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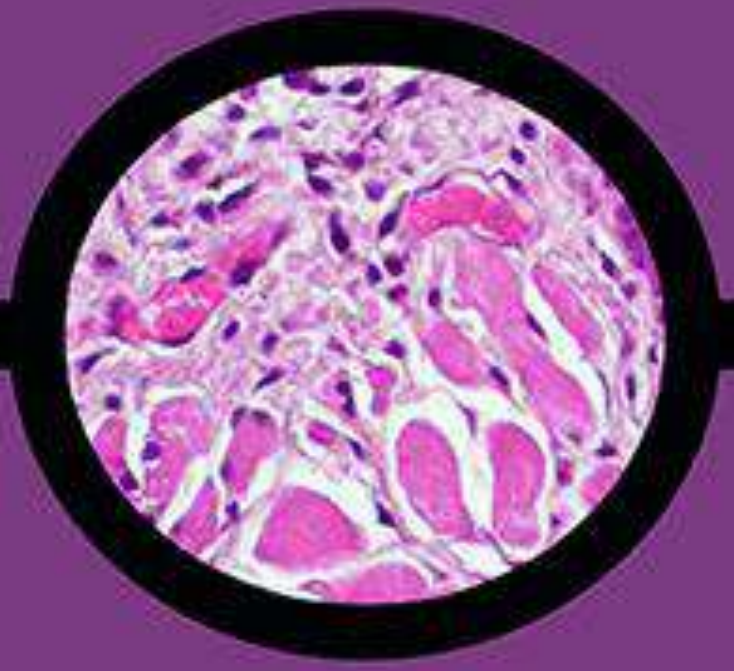

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Histopathological Profile Of Oral Lesion At The Opadcore Laboratory, Faculty Of Dentistry, Universitas Trisakti

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Keywords:

Epidemiology; histopathology; non-neoplastic; OPMD; neoplastic

ABSTRACT

Background: *A renewal of epidemiological data was carried out at Universitas Trisakti's OPaDCORE Laboratory to evaluate the prevalence and distribution of oral lesions. The research also sought to distinguish oral lesions according to their histopathological attributes, while considering factors such as age, gender, predilection, systemic disease, bad habits, and the dentist specialization.*
Method: *The study is a 4-year descriptive observational research on oral lesions, using a cross-sectional approach from January 2020 to October 2023. The data collected includes clinical diagnosis, histopathologic diagnosis, patient demographics, biopsy location, and medical history. The data was computerized using a Microsoft® Excel database.*
Result: *A total of 120 biopsy tissue reports showed that the most common oral lesions were radicular cyst (23.33%), periapical granuloma (15%), dentigerous cyst (14,17%), fibro-epithelial hyperplasia (10%), and mucocele (4,17%). Women (52,5%) had more oral lesions than men (47,5%). Among youngster (0-17 years old), dentigerous cysts (30%) and radicular cysts (30%) were common, while radicular cysts (23,53%) were common among adults (18-64 years old), and fibro-epithelial hyperplasia (25%) was common among the elderly (≥65 years old). Patients with oral lesions often had allergies (4,14%), hypertension (3,55%), gastritis (2,96%). Bad habits were also encountered with a high frequency of smokers (4,73%). Candida infection was found in 29 oral mycological smear specimens, and there was one case of cytological smear. Angular cheilitis (41.38%) was the most diagnosed condition.*
Conclusion: *Radicular cysts (23,33%) were the most common oral lesion found in the maxillary, with a higher prevalence in adult females according to OPaDCORE Laboratory's analysis*

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INTRODUCTION

Oral lesions refer to abnormal condition that can manifest within the oral cavity. The etiology and morphology are vary widely, ranging from benign to malignant.[1] Studies suggest that the prevalence of oral lesions ranges from 4.9% to 64.7% of individuals worldwide.[2] It is, therefore, crucial to promptly seek professional medical attention to prevent potential complications and safeguard overall health. Individuals who suspect the presence of oral lesions are encouraged to seek prompt medical attention.

Oral Pathology for Diagnostic, Collaboration Research and Education (OPaDCore) Laboratory at Universitas Trisakti has the distinction of being the only oral pathology laboratory in West Jakarta. Given its specialization in the oral cavity, it is critical to update the epidemiological data on oral lesions. To ensure the accuracy and relevance of epidemiological data on oral lesions, it is crucial to conduct regular updates in the OPaDCORE laboratory between 2020 and 2023. With the inclusion of additional variables that have not been previously listed in the data analysis of OPaDCORE Laboratory 2019, such as the medical history of systemic disease and negative health behaviors. Similar study have been reported from Kalantari et al, that non-neoplastic lesions are the most prevalence lesions based on data over the past 23 years.[6]

It is essential to note that certain oral lesions exhibit similar characteristics and clinical features, but differ in histopathology.[3] This can lead to erroneous diagnoses, requiring histopathological examination to confirm the clinical diagnosis from clinical examination and obtain an accurate histopathologic diagnosis. According to research studies, more than 70% of oral lesion diagnoses require interpretation of clinical and histopathological examinations to achieve a standard level of diagnostic accuracy.[4] These findings highlights the significance of histopathological examination in obtaining the correct diagnosis and managing oral lesions, as clinical diagnosis alone may not be sufficient for histopathologic diagnosis and management.[4,5]

RESEARCH METHOD

This study is a cross-sectional descriptive observational research that analyzes laboratory data for 4 years, specifically from January 2020 to October 2023. The histopathological data of oral lesions and related information were efficiently recorded and computerized using the Microsoft® Excel database, ensuring accuracy and ease of access. The collected data will be grouped and presented in a table format based on diagnostic information from OPaDCORE data, along with the clinical diagnosis, histopathologic diagnosis based on histopathological condition, age, gender, anatomical location, and the specialty of the dentist who sent the specimen. The systemic disease and bad habits were collected from the medical records of the OPaDCORE patients. In this study, to streamline data processing, oral lesions will be categorized into three groups: non-neoplastic lesions, oral potentially malignant disorders (OPMD), and neoplastic lesions.

This study has obtained an ethical approval letter from the Health Research Ethics Commission of the Faculty of Dentistry, Universitas Trisakti with letter number 699/S1/KEPK/FKG/8/2023 along with a research permit from the Dental Hospital Universitas Trisakti with letter number 710/Dir/RSGM-P/FKG/Usakti/VII/2023.

RESULTS

As many as 174 histopathology reports and 5 reports that had inconclusive histopathologic diagnoses were excluded, resulting in a final sample of 169 reports consisting of 120 biopsy tissue specimens and 49 cytology specimens. 120 biopsy tissue reports consisting of 63 (52,5%) female and 57 (47,5%) male patients.

Oral lesion from biopsy.

The compatibility rate between clinical diagnosis and histopathologic diagnosis reached 72.5%. Based on the category of the lesion, it was found that non-neoplastic lesions with 75 compatible and 19 incompatible cases, OPMD lesions with 5 compatible cases, and neoplastic lesions with 7 compatible and 14 incompatible cases. Patients who exhibited oral lesions had an average age of 37.58 ± 15.99 years, with the majority of these lesions located in the maxillary bone (31.67%). The most prevalent type of lesions identified belonged to the non-neoplastic (78,33%) category (Table 1) followed by neoplastic (17,5%) and OPMD (4,17%).

Table 1. Distribution and frequency of histopathologic oral lesions by tissue biopsy

Lesion category	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			F	M		
Non-neoplastic	94	78,33	53	41	35,89 ± 15,58	MAX (39,36)
OPMD	5	4,17	1	4	44,8 ± 15,19	TNG (60)
Neoplastic	21	17,5	9	12	43,43 ± 16,84	TNG (28,57)
Total	**120**	**100**	**63**	**57**	**37,58 ± 15,99**	**MAX (31,67)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; MAX, maxilla; TNG, tongue

Non-neoplastic lesion.

Non-neoplastic lesions had the highest number of cases than other categories, totalling 94 cases with a ratio of female patients (84.13%) more than male patients (71.93%). The grouping of non-neoplastic lesions was divided into several subcategories (Table 2) where cystic lesions in the form of radicular cysts were the most predominant type, particularly in the maxillary bone (75%) with the gender of patients being female (60.71%) compared to male (39.29%). The average age of patients diagnosed with these lesions was 39.43 ± 14.72 years. Notably, most of the radicular cysts were specimens sent by dentists specializing in oral surgery (46.43%), with 13 cases.

The second subcategory of non-neoplastic lesions is the inflammatory lesion group with a total of 26 lesions consisting of 18 cases (19.15%) of periapical granuloma, 4 cases (4.26%) of non-specific chronic inflammation, 1 case (1.06%) calcifying fibroblastic granuloma, 1 case (1.06%) foreign body granuloma, 1 case (1.06%) pyogenic granuloma, 1 case (1.06%) osteonecrosis. From the results obtained, periapical granuloma is a lesion that is mostly found in the maxillary bone (61.11%) and female gender (55.56%) compared to men (44.44%). The average age affected by periapical granuloma was 36.88 ± 11.65 years. General practitioners (66.67%) were the doctors who encountered the most periapical granulomas with 12 cases.

Table 2. Distribution and frequency of histopathologic non-neoplastic lesion

Histopathology diagnosis	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			F	M		
Inflammatory lesions	**26**	**27,66**	**15**	**11**	**35,62 ± 11,99**	**MAX (46,15)**
Calcifying fibroblastic granuloma	1	1,06	1	0	17	GEN (100)

Foreign body granuloma	1	1,06	0	1	27	MAN (100)
Periapical granuloma	18	19,15	10	8	37 ± 11,31	MAX (61,11)
Pyogenic granuloma	1	1,06	1	0	20	MAN (100)
Non-specific chronic inflammation	4	4,26	3	1	43,75 ± 9	BM (75)
Osteonecrosis	1	1,06	0	1	21	MAX (100)
Infective lesions	**2**	**2,13**	**1**	**1**	**43,5 ± 27,58**	**GEN, LM (50)**
Acute abscess	1	1,06	0	1	24	GEN (100)
CMV ulcer	1	1,06	1	0	63	LM (100)
Cystic lesions	**51**	**54,26**	**26**	**25**	**34,75 ± 15,38**	**MAX (47,06)**
Inflammatory odontogenic cyst	1	1,06	1	0	61	MAX (100)
Dentigerous cyst	17	18,09	8	9	29,76 ± 13,88	MAN (82,35)
Radicular cyst	28	29,79	17	11	39,43 ± 14,72	MAX (75)
Mucocele	5	5,32	0	5	20,2 ± 5,17	LM (80)
Reactive lesions	**14**	**14,89**	**10**	**4**	**38,71 ± 21,44**	**GEN (71,43)**
Epulis granulomatous	2	2,13	2	0	16 ± 12,73	GEN (100)
Fibro-epithelial hyperplasia	12	12,77	8	4	42,5 ± 20,47	GEN (66,67)
Autoimmune or metabolic lesion	**1**	**1,06**	**1**	**0**	**47**	**BM (100)**
Immune mediated disease - Pemphigus vulgaris	1	1,06	1	0	47	BM (100)
Total	**94**	**100**	**53**	**41**	**35,89 ± 15,58**	**MAX (39,36)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; MAX, maxilla; GEN, gingiva; MAN, mandible; BM, buccal mucosa; LM, labial mucosa

Oral potentially malignant disorder (OPMD) lesion.

In the OPMD lesion category, there were 4 cases with definitive diagnosis of mild (40%) and moderate (40%) epithelial dysplasia. Males (75%) were diagnosed with epithelial dysplasia more than females (33.33%) with an average age of 44.5 ± 17.52 years. All OPMD lesion specimens sent to the OPaDCORE Laboratory came from dentists specializing in oral medicine. Data on the distribution of OPMD lesions can be seen in Table 3 below.

Table 3. Distribution and frequency of histopathologic OPMD lesion

Histopathology diagnosis	**n**	**%**	**Gender**		**Age (*mean* ± SD)**	**Predilection (%)**
			P	**L**		
Epithelial dysplasia	4	80	1	3	44,5 ± 17,52	TNG (50)
Mild	2	40	1	1	50 ± 22,63	BM, TNG (50)
Moderate	2	40	0	2	39 ± 16,97	PAL, TNG (50)
Lichen planus	1	20	0	1	46	TNG (100)
Total	**5**	100	**1**	**4**	**44.8 ± 15.19**	**TNG (60)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; BM, buccal mucosa; PAL, palatal; TNG, tongue

Neoplastic lesion.

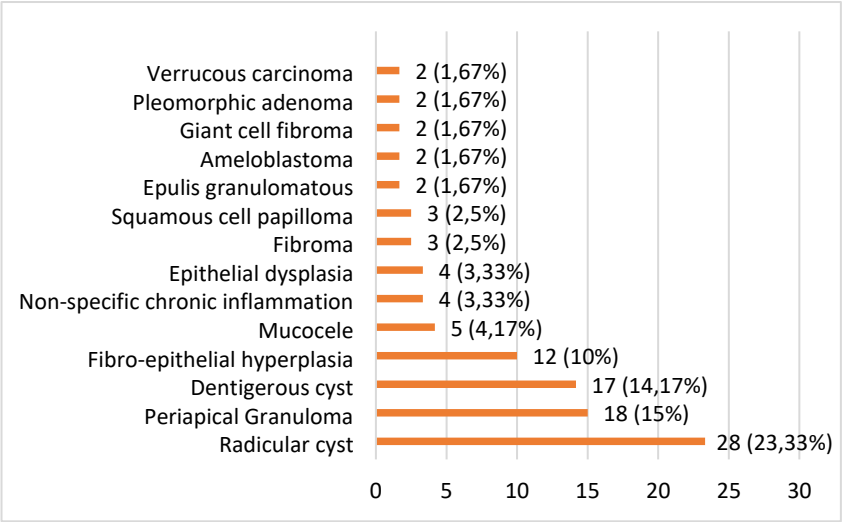
There were 21 neoplastic lesions found in patients with an overall average age of 43.43 ± 16.84 years and 6 cases were found in the tongue area. 12 cases of neoplastic lesions were sent from dentists specializing in oral surgery (57.14%). The neoplastic lesions present included: ameloblastoma (9.52%), cemento ossifying fibroma (4.76%), fibroma (14.29%), fibrolipoma (4.76%), focal cemento-osseous dysplasia (4.76%), giant cell fibroma (9.52%), capillary hemangioma (4, 76%), myofibroma (4.76%), complex odontoma (4.76%), pleomorphic adenoma (9.52%), squamous papilloma (14.29%), adenomatoid odontogenic tumor (4.76%), verrucous type squamous cell carcinoma (9.52%). Data sorting of neoplastic oral lesions can be seen in Table 4 below.

