

# Oral Pathological Lesions in the Aegean Region: A 30-Year Retrospective Study

## Ege Bölgesinde Oral Patolojik Lezyonlar: 30 Yıllık Retrospektif Bir Çalışma

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### Keywords

Oral lesions, pathology, prevalence, retrospective study, histology

### Anahtar Kelimeler

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### Abstract

**Objective:** Oral pathological lesions in the mouth vary greatly. However, few studies have evaluated these lesions with long-term data. This study aimed to analyze the demographic parameters (i.e., age, gender, anatomical location, and incidence) of oral pathologies in the Aegean Region.

**Materials and Methods:** In this retrospective study, histopathological reports of 30 years in the Department of Oral Pathology, Faculty of Dentistry, Ege University, were analyzed. Data on sex, age, lesion location, and histopathologic diagnosis were analyzed.

**Results:** The histopathological data of 6,330 patients were evaluated. Most of the pathological oral lesions were osseous lesions (n=3,858), and 2,472 soft tissue pathologies were identified. The posterior mandible was the most common location of these lesions (n=2,011).

**Conclusion:** Determining the variety and frequency of oral pathological lesions at a societal level is important for the management of these lesions.

### Öz

**Amaç:** Ağız içinde görülen oral patolojik lezyonlar geniş bir yelpazeye sahiptir. Bununla birlikte, birkaç çalışma tüm bu lezyonları uzun sürede çok sayıda verilerle değerlendirmiştir. Bu çalışma Ege Bölgesi'ndeki oral patolojilerin demografik parametrelerini (yaş, cinsiyet, anatomik yerleşim ve insidans) incelemeyi amaçlamaktadır.

**Gereç ve Yöntemler:** Bu retrospektif çalışmada Ege Üniversitesi Diş Hekimliği Fakültesi Ağız Patoloji Anabilim Dalı'nda toplanan 30 yıllık histopatolojik raporlar sunulmuştur. Cinsiyet, yaş, lezyonun yeri ve histopatolojik tanı ile ilgili bilgiler analiz edilmiştir.

**Bulgular:** Toplam 6.330 histopatolojik veri değerlendirildi. Ağızdaki patolojik lezyonların çoğu yumuşak doku lezyonlarıydı (n=2.472). Alt çene arka bölge, bu lezyonların en sık yerleşim yeri idi (n=2.011).

**Sonuç:** Bir toplumdaki oral patolojik lezyonların çeşitliliğinin ve sıklığının belirlenmesi bu lezyonların yönetimi açısından önemlidir.

## Introduction

A thorough understanding of the frequency and anatomical distribution of oral pathological lesions is imperative to guide the clinicians through the process of identification and clinical diagnosis of oral lesions.

Evaluation of the demographic distribution of oral lesions and their prevalence in the community is necessary for determination of risk groups and provision of health care services (1).

Histopathological examination is the gold standard to confirm-clinical diagnosis of oral pathology. Early diagnosis and treatment is essential to limit morbidity and improve quality of life. Additionally the accuracy of the preliminary diagnosis is prerequisite for timely and successful management of these cases (2).

Oral pathological lesions constitute a broad-spectrum of lesions presenting with miscellaneous symptoms, findings and prognosis. Various classifications are made by many authors depending on tissue origin, radiographic features or clinical behavior of the lesion (3). Racial, hereditary and geographical factors influence the incidence of oral lesions; further studies are important to evaluate demographic, clinical and epidemiologic characteristics in different populations (4).

The aim of this study is to provide clinical guidance in the diagnosis of oral pathologies thorough evaluation of the data acquired from the management oral pathologies over a period of 30-years. This study aims to analysis, the demographic parameters (age, sex, anatomic location and incidence) of oral pathologies presenting in Aegean Region of Turkey.

## Materials and Methods

In this retrospective study all of the histopathological analysis reported in the Department of Oral Pathology of Ege University, Faculty of Dentistry, thorough 1984 to 2014 were evaluated. Demographic data and tissue diagnosis of 6,330 patients' histopathological reports were analyzed. This retrospective study was approved by the Ethics Committee of Ege University Faculty of Medicine (decision no: 19-10.1T/46, date: 16.10.2019). Data including age, gender, anatomic location of the lesion, clinical and histopathologic diagnosis were recorded. Notes of patients lacking the above information were excluded from the study.

