

Benign tumours and tumour-like lesions in the oral cavity: a retrospective analysis

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Abstract

Introduction: Oral lesions are divided into non-neoplastic lesions, potentially malignant lesions and neoplastic lesions. More clinical data are needed to determine their helpful clinical pattern.

Aim: To present the epidemiological, clinical and histopathological characteristics of the oral lesions.

Material and methods: The retrospective study group comprised records of 208 patients which were reviewed according to selected epidemiological and clinical features. All the biopsy specimens were classified into: reactive lesions, precancerous lesions/potentially malignant lesions, salivary gland pathologies, benign and malignant tumours.

Results: The lower lip was the most common site involved followed by buccal and vestibular mucosa. The most frequent diagnoses were fibroma, mucocele and papilloma. The predominant pathomorphological forms were nodule and bulla. The most frequent salivary gland pathology was mucocele. Fibroma was the most frequent pathomorphological diagnosis, followed by mucocele and reactive lesions such as irritation fibroma (IF) and granuloma.

Conclusions: In cases of oral mucosal lesions, we propose the following algorithm: the exclusion of all odontogenic and iatrogenic causes; the detection and elimination of harmful habits, parafunctions and irritants from the oral cavity especially from the vestibule of the oral cavity and from the lips; all surgical treatment should be performed only after the proper detection and elimination of causative factors to decrease the risk of recurrence; excisional biopsy or in more diffuse lesions incisional biopsy is recommended to confirm clinical diagnosis; and consideration of other factors that can modify the clinical pattern of oral lesions, such as oral hygiene, systemic diseases, and drugs.

Key words: reactive lesions, tumours, precancerous lesions, lesions, fibroma.

Introduction

The oral cavity is one of the most common sites for tumours and tumour-like lesions. They include both non-odontogenic and odontogenic lesions. The diseases that affect the oral mucosa are diverse and comprise a broad spectrum of either benign or malignant lesions. Moreover, poor oral hygiene, removable dentures, smoking, malposition, harmful habits and mechanical irritation predispose to reactive lesions and tumour development. The diagnosis of oral pathologic changes is established from the different clinical and radiological features, although the final diagnosis is based on histopathological examination of the lesion [1–4]. The initial clinical diagnosis must be accurate and should not miss

any premalignant or malignant pathologic features. All oral lesions are divided into three groups, including non-neoplastic lesions, potentially malignant disorders and neoplastic lesions, and are also subdivided into 10 major subcategories: normal tissue, inflammatory and infectious lesions, cystic lesions, adaptive reactions, potentially malignant disorders, autoimmune and metabolic diseases, vascular and hemodynamic anomalies, hamartomatous lesions and congenital alterations, benign neoplasms and malignant neoplasms [2]. Despite the progress made in recent years in the diagnosis and treatment of oral lesions, more clinical data are needed to establish their helpful clinical pattern. To address this need, we have described clinical and pathomorphologi-

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cal features of these lesions and elucidated their reciprocal relationships.

Aim

The aim of this study was to present the epidemiological, clinical and histopathological characteristics of the most common lesions on the oral mucosa. Our data can prove helpful to create an algorithm of the diagnosis and treatment of all oral mucosal lesions.

Material and methods

The retrospective study group comprised records of 208 patients, including 108 (51.9%) women, aged 5–91 years (average: 52.65 years). The data were collected from the archives of the Department of Oral Surgery and Periodontology at Poznan University of Medical Sciences, Poznan, Poland. The patient records from January 2015 to November 2017 were reviewed according to gender, age, location of the lesion, clinical diagnosis, habits, medications, consistency, base, final histopathological diagnosis, duration of the lesion, treatment, symptoms and histopathological image. The study included all the patients admitted to the Department of Oral Surgery and Periodontology presenting with oral mucosal lesions. All the biopsy specimens of mucosal lesions were included in the study and were classified according to a classification adapted from the one proposed by the International Classification of Diseases to Dentistry and Stomatology (ICD-DA) and by the WHO classification of tumours (2005) [2]. Finally, they formed five groups of lesions: reactive lesions (group 1), precancerous lesions/potentially malignant lesions (group 2), salivary gland pathologies (group 3), benign tumours (group 4) and malignant tumours (group 5). The clinical data were collected from comprehensive medical and dental examination. The examination of the mouth was performed and medical history was elicited from each patient. The duration of the lesion ranged from three weeks to 30 years. Tissue specimens for histopathological examination were obtained by biopsy. In 185 patients, a complete excision of the lesion was carried out. Fine needle biopsy was performed in 17 subjects and incisional biopsy in one subject. In the remaining cases, it was impossible to determine the radicality of the surgical procedure or the excisional biopsy