Table 4. Distribution and frequency of histopathologic neoplastic lesion

Histopathology diagnosis	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			P	L		
Benign neoplasms	**19**	**90,48**	**9**	**10**	**40,32 ± 14,02**	**MAN, TNG (26,32)**
Ameloblastoma	2	9,52	0	2	30 ± 12,73	MAN (100)
Cemento-ossifying fibroma	1	4,76	0	1	45	MAN (100)
Fibroma	3	14,29	2	1	36,67 ± 14,01	GEN, TNG, BM (33,33)
Fibrolipoma	1	4,76	0	1	63	TNG (100)
Focal cemento-osseous dysplasia	1	4,76	1	0	31	MAX (100)
Giant cell fibroma	2	9,52	0	2	41 ± 8,49	TNG (100)
Capillary hemangioma	1	4,76	0	1	56	LM (100)
Myofibroma	1	4,76	0	1	38	FOM (100)
Complex odontoma	1	4,76	1	0	16	MAN (100)
Pleomorphic Adenoma	2	9,52	2	0	48 ± 8,49	MNOS, BM (50)
Squamous cell papilloma	3	14,29	2	1	46,67 ± 19,43	TNG, LM, GEN (33,33)
Adenomatoid odontogenic tumor	1	4,76	1	0	29	MAN (100)
Malignant neoplasms	**2**	**9,52**	**0**	**2**	**73 ± 14,14**	**GEN, TNG (50)**
Verrucous carcinoma	2	9,52	0	2	73 ± 14,14	GEN, TNG (50)
Total	**21**	**100**	**9**	**12**	**43,43 ± 16,84**	**TNG (28,57)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; MAN, mandible; TNG, tongue; GEN, gingiva; BM, buccal mucosa; MAX, maxilla; LM, labial mucosa; FOM; floor of the mouth; MNOS, mouth non-otherwise specified

Figure 1. Most commonly identified lesions



Distribution and frequency based on age

The frequency distribution by age group has identified that patients in the youngster age group (0-17 years) had the two most frequent lesions, such as dentigerous cysts (30%) and radicular cysts (30%). In the adult age group (18-64 years), radicular cysts were most common (23.53%) with 24 patients. While in elderly patients (≥65 years old), fibro-epithelial hyperplasia was found (25%). The distribution of oral lesions of patients by age category can be seen in Table 5.

Table 5. Distribution of oral lesions according to age category

Histopathology diagnosis	Youngster (0-17 years)	Adult (18-64 years)	Elderly (≥65 years)
	n (%)	*n* (%)	*n* (%)
Acute abscess	-	1 (0,98)	-
Ameloblastoma	-	2 (1,96)	-
Calcifying fibroblastic granuloma	1 (10)	-	-
Cemento-ossifying fibroma	-	1 (0,98)	-
Epulis granulomatous	1 (10)	1 (0,98)	-
Fibroma	-	3 (2,94)	-
Fibro-epithelial hyperplasia	-	10 (9,8)	2 (25)
Fibrolipoma	-	1 (0,98)	-
Focal cemento-osseous dysplasia	-	1 (0,98)	-
Giant cell fibroma	-	2 (1,96)	-
Foreign body granuloma	-	1 (0,98)	-
Periapical granuloma	-	17 (16,67)	1 (12,5)
Pyogenic granuloma	-	1 (0,98)	-
Capillary hemangioma	-	1 (0,98)	-
Immune mediated disease - Pemphigus vulgaris	-	1 (0,98)	-
Non-specific chronic inflammation	-	4 (3,92)	-
Inflammatory odontogenic cyst	-	1 (0,98)	-
Verrucous carcinoma	-	1 (0,98)	1 (12,5)
Dentigerous cyst	3 (30)	13 (12,74)	1 (12,5)

Radicular cyst	3 (30)	24 (23,53)	1 (12,5)
Epithelial dysplasia	-	3 (2,94)	1 (12,5)
Lichen planus	-	1 (0,98)	-
Mucocele	1 (10)	4 (3,92)	-
Myofibroma	-	1 (0,98)	-
Complex odontoma	1 (10)	-	-
Osteonecrosis	-	1 (0,98)	-
Squamous cell papilloma	-	2 (1,96)	1 (12,5)
Pleomorphic adenoma	-	2 (1,96)	-
Adenomatoid odontogenic tumor	-	1 (0,98)	-
CMV ulcer	-	1 (0,98)	-
Total	**10 (100)**	**102 (100)**	**8 (100)**

Distribution and frequency of systemic diseases and bad habits

As explained in Table 6, there are 3 most common systemic diseases found based on the medical record data of OPaDCORE patients, there are 7 patients with allergies (4.14%), 6 patients with hypertension (3.55%) and 5 patients with gastritis (2.96%). Table 7 explains the frequency distribution of bad habits owned by patients with oral lesions, such as 8 patients who smoke (4.73%) and 2 patients who drink alcohol (1.18%).

Table 6. Distributions and frequencies of systemic disease found in patients

Systemic diseases	***n***	**%**
Allergy	7	4,14
Asthma	1	0,59
Diabetes melitus	1	0,59
Epilepsy	1	0,59
Gastritis	5	2,96
Hypertense	6	3,55
Hyperthyroid	1	0,59
Heart disease	1	0,59
Unknown	146	86,39
Total	**169**	**100**

Table 7. Distributions and frequencies of bad habits found in patients

Bad habits	***n***	**(%)**
Alcoholic	2	1,18
Smoker	8	4,73
Unknown	159	94,08
Total	**169**	**100**

Distribution and frequency of specialization of dentist

The oral lesion specimens (Table 8) were mostly sent by oral surgery specialists 56 cases (46.67%) with a high prevalence of dentigerous cysts (28,57%), followed by general practitioner 31 cases (25.83%) with 38,71% of both lesions, periapical granulomas and radicular cysts. Oral medicine specialists 22 cases (18.33%) with a high prevalence of mucocele and all of the OPMD lesions. Periodontists, 10 cases (8.33%) and dental endodontist specialists, 1 case (0.83%).

Table 8. Distributions and frequencies of bad habits found in patients

Spesialization	Histopathological diagnosis	*n*	%
Oral surgery	Dentigerous cyst	16	28,57
	Radicular cyst	13	23
	Periapical granuloma	5	8,93
	Fibroma	3	5,36
	Fibro-epithelial hyperplasia	4	7,14
	Ameloblastoma	2	3,57
	Squamous papilloma	2	3,57
	Other*	11	19,64
	Total	**56**	**100**
Oral medicine	Mucocele	4	18,18
	Epithelial dysplasia	4	18,18
	Radicular cyst	3	14
	Fibro-epithelial hyperplasia	2	9
	Giant cell fibroma	2	9
	Non-specific chronic inflammation	2	9
	Other**	5	23
	Total	**22**	**100**
General practitioner	Periapical granuloma	12	38,71
	Radicular cyst	12	38,71
	Other***	7	22,58
	Total	**31**	**100**
Periodontist	Fibro-epithelial hyperplasia	5	50
	Other****	5	50
	Total	**10**	**100**
Endodontist	Periapical granuloma	**1**	**100**

*Cemento-ossifying fibroma, epulis granulomatous, foreign body granuloma, pyogenic granuloma, capillary hemangioma, non-specific chronic inflammation, inflammatory odontogenic cyst, immune-mediated disease – pemphigus vulgaris, myofibroma, complex odontoma, Adenomatoid odontogenic tumor.
**Calcifying fibroblastic granuloma, verrucous carcinoma, lichen planus, pleomorphic adenoma, CMV ulcer.
***Fibro-epitel hyperplasia, fibrolipoma, focal cemento-osseous dysplasia, mucocele, osteonecrosis, squamous papilloma, pleomorphic adenoma.
****Acute abscess, epulis granulomatous, non-specific chronic inflammation, verrucous carcinoma, dentigerous cyst.

Oral lesion from cytology.

As it appears in Table 9, 49 histopathology reports submitted in the form of cytology preparations, 48 cases from mycological smear, and 1 case from cytological smear. The results interpreted based on the histopathology report data by mycological smear identified 29 specimens (60.41%) as positive for candida infection and 19 specimens (39.58%) as negative for candida. Cheilitis angularis is the most common mycological smear lesion found in the corners of the lips. Patients suffering from lesions often occur in males (66.67%) compared to females (33.33%) with a mean adult age of 37.83 ± 19.73. Interestingly, there was 1 cytological smear specimen from a 69-year-old female patient with a predilection in the alveolar of teeth 36 and 37 indicating atypia cells.

Table 9. Distributions and frequencies of oral mycological smear specimen

Clinical diagnosis	*n*	(%)	Gender		Age	Predilection
			P	L	(*mean* ± SD)	(%)
Cheilitis angularis	12	41,38	4	8	37,83 ± 19,73	LI (100)
Denture stomatitis	9	31,03	3	6	59,44 ± 14,74	PAL (88,89)
Candidiasis	4	13,79	3	1	47,75 ± 18,64	TNG, PAL (50)
Pseudomembranous candidiasis	4	13,79	2	2	47 ± 13,9	TNG (75)
Total	**29**	**100**	**12**	**17**	**47,17 ± 18,94**	**LI (41,38)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; LI, labial area; PAL, palatal; TNG, tongue

DISCUSSION

There may be similarities between clinical features from the same oral lesion, thus, clinical diagnosis alone cannot detect the definitive diagnosis, so it is necessary to conduct histopathologic examination. Based on 120 biopsies, the compatibility between clinical and histopathologic diagnosis is 72,5%, specifically non-neoplastic lesions with 75 compatible from 94 cases , OPMD lesions with 5 compatible cases, and neoplastic lesions with 7 compatible from 21 cases. This is consistent with Saravani et al's findings, which show 70,1% compatibility between clinical and histopathologic diagnosis, with non-neoplastic lesions being three times more compatible than neoplastic lesions.[5]

Similar to previous studies, non-neoplastic lesions were the most common lesion category compared to neoplastic and OPMD lesions.[1,6–8] In the subcategory of non-neoplastic lesions, cystic lesions (54.26%) were the most common. In contrast to the results of Kalantari et al. who had the highest frequency of non-neoplastic lesions in the subcategory of reactive lesions (34.6%).[6] In recent studies many radicular cysts are found in adulthood which is supported by Goswami et al.[9] The most common predilection for radicular cysts in this study was in the maxillary bone (75%) of 28 cases in agreement with the study by Mappanggara et al.[10,11] According to research by Sirait et al. where the incidence of radicular cysts in men is more common than in women. This is different from this study which showed a higher rate of women (26.98%) than men (19.3%).[12,13]

The most common OPMD lesion was epithelial dysplasia (80%) with a clinical diagnosis of leukoplakia in males (75%) more than females (33.33%) and this is agreed by Almeida et al.[14,15] Leukoplakia in this study mostly affects adults and occurs in various areas such as the buccal mucosa, palatal, and tongue, which agrees

with previous studies by Monteiro et al.[1] However, Amagasa et al stated that the most potential areas for these lesions are the tongue and buccal mucosa.[6] Potentially malignant lesions such as leukoplakia are closely associated with tobacco and alcohol consumption.[17–19] The low frequency of OPMD lesions may be due to public ignorance about the appearance of these lesions and the absence of visible symptoms so that sometimes patients will come to the doctor after the lesion has developed into a malignancy.