### Classification of Oral Pathological Lesions

Oral pathological lesions in our study were divided into 7 main groups (Table 1). These; inflammatory lesions, benign bone pathology, malignant tumors, odontogenic tumors, lesions of odontogenic and non-odontogenic origin and soft tissue lesions. The first 6 groups of these were intra osseous lesions. Intra osseous oral pathological lesions were classified according to Neville's Text Book of Oral and Maxillofacial Pathology (5).

### Statistical Analysis

Data was analyzed using Microsoft Excel Software to reveal statistical prevalence values, frequency distribution tables and graphs.

## Results

A total of 6,330 histopathological diagnosis reported over a period of 30-years were analyzed in

**Table 1. Age distribution of oral pathological lesions**

Oral pathological lesions	Number of cases	Mean age	SD	Age range (years)
Inflammatory lesions	182	51.97	16.59	2-85
Benign bone pathology	1,144	37.54	18.39	0-93
Malignant tumors	103	57.78	16.16	13-86
Odontogenic lesions	2,175	37.11	16.61	0-84
Non-odontogenic lesions	94	44.72	16.49	10-81
Odontogenic tumors	160	29.44	17.29	1-76
Soft tissue lesions	2,472	40.68	17.87	0-89
Total	6,330	39.26	17.89	0-93
SD: Standard deviation				

this retrospective study. There were 3,223 (50.9%) female and 3,107 (49.1%) male patients. There was no significant difference between the sexes ( $p=0.005$ ). The mean age of the patients was 39.26 (standard deviation: 17.89 years). The age range varied from newborn to 93 years old (Table 2).

Locations of oral pathological lesions were grouped as posterior mandible ( $n=2,011$ ; 31.8%), anterior maxilla ( $n=1,492$ ; 23.6%), anterior mandible (841; 13.3%), posterior maxilla (811; 12.8%), miscellaneous region (not recorded or, unknown) ( $n=287$ ; 4.5%), cheek mucosa ( $n=244$ ; 3.9%), maxilla ( $n=184$ ; 2.9%), palatal mucosa ( $n=132$ ; 2.1%), mandible ( $n=131$ ; 2.1%) lip mucosa ( $n=116$ ; 1.8%), and tongue ( $n=74$ ; 1.2%) (Table 3). Intraoral pathologies were most commonly seen in male patients and posterior mandible (male: 1,062/female: 949). Tongue pathologies were the rarest and were more common among male patients (male: 40/female: 34). The distribution of these lesions according to age and location is shown in Figure 1.

Out of the 6,330 oral pathologies, 2,472 (39%) were classified as soft tissue pathologies and 3,858 (60.9%) were osseous pathologies. The most common intra-osseous pathologies were odontogenic pathologies ( $n=2,175$ ; 34.4%), followed by benign bone tumors

( $n=1,144$ ; 18.1%), inflammatory lesions ( $n=182$ ; 2.9%), odontogenic tumors ( $n=160$ ; 2.5%), malignant tumors ( $n=103$ ; 1.6%) and non-odontogenic pathologies ( $n=94$ ; 1.5%) (Figure 2).

Distribution of pathological lesions according to age is shown in Table 3. Soft tissue pathologies were more common among female patients ( $n=1,436$ ). Non-odontogenic lesions were the rarest pathologies that were seen in female patients ( $n=37$ ) (Figure 3).

Most of the “soft tissue lesions” ( $n=2,472$ ) were grouped under “others” ( $n=996$ ). Others were soft tissue lesions which diagnosis could not be fully determined.

