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Research Article

Clinicopathological Features and ICD-10 Categorization of Oro-maxillofacial Surgical Biopsies from Sulaimani

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ABSTRACT

Background: Few updated retrospective histopathological-based studies in Iraq evaluate a comprehensive spectrum of oro-maxillofacial lesions. Also, there was a need for a systematic way of categorizing the diseases and reporting results in codes according to the WHO classification that helps occupational health professionals in the clinical-epidemiological approach.

Objectives: to establish an electronic archiving database according to the ICD-10 that encompasses oro-maxillofacial lesions in Sulaimani city for the last 12 years, then to study the prevalence trend and correlation with clinicopathological parameters.

Subjects and Methods: A descriptive-analytical study included the archived records from three major histopathological centers in Sulaimani (College of Dentistry, Shahid Saifaldeen, and Shorsh Hospitals), related to surgical biopsies of oro-maxillofacial lesions performed between 2008 and 2019 in Sulaimani. Data were tabulated in an excel sheet and analyzed.

Results: This study involved 2100 oro-maxillofacial lesions, male: female ratio was 1:1.2, and a mean age of 41.03±19.51 years old. The most frequently involved sites were; the lip (14.5%), followed by the gum and alveolar ridge (14.2%). 69.4% of cases were non-neoplastic lesions. The neoplastic lesions were significantly (P=.000) observed in old patients with a mean age of 46.1±21.09, mostly epithelial tumors (39.1%), followed by connective tissue tumors (19.5%). Malignant connective tissue tumors were more frequently seen than benign ones (52.5% versus 47.5%). The non-neoplastic lesions revealed predominate soft tissue lesions (45.2%), followed by salivary gland diseases (13.8%), with a mean age of 38.26±18.8. Squamous cell carcinoma was the most common epithelial tumor, while haemangioma was predominant among connective tissue tumors

Conclusions: ICD-10 classification of oro-maxillofacial lesions in Sulaimani city helps establish a standardized coding database system for clinicopathological distribution. However, the majority of recorded lesions were non-neoplastic especially diagnosed as soft tissue lesions. Still, neoplastic lesions with their minor distribution deserve great attention as they threaten patients' lives.

Introduction

The oral cavity is liable to various lesions with different etiology and clinical features. A tentative diagnosis can be established from the history, clinical examination, and radiological findings, but in some situations, the definitive diagnosis depends on the histopathological characterization of the lesion after a biopsy. (1) Thus, the prevalence of oral manifestations in patients attending the outpatient dental clinic, those with specific systemic conditions, or in a cross-sectional sample from a population will not reflect the majority of biopsied oral lesions indicated for histopathological diagnosis since the possibility of clinicopathological diagnostic discrepancy exist. (2)

In Iraq, the largest comprehensive retrospective histopathological-based work that analyzed oral lesions in Baghdad was published in 1993. (3) A study from the north of Iraq, Kurdistan-Erbil, was conducted in 2016. (4) Recently, a study from the south of Iraq, Basrah, was published. (5) Many studies were concerned with specific groups of oral diseases.

In Sulaimani city, the first attempt to analyze all reported oral lesion biopsies was conducted in 2009 (6), followed by a study restricted to malignant oral lesions. (7) Since then, there has been an advance in health care and services, and many specialized dental centers and hospitals have been established. Therefore, the need to register updated data about the prevalence of all biopsied oral and maxillofacial lesions arises to be compared with the findings of the clinical studies for dental outpatients regarding the frequency of oral lesions in adults (8-10) and children. (11)

All the studies mentioned above did not use a systematic way of categorizing the diseases, nor did they report results in codes according to the WHO classification that helps occupational health professionals in the clinical-epidemiological approach. (12) The recommended method depends on using a family of health classifications that become advanced for a more comprehensive analysis of the health-disease process and inclusion of data beyond the diagnosis. (13) The International Classification of Diseases of Dentistry and Stomatology (ICD-DA),(14) International Classification of Diseases for Oncology (ICD-O),(15) and the International Classification of Diseases-10th Edition (ICD-10)(16) belong to this group of classification; In which ICD translates diagnoses of diseases from words into an alphanumeric code, permitting easy data storage, retrieval, and analysis.

The present study aimed to establish an electronic archiving database according to the ICD-10 that encompasses oro-maxillofacial biopsied lesions in Sulaimani city for the last 12 years, then to study the prevalence trend and correlation with clinicopathological parameters.

Subjects and Methods

A retrospective descriptive study analyzed the archives of histopathological reports of surgically removed specimens diagnosed as oral and maxillofacial lesions. They were stored in the Oral Pathology department at the College of Dentistry /Sulaimani University and two other major referral histopathological laboratories in government hospitals in Sulaimani city; Shahid Saifaldeen (Ministry of Health) and Shorsh (Ministry of Military Defense).

The study covered a period of 12 years, from 2008 to 2019. Biopsies from the skin (face and neck), re-excised surgical samples, duplicated cases, and cases with unclear or multiple missing clinical data were excluded.

