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Oral traumatic lesions

THESIS SUMMARY

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The dissertation work was developed in the Department of Oral Surgery at the Faculty of Dental Medicine of the Medical University "Prof. Dr. Paraskev Stoyanov"-Varna.

The dissertation contains 141 pages and is illustrated with 62 tables and 79 figures. The bibliography contains 180 literary sources, of which 3 are in Cyrillic and 177 are in Latin.

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1. Abbreviations used:

OTL- oral traumatic lesions

HB - hypertensive disease

ZB - diabetes

TUGSE - traumatic ulcerative granuloma with stromal eosinophilia

NS- necrotizing sialometaplasia

LA- Linea alba

PVP - polyvinylpyrrolidone

VAS - Visual Analog scale

EF- epulis fissuratum

2. Introduction

Medical science, and dentistry in particular, has come a long way in recent decades. However, both in the distant past and today there are diseases and conditions that accidentally and unexpectedly disturb the normal existence of the individual, throwing him out of his normal rhythm of existence. A sudden, unintended and accidental event can change a person's attitude and mood in seconds, causing them to show unheard of imagination in an effort to get rid of the unpleasant feeling. In these cases, it is most often about the subjective feeling known to every person, namely pain. In addition to pain, in a large percentage of cases, the face also has difficulties in basic functions such as eating, fluid intake, and others.

In other circumstances, the damage to tissues and organs in the human organism occurs with weak and indistinguishable forces for the patient, manifesting in the form of chronic trauma. Its most important clinical significance is expressed by the potential of chronic trauma to cause a preneoplastic process, which, over time, without particular symptoms, will lead to the development of malignant growth.

In the majority of cases of oral traumatic lesions, there is no dilemma as to the cause that led to the occurrence of this suffering. Through the analysis of the data obtained from the patient's questioning and the clinical examination, the diagnosis is not difficult for the experienced clinician. In some isolated cases, however, a thorough history and examination are not sufficient for this. This necessitates the application of other clinical and paraclinical methods in order to reach the correct diagnosis. Due to the above, we can say that the problem of traumatic lesions of the soft tissues in the oral area is a problem of global importance, as it covers all ages and different social groups of the population, differing in their occurrence and course.

3. Purpose and tasks

Purpose of the study

To characterize the main oral traumatic lesions, clarifying their relationship with certain local and systemic factors.

Tasks:

Task No. 1. To establish the demographic and clinical characteristics of patients with oral traumatic lesions.

Task No. 2. To clarify the relationship of oral traumatic lesions with certain local and systemic factors.

2.1. To trace the relationship in patients with oral traumatic lesions and the wearing of prosthetic structures (removable and fixed).

2.2. To clarify the peculiarities in the course of oral traumatic lesions in patients with existing systemic diseases - hypertension and type 2 diabetes.

Task No. 3. To determine the effect of the application of a drug spray containing polyvinylpyrrolidone (PVP) in the treatment of oral traumatic lesions.

Task No. 4. To characterize the isolated microbial flora and its relationship to the course of oral lesions with traumatic etiology

4. Materials and methods

A. Materials for the listed tasks

The present study is prospective, monocentric in nature, and was carried out by a team of researchers from the Department of Oral Surgery at the Medical University - Varna, with the main researcher - the dissertation student. For the implementation of the specified tasks, 56 patients with existing oral traumatic lesions who visited the University Medical - Dental Center and student halls, at the Faculty of Dental Medicine - Varna in the period January 2020 - June 2023 were included. The majority of the patients sought help from specialist for the specific lesion. In other patients, the described lesions were found during an examination conducted on another occasion, as well as during a preventive dental examination. The patients included in the study are between the ages of 12 and 83, and among them there are patients with chronic diseases requiring regular medication, as well as those without the presence of accompanying diseases. Among the chronic diseases encountered in the group of patients with OTL, the most common are hypertension, type 1 and 2 diabetes, patients who have had a heart attack and stroke, patients with chronic lung diseases and endocrine disorders.

All patients participating in the study were informed that the data from their records could be used for scientific research and signed an informed consent. All patients participating in the study filled out a questionnaire to investigate the type and characteristics of oral traumatic lesions. The questionnaire was filled after the clinical examination. Through it, information was collected regarding the cause of the traumatic lesions, the presence of certain harmful habits and a possible connection with the lesions, the duration and the characteristics of the pathology in individual patients. The presence of removable prosthetic structures, removable and fixed orthodontic appliances, and the presence of certain common diseases and conditions are also taken into account. A complete description of the individual lesions was made in each patient, detailing the exact location, size and shape, surrounding tissues, and the underlying lesions present.