was incomplete. Repeated biopsies of already diagnosed lesions were excluded. Bone lesions were excluded as well. All specimens were assessed by an experienced pathologist. This study was performed in accordance with the ethical standards laid down in an appropriate version of the World Association Declaration of Helsinki. Written informed consent was obtained from every subject before any study procedure was carried out.

Statistical analysis

The descriptive statistics was done by using IBM SPSS Statistics software (v. 23.0, Chicago, IL).

Results

There were no differences between males and females as regards the lesions that occurred. Most of the oral lesions occurred in the fifth decade of life. Pathologies of the salivary glands were more frequent in younger patients. Benign and malignant tumours occurred in the seventh decade of life. The age distribution is presented in Table 1.

Local distribution of the lesions

The lower lip was the most common site involved followed by buccal mucosa and vestibular mucosa. It was also particularly predisposed for the mucocele development. Most lesions in the mouth were located in the vestibule of the mouth (buccal mucosa, vestibular mucosa, and alveolar process). The vestibule of the oral cavity was often involved in reactive lesions and benign tumours. Buccal mucosa also predisposed to precancerous lesions. All frequencies are presented in Table 2.

Clinical, pathomorphological and physical manifestation of oral lesions

The most frequent clinical diagnoses were fibroma, mucocele and papilloma (Tables 3, 4). In the oral cavity the predominant pathomorphological forms of the lesion were nodule and bulla (Table 3). The most frequent salivary gland pathology was mucocele (Table 5). Fibroma was the most frequent pathomorphological diagnosis, followed by mucocele and reactive lesions such as irritation fibroma (IF) and different forms of granuloma (Tables 4–6).

Table 1. Age distribution in the five groups of patients

Age	Reactive lesions	Precancerous/ potentially malignant lesions	Salivary gland pathologies	Benign tumours	Malignant tumours
Mean ± SD	56.3 ±1.9	54.3 ±2.6	38.7 ±3.3	54.7 ±2.2	70.7 ±15.4
Median (IQR)	59 (21)	54 (23)	33 (25)	58 (23)	84 (?)
Min.–max.	12–91	5–80	13–89	10–80	40–88

SD – standard deviation, IQR – interquartile range.

Table 2. Lesions location in selected groups of lesions

Location	Reactive lesions (n = 73)		Precancerous lesions/ potentially malignant lesions (n = 37)		Salivary gland pathologies (n = 36)		Benign tumours (n = 58)		Malignant tumours (n = 3)		Total (n = 212)	
	n	%	n	%	n	%	n	%	n	%	n	%
Floor of the mouth	1	1.4	4	10.8	2	5.6	–	–	–	–	7	3.3
Marginal gingiva	10	13.7	3	8.1	–	–	1	1.7	–	–	14	6.6
Tongue	6	8.2	4	10.8	–	–	5	8.6	–	–	15	7.1
Lip angle	3	4.1	–	–	–	–	2	3.4	1	33.3	6	2.8
Soft palate	–	–	–	–	–	–	1	1.7	1	33.3	2	0.9
Hard palate	6	8.2	3	8.1	1	2.8	1	1.7	–	–	11	5.2
Buccal mucosa	11	15.1	8	21.6	3	8.3	21	36.2	1	33.3	44	20.8
Vestibular mucosa	16	21.9	2	5.4	–	–	5	8.6	–	–	23	10.8
Lower lip	7	9.6	6	16.2	30	83.3	15	25.9	–	–	59	27.8
Upper lip	1	1.4	1	2.7	–	–	2	3.4	–	–	4	1.9
Alveolar process	12	16.4	6	16.2	–	–	5	8.6	–	–	23	10.8