The Research Ethics Committee of the College of Dentistry at the University of Sulaimani approved this study.

Data were collected from patient records and encrypted to preserve confidentiality. Then it was organized and tabulated in a Microsoft® Excel spreadsheet (as a data bank). The independent variables included: age, gender, site of the lesion, type of operation, years of registration, and the histopathological diagnosis.

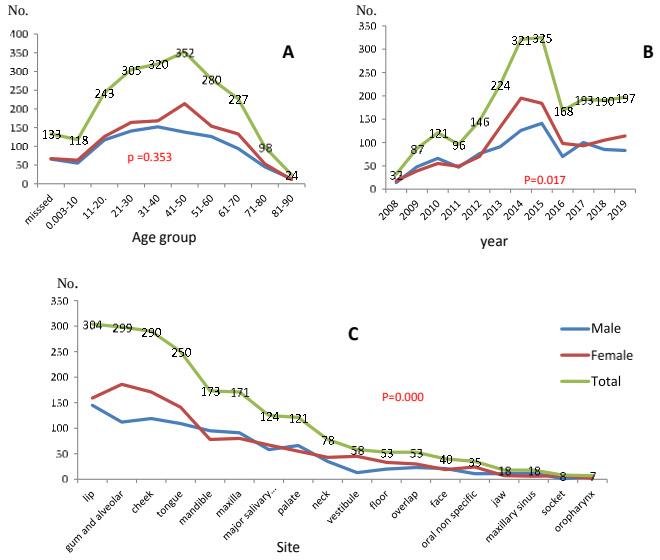
The classification of the anatomical sites and categories of histopathological diagnosis of the cases were based on histogenesis in the Oral and Maxillofacial Pathology textbook. (17) The codes of the World Health Organization ICD-DA,(14) ICD-O,(15) and ICD-10(16) with coded nomenclature for the morphology of neoplasms were added (ICD 10: C00-08).

For analysis purposes, lesions were categorized into two major groups; neoplastic and non-neoplastic. Neoplastic lesions based on histogenesis were subdivided into seven major subgroups: epithelial, salivary glands, odontogenic, connective tissue, hematopoietic, bone, and metastatic neoplasms. In addition, each one was divided into benign and malignant tumors. The non-neoplastic lesions were compiled into eleven major subgroups: soft tissue lesions, mucosal lesions, mucocutaneous lesions, epithelial lesions, bone lesions, inflammatory diseases, and not diseased tissue (normal), odontogenic lesions, periodontal, salivary diseases, and chronic sinusitis.

Statistical analysis was conducted using the Statistical Package for the Social Sciences for Windows 22.0 (SPSS Inc., IBM, Chicago, USA). Descriptive analyses were performed to clean the data and to check for the presence of extreme values. The Chi-square test and ANOVA evaluated possible associations between pathological groups (non-neoplastic and neoplastic groups) and categorical variables. A P-value of less than 0.05 was considered significant. In addition, the differences between men and women were assessed with the Wilcoxon matched-pairs signed-rank test.

Results

The study sample included 2100 cases of oral biopsies. It consisted of 949 (45.2%) males and 1151 (54.8%) females (Table 1), male: female ratio of 1:1.2. Their age ranged from 1 day (congenital epulis) to 94 years, with a mean age of 41.03±19.51 years. The most affected age group was 41-50 years, followed by 31-40 years, with no gender difference in different age groups (P=0.353) (Fig 1A). The distribution of oro-maxillofacial biopsies through the studied period indicated that the peak of registered cases was during 2015 (n= 325), followed by the year 2014 (n= 321), being significantly more in females (P= 0.017) (Fig 1B). The most frequently biopsied site was the lip (n=304, 14.5%), then gum and alveolar ridge (n=299, 14.2%), with significant gender variation (P= 0.000) (Fig 1C).



Pearson Chi-Square test between genders.

Figure 1: Frequency distribution of 2100 oro-maxillofacial reported surgical biopsies in Sulaimani city according to the age group (A), years of registration (B), and anatomical site (C)

Neoplastic lesions were reported in 642 (30.6%) cases, and the non-neoplastic diagnosis was registered in 1458 (69.4%) cases. The non-neoplastic biopsies were more frequently seen in females (n=834, 57.2%) than males (n= 624, 42.8%). While the neoplasms were nearly equally seen in male (n=325, 50.6%) and female (n=317, 49.4%) patients. There were significant differences in age and site distribution between neoplastic and non-neoplastic lesions. Neoplastic lesions occurred more frequently in older age patients (groups>41 years, mean=46.1±21.09) than those with non-neoplastic lesions (aged between 11 and 50 years, mean=38.2±18.82) (P<0.0001). The gum and alveolar mucosa (n=262, 17.9%) and the lip (n= 234, 16.04%) were the most affected site in non-neoplastic lesions, while the tongue (n=82, 12.8%) and the mandible (79, 12.3%) were the most affected site for neoplasms (P<0.0001) (Fig 2).