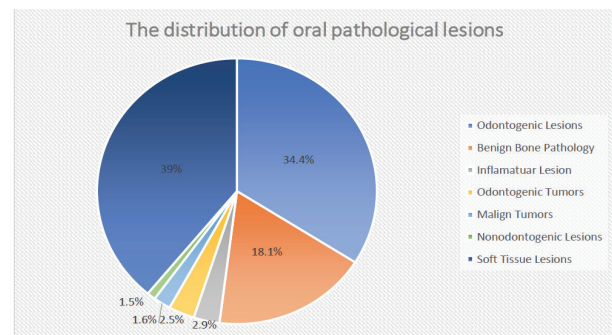


Figure 2. The distribution of oral pathological lesions

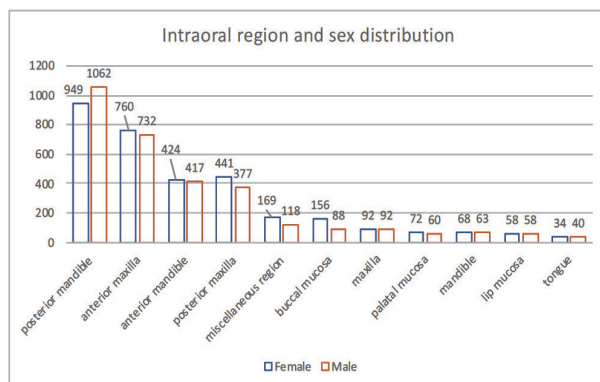


Figure 1. Intraoral region and sex distribution

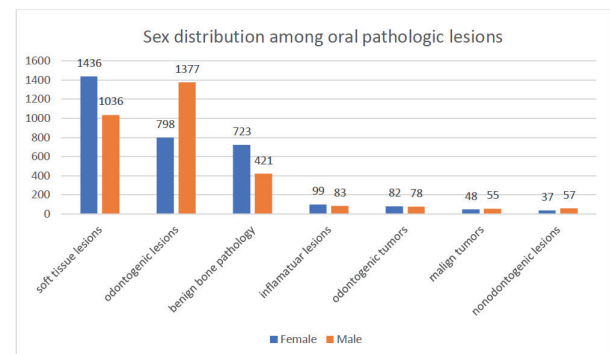


Figure 3. Sex distribution among oral pathological lesions

Table 2. Demographic data					
Variables	Number	Minimum	Maximum	Mean	SD
Age	6,330	0	93	39.26	17.89
Sex	Count			%	
	Total	6,330		100	
	Male	3,107		49.1	
	Female	3,223		50.9	
SD: Standard deviation					

Radicular cyst (n=853) was the most common odontogenic lesion (n=1,755). Peripheral giant cell granuloma (PGCG) (n=448) was the most common benign bone pathology (n=1,144). Ameloblastoma (n=89) was the most common odontogenic tumor

(n=160). Squamous cell carcinoma (SCC) (n=74) was the most common malignant tumor (n=103). Incisive canal cyst was the most common (n=85) non-odontogenic lesion (n=94) (Table 4).

**Table 3. Distribution of age according to locations of oral lesions**

Region	Number of cases	Mean age	SD	Age range (years)
Miscellaneous region	287	38.52	17.81	1-79
Anterior mandible	841	40.74	18.69	0-85
Posterior mandible	2,011	38.73	17.84	2-86
Anterior maxilla	1,492	37.11	17.51	0-93
Posterior maxilla	818	39.53	17.69	0-84
Lip mucosa	116	39.72	18.27	1-76
Buccal mucosa	244	46.08	15.26	8-89
Palatal mucosa	132	47.31	17.45	7-80
Mandible	131	41.24	17.01	7-70
Maxilla	184	37.24	17.53	1-79
Tongue	74	44.26	19.50	9-83
Total	6,330	39.26	17.89	0-93

SD: Standard deviation

**Table 4. Histopathologic diagnoses in each category**

Diagnosis	Number	Male	Female	M:F ratio	Mean age (years)	SD
<b>Soft tissue lesions</b>	2,472					
Adenocarcinoma	16	10	6	1.67	51.59	18.42
Actinomycoses	19	9	10	0.9	35.86	16.34
Fibrolipoma	25	10	15	0.67	33.28	15.53
Fibroma	208	83	125	0.66	12	7.07
Hemangioma	37	15	22	0.68	43.56	19.7
Hyperparakeratosis	37	21	16	1.31	25.07	15.6
Intradermal nevus	7	1	6	0.17	41.86	18.35
Irritation hyperplasia	552	211	341	0.62	53.63	14.78
Leukoedema	2	1	1	1	44.58	22.05
Mucosel	78	45	33	1.36	55.24	16.61
Papilloma	113	52	61	0.85	37.47	16.86
Pleomorphic adenoma	38	14	24	0.58	40.97	17.57
Pyogenic granuloma	303	103	200	0.52	45.19	14.18
Nicotinic stomatitis	5	3	2	1.5	33	5.66
Verruca vulgaris	36	16	20	0.8	38.37	20.48
Others	996	442	554	0.79	43.11	19.17
<b>Odontogenic lesions</b>	2,175					
Apical periodontal cyst	203	127	76	1.67	35.51	14.53
Dentigerous (follicular) cyst	497	334	163	2.05	31.85	17.53
Keratocysts	442	295	147	2.01	41.41	16.87