Discussion

In general, there was no male or female gender predilection for oral lesions in our study, but there was a gentle tendency for females or males in selected groups. In our opinion, female hormones may modify this predilection and may increase the tissue response to mechanical irritation, especially in groups of reactive lesions. All reactive lesions were more common in females than in males with a strong predilection in IF, FG, PGCG and PG groups. Similar results were presented/obtained in other studies [5], where there was a similar female to male ratio (1.5 : 1). This finding could reflect a greater concern and compliance in female patients towards dental care or the role of hormones. There were no gender differences in other groups of lesions. It proves that lesions of epithelial origin have no gender predilection and gender-dependent modifying factors, in contrast to lesions of vascular and connective tissue origin.

Most of the oral lesions, with the exception of salivary gland pathologies, occurred after the age of 45, which confirms the results obtained in other studies [6–8]. These results may be associated with the accumulation of all harmful habits and parafunctions and iatrogenic factors in the oral cavity. Removable dentures, extensive feelings, iatrogenic factors and habits are more typical of the elderly population. Hormone disturbances and severe systemic diseases occur more often in perimenopausal women after the age of 45. Furthermore, the occurrence of malignant tumours in the seventh decade

of life may be associated with a higher risk of genetic mutations at a more advanced age.

The present study demonstrated that the overall distribution of lesions was similar to that observed in other studies [6–8]. The vestibule of the mouth and the lips are exposed to harmful factors, such as biting, chronic irritation, mechanical and thermal injuries and, in the case of lips, also solar radiation. This proves the necessity of early detection and elimination of all potential irritants and parafunctions. It is also necessary to protect the lips against ultraviolet radiation and thermal injury.

Fibroma was the most frequent diagnosis, supporting previous findings reported in the literature [8, 9]. Fibroblasts and connective tissue are prone to proliferation and respond to mechanical irritation with reactive lesions or fibroma development. The long-term effect of harmful factors and mechanical irritation affect the proliferation of fibroblasts and other connective tissue components. There is a direct relationship between the existence of irritants and the occurrence of benign tumours and tumorous lesions of connective tissue origin, especially in the vestibule of the oral cavity.

Reactive lesions constituted the biggest category of oral lesions in our study. They can result from the underlying systemic disease, drug-induced stimulus, dental plaque and local iatrogenic factors. Reactive lesions of the oral cavity are non-neoplastic proliferations with very similar clinical appearance to benign neoplastic proliferation, which are produced in association with chronic local irritation or trauma. They include PGCG,

Table 3. Clinical diagnoses, pathomorphological diagnoses and physical forms of lesions