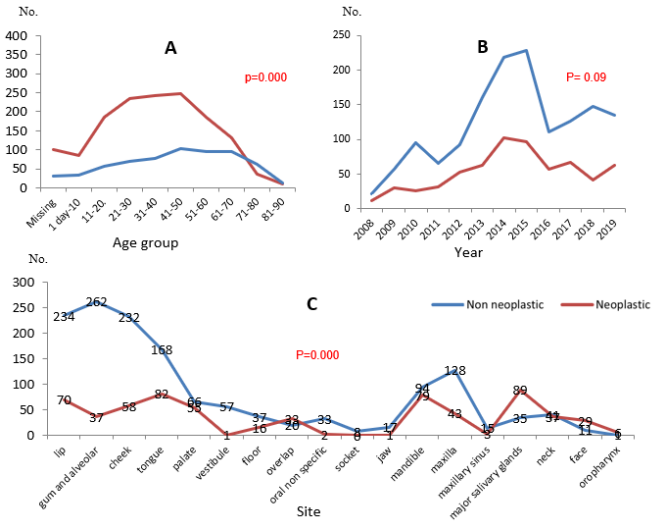


Figure 2: Frequency distribution of neoplastic and non-neoplastic oral and maxillofacial reported surgical biopsies in Sulaimani city according to the age group (A), years of registration (B), and anatomical site (C). Pearson Chi-Square test P value

According to neoplastic cell origin, the tumors were categorized into seven groups (Fig 3, Table 1). Epithelial neoplasia (n=251, 39.1%) was the commonest neoplasm, followed by connective tissue tumors (125, 19.5%). Further analysis indicated gender (P=0.007) and the mean age (P=0.000) significant variations among these categories. Post Hoc test indicated that patients who suffered from bone, connective tissues, and odontogenic neoplasms had significantly less mean age than those with metastatic, epithelial, and hematogenic neoplasms (Table 1, footnote). Males had more epithelial tumors followed by connective tissue tumors, while females had predominant epithelial tumors followed by salivary tumors (Table1). Neoplastic lesions included 305 (47.5%) benign and 337 (52.5%) malignant lesions. Malignant neoplasms frequently arise from epithelia (n=216, 64.09%) and salivary glands (n=54, 16.02%), while tumors of connective tissue (n= 119, 39.01%), odontogenic (n=74, 24.26%), and salivary glands (n=66, 21.63%) origin were more frequently reported benign neoplasms (Fig 3).

On the other hand, the non-neoplastic lesions were grouped into 11 categories according to their origin (Fig 3, Table 1). Soft tissue lesions were the most frequently reported (n=657, 45.2%), followed by salivary gland diseases (n=201, 13.8%). The remaining categories were minorities. Their distribution showed gender and mean age statistical variations (P=0.000). Salivary gland lesions were reported significantly in the youngest patients (27.79 ±17.7, P=0.000), and the epithelial, mucosal and soft tissue lesions occurred between 40-45 years old (Table 1). Females had more soft tissue and salivary gland diseases, while males had more soft tissue, followed by salivary and odontogenic lesions (Table 1).

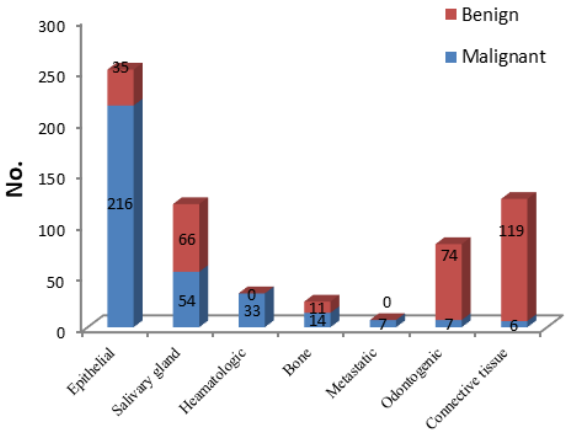


Figure 3: The major histopathological cell origin categories of oral neoplastic lesions

Odontogenic and bone tumors more frequently occur in the mandible. In addition, connective tissue tumors were often observed in the cheek, while epithelial tumors were mainly located in the tongue. For non-neoplastic lesions, both jaws had a similar frequency of odontogenic lesions. Salivary gland diseases are more frequent in the lip, and the most frequent biopsied site for soft tissue lesions was from the gum (Table 2).