The category of neoplastic lesions is divided into benign and malignant lesions which agrees with the study by Kalantari et al.[6] Malignant neoplasms in the form of verrucous carcinomas (*n=2 cases,* 9.52%) were identified in this study, which were found in the gingiva and tongue area of elderly males (73 ± 14,14). According to Monteiro et al. in their research, mentioned that verrucous carcinomas are most commonly found in elderly men (70,70 ± 9,4) in the gingiva.[1]

Based on histopathological oral lesion report data at the OPaDCORE Laboratory, it shows that women (52.5%) have more oral lesions than men (47.5%) with the most common oral lesion category being non-neoplastic lesions (53 cases in women) compared to other oral lesion categories and this is directly proportional to previous studies that have been conducted by Kalantari et al.[6]

The results of the current study found that the average age of all oral lesions was 37.58 ± 15.99 years, which is the adult age category. This statement agrees with other studies that have been conducted previously by De Almeida et al and others too.[14,20] Most patients in the oral lesion report data at the OPaDCORE Laboratory had a history of allergy (30.43%). In contrast to research conducted by Arruda et al where the history of systemic diseases of patients in order of frequency from high to low is hypertension (24.39%).[19] The most common allergy found in OPaDCORE patients is allergy to certain drugs. There were 146 patients with no known history of systemic disease. This is due to a limitation of RSGM medical record information and limited acquisition of information from patients referred from other hospitals. The most common bad habit found in OPaDCORE patients was smoking (4,73%). According to Maserejian et al, nicotine in tobacco is carcinogenic, while alcohol promotes carcinogen penetration through oral mucosa by increasing its solubility and permeability. Thus, long-term alcohol use in tobacco users may increase the risk of lesion formation.[17–19,21]

In this study, it was found that oral surgeons sent more cases, especially periapical lesions, which agrees with the study by Kelloway et al.[22] This could be attributed to the competence of oral surgeons who have expertise in surgical therapy and their role in managing complex dental and maxillofacial conditions to prevent the spread of infection, especially in periapical lesions.[23] The categories of lesions in the study results that were mostly found by oral surgeons were non-neoplastic and neoplastic lesions. The reason that supports the high frequency of general practitioners in performing biopsies which is the second order is that general dentists in this context refer to dental endodontist students of Universitas Trisakti who performs a lot of periapical surgery where periapical lesions in this study have the highest frequency. Oral medicine specialists are the third most frequent specimen senders identifying oral mucosal lesions, especially OPMD lesions due to their competence focusing on the diagnosis and management of oral conditions, especially those related to soft tissue (mucosa).[24] As mentioned by Rich et al. that OPMD lesions, especially those triggered by tobacco use, are commonly found by oral medicine in Australia.[25]

CONCLUSION

This study demonstrates the importance of histopathologic examination in establishing the definitive diagnosis and appropriate management of oral lesions with the compatibility rate between clinical and histopathologic diagnosis were 72,5%. The most common oral lesions found in the OPaDCORE laboratory were non-neoplastic lesions in the form of cystic lesions with the highest frequency of radicular cyst (23,33%), than other lesions. This epidemiologic data is not only useful to provide the distribution and frequency of oral lesions, but also to see the relationship between the most common systemic diseases of allergy (4,14%) and bad habit of smokers (4,73%) to the manifestation of oral lesions. This study concludes that oral surgeon were the most specialists in conducting the oral lesions found in OPaDCORE.

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Histopathological Profile Of Oral Lesion At The Opadcore Laboratory, Faculty Of Dentistry, Universitas Trisakti

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Histopathological Profile Of Oral Lesion At The Opadcore Laboratory, Faculty Of Dentistry, Universitas Trisakti

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Epidemiology; histopathology; non-neoplastic; OPMD; neoplastic

ABSTRACT

Background: *A renewal of epidemiological data was carried out at Universitas Trisakti's OPaDCORE Laboratory to evaluate the prevalence and distribution of oral lesions. The research also sought to distinguish oral lesions according to their histopathological attributes, while considering factors such as age, gender, predilection, systemic disease, bad habits, and the dentist specialization.*

Method: *The study is a 4-year descriptive observational research on oral lesions, using a cross-sectional approach from January 2020 to October 2023. The data collected includes clinical diagnosis, histopathologic diagnosis, patient demographics, biopsy location, and medical history. The data was computerized using a Microsoft® Excel database.*

Result: *A total of 120 biopsy tissue reports showed that the most common oral lesions were radicular cyst (23.33%), periapical granuloma (15%), dentigerous cyst (14,17%), fibro-epithelial hyperplasia (10%), and mucocele (4,17%). Women (52,5%) had more oral lesions than men (47,5%). Among youngster (0-17 years old), dentigerous cysts (30%) and radicular cysts (30%) were common, while radicular cysts (23,53%) were common among adults (18-64 years old), and fibro-epithelial hyperplasia (25%) was common among the elderly (≥65 years old). Patients with oral lesions often had allergies (4,14%), hypertension (3,55%), gastritis (2,96%). Bad habits were also encountered with a high frequency of smokers (4,73%). Candida infection was found in 29 oral mycological smear specimens, and there was one case of cytological smear. Angular cheilitis (41.38%) was the most diagnosed condition.*

Conclusion: *Radicular cysts (23,33%) were the most common oral lesion found in the maxillary, with a higher prevalence in adult females according to OPaDCORE Laboratory's analysis*

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INTRODUCTION

Oral lesions refer to abnormal condition that can manifest within the oral cavity. The etiology and morphology are vary widely, ranging from benign to malignant.[1] Studies suggest that the prevalence of oral lesions ranges from 4.9% to 64.7% of individuals worldwide.[2] It is, therefore, crucial to promptly seek professional medical attention to prevent potential complications and safeguard overall health. Individuals who suspect the presence of oral lesions are encouraged to seek prompt medical attention.

The OPaDCORE Laboratory at Universitas Trisakti has the distinction of being the only oral pathology laboratory in West Jakarta. Given its specialization in the oral cavity, it is critical to update the epidemiological data on oral lesions. To ensure the accuracy and relevance of epidemiological data on oral lesions, it is crucial to conduct regular updates in the OPaDCORE laboratory between 2020 and 2023. With the inclusion of additional variables that have not been previously listed in the data analysis of OPaDCORE Laboratory 2019, such as the medical history of systemic disease and negative health behaviors. Similar study have been reported from Kalantari et al, that non-neoplastic lesions are the most prevalence lesions based on data over the past 23 years.[5]

It is essential to note that certain oral lesions exhibit similar characteristics and clinical features, but differ in histopathology.[3] This can lead to erroneous diagnoses, requiring histopathological examination to confirm the clinical diagnosis from clinical examination and obtain an accurate histopathologic diagnosis. According to research studies, more than 70% of oral lesion diagnoses require interpretation of clinical and histopathological examinations to achieve a standard level of diagnostic accuracy.[4] These findings highlights the significance of histopathological examination in obtaining the correct diagnosis and managing oral lesions, as clinical diagnosis alone may not be sufficient for histopathologic diagnosis and management.[4,5]

RESEARCH METHOD

This study is a cross-sectional descriptive observational research that analyzes laboratory data for 4 years, specifically from January 2020 to October 2023. The histopathological data of oral lesions and related information were efficiently recorded and computerized using the Microsoft® Excel database, ensuring accuracy and ease of access. The collected data will be grouped and presented in a table format based on diagnostic information from OPaDCORE data, along with the clinical diagnosis, histopathologic diagnosis based on histopathological condition, age, gender, anatomical location, and the specialty of the dentist who sent the specimen. The systemic disease and bad habits were collected from the medical records of the OPaDCORE patients. In this study, to streamline data processing, oral lesions will be categorized into three groups: non-neoplastic lesions, oral potentially malignant disorders (OPMD), and neoplastic lesions.

This study has obtained an ethical approval letter from the Health Research Ethics Commission of the Faculty of Dentistry, Universitas Trisakti with letter number 699/S1/KEPK/FKG/8/2023 along with a research permit from the Dental Hospital Universitas Trisakti with letter number 710/Dir/RSGM-P/FKG/Usakti/VII/2023.

RESULTS

As many as 174 histopathology reports and 5 reports that had inconclusive histopathologic diagnoses were excluded, resulting in a final sample of 169 reports consisting of 120 biopsy tissue specimens and 49 cytology specimens. 120 biopsy tissue reports consisting of 63 (52,5%) female and 57 (47,5%) male patients.

Oral lesion from biopsy.

The compatibility rate between clinical diagnosis and histopathologic diagnosis reached 72.5%. Based on the category of the lesion, it was found that non-neoplastic lesions with 75 compatible and 19 incompatible cases, OPMD lesions with 5 compatible cases, and neoplastic lesions with 7 compatible and 14 incompatible cases. Patients who exhibited oral lesions had an average age of 37.58 ± 15.99 years, with the majority of these lesions located in the maxillary bone (31.67%). The most prevalent type of lesions identified belonged to the non-neoplastic (78,33%) category (Table 1) followed by neoplastic (17,5%) and OPMD (4,17%).

Table 1. Distribution and frequency of histopathologic oral lesions by tissue biopsy

Lesion category	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			F	M		
Non-neoplastic	94	78,33	53	41	35,89 ± 15,58	MAX (39,36)
OPMD	5	4,17	1	4	44,8 ± 15,19	TNG (60)
Neoplastic	21	17,5	9	12	43,43 ± 16,84	TNG (28,57)
Total	**120**	**100**	**63**	**57**	**37,58 ± 15,99**	**MAX (31,67)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; MAX, maxilla; TNG, tongue

Non-neoplastic lesion.

Non-neoplastic lesions had the highest number of cases than other categories, totalling 94 cases with a ratio of female patients (84.13%) more than male patients (71.93%). The grouping of non-neoplastic lesions was divided into several subcategories (Table 2) where cystic lesions in the form of radicular cysts were the most predominant type, particularly in the maxillary bone (75%) with the gender of patients being female (60.71%) compared to male (39.29%). The average age of patients diagnosed with these lesions was 39.43 ± 14.72 years. Notably, most of the radicular cysts were specimens sent by dentists specializing in oral surgery (46.43%), with 13 cases.

The second subcategory of non-neoplastic lesions is the inflammatory lesion group with a total of 26 lesions consisting of 18 cases (19.15%) of periapical granuloma, 4 cases (4.26%) of non-specific chronic inflammation, 1 case (1.06%) calcifying fibroblastic granuloma, 1 case (1.06%) foreign body granuloma, 1 case (1.06%) pyogenic granuloma, 1 case (1.06%) osteonecrosis. From the results obtained, periapical granuloma is a lesion that is mostly found in the maxillary bone (61.11%) and female gender (55.56%) compared to men (44.44%). The average age affected by periapical granuloma was 36.88 ± 11.65 years. General practitioners (66.67%) were the doctors who encountered the most periapical granulomas with 12 cases.

Table 2. Distribution and frequency of histopathologic non-neoplastic lesion

Histopathology diagnosis	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			F	M		
Inflammatory lesions	**26**	**27,66**	**15**	**11**	**35,62 ± 11,99**	**MAX (46,15)**
Calcifying fibroblastic granuloma	1	1,06	1	0	17	GEN (100)

Foreign body granuloma	1	1,06	0	1	27	MAN (100)
Periapical granuloma	18	19,15	10	8	37 ± 11,31	MAX (61,11)
Pyogenic granuloma	1	1,06	1	0	20	MAN (100)
Non-specific chronic inflammation	4	4,26	3	1	43,75 ± 9	BM (75)
Osteonecrosis	1	1,06	0	1	21	MAX (100)
Infective lesions	**2**	**2,13**	**1**	**1**	**43,5 ± 27,58**	**GEN, LM (50)**
Acute abscess	1	1,06	0	1	24	GEN (100)
CMV ulcer	1	1,06	1	0	63	LM (100)
Cystic lesions	**51**	**54,26**	**26**	**25**	**34,75 ± 15,38**	**MAX (47,06)**
Inflammatory odontogenic cyst	1	1,06	1	0	61	MAX (100)
Dentigerous cyst	17	18,09	8	9	29,76 ± 13,88	MAN (82,35)
Radicular cyst	28	29,79	17	11	39,43 ± 14,72	MAX (75)
Mucocele	5	5,32	0	5	20,2 ± 5,17	LM (80)
Reactive lesions	**14**	**14,89**	**10**	**4**	**38,71 ± 21,44**	**GEN (71,43)**
Epulis granulomatous	2	2,13	2	0	16 ± 12,73	GEN (100)
Fibro-epithelial hyperplasia	12	12,77	8	4	42,5 ± 20,47	GEN (66,67)
Autoimmune or metabolic lesion	**1**	**1,06**	**1**	**0**	**47**	**BM (100)**
Immune mediated disease - Pemphigus vulgaris	1	1,06	1	0	47	BM (100)
Total	**94**	**100**	**53**	**41**	**35,89 ± 15,58**	**MAX (39,36)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; MAX, maxilla; GEN, gingiva; MAN, mandible; BM, buccal mucosa; LM, labial mucosa

Oral potentially malignant disorder (OPMD) lesion.

In the OPMD lesion category, there were 4 cases with definitive diagnosis of mild (40%) and moderate (40%) epithelial dysplasia. Males (75%) were diagnosed with epithelial dysplasia more than females (33.33%) with an average age of 44.5 ± 17.52 years. All OPMD lesion specimens sent to the OPaDCORE Laboratory came from dentists specializing in oral medicine. Data on the distribution of OPMD lesions can be seen in Table 3 below.

Table 3. Distribution and frequency of histopathologic OPMD lesion

Histopathology diagnosis	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			P	L		
Epithelial dysplasia	4	80	1	3	44,5 ± 17,52	TNG (50)
Mild	2	40	1	1	50 ± 22,63	BM, TNG (50)
Moderate	2	40	0	2	39 ± 16,97	PAL, TNG (50)
Lichen planus	1	20	0	1	46	TNG (100)
Total	**5**	100	**1**	**4**	**44.8 ± 15.19**	**TNG (60)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; BM, buccal mucosa; PAL, palatal; TNG, tongue

Neoplastic lesion.

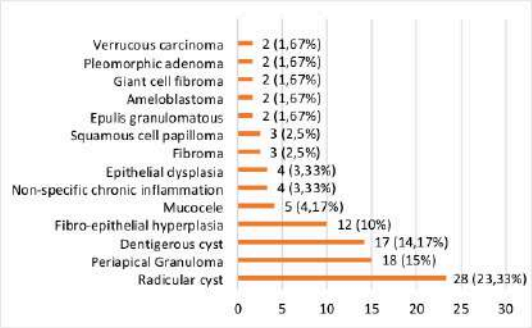
There were 21 neoplastic lesions found in patients with an overall average age of 43.43 ± 16.84 years and 6 cases were found in the tongue area. 12 cases of neoplastic lesions were sent from dentists specializing in oral surgery (57.14%). The neoplastic lesions present included: ameloblastoma (9.52%), cemento ossifying fibroma (4.76%), fibroma (14.29%), fibrolipoma (4.76%), focal cemento-osseous dysplasia (4.76%), giant cell fibroma (9.52%), capillary hemangioma (4, 76%), myofibroma (4.76%), complex odontoma (4.76%), pleomorphic adenoma (9.52%), squamous papilloma (14.29%), adenomatoid odontogenic tumor (4.76%), verrucous type squamous cell carcinoma (9.52%). Data sorting of neoplastic oral lesions can be seen in Table 4 below.