Variable	N (%)	Variable	N (%)
Clinical diagnosis:		Ulceration	1 (0.5)
Papilloma	22 (10.4)	Ranula	1 (0.5)
Carcinoma	1 (0.5)	Lipofibroma	1 (0.5)
Granuloma teleangiectaticum	1 (0.5)	Fibroma	35 (16.5)
Tumour mixtus	1 (0.5)	Irritation fibroma IF	26 (12.3)
Leukoplakia	17 (8.0)	Inflammatory fibrous hyperplasia IFH	3 (1.4)
Lichen planus	1 (0.5)	Inflammatory papillary hyperplasia IPH	3 (1.4)
Mucocele	36 (17.0)	Granuloma	13 (6.1)
Mucogranuloma	1 (0.5)	Granuloma teleangiectaticum	8 (3.8)
Epulis	20 (9.4)	Peripheral giant cell granuloma PGCG	3 (1.4)
Epulis inflamatoria	1 (0.5)	Pyogenic granuloma PG	2 (0.9)
Neurofibroma	1 (0.5)	Granuloma fissuratum FG	15 (7.1)
Ulceration	2 (0.9)	Lichenoid lesion	12 (5.4)
Ranula	1 (0.5)	Lichenoid lesion with inflammation	10 (4.5)
Fibroma	75 (35.4)	Metastasis	1 (0.9)
Granuloma fissuratum	22 (10.4)	Physical form of the lesion:	
Metastases	1 (0.5)	Nodule	151 (71.2)
Pathomorphological diagnosis:		Ulceration	2 (0.9)
Papilloma	16 (7.5)	Bulla	37 (17.5)
Carcinoma planoepitheliale	2 (0.9)	Macula	6 (2.8)
Dysplasia	4 (1.9)	Plaque	11 (5.2)
Tumour mixtus	1 (0.5)	Drugs:	198 (93.4)
Leukoplakia	6 (2.8)	Anticoagulants	1 (0.5)
Lichen planus	4 (1.9)	Anticonvulsants	1 (0.5)
Mucocele	30 (14.2)	Antiplatelet drugs	5 (2.5)
Mucogranuloma	4 (1.9)	Steroids	2 (1.0)
Haemangioma cavernosum	1 (0.5)	Benzodiazepines	1 (0.5)
Angiofibroma	3 (1.4)	Thyroxine analogue	4 (1.9)
Neurofibroma	2 (0.9)	Angiotensin-converting enzyme inhibitor	1 (0.5)

PG, GF, IF, cemento-ossifying fibroma, IFH, and IPH. These proliferations are painless pedunculated or sessile masses in dissimilar colours, beginning from light pink to red. The external appearance varies from nonulcerated flat to ulcerated mass. Lesion dimensions vary from several mm to several cm. According to Hunasgi *et al.*, the anterior portion of the maxilla and mandibular gingiva were involved most frequently. In the same study, IFH and PG were the most prevalent lesions [10]. Distributions of reactive lesions by gender and age also showed some differences [10]. According to the same authors, reactive lesions occurred mainly in the third and fourth decade. However, our results relating to histopathological diagnosis, typical location and age distribution were contrary. The reactive lesions' appearance reflects various stages of their development, as

in the early stages they appear red, raw with ulcerated surfaces and bleed on slight touch or spontaneously, while in the late stages they appear as firm, mature and avascular fibrous growths, which may be pedunculated or leaf-like in shape or as sessile. Connective tissue and epithelium are vulnerable to proliferation and often respond to irritation. Nevertheless, these different histological images are a range of a single lesion in diverse stages of maturation. Reactive proliferations are fibrous tissues with another histological component such as multinucleated giant cells, calcified material, or small vessels hyperplasia. Detailed histopathological diagnosis can include normal, atrophic, hyperplastic or ulcer pattern of the gingival lining epithelium, the type of inflammatory infiltrate, the presence of abundant capillary or cavernous vascular proliferation, the presence

Table 4. Characteristics of reactive lesions in group 1

Parameter	N (%)
Gender:	
Female	43 (58.9)
Male	30 (41.4)
Age [years]:	
≤ 45	15 (20.5)
> 45	58 (79.5)
Clinical diagnosis:	
Papilloma	3 (4.1)
Leukoplakia	1 (1.4)
Mucogranuloma	1 (1.4)
Epulis	19 (26.0)
Epulis inflammatoria	1 (1.4)
Neurofibroma	1 (1.4)
Fibroma	28 (38.4)
Granuloma fissuratum	19 (26.0)
Pathomorphological diagnosis:	
Irritation fibroma (IF)	26 (35.6)
Inflammatory fibrous hyperplasia (IFH)	3 (4.1)
Inflammatory papillary hyperplasia (IPH)	3 (4.1)
Granuloma	13 (17.8)
Granuloma teleangiectaticum	8 (11.0)
Peripheral giant cell granuloma (PCG)	3 (4.1)
Pyogenic granuloma (PG)	2 (2.7)
Granuloma fissuratum (GF)	15 (20.5)
Size/diameter [mm ²]:	
≤ 10	49 (67.1)
> 10	23 (32.9)
Consistency:	
Elastic	60 (82.2)
Soft	4 (5.5)
Hard	9 (12.3)
Habits/trauma/injures:	
Smoking	2 (2.7)
Biting	1 (1.4)
Poor oral hygiene	1 (1.4)
Dentures	22 (30.1)
Physical form of the lesion:	
Nodule	71 (97.3)
Bulla	1 (1.4)
Treatment (n = 73):	
Incisional biopsy	1 (1.4)
Excisional biopsy	72 (98.6)