Table 1: Total 2100 oral and maxillofacial surgical lesions categorized into major histopathological neoplastic and non-neoplastic lesions in relation to gender and age

	Histopathological categories	Total		Female p.008		Male		Chi-Square	Age			ANOVA
		No.	%	No.	%	No.	%		No.	mean	SD	P value
Neoplastic	Bone tumors	25	3.9	12	3.8	13	4	p=.007	24	37.96	21.12	0.000‡
	Connective tissue tumors	125	19.5	71	22.4	54	16.6		115	32.82	20.28	
	Epithelial tumors	251	39.1	109	34.4	142	43.7		238	58.97 *	16.78	
	Heamatologic neoplasm	33	5.1	17	5.4	16	4.9		33	45.64*	20.75	
	Metastatic carcinoma	7	1.1	3	.9	4	1.2		7	60.86*	19.04	
	Odontogenic tumor	81	12.6	31	9.8	50	15.4		79	32.78	17.62	
	Salivary gland tumors	120	18.7	74	23.3	46	14.2		114	42.86**	15.97	
	Total	642	100	317	100	325	100		610α	46.11	21.09	
Non-neoplastic	Bone lesions	70	4.8	29	3.5	41	6.6	p=.000	65	31.68 #	18.762	0.000‡
	Epithelial lesions	53	3.4	20	2.4	33	5.3		45	45.23	21.52	
	Inflammatory/infectious	22	1.5	15	1.8	7	1.1		20	42.2	21.89	
	Mucocutaneous diseases	129	8.9	78	9.4	51	8.2		124	45.63	13.46	
	Mucositis / ulceration	68	4.7	47	5.6	21	3.4		66	45.79	19.7	
	Normal tissue	66	4.5	36	4.3	30	4.8		62	40.03	18.45	
	Odontogenic lesions	175	12	85	10.2	90	14.4		164	31.73 #	16.04	
	Periodontal diseases	11	.8	6	.7	5	.8		11	36.18	16.96	
	Salivary gland diseases	201	13.8	111	13.3	90	14.4		182	27.79 @	17.7	
	Sinusitis chronic	6	.4	1	.1	5	.8		6	34.83	21.46	
	Soft tissue lesions	657	45.2	406	48.7	251	40.2		612	40.77	18.52	
	Total	1458	100	834	100	624	100		1357α	38.26	18.83	

Table 2 The histopathological categories of oral and maxillofacial surgical lesions distributed according to the site #

sites of 35 lesions (1.66%) were not recorded in reports.

Neoplastic histopathological categories		Lip C00-D10	Gum C03-D00.03	Cheek C06-D00.02	Overlap C06.9-D00.00	Tongue C01-C02-D10.1	Palate C05-D10.39	Floor C04-D10.2	Major SG C07-C08-D11	Maxilla C41.0-D16.4	Mandible C41.1-D16.5	Sinus C31.0-D14	Face C44.3-D23	Neck C44.4	Oropharynx C09-C10
Bone tumors			1	1	1	1	1		1	7	12				
Connective tissue tumors		21	19	26		24	10		3	6	5		5	6	2
Epithelial tumors		40	13	24	28	55	17	16	5	2	2	1	23	18	3
Heamatologic neoplasm			2	1	3		2		8	4	5	1	1	5	
Metastatic carcinoma		1	1	0						1		1		3	
Odontogenic tumor			1	0						23	54			3	
Salivary gland tumors		8	0	7	1	2	25		72		2			2	1
Total	No.	70	37	59	33	82	55	16	89	43	80	3	29	37	6
	Percentage	11	5.79	9.23	5.16	12.8	8.6	2.5	13.9	6.73	12.5	.47	4.53	5.79	0.94

Non-neoplastic histopathological categories		Lip	Gum	Cheek	Overlap	Tongue	Palate	Floor	Major SG	Maxilla	Mandible	Sinus	Face	Neck	Oropharynx
Bone lesions			1				5			34	30				
Epithelial lesions		8	6	12	1	13	8	1					2		
Inflammatory/infectious			2	2	1	3	1			1		4		8	
Mucocutaneous diseases		1	11	80	11	20	2	2							
Mucositis / ulceration		10	4	19	6	16	6	3							
Normal tissue		36	1	5		3			2	6	2		1	4	
Odontogenic lesions			6				5			82	80	2			
Periodontal diseases			9				1			1					
Salivary gland diseases		120		6		13	5	21							
Sinusitis chronic												6			
Soft tissue lesions		59	222	165	1	100	33	10	33	4	7	3	8	29	1
Total	No.	234	262	289	20	168	66	37	35	128	119	15	11	41	1
	Percentage	16.41	18.37	20.26	1.4	11.78	4.62	2.59	2.45	8.97	8.34	1.05	0.77	2.87	0.07

Table 3: Distribution of neoplasms according to the diagnosis concerning gender and mean age