Table 4. Distribution and frequency of histopathologic neoplastic lesion

Histopathology diagnosis	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			P	L		
Benign neoplasms	**19**	**90,48**	**9**	**10**	**40,32 ± 14,02**	**MAN, TNG (26,32)**
Ameloblastoma	2	9,52	0	2	30 ± 12,73	MAN (100)
Cemento-ossifying fibroma	1	4,76	0	1	45	MAN (100)
Fibroma	3	14,29	2	1	36,67 ± 14,01	GEN, TNG, BM (33,33)
Fibrolipoma	1	4,76	0	1	63	TNG (100)
Focal cemento-osseous dysplasia	1	4,76	1	0	31	MAX (100)
Giant cell fibroma	2	9,52	0	2	41 ± 8,49	TNG (100)
Capillary hemangioma	1	4,76	0	1	56	LM (100)
Myofibroma	1	4,76	0	1	38	FOM (100)
Complex odontoma	1	4,76	1	0	16	MAN (100)
Pleomorphic Adenoma	2	9,52	2	0	48 ± 8,49	MNOS, BM (50)
Squamous cell papilloma	3	14,29	2	1	46,67 ± 19,43	TNG, LM, GEN (33,33)
Adenomatoid odontogenic tumor	1	4,76	1	0	29	MAN (100)
Malignant neoplasms	**2**	**9,52**	**0**	**2**	**73 ± 14,14**	**GEN, TNG (50)**
Verrucous carcinoma	2	9,52	0	2	73 ± 14,14	GEN, TNG (50)
Total	**21**	**100**	**9**	**12**	**43,43 ± 16,84**	**TNG (28,57)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; MAN, mandible; TNG, tongue; GEN, gingiva; BM, buccal mucosa; MAX, maxilla; LM, labial mucosa; FOM; floor of the mouth; MNOS, mouth non-otherwise specified

Figure 1. Most commonly identified lesions



Distribution and frequency based on age

The frequency distribution by age group has identified that patients in the youngster age group (0-17 years) had the two most frequent lesions, such as dentigerous cysts (30%) and radicular cysts (30%). In the adult age group (18-64 years), radicular cysts were most common (23.53%) with 24 patients. While in elderly patients (≥65 years old), fibro-epithelial hyperplasia was found (25%). The distribution of oral lesions of patients by age category can be seen in Table 5.

Table 5. Distribution of oral lesions according to age category

Histopathology diagnosis	Youngster (0-17 years)	Adult (18-64 years)	Elderly (≥65 years)
	n (%)	*n* (%)	*n* (%)
Acute abscess	-	1 (0,98)	-
Ameloblastoma	-	2 (1,96)	-
Calcifying fibroblastic granuloma	1 (10)	-	-
Cemento-ossifying fibroma	-	1 (0,98)	-
Epulis granulomatous	1 (10)	1 (0,98)	-
Fibroma	-	3 (2,94)	-
Fibro-epithelial hyperplasia	-	10 (9,8)	2 (25)
Fibrolipoma	-	1 (0,98)	-
Focal cemento-osseous dysplasia	-	1 (0,98)	-
Giant cell fibroma	-	2 (1,96)	-
Foreign body granuloma	-	1 (0,98)	-
Periapical granuloma	-	17 (16,67)	1 (12,5)
Pyogenic granuloma	-	1 (0,98)	-
Capillary hemangioma	-	1 (0,98)	-
Immune mediated disease - Pemphigus vulgaris	-	1 (0,98)	-
Non-specific chronic inflammation	-	4 (3,92)	-
Inflammatory odontogenic cyst	-	1 (0,98)	-
Verrucous carcinoma	-	1 (0,98)	1 (12,5)
Dentigerous cyst	3 (30)	13 (12,74)	1 (12,5)

Radicular cyst	3 (30)	24 (23,53)	1 (12,5)
Epithelial dysplasia	-	3 (2,94)	1 (12,5)
Lichen planus	-	1 (0,98)	-
Mucocele	1 (10)	4 (3,92)	-
Myofibroma	-	1 (0,98)	-
Complex odontoma	1 (10)	-	-
Osteonecrosis	-	1 (0,98)	-
Squamous cell papilloma	-	2 (1,96)	1 (12,5)
Pleomorphic adenoma	-	2 (1,96)	-
Adenomatoid odontogenic tumor	-	1 (0,98)	-
CMV ulcer	-	1 (0,98)	-
Total	**10 (100)**	**102 (100)**	**8 (100)**

Distribution and frequency of systemic diseases and bad habits

As explained in Table 6, there are 3 most common systemic diseases found based on the medical record data of OPaDCORE patients, there are 7 patients with allergies (4.14%), 6 patients with hypertension (3.55%) and 5 patients with gastritis (2.96%). Table 7 explains the frequency distribution of bad habits owned by patients with oral lesions, such as 8 patients who smoke (4.73%) and 2 patients who drink alcohol (1.18%).

Table 6. Distributions and frequencies of systemic disease found in patients

Systemic diseases	***n***	**%**
Allergy	7	4,14
Asthma	1	0,59
Diabetes melitus	1	0,59
Epilepsy	1	0,59
Gastritis	5	2,96
Hypertense	6	3,55
Hyperthyroid	1	0,59
Heart disease	1	0,59
Unknown	146	86,39
Total	**169**	**100**

Table 7. Distributions and frequencies of bad habits found in patients

Bad habits	***n***	**(%)**
Alcoholic	2	1,18
Smoker	8	4,73
Unknown	159	94,08
Total	**169**	**100**

Distribution and frequency of specialization of dentist

The oral lesion specimens (Table 8) were mostly sent by oral surgery specialists 56 cases (46.67%) with a high prevalence of dentigerous cysts (28.57%), followed by general practitioner 31 cases (25.83%) with

38,71% of both lesions, periapical granulomas and radicular cysts. Oral medicine specialists 22 cases (18.33%) with a high prevalence of mucocele and all of the OPMD lesions. Periodontists, 10 cases (8.33%) and dental endodontist specialists, 1 case (0.83%).

Table 8. Distributions and frequencies of bad habits found in patients

Spesialization	Histopathological diagnosis	*n*	%
Oral surgery	Dentigerous cyst	16	28,57
	Radicular cyst	13	23
	Periapical granuloma	5	8,93
	Fibroma	3	5,36
	Fibro-epithelial hyperplasia	4	7,14
	Ameloblastoma	2	3,57
	Squamous papilloma	2	3,57
	Other*	11	19,64
	Total	**56**	**100**
Oral medicine	Mucocele	4	18,18
	Epithelial dysplasia	4	18,18
	Radicular cyst	3	14
	Fibro-epithelial hyperplasia	2	9
	Giant cell fibroma	2	9
	Non-specific chronic inflammation	2	9
	Other**	5	23
	Total	**22**	**100**
General practitioner	Periapical granuloma	12	38,71
	Radicular cyst	12	38,71
	Other***	7	22,58
	Total	**31**	**100**
Periodontist	Fibro-epithelial hyperplasia	5	50
	Other****	5	50
	Total	**10**	**100**
Endodontist	Periapical granuloma	**1**	**100**

*Cemento-ossifying fibroma, epulis granulomatous, foreign body granuloma, pyogenic granuloma, capillary hemangioma, non-specific chronic inflammation, inflammatory odontogenic cyst, immune-mediated disease – pemphigus vulgaris, myofibroma, complex odontoma, Adenomatoid odontogenic tumor.
**Calcifying fibroblastic granuloma, verrucous carcinoma, lichen planus, pleomorphic adenoma, CMV ulcer.
***Fibro-epitel hyperplasia, fibrolipoma, focal cemento-osseous dysplasia, mucocele, osteonecrosis, squamous papilloma, pleomorphic adenoma.
****Acute abscess, epulis granulomatous, non-specific chronic inflammation, verrucous carcinoma, dentigerous cyst.

Oral lesion from cytology.

As it appears in Table 9, 49 histopathology reports submitted in the form of cytology preparations, 48 cases from mycological smear, and 1 case from cytological smear. The results interpreted based on the histopathology report data by mycological smear identified 29 specimens (60.41%) as positive for candida infection and 19 specimens (39.58%) as negative for candida. Cheilitis angularis is the most common

mycological smear lesion found in the corners of the lips. Patients suffering from lesions often occur in males (66.67%) compared to females (33.33%) with a mean adult age of 37.83 ± 19.73. Interestingly, there was 1 cytological smear specimen from a 69-year-old female patient with a predilection in the alveolar of teeth 36 and 37 indicating atypia cells.

Table 9. Distributions and frequencies of oral mycological smear specimen

Clinical diagnosis	*n*	(%)	Gender		Age	Predilection
			P	L	(*mean* ± SD)	(%)
Cheilitis angularis	12	41,38	4	8	37,83 ± 19,73	LI (100)
Denture stomatitis	9	31,03	3	6	59,44 ± 14,74	PAL (88,89)
Candidiasis	4	13,79	3	1	47,75 ± 18,64	TNG, PAL (50)
Pseudomembranous candidiasis	4	13,79	2	2	47 ± 13,9	TNG (75)
Total	**29**	**100**	**12**	**17**	**47,17 ± 18,94**	**LI (41,38)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; LI, labial area; PAL, palatal; TNG, tongue

DISCUSSION

There may be similarities between clinical features from the same oral lesion, thus, clinical diagnosis alone cannot detect the definitive diagnosis, so it is necessary to conduct histopathologic examination. Based on 120 biopsies, the compatibility between clinical and histopathologic diagnosis is 72,5%, specifically non-neoplastic lesions with 75 compatible from 94 cases , OPMD lesions with 5 compatible cases, and neoplastic lesions with 7 compatible from 21 cases. This is consistent with Saravani et al's findings, which show 70,1% compatibility between clinical and histopathologic diagnosis, with non-neoplastic lesions being three times more compatible than neoplastic lesions.[5]

Similar to previous studies, non-neoplastic lesions were the most common lesion category compared to neoplastic and OPMD lesions.[1,6–8] In the subcategory of non-neoplastic lesions, cystic lesions (54.26%) were the most common. In contrast to the results of Kalantari et al. who had the highest frequency of non-neoplastic lesions in the subcategory of reactive lesions (34.6%).[6] In recent studies many radicular cysts are found in adulthood which is supported by Goswami et al.[9] The most common predilection for radicular cysts in this study was in the maxillary bone (75%) of 28 cases in agreement with the study by Mappanggara et al.[10,11] According to research by Sirait et al. where the incidence of radicular cysts in men is more common than in women. This is different from this study which showed a higher rate of women (26.98%) than men (19.3%).[12,13]

The most common OPMD lesion was epithelial dysplasia (80%) with a clinical diagnosis of leukoplakia in males (75%) more than females (33.33%) and this is agreed by Almeida et al.[14,15] Leukoplakia in this study mostly affects adults and occurs in various areas such as the buccal mucosa, palatal, and tongue, which agrees with previous studies by Monteiro et al.[1] However, Amagasa et al stated that the most potential areas for these lesions are the tongue and buccal mucosa.[6] Potentially malignant lesions such as leukoplakia are closely associated with tobacco and alcohol consumption.[17–19] The low frequency of OPMD lesions may be due to public ignorance about the appearance of these lesions and the absence of visible symptoms so that sometimes patients will come to the doctor after the lesion has developed into a malignancy.

The category of neoplastic lesions is divided into benign and malignant lesions which agrees with the study by Kalantari et al.[6] Malignant neoplasms in the form of verrucous carcinomas (*n=2 cases*, 9.52%) were identified in this study, which were found in the gingiva and tongue area of elderly males (73 ± 14,14). According to Monteiro et al. in their research, mentioned that verrucous carcinomas are most commonly found in elderly men (70,70 ± 9,4) in the gingiva.[1]

Based on histopathological oral lesion report data at the OPaDCORE Laboratory, it shows that women (52.5%) have more oral lesions than men (47.5%) with the most common oral lesion category being non-neoplastic lesions (53 cases in women) compared to other oral lesion categories and this is directly proportional to previous studies that have been conducted by Kalantari et al.[6]

The results of the current study found that the average age of all oral lesions was 37.58 ± 15.99 years, which is the adult age category. This statement agrees with other studies that have been conducted previously by De Almeida et al and others too.[14,20] Most patients in the oral lesion report data at the OPaDCORE Laboratory had a history of allergy (30.43%). In contrast to research conducted by Arruda et al where the history of systemic diseases of patients in order of frequency from high to low is hypertension (24.39%).[19] The most common allergy found in OPaDCORE patients is allergy to certain drugs. There were 146 patients with no known history of systemic disease. This is due to a limitation of RSGM medical record information and limited acquisition of information from patients referred from other hospitals. The most common bad habit found in OPaDCORE patients was smoking (4,73%). According to Maserejian et al, nicotine in tobacco is carcinogenic, while alcohol promotes carcinogen penetration through oral mucosa by increasing its solubility and permeability. Thus, long-term alcohol use in tobacco users may increase the risk of lesion formation.[17–19,21]

In this study, it was found that oral surgeons sent more cases, especially periapical lesions, which agrees with the study by Kelloway et al.[22] This could be attributed to the competence of oral surgeons who have expertise in surgical therapy and their role in managing complex dental and maxillofacial conditions to prevent the spread of infection, especially in periapical lesions.[23] The categories of lesions in the study results that were mostly found by oral surgeons were non-neoplastic and neoplastic lesions. The reason that supports the high frequency of general practitioners in performing biopsies which is the second order is that general dentists in this context refer to dental endodontist students of Universitas Trisakti who performs a lot of periapical surgery where periapical lesions in this study have the highest frequency. Oral medicine specialists are the third most frequent specimen senders identifying oral mucosal lesions, especially OPMD lesions due to their competence focusing on the diagnosis and management of oral conditions, especially those related to soft tissue (mucosa).[24] As mentioned by Rich et al. that OPMD lesions, especially those triggered by tobacco use, are commonly found by oral medicine in Australia.[25]

CONCLUSION

This study demonstrates the importance of histopathologic examination in establishing the definitive diagnosis and appropriate management of oral lesions with the compatibility rate between clinical and histopathologic diagnosis were 72,5%. The most common oral lesions found in the OPaDCORE laboratory were non-neoplastic lesions in the form of cystic lesions with the highest frequency of radicular cyst (23,33%), than other lesions. This epidemiologic data is not only useful to provide the distribution and frequency of oral lesions, but also to see the relationship between the most common systemic diseases of allergy (4,14%) and bad habit

of smokers (4,73%) to the manifestation of oral lesions. This study concludes that oral surgeon were the most specialists in conducting the oral lesions found in OPaDCORE.