B. Methods.

Documentary method

For all patients, we collected information on demographic characteristics (gender and age), all available medical records and epicrisises were reviewed to collect information on available diseases and intake of certain medications. In the processing of the materials, all legal regulations regarding the protection of personal data have been observed.

Diagnostic methods:

- Medical history

It is expressed in the need to obtain the most detailed and comprehensive information regarding the specific disease. The questions are related to the specific symptoms bothering the patient, the time and manner of the onset of the suffering, whether any therapy was conducted on this occasion.

- Clinical examination

In the course of the clinical work, the exact localization of the available lesions is taken into account. Whether it is single or multiple lesions is monitored. The size, consistency, surrounding healthy tissues, presence or absence of a shaft were carefully determined and described. A standard periodontal probe “CP15” was used to measure the size of the studied lesions.

A thorough examination of the existing dentition is necessary - looking for sharp carious teeth, teeth in the wrong position and ectopically located teeth, poorly

adapted restorations, as well as removable and fixed prosthetic structures. Whether the described lesion has direct contact with any of these structures at rest or in function is considered.

When performing the clinical examination, the subjective feeling of pain due to the traumatic lesions present was measured. For this purpose, a standard VAS scale (Visual Analog scale) was used to measure pain, and the same was done during the control examination, in order to compare the obtained values.

- Clinical examinations:

- X-ray diagnostics

In those cases in which a certain dental pathology was detected, which was the cause of the development of oral traumatic lesions, the patients were subjected to an X-ray examination. In these cases, it concerns fractured and carious teeth, improperly made fixed restorations, which with their sharp edges damage the oral tissues. Patients who required an X-ray examination were referred to the Department of Imaging Diagnostics at the University Medical - Dental Center at the Faculty of Dental Medicine.

- Laboratory studies

All patients participating in the study were assigned laboratory blood tests, through which changes from the norm in the blood count, glucose levels and, in some patients, folic acid values were reported. Patients were referred for testing to a registered medical laboratory, and their test results were collected through the laboratory's electronic virtual system.

- Microbiological examination

Since among the tasks listed above, it is indicated that the pathogenic microflora will be examined in the course of the conducted research, it is planned to carry out a microbiological study. It aims to characterize the flora isolated from the studied lesions. For this purpose, the use of two types of transport media - Amies and Stuart - in which the studied secretion will be transported, is foreseen.

For the purposes of the microbiological study, 20 patients with endophytic traumatic lesions were selected. These are cases that are clinically presented with a defect in the integrity of the oral soft tissues, and the material was taken

from the examined lesions (their bottom and shaft) and their surrounding healthy tissues, by means of a sterile swab found in the package together with the transport medium. Exophytic traumatic lesions were not subjected to microbiological examination. The sample thus taken is sent within a maximum of 2 hours to a registered microbiological laboratory, and the results of the conducted microbiological examination are obtained electronically, through the laboratory's website.

Treatment methods:

- Conservative treatment

It is expressed on the one hand in the local application of epithelization-supporting and pain-relieving agents, which are applied directly to the lesion and the surrounding tissues, playing the role of a barrier limiting the action of the damaging factor. In the process of treating the patients participating in the study, a medication containing polyvinylpyrrolidone (PVP) was administered in order to study its effect. The treatment of the lesion with the preparation is carried out by using the nozzle available in the product package, injecting it 3 times on the lesion from a distance of 1-2 centimeters. Patients were instructed not to eat or drink for the next hour, for a better effect of the medication. Patients were also instructed to repeat this action 3 times a day during the treatment period, until the symptoms resolved and the treated lesions disappeared.

Another aspect of the conservative treatment of OTL includes means to improve oral hygiene and limit bacterial growth - solutions of chlorhexidine 0.12%, hydrogen peroxide 3% and betadine were used for this purpose.

On the other hand, conservative treatment is also expressed in removing the cause that led to this suffering - etiological treatment.

- Surgical treatment

In some of the cases with traumatic lesions, surgical treatment is indicated. These are cases of acute trauma, most of which are of great force, resulting in large wound surfaces with involvement of surrounding tissues and organs.