		Oral neoplastic lesions	Total		Male		Female		Age	
			No.	%	No.	%	No.	%	Mean	SD
Epithelial	Malignant	BCC	11	1.713	4	1.231	7	2.2082	66	15.69
		Hatchinson's freckle (lentigo maligna)	1	0.156	1	0.308	0	0	58	-
		Melanoma malignant	4	0.623	3	0.923	1	0.3155	55.25	29.94
		Melanoma malignant metastatic	2	0.312	1	0.308	1	0.3155	77	-
		Nasopharyngeal carcinoma metastatic	1	0.156	1	0.308	0	0	59	-
		SCC	189	29.44	108	33.23	81	25.552	60.99	14.25
		Undifferentiated carcinoma	2	0.312	1	0.308	1	0.3155	74.5	0.707
		Verrucous carcinoma	6	0.935	4	1.231	2	0.6309	56.33	18.6
		Total	216	33.64	123	37.85	93	29.33	61.27	14.81
	Benign	Intradermal nevus	5	0.779	1	0.308	4	1.2618	36.6	17.93
		Keratoacanthoma	5	0.779	3	0.923	2	0.6309	57.8	15.38
		Melanoma	2	0.312	1	0.308	1	0.3155	47.8	30.11
		Squamous papilloma	23	3.583	14	4.308	9	2.8391	41.67	22.35
		Total	35	5.45	19	5.84	16	5.04	43	20.8
Salivary gland	Malignant	Acinic cell carcinoma	3	0.467	0	0	3	0.9464	58.5	4.94
		Adenoid cystic carcinoma	19	2.96	7	2.154	12	3.7855	44.78	0.14
		Carcinoma ex pleomorphic adenoma	3	0.467	2	0.615	1	0.3155	61.33	10.97
		Epithelial-myoepithelial carcinoma	1	0.156	0	0	1	0.3155	65	.
		Mammary analogue secretory carcinoma	2	0.312	0	0	2	0.6309	32	2.82
		Mucoepidermoid carcinoma	14	2.181	8	2.462	6	1.8927	37.69	17.24
		Myoepithelial carcinoma	1	0.156	1	0.308	0	0	66	.
		Papillary carcinoma	1	0.156	0	0	1	0.3155	70	.
		Polymorphous low-grade adenocarcinoma	8	1.246	4	1.231	4	1.2618	46.75	11.23
		Salivary intraductal carcinoma	1	0.156	0	0	1	0.3155	30	
		Undifferentiated carcinoma metastatic	1	0.156	0	0	1	0.3155	53	15.78
		Total	54	8.41	22	6.76	32	10.09	45.47	
	Benign	Adenoma	2	0.312	2	0.615	0	0	46	1.41
		Pleomorphic adenoma	56	8.723	16	4.923	40	12.618	38.05	15.61
		Warthin s tumor	8	1.246	6	1.846	2	0.6309	57.25	7.85
		Total	66		24		42		40.74	15.92
Bone	Malignant	Ewing sarcoma	1	0.156	1	0.308	0	0	11	0
		Osteosarcoma	12	1.869	5	1.538	7	2.2082	44.5	22.98
		Spindle cell sarcoma	1	0.156	0	0	1	0.3155	55	0
		Total	14	2.18	6	1.84	8	2.52	42.58	23.24
	Benign	Osteochondroma	2	0.312	1	0.308	1	0.3155	27.5	14.84
		Ossifying fibroma	4	0.623	2	0.615	2	0.6309	31.5	26.26
		Osteoma	5	0.779	4	1.231	1	0.3155	36.5	16.53
		Total	11	1.71	7	2.15	4	1.26	33.33	18.58
Connective tissue	Malignant	Angiosarcoma	1	0.156	0	0	1	0.3155	80	
		Malignant fibrous histiocytoma	1	0.156	0	0	1	0.3155	24	
		Rhabdomyosarcoma	2	0.312	2	0.615	0	0	11	8.48
		Small cell tumor	1	0.156	0	0	1	0.3155	44	
		Undifferentiated spindle cell sarcoma	1	0.156	0	0	1	0.3155	41	
		Total	6	0.93	2	0.61	4	1.26	35.16	26.4
	Benign	Congenital epulis	3	0.467	0	0	3	0.9464	6	5.9
		Cystic hygroma	3	0.467	0	0	3	0.9464	11.8	8.8
		Fibroma	5	0.779	2	0.615	3	0.9464	24	9.82
		Haemangioma	51	7.944	26	8	25	7.8864	36.9	19.36
		Heamangiopericytoma	8	1.246	4	1.231	4	1.2618	26	24.45
		Lipoma	15	2.336	7	2.154	8	2.5237	39.78	16.75
		Lymphangioma	6	0.935	3	0.923	3	0.9464	12.5	5.32
		Neural tumor	14	2.181	9	2.769	5	1.5773	41.06	21.8
		Ossifying fibroma	14	2.181	1	0.308	13	4.1009	29.53	18.63
		Total	119	18.54	52	16	67	21.13	32.69	20.03
Haematologic	Malignant	Langerhans cell histioctyosis X	4	0.623	2	0.615	2	0.631	21.75	17.15
		Lymphoma	27	4.206	13	4	14	4.416	48.41	19.29
		Multiple myeloma	1	0.156	1	0.308	0	0	72	
		Plasma cell tumor	1	0.156	0	0	1	0.315	40	
		Total	33	5.14	16	4.92	17	5.36	45.6	20.75
Metastatic	Malignant	Adenoid cystic carcinoma	5	0.779	3	0.923	2	0.631	55.2	18.21
		Metastatic renal cell carcinoma	1	0.156	1	0.308	0	0	63	
		Mucoepidermoid carcinoma	1	0.156	0	0	1	0.315	87	
		Total	7	1.09	4	1.23	3	0.94	60.85	19.03
Odontogenic	Malignant	Ameloblastic carcinoma	7	1.09	7	2.154	0	0	58.2	9.31
	Benign	Ameloblastic fibroma	4	0.623	4	1.231	0	0	8.04	12.68
		Ameloblastoma	21	3.271	14	4.308	7	2.208	38.66	16.68