of mineralized material, the presence of multinucleated giant cells and loose or dense types of connective tissue and the presence of fibroblastic proliferation. In our opinion, the long period of development of these lesions, their maturation and evolution of their appearance may affect the final histopathological diagnosis and provide results in contrast to those of other studies. Removable dentures, malposition, biting and poor oral hygiene predispose to the development of reactive lesions in the oral cavity. PGCG originates from the periosteum or periodontal membrane. It is a soft tissue lesion that very rarely affects the underlying bone, though the latter may suffer superficial erosion. It manifests as a red-purple nodule located in the region of the gums or edentulous alveolar margins, primarily in the lower jaw. The differential diagnosis includes central giant cell granuloma, which are located within the jaw itself and exhibit more aggressive behaviour. Radiological evaluation is recommended for distinguishing [11]. The attached gingiva was the most frequent place of reactive lesions in which PGCG was the most prevalent lesion [9, 12].

Oral mucocele is the most common benign minor salivary gland lesion, caused by mechanical trauma to the excretory duct of the gland. Clinically, they are characterized by single or multiple, soft, fluctuant nodules, ranging from the normal colour of the oral mucosa to deep blue. They represent the 17th most common lesion of the oral cavity [13]. Oral mucoceles are usually dome-shaped enlargements with intact epithelium. They are classified as extravasation or retention types. Trauma such as that from biting the lip is assumed to cause most mucoceles. It is a self-limiting mucous containing a cyst of the salivary glands commonly occurring in the oral cavity, with a relatively rapid onset and fluctuating size [13]. The decrease in size may be due to the rupture of the lesion, and subsequent mucin accumulation or re-absorption of saliva deposits may cause the lesion to reform. It was also observed that most of the mucoceles had a diameter ranging from 5 to 14 mm. The lower lip is the most common site for mucocele. Other locations such as the upper lip and floor of the mouth can be predisposing locations for adenoma pleomorphum and ranula, which is the retention cyst of the sublingual gland [14].

Oral leukoplakia can be defined as a predominantly white lesion of the oral mucosa that cannot be characterized as any other definable lesion. It is the most prevalent precancerous lesion of the oral mucosa. Some oral leukoplakia will transform into cancer [15]. The annual risk of malignant transformation of leukoplakia, if not malignant already at the first visit, is approximately 2–3% [16]. Approximately 70% of oral leukoplakias are found on the lip vermillion, buccal mucosa and gingiva [15]. In the study by Cebeci *et al.*, white lesions were observed in 2.2% of patients [17]. Gender, age and oral distribu-

Table 5. Characteristics of precancerous lesions/potentially malignant lesions in group 2 ($n = 37$) and of salivary gland pathologies in group 3 ($n = 36$)

