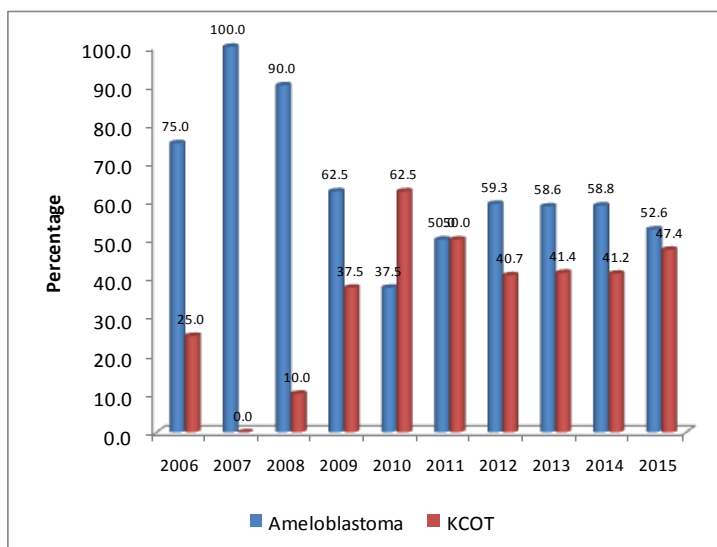


Fig 5: Comparison of distribution of Ameloblastoma and KCOT over 5 year time period

Year	Epithelial cancer and precancerous lesion		Odontogenic tumours		$\chi^2$	P
	Count	Percent	Count	Percent		
2006 – 2010	667	92.0	58	8.0	30.37**	0.000
2011 – 2015	849	82.9	175	17.1		

Table 4: Comparison of distribution of Ameloblastoma and KCOT over 5 year time period

### V. Discussion

Reactive lesions of the oral cavity are non-neoplastic proliferations which clinically resembles benign neoplastic proliferation[7]. In the present study mucocele (47.3%) was the most common reactive lesion. It occurred in 1<sup>st</sup> and 2<sup>nd</sup> decade of life and showed a male predilection. Lower lip was the most common site. These findings are similar to other studies reported by Skinner et al. and Das and Das et al. The mechanism of formation of the mucocele is still not totally clear; however, from the history given a traumatic etiology rather than an obstructive phenomenon was seen commonly. The most frequent occurrence of the mucocele in the lateral aspect of the lower lip, a trauma-prone site in the present study also supports the role of trauma as an etiologic factor either in the form of sharp tooth cusp or biting habit where the psychological stress appeared as an initiating factor for the biting trauma. The greater number and density of salivary glands in the lower lip may also play a role in the predilection for mucocele development in the lower lip[8]. The second most common inflammatory or reactive lesion in our study was irritation fibroma (35.6%). This incidence is comparable to that reported by Naderi et al[7]. It was more prevalent in males and buccal mucosa was most commonly affected. In this study we have found that periapical cyst (62%) of inflammatory origin is the most common odontogenic cyst compared to dentigerous cyst (34%) which is developmental in origin. This is in accordance with the study conducted by Donoghue et al in the South Indian population over a period of 10 years[9]. Our results may have influenced by our redefinition of odontogenic keratocysts as keratocystic odontogenic tumours, which has an impact on the frequency rate of odontogenic cyst diagnosis. Periapical cyst showed a predilection for maxilla whereas posterior mandible was the favourable site for dentigerous cyst in our study. Altogether maxilla was most commonly affected by odontogenic cysts, which are in consistent with the findings of Escobar et al[10] but in conflict with those of other studies by Meningaud et al[11] and Koseoglu et al[12].

The periapical cyst also known as inflammatory cyst arises as a result of an inflammatory focus, especially due to pulpal infection after dental caries. Periapical cysts were more common in the second and third decades of life consistent with the findings of Souza et al[13]. In agreement with other studies periapical cysts were more prevalent among males. The male predominance of periapical cysts might be related to the fact that men are more likely to neglect their oral hygiene. With respect to the site, it is interesting that most of the periapical cysts were situated in the upper anterior zone which may be attributed to a greater frequency of trauma in the anterior maxillary region.

The dentigerous cyst is a developmental cyst that encloses the crown of an unerupted tooth by expansion of its follicle and is attached to its neck. Most of them were diagnosed in males. Daley et al[14].suggested that this might be due to a smaller jaw size and a greater trend for prophylactic extraction of

third molars in females. The posterior mandibular region is the common site of the lesion, followed by the anterior maxilla which is coinciding with our results. According to Jones et al[15]. the frequency of dentigerous cysts at these sites can be explained by the fact that the lower third molars and upper canines are the most commonly impacted teeth. Odontogenic tumours are derived from epithelial, ectomesenchymal and/or mesenchymal elements of the tooth-forming apparatus. These lesions range from hamartomatous to benign neoplasm to malignant tumours with metastatic potential[16]. They are found exclusively within the maxillofacial skeleton (intraosseous) or in the gingiva overlying tooth-bearing areas or alveolar mucosa in edentulous regions.