Oral neoplastic lesions	Total		Male		Female		Age	
	No.	%	No.	%	No.	%	Mean	SD
AOT with CEOT	1	0.156	0	0	1	0.315	24	.
Cemento- ossifying fibroma	1	0.156	0	0	1	0.315	35	.
CEOT	1	0.156	0	0	1	0.315	24	.
KOC	39	6.075	20	6.154	19	5.994	32.28	14.54
Melanotic neuroectodermal tumor	2	0.312	1	0.308	1	0.315	2.66	3.3
Odontogenic fibroma	2	0.312	1	0.308	1	0.315	22.5	12.02
Odontogenic myxoma	1	0.156	1	0.308	0	0	39	.
Odontoma	2	0.312	2	0.615	0	0	11.5	9.19
Total	74	11.53	43	13.23	31	9.77	31.06	16.72

Table 4: Distribution of non-neoplastic oral and maxillofacial lesions.

	Non-neoplastic lesions	ICD	No	%		Non-neoplastic lesions	ICD	No	%		Non-neoplastic lesions	ICD	No	%
Salivary gland	Benign lymphoepithelial lesion	K11.8	28	1.92		Actinic Cheilosis	K13	2	0.14		Abscess	L01.0	6	0.41
	Granulomatous sialadenitis	K11.2	2	0.14		Actinic Keratosis	L57	2	0.14		Actinomycosis	A42	5	0.34
	Mucocele	K11.6	144	9.88	Epithelia	leukpplakia - dysplasia	K13.21	12	0.82	Infectious	Candidal stomatitis	B37	2	0.14
	Necrotizing sialometaplasia	K11.8	1	0.07		leukoplakia- Hyperkeratosis	K13.21	20	1.37		Mucormycosis	B46	1	0.07
	Sialadenitis acute	K11.21	1	0.07		Hyperplasia	K13.2	14	0.96		Toxoplasmosis	B58	2	0.14
	Sialadenitis chronic	K11.23	22	1.51		Leukoedema	K13.2	1	0.07		Tuberculous lymphadenopathy	A18	2	0.14
	Sailolithiasis	K11.5	3	0.21		Pigmentation	K13.79	2	0.14		Verrucous vulgaris	B07.9	4	0.27
	Total		201	13.8		Total		53	3.64		Total		22	1.51
Mucocutanous	Lichen planus	L43	93	6.38		Mucositis	K12.3	4	0.27		Chronic gingivitis	K05.1	3	0.21
	Lichenoid reaction	L43.2	13	0.89	Mucositis	Non-specific ulcer	K12.1	63	4.32	Periodontal	Desquamative gingivitis	K05.1	4	0.27
	Mucus membrane pemphigoid	L12.1	3	0.21		Traumatic ulcer	K12.0	1	0.07		Gingival fibromatosis	K06.1	2	0.14
	Pemphigus vulgaris	L10.0	20	1.37							Periodontal abscess	K05.2	2	0.14
	Total		129	8.85		Total		68	4.66		Total		11	0.75
Soft tissue	Dermoid - epidermoid cyst	K09.8	15	1.03		CEOC	K09.0	3	0.21		Alveolar osteitis	M27.3	1	0.07
	Developmental cyst	K09.9	17	1.17		Dentigerous cyst	K09.0	22	1.51		Aneurysmal bone cyst	M27.49	6	0.41
	Dystrophic calcification		2	0.14		Eruption cyst	K09.0	1	0.07		CGCG	M27.1	19	1.3
	Denture granuloma *	K06.2	62	4.25		Infected deve. cyst	K09.0	6	0.41		Cherubisum	M27.8	1	0.07
	Fibrous polyps* (hyperplasia)	K13.6	212	14.5	Odontogenic	Paradental cyst	K09.0	2	0.14	Bone	Nasopalatine/ palatal cyst	K09.1	6	0.41
	Gum epulis*	K06.8	36	2.47		Periapical abscess	K04.6	12	0.82		Exostosis and torus	M27.0	4	0.27
	Granuloma #	K13.4	191	13.1		Periapical cyst	K04.8	101	6.93		Fibrous dysplasia	M27.8	13	0.89
	Granulomatosis	L92.8	2	0.14		Periapical granuloma	K04.6	27	1.85		Osteomyelitis	M27.2	12	0.82
	Hematoma	S00.532	22	1.51		Residual cyst	K04.8	1	0.07		Sequestrum	M27.2	6	0.41
	Muscular hyperplasia (mass)	M79.9	2	0.14		Total		175	12		Simple bony cyst	M27.49	2	0.14
	Nodular fasciitis	M72.4	3	0.21							Total		4.8	4.8
	PGCG	K06.8	85	5.83							Normal		66	4.53
	Sebaceous cyst	L72.3	1	0.07							Chronic sinusitis	J32.0	6	0.41
	Reactive hyperplasia of lymph nod						R59.9	5	0.34					
	Non-specific inflammation (soft tissue swelling)						M79.9	2	0.14					
	Total							657	45.1					