Parameter	Precancerous lesions/ potentially malignant lesions Group 2 n (%)	Salivary glands pathologies Group 3 n (%)	Parameter	Precancerous lesions/ potentially malignant lesions Group 2 n (%)	Salivary glands pathologies Group 3 n (%)
Gender:			Mucocele	–	30 (83.3)
Female	17 (45.9)	13 (36.1)	Mucogranuloma	–	4 (11.1)
Male	20 (54.1)	23 (63.9)	Ranula	–	1 (2.8)
Age [years]:			Size/diameter [mm ²]:		
≤ 45	9 (24.3)	26 (72.2)	≤ 10	26 (70.3)	27 (75.0)
> 45	28 (75.7)	10 (27.8)	> 10	11 (29.7)	9 (25.0)
Clinical diagnosis:			Consistency:		
Papilloma	4 (10.8)	–	Elastic	17 (45.9)	
Leukoplakia	16 (43.2)	–	Soft	1 (2.7)	35 (97.2)
Lichen planus	1 (2.7)	–	Hard	19 (51.4)	1 (2.8)
Mucocele	2 (5.4)	32 (88.9)	Habits/trauma/injuries:	24 (64.9)	32 (88.9)
Epulis	1 (2.7)	–	Smoking	10 (27.0)	
Ulceration	2 (5.4)	–	Biting	2 (5.4)	4 (11.1)
Fibroma	5 (13.5)	1 (2.8)	Chronic trauma	1	
Granuloma fissuratum	1 (2.7)	–	Dentures	6 (16.2)	1 (2.8)
Ranula	–	1 (2.8)	Physical form of the lesion:		
Granuloma teleangiectaticum	–	1 (2.8)	Nodule	17 (45.9)	4 (11.1)
Adenoma pleomorphum/ tumour mixtus	–	1 (2.8)	Ulceration	2 (5.4)	–
Pathomorphological diagnosis:			Bulla	2 (5.4)	35 (97.2)
Oral dysplasia	4 (10.8)	–	Macula	6 (16.2)	–
Leukoplakia	6 (16.2)	–	Plaque	10 (27.0)	–
Lichen planus	4 (10.8)	–	Treatment:		
Ulceration	1 (2.7)	–	Incisional biopsy	15 (40.5)	–
Lichenoid lesion	12 (32.4)	–	Biopsy	–	1 (2.8)
Lichenoid lesion with inflammation	10 (27.0)	–	Excisional biopsy	22 (59.5)	35 (97.2)
Adenoma pleomorphum/ tumour mixtus	–	1 (2.8)	Duration:	25 (67.6)	23 (63.9)
			≤ 1 month	2 (5.4)	3 (8.3)
			> 1 month ≤ 1 year	7 (18.9)	9 (25.0)
			> 1 year	3 (8.1)	1 (2.8)

tion of leukoplakia in our study were confirmed in other studies [15–17]. In our opinion, clinical characteristics and the risk of malignant transformation in predominantly white lesions of the alveolar ridge (“alveolar ridge keratosis”) and the buccal gingiva (“frictional keratosis”) is lower than for similar lesions located on the borders of the tongue or the floor of the mouth. A clinical diagnosis or differential diagnosis of white mucosal lesions is the result of a number of parameters. The second most common precancerous lesion was oral lichen planus (OLP).

Oral lichen planus is a chronic inflammatory oral mucosal disease that occurs more frequently in middle-aged and elderly female patients. It is a T-cell dysfunction-induced localized autoimmune disease. Six types of OLP can be identified, namely reticular, papular, plaque-like, atrophic/erosive, ulcerative, and bullous types. It always has a bilateral and symmetric distribution of the oral lesions [18]. Oral lichen planus distribution in our study on buccal mucosa, tongue and gingiva confirmed the clinical observation from previous studies [18]. In our opinion,

Table 6. Characteristics of benign and malignant tumours (group 4 and group 5)

Benign tumours (n = 58)		Benign tumours (n = 58)	
	N (%)		N (%)
Gender:		Habits/trauma/injuries:	
Female	32 (55.2)	Smoking	2 (3.4)
Male	26 (44.8)	Biting	3 (5.2)
Age [years]:		Treatment (n = 58):	
≤ 45	15 (25.9)	Excisional biopsy	58 (100.0)
> 45	43 (74.1)	Duration:	
Clinical diagnosis:		≤ 1 month	–
Papilloma	14 (24.1)	> 1 month ≤ 1 year	10 (17.2)
Mucocele	1 (1.7)	> 1 year	11 (19.0)
Fibroma	41 (70.7)	Malignant tumour (n = 3)	
Granuloma fissuratum	2 (3.4)	n (%)	
Pathomorphological diagnosis:		Gender (n = 3):	
Papilloma	16 (27.6)	F	2 (66.7)
Haemangioma cavernosus	1 (1.7)	M	1 (33.3)
Angiofibroma	3 (5.2)	Age [years]:	
Neurofibroma	2 (3.4)	≤ 45	1 (33.3)
Fibrolipoma	1 (1.7)	> 45	2 (66.7)
Fibroma	35 (60.3)	Clinical diagnosis (n = 3):	
Size/diameter [mm ²]:		Papilloma	1 (33.3)
≤ 10	49 (84.5)	Carcinoma	1 (33.3)
> 10	9 (15.5)	Malignancy	1 (33.3)
Consistency:		Pathomorphological diagnosis:	
Elastic	24 (41.4)	Carcinoma planoepitheliale keratodes	2 (66.7)
Soft	1 (1.7)	Malignancy	1 (33.3)
Hard	33 (56.9)	Treatment:	
		Excisional biopsy	3 (100.0)