Table 4. continued

Odontogenic cyst	108	69	39	1.77	37.92	18.22
Radicular cyst	853	513	340	1.51	37.54	15.37
Residual cyst	72	39	33	1.18	45.24	14.42
<b>Benign bone pathologies</b>	1,144					
Aneurysmal bone cyst	9	0	9	0	24.22	10.28
Exostoses	8	2	6	0.33	42.38	13.18
Fibrous dysplasia	34	9	25	0.36	36.35	18.09
Ossifying fibroma	278	85	193	0.44	35.36	16.35
Osteoma	84	30	54	0.56	38.37	15.59
Peripheral giant cell granuloma	448	191	257	0.74	41.19	18.85
Central giant cell granuloma	251	98	153	0.64	34.03	20.15
Cemento ossifying fibroma	32	6	26	0.23	34.38	14.62
<b>Inflammatory lesions</b>	182					
Osteomyelitis	182	83	99	0.84	51.97	16.59
<b>Odontogenic tumors</b>	160					
Ameloblastoma	89	48	41	1.17	36.02	15.97
Compound odontoma	24	13	11	1.18	26.58	18.58
Complex odontoma	47	17	30	0.57	18.45	12.69
<b>Malignant tumors</b>	103					
Differentiated spinocellular carcinoma	9	5	4	1.25	57.11	6.25
Spinocellular carcinoma	3	2	1	2	44.24	15.25
Mucoepidermoid carcinoma	17	8	9	0.89	60.78	16.11
Squamous cell carcinoma	74	40	34	1.15	61.66	5.51
<b>Non-odontogenic lesions</b>	94					
Epidermoid cyst	5	3	2	1.5	36.2	18.44
Globulomaxillary cyst	4	2	2	1	33	30.29
Incisive canal cyst	85	52	33	1.58	45.78	15.49
SD: Standard deviation						

## Discussion

In the 30-year retrospective evaluation, 6,330 oral pathologies were evaluated. Of these evaluations, 996 soft tissue lesions could not be determined precisely due to missing data entry. While 3,107 oral pathological lesions were seen in men, 3,223 of them were seen in women. This shows that there is no difference in terms of gender. In accordance with other studies (1-4,6-18) male-female ratio was almost equal in our study. The age range is 0-93 years old as 6,330 oral pathologies constitute a diverse and massive cohort,

the average age is 39.26. This situation is compatible with other studies (1-3,11,12,15-18).

Most of the oral pathological lesions were seen in the posterior mandible, in coordination with other studies (2-4,6-9,12,13,16,19-23). This finding could possibly be associated with the presence of adjacent anatomical structures such as tongue, cheek mucosa and salivary glands in the lower jaw (2). Contrary to our findings, Selvamani et al. (24) emphasized that some intraoral lesions were mostly seen in the maxilla. While other studies state that some pathological lesions in the mouth are seen equally in

both jaws (15,25). There is no definitive explanation regarding the site predilection of oral pathologies in the literature.

In many retrospective studies of oral pathological lesions (1,4,6-9,11,14,16,18), the presence of excess amount of soft tissue lesions was noticeable as in our study (Table 3). Among these soft tissue lesions, irritation hyperplasia was the second commonest after "others" group (Table 4). Oral mucosa is prone to developmental disorders, irritation, inflammation and neoplastic conditions as it's constantly under the effect of different internal and external stimuli. Reactive lesions are tumor-like hyperplasia that develop in response to a low-grade irritation or injury, such as chewing, food impaction, calculus, iatrogenic injuries such as mechanical irritation caused by ill-fitting dentures, fillings and crowns. Irritation hyperplasia, pyogenic granuloma, PGCG, and cemento-ossifying fibroma are common reactive lesions seen in the oral cavity. Reactive lesions are commonly seen in the gingiva followed by in no particular order tongue, palate, cheek and floor of the mouth. Clinical characteristics of these lesions consist of sessile or pedunculated masses with smooth or irregular surfaces, and present with different colors, from bright pink to red (26). Irritation hyperplasia is the most common tumor like and submucosal reactive lesion in the oral cavity that is composed of fibrous or connective tissue caused by mechanical trauma of irritants such as calculi, foreign bodies, chronic biting, overhanging restoration margins, sharp spicules of bones and over extended borders of appliances (27). The findings of our study confirm that in our society, particularly in the elderly edentulous group, poor oral hygiene and less than ideal management of restorative treatment needs remain as an issue to be solved by the health authorities.