* Fibroepithelial polyps,

\# Granuloma (Pyogenic170, Plasma cell 10, eosinophile 5, Foreign body 6)

From the total 642 neoplasms, squamous cell carcinoma was the most common malignant neoplasm (primary lesions n=189, 29.44%), commonly in males, and most patients affected were a senior group, with a mean age of 60.99±14.25 years. For salivary gland malignancies, adenoid cystic carcinoma ranked on the top (n=19, 2.96%) and was frequently seen in females, followed by mucoepidermoid carcinoma (n=14, 2.181%). Finally, lymphoma was the most frequent hematologic neoplasm (n=27, 4.206%) (Table 3).

Hemangioma was the most frequent benign connective tissue neoplasm (n=51, 7.94%), nearly equal in both genders. Most patients affected were adults with a mean age of 36.9±19.36 years. Odontogenic tumors showed predominant keratocyst and ameloblastoma with male predilection and mean ages of 32.28 and 38.66 years, respectively. The most frequent benign neoplasm of major salivary glands was pleomorphic adenoma (n=56, 8.72%), with more cases in females. Most patients affected were an adult group, with a mean age of 38.05±15.61 years.

The most common non-neoplastic lesions were soft tissue lesions (fibroepithelial polyp, 14.5%; granuloma,13.1%; PGCG, 5.83%), salivary gland diseases (mucocele, 9.88%), odontogenic lesions (periapical cysts, 6.93%), mucocutaneous lesions (lichen planus,6.38%), mucosal lesions (non-specific ulcers, 4.32%), table 4.

Discussion

Knowing the relative frequency of oro-maxillofacial lesions is essential to understanding the prevalence and severity of oral diseases within a particular population. Furthermore, it facilitates the planning of appropriate diagnosis, prompt treatment, and prevention strategies in health care centers. (18) Nevertheless, the prevalence of biopsied oral lesions does not represent all the lesions dentists see since certain conditions are rarely biopsied and neglected. Retrospective studies assessing biopsied oral lesions help to identify their distribution, the magnitude of the problem, awareness of the high-risk group, and highlighting the common oral lesions that needed a biopsy. In addition, they emphasize the responsibility of dentists in preventive and curative services.

Studies lack uniformity concerning the age range, extended study period, sites examined, and the classification of diseases into subgroups; this makes direct comparisons difficult and open to misinterpretation. On the other hand, in Sulaimani histopathological centers, the general histopathologist, when an oro-maxillofacial case needs consultation, the slides are reviewed by oral pathologists. Therefore, the final diagnosis was established after associating the clinical, radiographic, and histopathological features. An unspecific diagnosis was established in the cases with unavailable clinical and/or radiographic features, such as odontogenic cyst, fibro-osseous lesion not otherwise specified, and non-specific ulceration. The reports in the College of Dentistry were computerized and ICD-coded, but they represented part of maxillofacial biopsied specimens. The present study expanded the project to involve major centers' reports of similar lesions and applied an ICD-10 scoring system for their data to standardize the oral biopsies.

This study revealed slight female predominance (54.8% versus 45.2% males). Similar findings were reported in Saudi Arabia (Jeddah (18), South-Western-Jazan (19), and Eastern Province (20), Iran (21-23), Turkey (24), and in North Iraq; Sulaimani (6) and Erbil (4). A higher percentage of female distribution was recorded in Jordan (60%). (25) Conversely, in Basrah, a study showed male predominance (50.5%),(5) beside a study established in Al-Qurayyat specialized dental center, North-West, Saudi Arabia (61.2%) (26). These studies confirm regional and nationality variations.

The age ranged from 1 day to 94 years, with a mean age of 41.03±19.51. The most affected age group was 41-50 years, followed by 31-40 years. In Erbil, Yekin et al.(4) study showed that most patients are in their second to fourth decades of life. Siadati et al.(21) study showed more biopsied lesions in less than 40 years old with a mean age of 34.6 ± 20.3 years, and in Farzinnia et al.(23) study in Sheraz- Iran, more frequent lesions were in the second decade of life (10-19 years). A Turkish study showed a nearly similar mean age of the studied patients (39.26 ±17.89 years) (24). While another single-center Turkish study revealed most lesions in the sixth decade of life (27), Joseph et al. (28) detected a mean age of 37.83±16.62 years, with ages ranging from 1 to 93 years. While the higher mean age of 46.8 ± 23.4 years, with ages ranging from birth to 100 years, was reported by Saleh et al. (19). This difference could be attributed to various inclusion criteria of oral lesions, and referral role of the oral specialist

The most frequently affected site in this study was the lip, followed by the gum-alveolar mucosa and buccal mucosa. Saleh et al.(19) found that the tongue was the most affected site, followed by buccal mucosa and alveolar-gingiva mucosa. A study in Kuwait reported that the labial/buccal mucosa was the most biopsied site, followed by the mandible and tongue (28). A five-year retrospective study of biopsied jaw lesions showed that mandibular lesions were most commonly diagnosed than maxillary lesions (1). Mordani et al. 2014 (22) recorded the mandible as the most common site, followed by gingiva and buccal mucosa. This difference was attributed to different sample sizes and specific environmental and habitual agents that determined various site distributions.