three main white lesions predominate in the oral cavity: leukoplakia, OLP and lichenoid lesion. Lichenoid lesion is caused by prolonged, direct anatomic contact of the oral mucosa with dental restorations. The disappearance of these lesions within a period of 2–3 months after removal of iatrogenic factors is an important clinical feature of lichenoid lesions. In the case of persistence after the removal of iatrogenic factors, the diagnosis of leukoplakia and OLP should be tried [18]. Surgical biopsy of OLP is controversial, especially in reticular, popular and plaque-like forms. We decided to perform an excisional biopsy because of the suspicion of dysplastic change or malignant transformation [18].

Most of the lesions presented reached a size of less than 10 mm. Only GF were characterized by a bigger diameter. In our opinion, a larger size of GF is associated with the long-lasting and contiguous effect of removable dentures on the oral mucosa. The most common physical form of lesions was a nodule. This form is easily accessible for surgical removal. These two factors determined the choice of surgical treatment in the form of excisional

biopsy. Surgical excision, and the removal of the underlying cause in some cases, is the preferred method of treatment [19, 20]. Incisional biopsy was carried out in the case of extensive reactive lesions and in selected cases of leukoplakias. Mapping is the recommended method to confirm the diagnosis of leukoplakia [16].

Some systemic diseases can manifest in the oral cavity. In our study, we detected the co-occurrence of HCV and OLP Recklinghausen syndrome and neurofibroma. Neurofibroma is an uncommon benign tumour of the oral cavity derived from the cells that constitute the nerve sheath neurofibromatosis type 1 (NF1), also for about 90% of all cases. Oral cavity involvement by a solitary and peripheral plexiform neurofibroma in patients with no other signs of neurofibromatosis is uncommon [21]. Oral manifestations can be found in almost 72% of NF1 patients [21]. NF1 is known as Recklinghausen syndrome. Other common diseases were hypothyroidism, diabetes, hypertension, asthma and epilepsy. Systemic diseases and applied therapies could affect the clinical presentation of oral lesions.

Conclusions

The oral cavity is the place where various mucosal lesions can occur. Their occurrence can be limited by early detection and elimination of harmful habits and iatrogenic factors, especially from the vestibule of the mouth and the lips that are predisposed to their development. Comprehensive examination is helpful in making a diagnosis. When oral mucosal lesions are detected, we propose the following algorithm.

1. The exclusion of all possible odontogenic and iatrogenic causes of oral mucosal lesions.
2. The detection and elimination of harmful habits, parafunctions and irritants from the oral cavity especially from the vestibule of the oral cavity and from the lips.
3. All surgical treatment should be performed only after the proper detection and elimination of causative factors to decrease the risk of recurrence.
4. Excisional biopsy or in more diffuse lesions, incisional biopsy are recommended to confirm clinical diagnosis.
5. Consideration of other local and systemic factors that can modify the clinical pattern of oral lesions, such as oral hygiene, systemic diseases, and drugs.

There are a few local and systemic factors which can modify their clinical and histopathological image. Incisional or excisional biopsies are recommended to confirm clinical diagnosis and to exclude oral dysplasia and malignant transformation and as an independent method of treatment.

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Conflict of interest

The authors declare no conflict of interest

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