Other cases in which surgical interventions are performed are those in which a biopsy is required in order to clarify the diagnosis. Most often, these are the cases of exophytic traumatic lesions, in which it is not possible to make the correct diagnosis using only clinical methods - mucocele, traumatic fibroma,

fissural epulis, traumatic granuloma, etc. In these cases, the diagnosis is made after histological examination of the biopsied material. For this purpose, biopsy materials were fixed in 10% neutral formalin immediately after removal before sending to the histology laboratory.

Statistical methods:

The following statistical methods were applied:

1. Descriptive analysis – includes mean values, standard deviation, median and interquartile range for quantitative variables; frequency and percentage distribution for nominal, ordinal or dichotomous (0-1) variables.
2. Chi-square test and Fisher's exact test for comparison and correlation of proportions and frequency data.
3. Graphical analysis – for visualization of the obtained results.
4. Variance analysis of quantitative variables – calculating estimates of central tendency and dispersion.
5. Kolmogorov-Smirnov and Shapiro-Wilk methods - for checking the normality of the distribution of the quantitative variable.
6. Students t-test /paired Students t-test - for testing hypotheses of a difference between two independent/dependent samples in the case of statistically significant differences of quantitative indicators with a normal distribution and for interval evaluation / the confidence interval (CI) reflects the reliability of the evaluation of the studied parameter and the Mann–Whitney U test for a non-normally distributed sample.
7. Kruskal–Wallis test for testing hypotheses of difference in more than two groups
8. Spearman's correlation analysis (Spearman Rho) to examine the linear relationship between two quantities, at least one of which is measured on an ordinal scale.
9. Biostatistical analysis and graphical presentation were done using SPSS Statistics 25.0., Microsoft Office 2013, Jamovi 2.3.24
10. We adopted a significance level of $\alpha = 0.05$. Observed differences between groups were considered reliable in cases where the calculated probability $p < \alpha$.

5. Results and Discussion:

5.1. Demographic and clinical characteristics of patients with oral traumatic lesions.

The presented study includes 56 patients with described oral traumatic lesions registered in the period January 2020 - June 2023. The selection of patients included in the study has the type presented in the graph.

Reason for visit Number	Брой	%	p (χ^2)
due to the presence of OTL	26		
another oral disease	22	0.008*	0.008*
during a preventive examination	8		

Table 1 selection of patients.

In the present report, the studied patients were divided into two groups according to the type of traumatic lesions present, and this was done for practical and clinical reasons.

Group 1

It includes lesions defined by us as exophytic - developing above the surrounding healthy soft tissue, growing on a broad base or peduncle. The number of registered cases in this group is 16 (n=16, 28.5 %). The most common exophytic lesions are traumatic fibroma followed by epulis and mucocele.

Group 2

It includes lesions clinically manifested as a defect in the structure of soft tissues, conditionally called by us endophytic - developing in the form of an

ulcer with a bottom and a shaft, distinguishing damaged from healthy tissues (n=40, 71.5%). Of the endophytic lesions, three in number are the result of chemical exfoliation, while the remaining 37 represent classic traumatic lesions, the result of chronic or acute trauma with the characteristic macroscopic picture. Four of the specified 37 lesions are of iatrogenic origin.

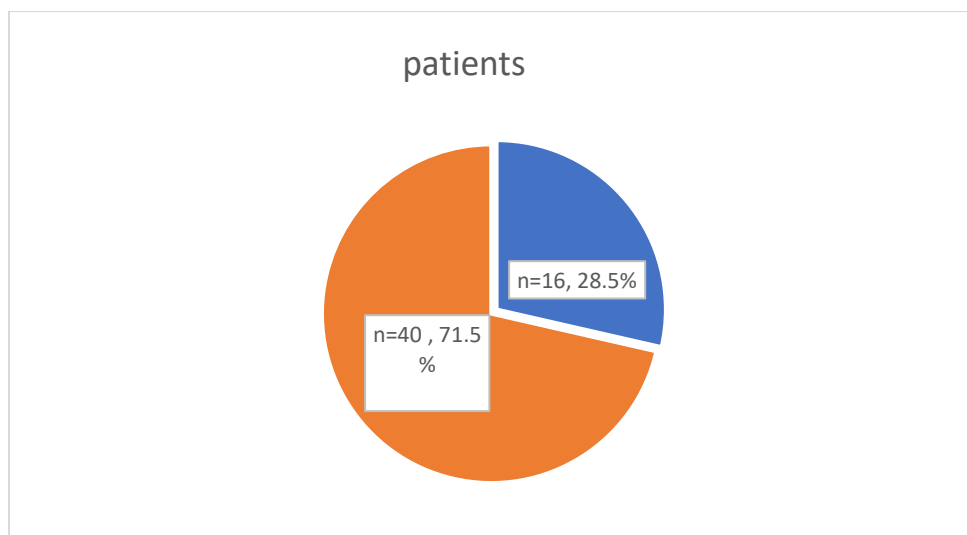


Fig. distribution of patients by group.