Odontogenic lesions originate from odontogenic epithelium of tooth germ, and these lesions occur frequently during the development of teeth in the first two decades of life (4). Radicular cyst is an inflammatory cyst that is associated with odontogenic infections. It is also associated with increased maxillofacial trauma (13,17,21,24,28). In accordance with other studies (1,3,7,10,11,13,15,17-19,21,24) radicular cysts were found to be the commonest odontogenic pathology. The incidence of radicular cysts were found to be higher in men

(Table 4). However a couple of retrospective studies by Silva et al. (6) and Prosdócimo et al. (14) found that dentigerous cysts were the commonest odontogenic lesion.

In our study, the commonest benign bone tumor was found to be the PGCG. It has a predilection for gingiva and poor oral hygiene plays a role in the etiology (4). A PGCG is a reactive, exophytic lesion that occurs primarily in gingiva and alveolar ridge. It originates from the periosteum or periodontal membrane in both dentate and edentulous areas (16,29). Radiographic findings are widening of the adjacent periodontal space and the adjacent interdental septum is more radiolucent than the normal surrounding bone that shows a normal trabecular structure (29). In accordance with the current study, it was previously shown that PGCG has a slight predilection for female gender (16,18).

Osteomyelitis is an intraosseous inflammatory process encompassing cortical bone and periosteum that is characterized by progressive inflammatory osteoclasia with ossification. Osteomyelitis can be seen in any bone including the femur, humerus, or jaws. The most typical pathogenesis is an infection with bacteria such as *Staphylococcus aureus* or *Mycobacteria*, but it may also be induced by trauma, radiation, or specific drugs (30). Osteomyelitis is rarely seen in the jaws and in our study it was classified as an inflammatory lesion. In the current study male to female ratio is found to be 0.84 and the average age is 51.97. These values are very close to the values shown by Andre et al. (31). Osteomyelitis was extremely rare in our study.

Odontogenic tumors constitute a heterogeneous group of pathological lesions, arising from dental mesenchymal cells or its remnants. Biologically, some of these lesions present as hamartomas with varying degrees of differentiation, while the rest are benign or malignant neoplasms with variable aggressiveness and potential to develop metastasis (12,16,18,20,23). Since the odontogenic tumors are generally asymptomatic, patients do not notice until it reaches large sizes. Odontogenic tumors are more commonly seen in the 4<sup>th</sup> decade of life (12,16,18,20,23). However, our findings show that odontogenic tumors are more common in the third decade of life. In accordance with the literature, ameloblastoma is the commonest odontogenic tumor in the current



study (1,3,4,11,12,16,18,20,23). Although there is no significant gender predilection in other and the current study, Jaafari Ashkavandi et al. (4) state a slight male predilection.

SCC constitutes 90% of malignant tumors in the mouth. It has a male predilection and commoner in the 6th decade of life (32-35). In accordance with these studies SCC is the commonest maxillofacial malignant tumor. The male to female ratio was 1.15 and the average age was 61.66.

Non-odontogenic cysts are developmental or reactive lesions. These lesions develop from non-odontogenic epithelium and are more common in men (2,13,15,17,18). The commonest non-odontogenic lesion is incisive canal cyst (1,3,11,14). Our findings are consistent with these literatures.

## Conclusion

In this study, the 30-year demographic distribution of oral pathologies in the Aegean region is documented. Soft tissue pathologies were the commonest oral pathologies and posterior mandible was the most frequently affected anatomical site. A slight female predilection that was not significant was noted. Findings of the current study can contribute to formulating a clinical working diagnosis hence management issues surrounding oral pathologies.

## Ethics

**Ethics Committee Approval:** This retrospective study was approved by the Ethics Committee of Ege University Faculty of Medicine (decision no: 19-10.1T/46, date: 16.10.2019).

**Informed Consent:** All participants provided written consent to the approved protocol as they were free to decline their participation. The personal data of the participants were kept confidential.

**Peer-review:** Externally and internally peer-reviewed.

## Authorship Contributions

Concept: A.Ç., C.E., H.K., Design: A.Ç., C.E., H.K., Supervision: A.Ç., C.E., H.K., Fundings: A.Ç., C.E., H.K., A.M., Materials: A.Ç., C.E., Data Collection or Processing: A.Ç., C.E., H.K., A.M., Analysis or Interpretation: A.Ç., A.M., Literature Search: A.Ç., C.E., H.K., Writing: A.Ç., Critical Review: A.Ç., C.E.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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