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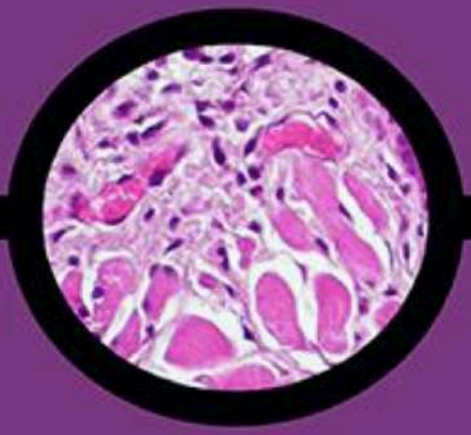

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Histopathological Profile Of Oral Lesion At The Opadcore Laboratory, Faculty Of Dentistry, Universitas Trisakti

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Epidemiology; histopathology; non-neoplastic; OPMD; neoplastic

ABSTRACT

Background: *A renewal of epidemiological data was carried out at Universitas Trisakti's OPaDCORE Laboratory to evaluate the prevalence and distribution of oral lesions. The research also sought to distinguish oral lesions according to their histopathological attributes, while considering factors such as age, gender, predilection, systemic disease, bad habits, and the dentist specialization.*

Method: *The study is a 4-year descriptive observational research on oral lesions, using a cross-sectional approach from January 2020 to October 2023. The data collected includes clinical diagnosis, histopathologic diagnosis, patient demographics, biopsy location, and medical history. The data was computerized using a Microsoft® Excel database.*

Result: *A total of 120 biopsy tissue reports showed that the most common oral lesions were radicular cyst (23.33%), periapical granuloma (15%), dentigerous cyst (14,17%), fibro-epithelial hyperplasia (10%), and mucocele (4,17%). Women (52,5%) had more oral lesions than men (47,5%). Among youngster (0-17 years old), dentigerous cysts (30%) and radicular cysts (30%) were common, while radicular cysts (23,53%) were common among adults (18-64 years old), and fibro-epithelial hyperplasia (25%) was common among the elderly (≥65 years old). Patients with oral lesions often had allergies (4,14%), hypertension (3,55%), gastritis (2,96%). Bad habits were also encountered with a high frequency of smokers (4,73%). Candida infection was found in 29 oral mycological smear specimens, and there was one case of cytological smear. Angular cheilitis (41.38%) was the most diagnosed condition.*

Conclusion: *Radicular cysts (23,33%) were the most common oral lesion found in the maxillary, with a higher prevalence in adult females according to OPaDCORE Laboratory's analysis*

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INTRODUCTION

Oral lesions refer to abnormal condition that can manifest within the oral cavity. The etiology and morphology are vary widely, ranging from benign to malignant.[1] Studies suggest that the prevalence of oral lesions ranges from 4.9% to 64.7% of individuals worldwide.[2] It is, therefore, crucial to promptly seek professional medical attention to prevent potential complications and safeguard overall health. Individuals who suspect the presence of oral lesions are encouraged to seek prompt medical attention.

Oral Pathology for Diagnostic, Collaboration Research and Education (OPaDCore) Laboratory at Universitas Trisakti has the distinction of being the only oral pathology laboratory in West Jakarta. Given its specialization in the oral cavity, it is critical to update the epidemiological data on oral lesions. To ensure the accuracy and relevance of epidemiological data on oral lesions, it is crucial to conduct regular updates in the OPaDCORE laboratory between 2020 and 2023. With the inclusion of additional variables that have not been previously listed in the data analysis of OPaDCORE Laboratory 2019, such as the medical history of systemic disease and negative health behaviors. Similar study have been reported from Kalantari et al, that non-neoplastic lesions are the most prevalence lesions based on data over the past 23 years.[6]

It is essential to note that certain oral lesions exhibit similar characteristics and clinical features, but differ in histopathology.[3] This can lead to erroneous diagnoses, requiring histopathological examination to confirm the clinical diagnosis from clinical examination and obtain an accurate histopathologic diagnosis. According to research studies, more than 70% of oral lesion diagnoses require interpretation of clinical and histopathological examinations to achieve a standard level of diagnostic accuracy.[4] These findings highlights the significance of histopathological examination in obtaining the correct diagnosis and managing oral lesions, as clinical diagnosis alone may not be sufficient for histopathologic diagnosis and management.[4,5]

RESEARCH METHOD

This study is a cross-sectional descriptive observational research that analyzes laboratory data for 4 years, specifically from January 2020 to October 2023. The histopathological data of oral lesions and related information were efficiently recorded and computerized using the Microsoft® Excel database, ensuring accuracy and ease of access. The collected data will be grouped and presented in a table format based on diagnostic information from OPaDCORE data, along with the clinical diagnosis, histopathologic diagnosis based on histopathological condition, age, gender, anatomical location, and the specialty of the dentist who sent the specimen. The systemic disease and bad habits were collected from the medical records of the OPaDCORE patients. In this study, to streamline data processing, oral lesions will be categorized into three groups: non-neoplastic lesions, oral potentially malignant disorders (OPMD), and neoplastic lesions.

This study has obtained an ethical approval letter from the Health Research Ethics Commission of the Faculty of Dentistry, Universitas Trisakti with letter number 699/S1/KEPK/FKG/8/2023 along with a research permit from the Dental Hospital Universitas Trisakti with letter number 710/Dir/RSGM-P/FKG/Usakti/VII/2023.

RESULTS

As many as 174 histopathology reports and 5 reports that had inconclusive histopathologic diagnoses were excluded, resulting in a final sample of 169 reports consisting of 120 biopsy tissue specimens and 49 cytology specimens. 120 biopsy tissue reports consisting of 63 (52,5%) female and 57 (47,5%) male patients.

Oral lesion from biopsy.

The compatibility rate between clinical diagnosis and histopathologic diagnosis reached 72.5%. Based on the category of the lesion, it was found that non-neoplastic lesions with 75 compatible and 19 incompatible cases, OPMD lesions with 5 compatible cases, and neoplastic lesions with 7 compatible and 14 incompatible cases. Patients who exhibited oral lesions had an average age of 37.58 ± 15.99 years, with the majority of these lesions located in the maxillary bone (31.67%). The most prevalent type of lesions identified belonged to the non-neoplastic (78,33%) category (Table 1) followed by neoplastic (17,5%) and OPMD (4,17%).

Table 1. Distribution and frequency of histopathologic oral lesions by tissue biopsy

Lesion category	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			F	M		
Non-neoplastic	94	78,33	53	41	35,89 ± 15,58	MAX (39,36)
OPMD	5	4,17	1	4	44,8 ± 15,19	TNG (60)
Neoplastic	21	17,5	9	12	43,43 ± 16,84	TNG (28,57)
Total	**120**	**100**	**63**	**57**	**37,58 ± 15,99**	**MAX (31,67)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; MAX, maxilla; TNG, tongue

Non-neoplastic lesion.

Non-neoplastic lesions had the highest number of cases than other categories, totalling 94 cases with a ratio of female patients (84.13%) more than male patients (71.93%). The grouping of non-neoplastic lesions was divided into several subcategories (Table 2) where cystic lesions in the form of radicular cysts were the most predominant type, particularly in the maxillary bone (75%) with the gender of patients being female (60.71%) compared to male (39.29%). The average age of patients diagnosed with these lesions was 39.43 ± 14.72 years. Notably, most of the radicular cysts were specimens sent by dentists specializing in oral surgery (46.43%), with 13 cases.

The second subcategory of non-neoplastic lesions is the inflammatory lesion group with a total of 26 lesions consisting of 18 cases (19.15%) of periapical granuloma, 4 cases (4.26%) of non-specific chronic inflammation, 1 case (1.06%) calcifying fibroblastic granuloma, 1 case (1.06%) foreign body granuloma, 1 case (1.06%) pyogenic granuloma, 1 case (1.06%) osteonecrosis. From the results obtained, periapical granuloma is a lesion that is mostly found in the maxillary bone (61.11%) and female gender (55.56%) compared to men (44.44%). The average age affected by periapical granuloma was 36.88 ± 11.65 years. General practitioners (66.67%) were the doctors who encountered the most periapical granulomas with 12 cases.

Table 2. Distribution and frequency of histopathologic non-neoplastic lesion

Histopathology diagnosis	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			F	M		
Inflammatory lesions	**26**	**27,66**	**15**	**11**	**35,62 ± 11,99**	**MAX (46,15)**
Calcifying fibroblastic granuloma	1	1,06	1	0	17	GEN (100)

Foreign body granuloma	1	1,06	0	1	27	MAN (100)
Periapical granuloma	18	19,15	10	8	37 ± 11,31	MAX (61,11)
Pyogenic granuloma	1	1,06	1	0	20	MAN (100)
Non-specific chronic inflammation	4	4,26	3	1	43,75 ± 9	BM (75)
Osteonecrosis	1	1,06	0	1	21	MAX (100)
Infective lesions	**2**	**2,13**	**1**	**1**	**43,5 ± 27,58**	**GEN, LM (50)**
Acute abscess	1	1,06	0	1	24	GEN (100)
CMV ulcer	1	1,06	1	0	63	LM (100)
Cystic lesions	**51**	**54,26**	**26**	**25**	**34,75 ± 15,38**	**MAX (47,06)**
Inflammatory odontogenic cyst	1	1,06	1	0	61	MAX (100)
Dentigerous cyst	17	18,09	8	9	29,76 ± 13,88	MAN (82,35)
Radicular cyst	28	29,79	17	11	39,43 ± 14,72	MAX (75)
Mucocele	5	5,32	0	5	20,2 ± 5,17	LM (80)
Reactive lesions	**14**	**14,89**	**10**	**4**	**38,71 ± 21,44**	**GEN (71,43)**
Epulis granulomatous	2	2,13	2	0	16 ± 12,73	GEN (100)
Fibro-epithelial hyperplasia	12	12,77	8	4	42,5 ± 20,47	GEN (66,67)
Autoimmune or metabolic lesion	**1**	**1,06**	**1**	**0**	**47**	**BM (100)**
Immune mediated disease - Pemphigus vulgaris	1	1,06	1	0	47	BM (100)
Total	**94**	**100**	**53**	**41**	**35,89 ± 15,58**	**MAX (39,36)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; MAX, maxilla; GEN, gingiva; MAN, mandible; BM, buccal mucosa; LM, labial mucosa

Oral potentially malignant disorder (OPMD) lesion.

In the OPMD lesion category, there were 4 cases with definitive diagnosis of mild (40%) and moderate (40%) epithelial dysplasia. Males (75%) were diagnosed with epithelial dysplasia more than females (33.33%) with an average age of 44.5 ± 17.52 years. All OPMD lesion specimens sent to the OPaDCORE Laboratory came from dentists specializing in oral medicine. Data on the distribution of OPMD lesions can be seen in Table 3 below.

Table 3. Distribution and frequency of histopathologic OPMD lesion

Histopathology diagnosis	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			P	L		
Epithelial dysplasia	4	80	1	3	44,5 ± 17,52	TNG (50)
Mild	2	40	1	1	50 ± 22,63	BM, TNG (50)
Moderate	2	40	0	2	39 ± 16,97	PAL, TNG (50)
Lichen planus	1	20	0	1	46	TNG (100)
Total	**5**	100	**1**	**4**	**44.8 ± 15.19**	**TNG (60)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; BM, buccal mucosa; PAL, palatal; TNG, tongue

Neoplastic lesion.

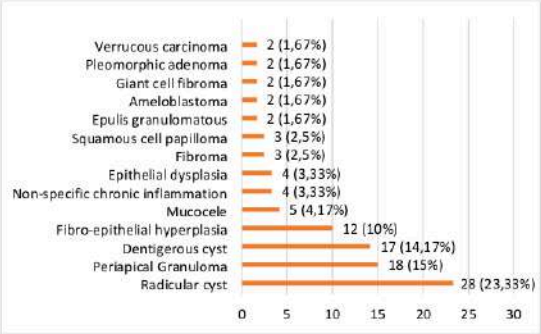
There were 21 neoplastic lesions found in patients with an overall average age of 43.43 ± 16.84 years and 6 cases were found in the tongue area. 12 cases of neoplastic lesions were sent from dentists specializing in oral surgery (57.14%). The neoplastic lesions present included: ameloblastoma (9.52%), cemento ossifying fibroma (4.76%), fibroma (14.29%), fibrolipoma (4.76%), focal cemento-osseous dysplasia (4.76%), giant cell fibroma (9.52%), capillary hemangioma (4, 76%), myofibroma (4.76%), complex odontoma (4.76%), pleomorphic adenoma (9.52%), squamous papilloma (14.29%), adenomatoid odontogenic tumor (4.76%), verrucous type squamous cell carcinoma (9.52%). Data sorting of neoplastic oral lesions can be seen in Table 4 below.