From the above chart it is clear that the predominant type of oral traumatic lesions are those presenting with the clinical feature of ulcers or ulcers on the soft tissue surface, compared to the group of lesions defined as exophytic.

The low rate of exophytic lesions (Re Cecconi et al. 2010) explains that many patients do not seek medical help for this condition, as it does not cause difficulties and discomfort, as well as due to the recurrent course of one of the most common exophytic traumatic lesions.

Distribution by gender.

Of all patients included in the study, 32 (57.15%) were women, respectively 24 (42.85%) were men. The distribution by gender in the individual groups is shown in the table.

gender	GR 1		GR 2	
	n	%	n	%
female	8	50	25	62.5
male	8	50	15	37.5
Общо	16	100	40	100

A number of authors confirm our findings that certain traumatic lesions are more common among patients at a young age. This includes diseases such as IMO and mucocele. According to Rao et al., 2012, the diagnosis of mucocele occurs most often in the first three decades of the patients' lives, as it is also one of the most common OTL.

Prevalence of chronic diseases among the patients included in the study.

Another factor characterizing the studied group of patients is the presence or absence of chronic diseases. Of all the patients included in the study, 43 (76.78%) indicated that they had one or more chronic diseases. Among the most frequent diseases are the so-called socially significant diseases such as hypertension, diabetes type 1 and 2, past vascular accidents, as well as oncological and endocrine diseases.

	MALE, n	MALE, %	FEMALE, n	FEMALE, %	total, n	total, %	p	Tect
hipertension	15	62.5 %	19	59.4 %	34	60.7 %	0,813	χ^2
oncological. and immunodeficiency	2	8,40%	3	9.4 %	5	8,90%	0,44	Fisher's ET
diabetes	3	12.5 %	7	21.9 %	10	17.9 %	0,489	Fisher's ET
neurological	5	20.8 %	9	28.1 %	14	25.0 %	0,533	Fisher's ET
endocrine	1	4.2 %	9	28.1 %	10	17.9 %	0.032*	Fisher's ET

Table 5. Prevalence of chronic diseases.

Medication intake by the studied patients.

Another factor characterizing the demographic characteristics of the patients and related to the OTL problem is the systemic therapy applied by the subjects. In our study, the following groups of medications used by the examined patients were registered:

- Antihypertensive medications;
- Anticoagulants/antiaggregants;
- Corticosteroids;
- Bisphosphonates.

From the charts presented, it can be seen that a total of 33 of all studied patients were taking medication for hypertension (n=33, 58.92%), with a minimal advantage for women in this regard. Naturally, with advancing age, the need for antihypertensive therapy increases.

The relationship between the intake of certain medications and oral health was clarified in a study by Ciancio and colleagues in 2004, and the authors found that the intake of antidepressants and antihypertensive medications had a negative effect on the degree of gingival inflammation as well as the plaque index.

Distribution of the various harmful habits among the patients included in the study.

As it became clear from the analysis of the literature, harmful habits expressed in biting and sucking certain tissues in the oral cavity are a frequent reason for the development of OTL. In our study, half of the included patients showed a history of this harmful habit.

Bad habits	male, n	male, %	female, n	female, %	total, n	total, %	p*
no	11	39.3 %	17	60.7 %	28	100%	0,884
Lip biting	4	36.4 %	7	63.6 %	11	100%	
Tongue biting	1	33.3 %	2	66.7 %	3	100%	
Cheek biting	2	66.7 %	1	33.3 %	3	100%	
Biting objects	3	50.0 %	3	50.0 %	6	100%	
Combination	3	60.0 %	2	40.0 %	5	100%	
total	24	42.9 %	32	57.1 %	56	100%	

Table 14. Gender distribution of harmful habits.

Data on the prevalence of IMO mainly among women at a young age are also confirmed by the literature. Mucocele, traumatic fibroma, linea alba, etc. are also included in the group of OTL directly related to this harmful habit (Bahadure et al. 2012, Jain G et al. 2017, Glass LF et al. 1991).