In our study the odontogenic tumour constituted 8% of the total tumour and tumour like lesions of oral cavity from the year 2006-2010 and 17.1% of the total cases from the year 2011-2015. The most common odontogenic tumour in this study was ameloblastoma, similar to other studies from Asian[17,18] and African [19,20] countries. It constituted 68.9% of odontogenic tumours in the year 2006-10 and 53.86% in the year 2011-15. After the inclusion of odontogenic keratocysts as KCOT in 2005 WHO classification, the prevalence of odontogenic tumours has increased. KCOT formed the second most common tumour, comprising 27% of odontogenic tumours in the year 2006-11 and 44% in the year 2011-15. In this study, odontoma is in the third position following ameloblastoma and KCOT, with a frequency of occurrence of 2.1% in the year 2006-2010 and 1% in the year 2010-2015. The lower prevalence of odontoma in the Asian and African population may be due to the lack of routine dental care as these tumours remain unnoticed for years. Moreover, after surgical removal these tumours might not be sent for histopathological examination. A slight male predilection (male: female = 1.3:1) of odontogenic tumours was noticed in this study. This is in concordance with other studies from China,[17,18] Australia[21] and another study from India[22] Studies conducted in Brazilian population showed a female predilection. This possibly discloses a gender difference among different populations. Mandible was the most common jaw affected which is similar to other studies from Asia[17,23] and Africa.<sup>19</sup>

In our study out of 2394 tumour and tumour like lesions 1316 cases were epithelial cancer and precancerous lesion in which epithelial cancer (49.5%) outnumbered the precancerous lesion (37.2%). But during the year 2011-2015 there was an increase in the incidence of precancerous lesion and decrease in the incidence of epithelial cancer compared to the year 2006-2010. This difference in pattern of occurrence may be due to the increased awareness among patients and advanced diagnostic aids which helps in early detection of premalignant lesion and thereby prevent progression towards cancer. Oral squamous cell carcinoma was the most common malignant epithelial lesion in our study. It showed a predilection for elderly males during the fifth to eighth decades of life most probably because more men than women indulge in high-risk habits such as tobacco and alcohol abuse. The probability of developing oral SCC increases with the period of exposure to risk factors, and increasing age adds the further dimension of age-related mutagenic and epigenetic changes. It rarely occurs in young patients under 40 years (1-6%). The reason is that even when young patients have indulged in the risk factors of tobacco and alcohol; it is for considerably shorter periods compared with the older age group to induce malignant transformation[24]. However, the incidence of oral SCC in non-habituate young persons under the age of 40 is increasing. In the present study the incidence of SCC in young non-habituate patients has increased from 0.3% in the year 2006-10 to 1.4% in the year 2011-15. Other factors should be investigated in order to explain SCC etiology in these patients, such as genetic predisposition (Fanconi's anaemia, xeroderma pigmentosa, KID 'keratosis, ichthyosis and deafness' syndrome), previous viral infections, immunodeficiency states, occupational exposure to carcinogenic elements, socioeconomic condition, and oral hygiene and trauma[25].

In our study the most common site of occurrence of SCC was the buccal mucosa followed by tongue. The reason behind this may be that in our population majority of patients keep tobacco in the vestibular region and under the tongue for long period of time while doing tedious work. Trauma induced by the sharp cusps of teeth also contributes to the increased incidence of SCC on the lateral border of tongue. Floor of the mouth was the next commonly affected site by SCC because they are lined by thin non-keratinised epithelium. Not only do carcinogens readily penetrate this thin epithelium to reach the progenitor cell compartment, but carcinogens, particularly tobacco products and alcohol in solution, constantly accumulate in the floor of the mouth and bathe the tissues of the floor of the mouth and the ventrum of tongue[26].

Among connective tissue tumours Pyogenic granuloma (Lobular capillary hemangioma) was the most common (68%) followed by fibroma. Most of the lesion occurred in gingiva and showed a female predilection with a male: female ratio of 1:3. The location of pyogenic granuloma on the anterior gingiva makes it easily noticed which contributes to its increased prevalence. The etiology of pyogenic granuloma includes local irritants, trauma, calculus and hormonal imbalances which makes it more common in females especially during pregnancy[27]. Bone pathologies contribute to about 4.6% of total cases in the year 2006-2010 and 2.3% of total cases in the year 2011-2015. Fibrous dysplasia was the most common bone pathology in our study showing a female predilection with posterior mandibular region commonly involved.

## VI. Conclusion

The present study reviewed the prevalence and characteristics of oral lesions in a tertiary dental health-care setting in southern Kerala. The difference in reported frequency of oral lesions from other studies could be due to geographic or ethnic difference. Therefore, studies from different population could contribute additional knowledge to the literature and serve as a potential source of information to understand the role of regional or geographic variations. Moreover the prevalence and characteristics of the lesions prevailing in this population in this geographic area, will be useful for the dentist in diagnosing and managing these lesions appropriately .

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