Neoplastic lesions were seen in 30.6% of the present study with nearly equal gender distribution with a mean age of 46.1±21.09 years. The disparity in the male-to-female ratio has become less pronounced over the last few years. This is probably because women have more equally exposed themselves to known oral carcinogens such as tobacco and alcohol and were more likely to visit dental clinics than males. Therefore, they were aware of early changes in their oral mucosa's color, nature, or texture. Although Aljazaeri et al.(5) reported a slightly higher distribution of neoplastic lesions in their study (35.3%) with male predominance, the malignant tumors were seen most frequently in patients over 69 years. Since the decline in immune surveillance occurs with aging, it is associated with the accumulation of cellular DNA mutations, which is known to be a significant factor in the development of malignancy.(29) Furthermore, elderly patients visit their dentists less frequently than physicians and might be misdiagnosed.(30) However, a comparative result cannot be done with Al-Hindi et al.(18) findings, as they considered salivary diseases and tumors a single category. Saleh et al.(19) illustrated a higher frequency of neoplasia in their study (49.7%), with mean ages of 64.8 for malignant tumors, 36.5 for benign tumors, and 27.8. for benign odontogenic tumors. A lower percentage (20.7%) of neoplastic

lesions was detected by Alanazi et al.(26) . Furthermore, neoplasia constituted only 9.3% of biopsied cases of Iranian patients. (22) While a study conducted in Saudi Arabia found a nearly similar frequency of neoplastic lesions (29.3%) with male predominance and the mean ages for malignant and benign tumors were 45.4 and 33.7, respectively. (20)

Non-neoplastic lesions were recorded in 69.4%, with female predominance (57.2%) and a mean age of 38.26±18.82 years. Aljazaeri et al.(5) revealed a slightly lower distribution of non-neoplastic lesions (64.6%), with female predominance. While Saleh et al.(19) study showed lesser frequency (50.3%), and age ranged from newborn to 82 years old. A nearly similar result was found in the Saudi Arabia study, as they detected the non-neoplastic lesions (70.6%) predominately found in females, with high mean age seen in non-specified lesions (55.2). (20)

This study recorded slightly more malignant tumors than benign ones (52.5% versus 47.5%). Neoplasia, in general, was commonly seen in epithelia (39.1%), followed by connective tissue (19.5%) and salivary glands (18.7%). AL-Kateeb, (25), in his study of benign soft tissue tumors in Jordan, detected equal distribution of epithelial and mesenchymal tumors (50%) each. Various studies utilized different approaches of neoplastic classification and histopathological centers, as Al-Hindi et al. (18) identified predominate benign mesenchymal tumors (8.7%), followed by malignant (epithelial and mesenchymal origin) (5.7%), then salivary gland disease and tumors (4.9%) from the total 1218 oral maxillofacial lesions. On the other hand, Al-Jazaeri et al.(5) classified neoplasia into two groups malignant (epithelial, mesenchymal, and salivary gland origin) (19.1%) and benign (epithelial, mesenchymal, salivary gland, and odontogenic origin) (16.3%).

Regarding neoplastic lesions in the present study, epithelial tumors, in which squamous cell carcinomas were predominant, followed by connective tissue tumors, in which haemangiomas were most commonly detected. Al-Hindi et al.(18) reported fibroma as the most commonly seen benign tumor, and SCC as the predominant malignant tumor.

For non-neoplastic lesions in the current study, the most commonly seen were soft tissue lesions such as a fibroepithelial polyp (fibrous polyp), followed by salivary gland diseases (mucocele). However, Al-Jazaeri et al. (5) utilized a different approach for non-neoplastic specification and reported the most frequent reactive lesions, followed by cystic lesions.

In conclusion, this study reported predominate non-neoplastic lesions versus neoplastic ones, mainly diagnosed as soft tissue lesions followed by salivary gland diseases. Still, epithelial tumors were the most common neoplasms, followed by connective tissue tumors. ICD classification for oral and maxillofacial diseases over 12 years in Sulaimani City helps to tabulate and code lesions in a standardized, uniform manner which makes it easier to review by the pathologist; thus, it permits analysis, interpretation, and comparison. It also provided a systematic archiving system for all available oro-maxillofacial specimens on a computerized diagnostic index database to be kept in the Department of Oral Pathology in the College of Dentistry/University of Sulaimani/Iraq as a database bank. In this manner, we built an epidemiological database for demographic characterization and the distribution of high-risk diseases in this city.

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Conflict of Interest

No conflict of interest

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