Table 4. Distribution and frequency of histopathologic neoplastic lesion

Histopathology diagnosis	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			P	L		
Benign neoplasms	**19**	**90,48**	**9**	**10**	**40,32 ± 14,02**	**MAN, TNG (26,32)**
Ameloblastoma	2	9,52	0	2	30 ± 12,73	MAN (100)
Cemento-ossifying fibroma	1	4,76	0	1	45	MAN (100)
Fibroma	3	14,29	2	1	36,67 ± 14,01	GEN, TNG, BM (33,33)
Fibrolipoma	1	4,76	0	1	63	TNG (100)
Focal cemento-osseous dysplasia	1	4,76	1	0	31	MAX (100)
Giant cell fibroma	2	9,52	0	2	41 ± 8,49	TNG (100)
Capillary hemangioma	1	4,76	0	1	56	LM (100)
Myofibroma	1	4,76	0	1	38	FOM (100)
Complex odontoma	1	4,76	1	0	16	MAN (100)
Pleomorphic Adenoma	2	9,52	2	0	48 ± 8,49	MNOS, BM (50)
Squamous cell papilloma	3	14,29	2	1	46,67 ± 19,43	TNG, LM, GEN (33,33)
Adenomatoid odontogenic tumor	1	4,76	1	0	29	MAN (100)
Malignant neoplasms	**2**	**9,52**	**0**	**2**	**73 ± 14,14**	**GEN, TNG (50)**
Verrucous carcinoma	2	9,52	0	2	73 ± 14,14	GEN, TNG (50)
Total	**21**	**100**	**9**	**12**	**43,43 ± 16,84**	**TNG (28,57)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; MAN, mandible; TNG, tongue; GEN, gingiva; BM, buccal mucosa; MAX, maxilla; LM, labial mucosa; FOM; floor of the mouth; MNOS, mouth non-otherwise specified

Figure 1. Most commonly identified lesions



Distribution and frequency based on age

The frequency distribution by age group has identified that patients in the youngster age group (0-17 years) had the two most frequent lesions, such as dentigerous cysts (30%) and radicular cysts (30%). In the adult age group (18-64 years), radicular cysts were most common (23.53%) with 24 patients. While in elderly patients (≥65 years old), fibro-epithelial hyperplasia was found (25%). The distribution of oral lesions of patients by age category can be seen in Table 5.

Table 5. Distribution of oral lesions according to age category

Histopathology diagnosis	Youngster (0-17 years)	Adult (18-64 years)	Elderly (≥65 years)
	n (%)	*n* (%)	*n* (%)
Acute abscess	-	1 (0,98)	-
Ameloblastoma	-	2 (1,96)	-
Calcifying fibroblastic granuloma	1 (10)	-	-
Cemento-ossifying fibroma	-	1 (0,98)	-
Epulis granulomatous	1 (10)	1 (0,98)	-
Fibroma	-	3 (2,94)	-
Fibro-epithelial hyperplasia	-	10 (9,8)	2 (25)
Fibrolipoma	-	1 (0,98)	-
Focal cemento-osseous dysplasia	-	1 (0,98)	-
Giant cell fibroma	-	2 (1,96)	-
Foreign body granuloma	-	1 (0,98)	-
Periapical granuloma	-	17 (16,67)	1 (12,5)
Pyogenic granuloma	-	1 (0,98)	-
Capillary hemangioma	-	1 (0,98)	-
Immune mediated disease - Pemphigus vulgaris	-	1 (0,98)	-
Non-specific chronic inflammation	-	4 (3,92)	-
Inflammatory odontogenic cyst	-	1 (0,98)	-
Verrucous carcinoma	-	1 (0,98)	1 (12,5)
Dentigerous cyst	3 (30)	13 (12,74)	1 (12,5)

Radicular cyst	3 (30)	24 (23,53)	1 (12,5)
Epithelial dysplasia	-	3 (2,94)	1 (12,5)
Lichen planus	-	1 (0,98)	-
Mucocele	1 (10)	4 (3,92)	-
Myofibroma	-	1 (0,98)	-
Complex odontoma	1 (10)	-	-
Osteonecrosis	-	1 (0,98)	-
Squamous cell papilloma	-	2 (1,96)	1 (12,5)
Pleomorphic adenoma	-	2 (1,96)	-
Adenomatoid odontogenic tumor	-	1 (0,98)	-
CMV ulcer	-	1 (0,98)	-
Total	**10 (100)**	**102 (100)**	**8 (100)**

Distribution and frequency of systemic diseases and bad habits

As explained in Table 6, there are 3 most common systemic diseases found based on the medical record data of OPaDCORE patients, there are 7 patients with allergies (4.14%), 6 patients with hypertension (3.55%) and 5 patients with gastritis (2.96%). Table 7 explains the frequency distribution of bad habits owned by patients with oral lesions, such as 8 patients who smoke (4.73%) and 2 patients who drink alcohol (1.18%).

Table 6. Distributions and frequencies of systemic disease found in patients

Systemic diseases	***n***	%
Allergy	7	4,14
Asthma	1	0,59
Diabetes melitus	1	0,59
Epilepsy	1	0,59
Gastritis	5	2,96
Hypertense	6	3,55
Hyperthyroid	1	0,59
Heart disease	1	0,59
Unknown	146	86,39
Total	**169**	**100**

Table 7. Distributions and frequencies of bad habits found in patients

Bad habits	***n***	**(%)**
Alcoholic	2	1,18
Smoker	8	4,73
Unknown	159	94,08
Total	**169**	**100**

Distribution and frequency of specialization of dentist

The oral lesion specimens (Table 8) were mostly sent by oral surgery specialists 56 cases (46.67%) with a high prevalence of dentigerous cysts (28,57%), followed by general practitioner 31 cases (25.83%) with 38,71% of both lesions, periapical granulomas and radicular cysts. Oral medicine specialists 22 cases (18.33%) with a high prevalence of mucocele and all of the OPMD lesions. Periodontists, 10 cases (8.33%) and dental endodontist specialists, 1 case (0.83%).

Table 8. Distributions and frequencies of bad habits found in patients

Spesialization	Histopathological diagnosis	*n*	%
Oral surgery	Dentigerous cyst	16	28,57
	Radicular cyst	13	23
	Periapical granuloma	5	8,93
	Fibroma	3	5,36
	Fibro-epithelial hyperplasia	4	7,14
	Ameloblastoma	2	3,57
	Squamous papilloma	2	3,57
	Other*	11	19,64
	Total	**56**	**100**
Oral medicine	Mucocele	4	18,18
	Epithelial dysplasia	4	18,18
	Radicular cyst	3	14
	Fibro-epithelial hyperplasia	2	9
	Giant cell fibroma	2	9
	Non-specific chronic inflammation	2	9
	Other**	5	23
	Total	**22**	**100**
General practitioner	Periapical granuloma	12	38,71
	Radicular cyst	12	38,71
	Other***	7	22,58
	Total	**31**	**100**
Periodontist	Fibro-epithelial hyperplasia	5	50
	Other****	5	50
	Total	**10**	**100**
Endodontist	Periapical granuloma	1	100

*Cemento-ossifying fibroma, epulis granulomatous, foreign body granuloma, pyogenic granuloma, capillary hemangioma, non-specific chronic inflammation, inflammatory odontogenic cyst, immune-mediated disease – pemphigus vulgaris, myofibroma, complex odontoma, Adenomatoid odontogenic tumor.
**Calcifying fibroblastic granuloma, verrucous carcinoma, lichen planus, pleomorphic adenoma, CMV ulcer.
***Fibro-epitel hyperplasia, fibrolipoma, focal cemento-osseous dysplasia, mucocele, osteonecrosis, squamous papilloma, pleomorphic adenoma.
****Acute abscess, epulis granulomatous, non-specific chronic inflammation, verrucous carcinoma, dentigerous cyst.

Oral lesion from cytology.

As it appears in Table 9, 49 histopathology reports submitted in the form of cytology preparations, 48 cases from mycological smear, and 1 case from cytological smear. The results interpreted based on the histopathology report data by mycological smear identified 29 specimens (60.41%) as positive for candida infection and 19 specimens (39.58%) as negative for candida. Cheilitis angularis is the most common mycological smear lesion found in the corners of the lips. Patients suffering from lesions often occur in males (66.67%) compared to females (33.33%) with a mean adult age of 37.83 ± 19.73. Interestingly, there was 1 cytological smear specimen from a 69-year-old female patient with a predilection in the alveolar of teeth 36 and 37 indicating atypia cells.

Table 9. Distributions and frequencies of oral mycological smear specimen

Clinical diagnosis	*n*	(%)	Gender		Age	Predilection
			P	L	(*mean* ± SD)	(%)
Cheilitis angularis	12	41,38	4	8	37,83 ± 19,73	LI (100)
Denture stomatitis	9	31,03	3	6	59,44 ± 14,74	PAL (88,89)
Candidiasis	4	13,79	3	1	47,75 ± 18,64	TNG, PAL (50)
Pseudomembranous candidiasis	4	13,79	2	2	47 ± 13,9	TNG (75)
Total	**29**	**100**	**12**	**17**	**47,17 ± 18,94**	**LI (41,38)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; LI, labial area; PAL, palatal; TNG, tongue

DISCUSSION

There may be similarities between clinical features from the same oral lesion, thus, clinical diagnosis alone cannot detect the definitive diagnosis, so it is necessary to conduct histopathologic examination. Based on 120 biopsies, the compatibility between clinical and histopathologic diagnosis is 72,5%, specifically non-neoplastic lesions with 75 compatible from 94 cases , OPMD lesions with 5 compatible cases, and neoplastic lesions with 7 compatible from 21 cases. This is consistent with Saravani et al's findings, which show 70,1% compatibility between clinical and histopathologic diagnosis, with non-neoplastic lesions being three times more compatible than neoplastic lesions.[5]

Similar to previous studies, non-neoplastic lesions were the most common lesion category compared to neoplastic and OPMD lesions.[1,6–8] In the subcategory of non-neoplastic lesions, cystic lesions (54.26%) were the most common. In contrast to the results of Kalantari et al. who had the highest frequency of non-neoplastic lesions in the subcategory of reactive lesions (34.6%).[6] In recent studies many radicular cysts are found in adulthood which is supported by Goswami et al.[9] The most common predilection for radicular cysts in this study was in the maxillary bone (75%) of 28 cases in agreement with the study by Mappanggara et al.[10,11] According to research by Sirait et al. where the incidence of radicular cysts in men is more common than in women. This is different from this study which showed a higher rate of women (26.98%) than men (19.3%).[12,13]

The most common OPMD lesion was epithelial dysplasia (80%) with a clinical diagnosis of leukoplakia in males (75%) more than females (33.33%) and this is agreed by Almeida et al.[14,15] Leukoplakia in this study mostly affects adults and occurs in various areas such as the buccal mucosa, palatal, and tongue, which agrees

with previous studies by Monteiro et al.[1] However, Amagasa et al stated that the most potential areas for these lesions are the tongue and buccal mucosa.[6] Potentially malignant lesions such as leukoplakia are closely associated with tobacco and alcohol consumption.[17–19] The low frequency of OPMD lesions may be due to public ignorance about the appearance of these lesions and the absence of visible symptoms so that sometimes patients will come to the doctor after the lesion has developed into a malignancy.

The category of neoplastic lesions is divided into benign and malignant lesions which agrees with the study by Kalantari et al.[6] Malignant neoplasms in the form of verrucous carcinomas (*n=2 cases,* 9.52%) were identified in this study, which were found in the gingiva and tongue area of elderly males (73 ± 14,14). According to Monteiro et al. in their research, mentioned that verrucous carcinomas are most commonly found in elderly men (70,70 ± 9,4) in the gingiva.[1]

Based on histopathological oral lesion report data at the OPaDCORE Laboratory, it shows that women (52.5%) have more oral lesions than men (47.5%) with the most common oral lesion category being non-neoplastic lesions (53 cases in women) compared to other oral lesion categories and this is directly proportional to previous studies that have been conducted by Kalantari et al.[5]

The results of the current study found that the average age of all oral lesions was 37.58 ± 15.99 years, which is the adult age category. This statement agrees with other studies that have been conducted previously by De Almeida et al and others too.[14,20] Most patients in the oral lesion report data at the OPaDCORE Laboratory had a history of allergy (30.43%). In contrast to research conducted by Arruda et al where the history of systemic diseases of patients in order of frequency from high to low is hypertension (24.39%).[19] The most common allergy found in OPaDCORE patients is allergy to certain drugs. There were 146 patients with no known history of systemic disease. This is due to a limitation of RSGM medical record information and limited acquisition of information from patients referred from other hospitals. The most common bad habit found in OPaDCORE patients was smoking (4,73%). According to Maserejian et al, nicotine in tobacco is carcinogenic, while alcohol promotes carcinogen penetration through oral mucosa by increasing its solubility and permeability. Thus, long-term alcohol use in tobacco users may increase the risk of lesion formation.[17–19,21]

In this study, it was found that oral surgeons sent more cases, especially periapical lesions, which agrees with the study by Kelloway et al.[22] This could be attributed to the competence of oral surgeons who have expertise in surgical therapy and their role in managing complex dental and maxillofacial conditions to prevent the spread of infection, especially in periapical lesions.[23] The categories of lesions in the study results that were mostly found by oral surgeons were non-neoplastic and neoplastic lesions. The reason that supports the high frequency of general practitioners in performing biopsies which is the second order is that general dentists in this context refer to dental endodontist students of Universitas Trisakti who performs a lot of periapical surgery where periapical lesions in this study have the highest frequency. Oral medicine specialists are the third most frequent specimen senders identifying oral mucosal lesions, especially OPMD lesions due to their competence focusing on the diagnosis and management of oral conditions, especially those related to soft tissue (mucosa).[24] As mentioned by Rich et al. that OPMD lesions, especially those triggered by tobacco use, are commonly found by oral medicine in Australia.[25]

CONCLUSION

This study demonstrates the importance of histopathologic examination in establishing the definitive diagnosis and appropriate management of oral lesions with the compatibility rate between clinical and histopathologic diagnosis were 72,5%. The most common oral lesions found in the OPaDCORE laboratory were non-neoplastic lesions in the form of cystic lesions with the highest frequency of radicular cyst (23,33%), than other lesions. This epidemiologic data is not only useful to provide the distribution and frequency of oral lesions, but also to see the relationship between the most common systemic diseases of allergy (4,14%) and bad habit of smokers (4,73%) to the manifestation of oral lesions. This study concludes that oral surgeon were the most specialists in conducting the oral lesions found in OPaDCORE.