Prosthetic structures as a factor in the development of OTL

In the present study, information was collected on available prosthetic structures - replaceable and non-replaceable, which may be a factor in the development of OTL. The results we obtained are as follows.

Type of prosthetic construction	male, n	male, %	female, n	femal, %	total, n	total, %	p (χ^2)
no	16	48.5 %	17	51.5 %	33	100%	0,591
moveable	5	35.7 %	9	64.3 %	14	100%	
fixed	3	33.3 %	6	66.7 %	9	100%	
total	24	42.9 %	32	57.1 %	56	100%	

Table 15. Prevalence of prosthetic designs among study patients

As was clear from the literature review, a factor determining the importance of OTL in patients wearing prostheses is the duration of their wear (Rotundo et al. 2013, Garcia-Pola et al 2002). Again according to the literature data, the wearing time of the available prostheses was divided into three periods - from the handover of the prosthesis to the end of the first 6 months, after the sixth month to the end of the sixth - seventh year, and a period longer than 7 years.

Clinical characteristics of traumatic lesions.

As was foreseen in Task 1, in addition to characterizing the demographic characteristics of patients with OTL, a description of their clinical characteristics is also envisaged. To this end, the exact localization, number (whether single or multiple lesions), shape, size, presence of edges and rupture of the lesions will be described. The bottom of the registered OTL will be described, as well as the type of growth (whether it is exophytic or those manifesting as a soft tissue defect), as well as the results of a histological examination for those from which it was performed. The results of these indicators are presented in the table.

Criterion objective status	Category	N	Number of cases	%	95% CI		p
					LL	UL	
Localization of OTL	1 Buccal mucosa	56	17	30,4%	18,8%	44,1%	0,008
	2. Gingiva	56	17	30,4%	18,8%	44,1%	
	3. Tongue	56	10	17,9%	8,9%	30,4%	
	4. Lip	56	10	17,9%	8,9%	30,4%	
	5. alate	56	2	3,6%	0,4%	12,3%	
Number OTL	Single	56	53	94,6%	85,1%	98,9%	< .001
	Multiple	56	3	5,4%	1,1%	14,9%	
Shape OTL	Round	56	14	25,0%	14,4%	38,4%	0,061
	Oval	56	15	26,8%	15,8%	40,3%	
	Incorrect	56	27	48,2%	34,7%	62,0%	
Size OTL 1 day	Up to 6 mm	56	23	41,1%	28,1%	55,0%	0,181
	over 6 mm	56	33	58,9%	45,0%	71,9%	
Edges of OTL	Smooth	56	35	62,5%	48,5%	75,1%	< .001
	Sharp	56	20	35,7%	23,4%	49,6%	
	Others	56	1	1,8%	0,0%	9,6%	
Ruptures OTL	No	56	46	82,1%	69,6%	91,1%	< .001
	yes	56	10	17,9%	8,9%	30,4%	
VAL otl	no	56	11	19,6%	10,2%	32,4%	< .001
	Erythema	56	42	75,0%	61,6%	85,6%	
	Edenic	56	3	5,4%	1,1%	14,9%	
Bottom of OTL	1. Bottomless	56	17	30,4%	18,8%	44,1%	0,001
	2. With granulations	56	3	5,4%	1,1%	14,9%	
	3. With blood clots	56	15	26,8%	15,8%	40,3%	
	4. Crater-shaped	56	17	30,4%	18,8%	44,1%	
	5. With sticker	56	4	7,1%	2,0%	17,3%	
Growth of OTL	Endophytic	56	40	71,4%	57,8%	82,7%	0,001
	Exophytic	56	16	28,6%	17,3%	42,2%	
Result histology OTL	Epulis	9	1	11,1%	0,3%	48,3%	0,02
	Fibroma	9	8	88,9%	51,8%	99,7%	

Table. Clinical characteristics of OTL.