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Histopathological Profile Of Oral Lesion At The Opadcore Laboratory, Faculty Of Dentistry, Universitas Trisakti

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ABSTRACT

Background: *A renewal of epidemiological data was carried out at Universitas Trisakti's OPaDCORE Laboratory to evaluate the prevalence and distribution of oral lesions. The research also sought to distinguish oral lesions according to their histopathological attributes, while considering factors such as age, gender, predilection, systemic disease, bad habits, and the dentist specialization.*

Method: *The study is a 4-year descriptive observational research on oral lesions, using a cross-sectional approach from January 2020 to October 2023. The data collected includes clinical diagnosis, histopathologic diagnosis, patient demographics, biopsy location, and medical history. The data was computerized using a Microsoft® Excel database.*

Result: *A total of 120 biopsy tissue reports showed that the most common oral lesions were radicular cyst (23,33%), periapical granuloma (15%), dentigerous cyst (14,17%), fibro-epithelial hyperplasia (10%), and mucocele (4,17%). Women (52,5%) had more oral lesions than men (47,5%). Among youngster (0-17 years old), dentigerous cysts (30%) and radicular cysts (30%) were common, while radicular cysts (23,53%) were common among adults (18-64 years old), and fibro-epithelial hyperplasia (25%) was common among the elderly (≥65 years old). Patients with oral lesions often had allergies (4,14%), hypertension (3,55%), gastritis (2,96%). Bad habits were also encountered with a high frequency of smokers (4,73%). Candida infection was found in 29 oral mycological smear specimens, and there was one case of cytological smear. Angular cheilitis (41,38%) was the most diagnosed condition.*

Conclusion: *Radicular cysts (23,33%) were the most common oral lesion found in the maxillary, with a higher prevalence in adult females according to OPaDCORE Laboratory's analysis*

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INTRODUCTION

Oral lesions refer to abnormal condition that can manifest within the oral cavity. The etiology and morphology are vary widely, ranging from benign to malignant.[1] Studies suggest that the prevalence of oral lesions ranges from 4.9% to 64.7% of individuals worldwide.[2] It is, therefore, crucial to promptly seek professional medical attention to prevent potential complications and safeguard overall health. Individuals who suspect the presence of oral lesions are encouraged to seek prompt medical attention.

The OPaDCORE Laboratory at Universitas Trisakti has the distinction of being the only oral pathology laboratory in West Jakarta. Given its specialization in the oral cavity, it is critical to update the epidemiological data on oral lesions. To ensure the accuracy and relevance of epidemiological data on oral lesions, it is crucial to conduct regular updates in the OPaDCORE laboratory between 2020 and 2023. With the inclusion of additional variables that have not been previously listed in the data analysis of OPaDCORE Laboratory 2019, such as the medical history of systemic disease and negative health behaviors. Similar study have been reported from Kalantari et al, that non-neoplastic lesions are the most prevalence lesions based on data over the past 23 years.[6]

It is essential to note that certain oral lesions exhibit similar characteristics and clinical features, but differ in histopathology.[3] This can lead to erroneous diagnoses, requiring histopathological examination to confirm the clinical diagnosis from clinical examination and obtain an accurate histopathologic diagnosis. According to research studies, more than 70% of oral lesion diagnoses require interpretation of clinical and histopathological examinations to achieve a standard level of diagnostic accuracy.[4] These findings highlights the significance of histopathological examination in obtaining the correct diagnosis and managing oral lesions, as clinical diagnosis alone may not be sufficient for histopathologic diagnosis and management.[4,5]

RESEARCH METHOD

This study is a cross-sectional descriptive observational research that analyzes laboratory data for 4 years, specifically from January 2020 to October 2023. The histopathological data of oral lesions and related information were efficiently recorded and computerized using the Microsoft® Excel database, ensuring accuracy and ease of access. The collected data will be grouped and presented in a table format based on diagnostic information from OPaDCORE data, along with the clinical diagnosis, histopathologic diagnosis based on histopathological condition, age, gender, anatomical location, and the specialty of the dentist who sent the specimen. The systemic disease and bad habits were collected from the medical records of the OPaDCORE patients. In this study, to streamline data processing, oral lesions will be categorized into three groups: non-neoplastic lesions, oral potentially malignant disorders (OPMD), and neoplastic lesions.

This study has obtained an ethical approval letter from the Health Research Ethics Commission of the Faculty of Dentistry, Universitas Trisakti with letter number 699/S1/KEPK/FKG/6/2023 along with a research permit from the Dental Hospital Universitas Trisakti with letter number 710/Dir/RSGM-P/FKG/Usakti/VII/2023.

RESULTS

As many as 174 histopathology reports and 5 reports that had inconclusive histopathologic diagnoses were excluded, resulting in a final sample of 169 reports consisting of 120 biopsy tissue specimens and 49 cytology specimens. 120 biopsy tissue reports consisting of 63 (52,5%) female and 57 (47,5%) male patients.

Oral lesion from biopsy.

The compatibility rate between clinical diagnosis and histopathologic diagnosis reached 72.5%. Based on the category of the lesion, it was found that non-neoplastic lesions with 75 compatible and 19 incompatible cases, OPMD lesions with 5 compatible cases, and neoplastic lesions with 7 compatible and 14 incompatible cases. Patients who exhibited oral lesions had an average age of 37.58 ± 15.99 years, with the majority of these lesions located in the maxillary bone (31.67%). The most prevalent type of lesions identified belonged to the non-neoplastic (78,33%) category (Table 1) followed by neoplastic (17,5%) and OPMD (4,17%).

Table 1. Distribution and frequency of histopathologic oral lesions by tissue biopsy

Lesion category	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			F	M		
Non-neoplastic	94	78,33	53	41	35,89 ± 15,58	MAX (39,36)
OPMD	5	4,17	1	4	44,8 ± 15,19	TNG (60)
Neoplastic	21	17,5	9	12	43,43 ± 16,84	TNG (28,57)
Total	**120**	**100**	**63**	**57**	**37,58 ± 15,99**	**MAX (31,67)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; MAX, maxilla; TNG, tongue

Non-neoplastic lesion.

Non-neoplastic lesions had the highest number of cases than other categories, totalling 94 cases with a ratio of female patients (84.13%) more than male patients (71.93%). The grouping of non-neoplastic lesions was divided into several subcategories (Table 2) where cystic lesions in the form of radicular cysts were the most predominant type, particularly in the maxillary bone (75%) with the gender of patients being female (60.71%) compared to male (39.29%). The average age of patients diagnosed with these lesions was 39.43 ± 14.72 years. Notably, most of the radicular cysts were specimens sent by dentists specializing in oral surgery (46.43%), with 13 cases.

The second subcategory of non-neoplastic lesions is the inflammatory lesion group with a total of 26 lesions consisting of 18 cases (19.15%) of periapical granuloma, 4 cases (4.26%) of non-specific chronic inflammation, 1 case (1.06%) calcifying fibroblastic granuloma, 1 case (1.06%) foreign body granuloma, 1 case (1.06%) pyogenic granuloma, 1 case (1.06%) osteonecrosis. From the results obtained, periapical granuloma is a lesion that is mostly found in the maxillary bone (61.11%) and female gender (55.56%) compared to men (44.44%). The average age affected by periapical granuloma was 36.88 ± 11.65 years. General practitioners (66.67%) were the doctors who encountered the most periapical granulomas with 12 cases.

Table 2. Distribution and frequency of histopathologic non-neoplastic lesion

Histopathology diagnosis	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			F	M		
Inflammatory lesions	**26**	**27,66**	**15**	**11**	**35,62 ± 11,99**	**MAX (46,15)**
Calcifying fibroblastic granuloma	1	1,06	1	0	17	GEN (100)

Foreign body granuloma	1	1,06	0	1	27	MAN (100)
Periapical granuloma	18	19,15	10	8	37 ± 11,31	MAX (61,11)
Pyogenic granuloma	1	1,06	1	0	20	MAN (100)
Non-specific chronic inflammation	4	4,26	3	1	43,75 ± 9	BM (75)
Osteonecrosis	1	1,06	0	1	21	MAX (100)
Infective lesions	**2**	**2,13**	**1**	**1**	**43,5 ± 27,58**	**GEN, LM (50)**
Acute abscess	1	1,06	0	1	24	GEN (100)
CMV ulcer	1	1,06	1	0	63	LM (100)
Cystic lesions	**51**	**54,26**	**26**	**25**	**34,75 ± 15,38**	**MAX (47,06)**
Inflammatory odontogenic cyst	1	1,06	1	0	61	MAX (100)
Dentigerous cyst	17	18,09	8	9	29,76 ± 13,88	MAN (82,35)
Radicular cyst	28	29,79	17	11	39,43 ± 14,72	MAX (75)
Mucocele	5	5,32	0	5	20,2 ± 5,17	LM (80)
Reactive lesions	**14**	**14,89**	**10**	**4**	**38,71 ± 21,44**	**GEN (71,43)**
Epulis granulomatous	2	2,13	2	0	16 ± 12,73	GEN (100)
Fibro-epithelial hyperplasia	12	12,77	8	4	42,5 ± 20,47	GEN (66,67)
Autoimmune or metabolic lesion	**1**	**1,06**	**1**	**0**	**47**	**BM (100)**
Immune mediated disease - Pemphigus vulgaris	1	1,06	1	0	47	BM (100)
Total	**94**	**100**	**53**	**41**	**35,89 ± 15,58**	**MAX (39,36)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; MAX, maxilla; GEN, gingiva; MAN, mandible; BM, buccal mucosa; LM, labial mucosa

Oral potentially malignant disorder (OPMD) lesion.

In the OPMD lesion category, there were 4 cases with definitive diagnosis of mild (40%) and moderate (40%) epithelial dysplasia. Males (75%) were diagnosed with epithelial dysplasia more than females (33.33%) with an average age of 44.5 ± 17.52 years. All OPMD lesion specimens sent to the OPaDCORE Laboratory came from dentists specializing in oral medicine. Data on the distribution of OPMD lesions can be seen in Table 3 below.

Table 3. Distribution and frequency of histopathologic OPMD lesion

Histopathology diagnosis	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			P	L		
Epithelial dysplasia	4	80	1	3	44,5 ± 17,52	TNG (50)
Mild	2	40	1	1	50 ± 22,63	BM, TNG (50)
Moderate	2	40	0	2	39 ± 16,97	PAL, TNG (50)
Lichen planus	1	20	0	1	46	TNG (100)
Total	**5**	100	1	**4**	**44.8 ± 15.19**	**TNG (60)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; BM, buccal mucosa; PAL, palatal; TNG, tongue

Neoplastic lesion.

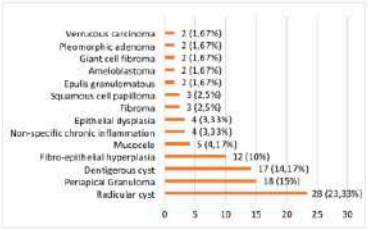
There were 21 neoplastic lesions found in patients with an overall average age of 43.43 ± 16.84 years and 6 cases were found in the tongue area. 12 cases of neoplastic lesions were sent from dentists specializing in oral surgery (57.14%). The neoplastic lesions present included: ameloblastoma (9.52%), cemento ossifying fibroma (4.76%), fibroma (14.29%), fibrolipoma (4.76%), focal cemento-osseous dysplasia (4.76%), giant cell fibroma (9.52%), capillary hemangioma (4. 76%), myofibroma (4.76%), complex odontoma (4.76%), pleomorphic adenoma (9.52%), squamous papilloma (14.29%), adenomatoid odontogenic tumor (4.76%), verrucous type squamous cell carcinoma (9.52%). Data sorting of neoplastic oral lesions can be seen in Table 4 below.

Table 4. Distribution and frequency of histopathologic neoplastic lesion

Histopathology diagnosis	n	%	Gender		Age (*mean* ± SD)	Predilection (%)
			P	L		
Benign neoplasms	**19**	**90,48**	**9**	**10**	**40,32 ± 14,02**	**MAN, TNG (26,32)**
Ameloblastoma	2	9,52	0	2	30 ± 12,73	MAN (100)
Cemento-ossifying fibroma	1	4,76	0	1	45	MAN (100)
Fibroma	3	14,29	2	1	36,67 ± 14,01	GEN, TNG, BM (33,33)
Fibrolipoma	1	4,76	0	1	63	TNG (100)
Focal cemento-osseous dysplasia	1	4,76	1	0	31	MAX (100)
Giant cell fibroma	2	9,52	0	2	41 ± 8,49	TNG (100)
Capillary hemangioma	1	4,76	0	1	56	LM (100)
Myofibroma	1	4,76	0	1	38	FOM (100)
Complex odontoma	1	4,76	1	0	16	MAN (100)
Pleomorphic Adenoma	2	9,52	2	0	48 ± 8,49	MNOS, BM (50)
Squamous cell papilloma	3	14,29	2	1	46,67 ± 19,43	TNG, LM, GEN (33,33)
Adenomatoid odontogenic tumor	1	4,76	1	0	29	MAN (100)
Malignant neoplasms	**2**	**9,52**	**0**	**2**	**73 ± 14,14**	**GEN, TNG (50)**
Verrucous carcinoma	2	9,52	0	2	73 ± 14,14	GEN, TNG (50)
Total	**21**	**100**	**9**	**12**	**43,43 ± 16,84**	**TNG (28,57)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; MAN, mandible; TNG, tongue; GEN, gingiva; BM, buccal mucosa; MAX, maxilla; LM, labial mucosa; FOM; floor of the mouth; MNOS, mouth non-otherwise specified

Figure 1. Most commonly identified lesions



Distribution and frequency based on age

The frequency distribution by age group has identified that patients in the youngster age group (0-17 years) had the two most frequent lesions, such as dentigerous cysts (30%) and radicular cysts (30%). In the adult age group (18-64 years), radicular cysts were most common (23.53%) with 24 patients. While in elderly patients (≥65 years old), fibro-epithelial hyperplasia was found (25%). The distribution of oral lesions of patients by age category can be seen in Table 5.

Table 5. Distribution of oral lesions according to age category

Histopathology diagnosis	Youngster (0-17 years)	Adult (18-64 years)	Elderly (≥65 years)
	n (%)	*n* (%)	*n* (%)
Acute abscess	-	1 (0,98)	-
Ameloblastoma	-	2 (1,96)	-
Calcifying fibroblastic granuloma	1 (10)	-	-
Cemento-ossifying fibroma	-	1 (0,98)	-
Epulis granulomatous	1 (10)	1 (0,98)	-
Fibroma	-	3 (2,94)	-
Fibro-epithelial hyperplasia	-	10 (9,8)	2 (25)
Fibrolipoma	-	1 (0,98)	-
Focal cemento-osseous dysplasia	-	1 (0,98)	-
Giant cell fibroma	-	2 (1,96)	-
Foreign body granuloma	-	1 (0,98)	-
Periapical granuloma	-	17 (16,67)	1 (12,5)
Pyogenic granuloma	-	1 (0,98)	-
Capillary hemangioma	-	1 (0,98)	-
Immune mediated disease - Pemphigus vulgaris	-	1 (0,98)	-
Non-specific chronic inflammation	-	4 (3,92)	-
Inflammatory odontogenic cyst	-	1 (0,98)	-
Verrucous carcinoma	-	1 (0,98)	1 (12,5)
Dentigerous cyst	3 (30)	13 (12,74)	1 (12,5)

Radicular cyst	3 (30)	24 (23.53)	1 (12.5)
Epithelial dysplasia	-	3 (2.94)	1 (12.5)
Lichen planus	-	1 (0.98)	-
Mucocele	1 (10)	4 (3.92)	-
Myofibroma	-	1 (0.98)	-
Complex odontoma	1 (10)	-	-
Osteonecrosis	-	1 (0.98)	-
Squamous cell papilloma	-	2 (1.96)	1 (12.5)
Pleomorphic adenoma	-	2 (1.96)	-
Adenomatoid odontogenic tumor	-	1 (0.98)	-
CMV ulcer	-	1 (0.98)	-
Total	**10 (100)**	**102 (100)**	**8 (100)**

Distribution and frequency of systemic diseases and bad habits

As explained in Table 6, there are 3 most common systemic diseases found based on the medical record data of OPaDCORE patients, there are 7 patients with allergies (4.14%), 6 patients with hypertension (3.55%) and 5 patients with gastritis (2.96%). Table 7 explains the frequency distribution of bad habits owned by patients with oral lesions, such as 8 patients who smoke (4.73%) and 2 patients who drink alcohol (1.18%).

Table 6. Distributions and frequencies of systemic disease found in patients

Systemic diseases	*n*	%
Allergy	7	4,14
Asthma	1	0,59
Diabetes melitus	1	0,59
Epilepsy	1	0,59
Gastritis	5	2,96
Hypertense	6	3,55
Hyperthyroid	1	0,59
Heart disease	1	0,59
Unknown	146	86.39
Total	**169**	**100**

Table 7. Distributions and frequencies of bad habits found in patients

Bad habits	*n*	(%)
Alcoholic	2	1,18
Smoker	8	4.73
Unknown	159	94,08
Total	**169**	**100**

Distribution and frequency of specialization of dentist

The oral lesion specimens (Table 8) were mostly sent by oral surgery specialists 56 cases (46.67%) with a high prevalence of dentigerous cysts (28.57%), followed by general practitioner 31 cases (25.83%) with

38,71% of both lesions, periapical granulomas and radicular cysts. Oral medicine specialists 22 cases (18.33%) with a high prevalence of mucocele and all of the OPMD lesions. Periodontists, 10 cases (8.33%) and dental endodontist specialists, 1 case (0.83%).

Table 8. Distributions and frequencies of bad habits found in patients

Spesialization	Histopathological diagnosis	*n*	%
Oral surgery	Dentigerous cyst	16	28.57
	Radicular cyst	13	23
	Periapical granuloma	5	8.93
	Fibroma	3	5.36
	Fibro-epithelial hyperplasia	4	7.14
	Ameloblastoma	2	3.57
	Squamous papilloma	2	3.57
	Other*	11	19.64
	Total	**56**	**100**
Oral medicine	Mucocele	4	18.18
	Epithelial dysplasia	4	18.18
	Radicular cyst	3	14
	Fibro-epithelial hyperplasia	2	9
	Giant cell fibroma	2	9
	Non-specific chronic inflammation	2	9
	Other**	5	23
	Total	**22**	**100**
General practitioner	Periapical granuloma	12	38,71
	Radicular cyst	12	38,71
	Other***	7	22,58
	Total	**31**	**100**
Periodontist	Fibro-epithelial hyperplasia	5	50
	Other****	5	50
	Total	**10**	**100**
Endodontist	Periapical granuloma	**1**	**100**

*Cemento-ossifying fibroma, epulis granulomatous, foreign body granuloma, pyogenic granuloma, capillary hemangioma, non-specific chronic inflammation, inflammatory odontogenic cyst, immune-mediated disease – pemphigus vulgaris, myofibroma, complex odontoma, Adenomatoid odontogenic tumor.
**Calcifying fibroblastic granuloma, verrucous carcinoma, lichen planus, pleomorphic adenoma, CMV ulcer.
***Fibro-epital hyperplasia, fibrolipoma, focal cemento-osseous dysplasia, mucocele, osteonecrosis, squamous papilloma, pleomorphic adenoma.
****Acute abscess, epulis granulomatous, non-specific chronic inflammation, verrucous carcinoma, dentigerous cyst.

Oral lesion from cytology.

As it appears in Table 9, 49 histopathology reports submitted in the form of cytology preparations, 48 cases from mycological smear, and 1 case from cytological smear. The results interpreted based on the histopathology report data by mycological smear identified 29 specimens (60.41%) as positive for candida infection and 19 specimens (39.58%) as negative for candida. Cheilitis angularis is the most common

mycological smear lesion found in the corners of the lips. Patients suffering from lesions often occur in males (66.67%) compared to females (33.33%) with a mean adult age of 37.83 ± 19.73. Interestingly, there was 1 cytological smear specimen from a 69-year-old female patient with a predilection in the alveolar of teeth 36 and 37 indicating atypia cells.

Table 9. Distributions and frequencies of oral mycological smear specimen

Clinical diagnosis	*n*	(%)	Gender		Age	Predilection
			P	L	(*mean* ± SD)	(%)
Cheilitis angularis	12	41,38	4	8	37,83 ± 19,73	LI (100)
Denture stomatitis	9	31,03	3	6	59,44 ± 14,74	PAL (88,89)
Candidiasis	4	13,79	3	1	47,75 ± 18,64	TNG, PAL (50)
Pseudomembranous candidiasis	4	13,79	2	2	47 ± 13,9	TNG (75)
Total	**29**	**100**	**12**	**17**	**47,17 ± 18,94**	**LI (41,38)**

n, total sample; F, female; M, male; mean, average; SD, standard deviation; LI, labial area; PAL, palatal; TNG, tongue

DISCUSSION

There may be similarities between clinical features from the same oral lesion, thus, clinical diagnosis alone cannot detect the definitive diagnosis, so it is necessary to conduct histopathologic examination. Based on 120 biopsies, the compatibility between clinical and histopathologic diagnosis is 72,5%, specifically non-neoplastic lesions with 75 compatible from 94 cases , OPMD lesions with 5 compatible cases, and neoplastic lesions with 7 compatible from 21 cases. This is consistent with Saravani et al's findings, which show 70,1% compatibility between clinical and histopathologic diagnosis, with non-neoplastic lesions being three times more compatible than neoplastic lesions.[5]

Similar to previous studies, non-neoplastic lesions were the most common lesion category compared to neoplastic and OPMD lesions.[1,6-8] In the subcategory of non-neoplastic lesions, cystic lesions (54.26%) were the most common. In contrast to the results of Kalantari et al. who had the highest frequency of non-neoplastic lesions in the subcategory of reactive lesions (34.6%).[9] In recent studies many radicular cysts are found in adulthood which is supported by Goswami et al.[9] The most common predilection for radicular cysts in this study was in the maxillary bone (75%) of 28 cases in agreement with the study by Mappanggara et al.[10,11] According to research by Sirait et al. where the incidence of radicular cysts in men is more common than in women. This is different from this study which showed a higher rate of women (26.98%) than men (19.3%).[12,10]

The most common OPMD lesion was epithelial dysplasia (80%) with a clinical diagnosis of leukoplakia in males (75%) more than females (33.33%) and this is agreed by Almeida et al.[14,15] Leukoplakia in this study mostly affects adults and occurs in various areas such as the buccal mucosa, palatal, and tongue, which agrees with previous studies by Monteiro et al.[1] However, Amagasa et al stated that the most potential areas for these lesions are the tongue and buccal mucosa.[6] Potentially malignant lesions such as leukoplakia are closely associated with tobacco and alcohol consumption.[17-19] The low frequency of OPMD lesions may be due to public ignorance about the appearance of these lesions and the absence of visible symptoms so that sometimes patients will come to the doctor after the lesion has developed into a malignancy.

The category of neoplastic lesions is divided into benign and malignant lesions which agrees with the study by Kalantari et al.[6] Malignant neoplasms in the form of verrucous carcinomas (*n=2 cases*, 9.52%) were identified in this study, which were found in the gingiva and tongue area of elderly males (73 ± 14,14). According to Monteiro et al. in their research, mentioned that verrucous carcinomas are most commonly found in elderly men (70,70 ± 9,4) in the gingiva.[1]

Based on histopathological oral lesion report data at the OPaDCORE Laboratory, it shows that women (52.5%) have more oral lesions than men (47.5%) with the most common oral lesion category being non-neoplastic lesions (53 cases in women) compared to other oral lesion categories and this is directly proportional to previous studies that have been conducted by Kalantari et al.[6]

The results of the current study found that the average age of all oral lesions was 37.58 ± 15.99 years, which is the adult age category. This statement agrees with other studies that have been conducted previously by De Almeida et al and others too.[14,20] Most patients in the oral lesion report data at the OPaDCORE Laboratory had a history of allergy (30.43%). In contrast to research conducted by Arruda et al where the history of systemic diseases of patients in order of frequency from high to low is hypertension (24.39%).[10] The most common allergy found in OPaDCORE patients is allergy to certain drugs. There were 146 patients with no known history of systemic disease. This is due to a limitation of RSGM medical record information and limited acquisition of information from patients referred from other hospitals. The most common bad habit found in OPaDCORE patients was smoking (4,73%). According to Maserejian et al, nicotine in tobacco is carcinogenic, while alcohol promotes carcinogen penetration through oral mucosa by increasing its solubility and permeability. Thus, long-term alcohol use in tobacco users may increase the risk of lesion formation.[17–19,21]

In this study, it was found that oral surgeons sent more cases, especially periapical lesions, which agrees with the study by Kelloway et al.[22] This could be attributed to the competence of oral surgeons who have expertise in surgical therapy and their role in managing complex dental and maxillofacial conditions to prevent the spread of infection, especially in periapical lesions.[23] The categories of lesions in the study results that were mostly found by oral surgeons were non-neoplastic and neoplastic lesions. The reason that supports the high frequency of general practitioners in performing biopsies which is the second order is that general dentists in this context refer to dental endodontist students of Universitas Trisakti who performs a lot of periapical surgery where periapical lesions in this study have the highest frequency. Oral medicine specialists are the third most frequent specimen senders identifying oral mucosal lesions, especially OPMD lesions due to their competence focusing on the diagnosis and management of oral conditions, especially those related to soft tissue (mucosa).[24] As mentioned by Rich et al. that OPMD lesions, especially those triggered by tobacco use, are commonly found by oral medicine in Australia.[25]

CONCLUSION

This study demonstrates the importance of histopathologic examination in establishing the definitive diagnosis and appropriate management of oral lesions with the compatibility rate between clinical and histopathologic diagnosis were 72,5%. The most common oral lesions found in the OPaDCORE laboratory were non-neoplastic lesions in the form of cystic lesions with the highest frequency of radicular cyst (23,33%), than other lesions. This epidemiologic data is not only useful to provide the distribution and frequency of oral lesions, but also to see the relationship between the most common systemic diseases of allergy (4,14%) and bad habit

of smokers (4,73%) to the manifestation of oral lesions. This study concludes that oral surgeon were the most specialists in conducting the oral lesions found in OPaDCORE.

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