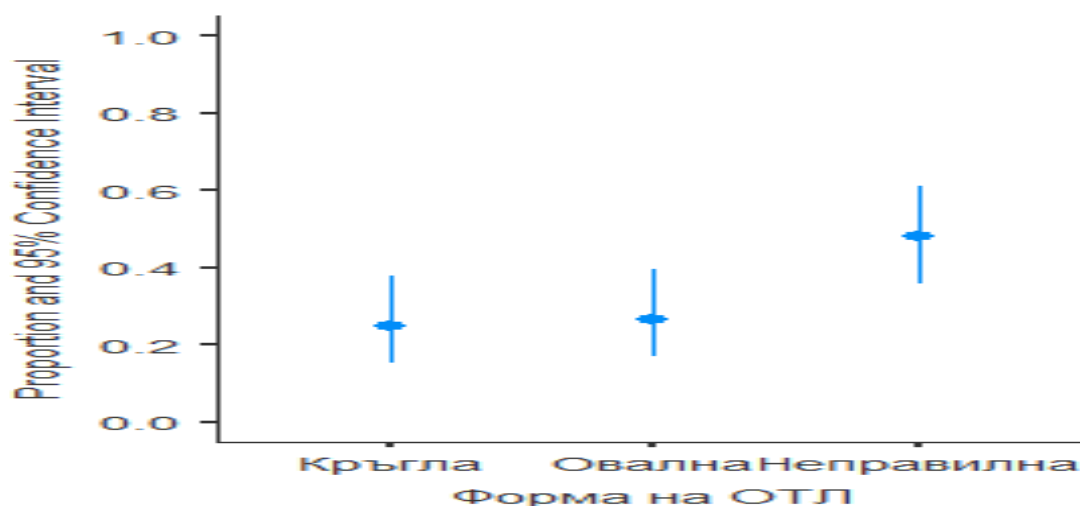
From the table presented in this way, it can be seen that the most frequent localization of traumatic lesions is the buccal mucosa and the gingiva. Other locations described in the specimen are tongue, lips and palate. Cases with lesions localized on the tongue and lips are again equal (n=10, 17.10%), or in total make up 35% of all registered lesions. The least number of lesions are located on the hard palate (n=2, 3.6%), and in both cases, they are localized on the lateral part of the palate, near the alveolar ridge.

Regarding the distribution of the lesions, they were divided into those manifesting as multiple or as single lesions. The ratio according to this indicator is in favor of single lesions – 53 out of all 56 lesions are manifested as a single finding (n= 53, 94.64 %).

Apriasari and colleagues (2012) confirm what was said about the localization of OTL by indicating that the most frequent localization, according to them, involves the buccal and lingual sulcus. Regarding chemical damage to oral tissues, there is a wealth of data in the literature (Girish et al. 2015, , Phore et al. 2018, Gilveti, C., et al. 2010). The majority of them share more extensive damage to the oral tissues, in view of the nature of the traumatic agent, resulting in the involvement of deeper tissues and anatomical structures.

Shape of the lesions.

Another indicator clinically describing oral traumatic lesions is their shape. In the sample presented by us, the options for the shape of the lesion are round, oval and irregular. The distribution according to the form of OTL can be visualized with the following graph.



48.2% of all registered lesions are of irregular shape (n= 27), the next most frequent are those with oval shape (26.8%) or 15 of all registered lesions. The least numerous are the lesions defined by us as having a round shape (n= 14, 25%).

Santosh et al. 2015, describe exophytic traumatic lesions according to shape as nodular (nodule-shaped), bulbar (bulb-like shape), all of the shape variants presented in this way being a variety of oval or rounded shape, which is in sync with our results. Similar data can be reported for another type of lesion from the group of exophytic and eosinophilic (traumatic) granuloma (Hirshberg, Abraham, et al. 2006, Joseph B. K et al. 2010).

Size of the lesions.

The next of the clinical criteria by which OTL will be described is the size of the lesion. For the easier analysis of the obtained data, we conditionally divided the described traumatic lesions into two groups according to their size - large and small lesions. Lesions up to 6 mm in size. lesions with a size of 7 and more than 7 mm were defined as small, respectively. fell into the group of large lesions.

The measurement of the size of the described lesions was carried out both at the beginning of the study and registration of the patient (day 1) and on the 6th day, and with the analysis of the change in size, an assessment of the healing process was made.

In our sample, the lesions defined as large (with a size of 7 and more millimeters) predominate. They make up 33 of all 56 lesions or 58.9%. Accordingly, the lesions defined by us as small in size are 23 or 41.1%. Again, the same can be said for this criterion as for the shape of the lesions indicator.

Rennick et al. in a 2016 study investigated the changes in the size of the lesions they described in orthodontic patients, in order to account for the effect of their applied 2-DeNT Oral Topical Powder for the treatment of lesions in the oral cavity. The authors compared the results of the size of the lesions during the first ten days, and for this purpose they instructed the patients to fill out a form created for the purpose themselves. Baricevic M et al. 2011 described the lesions in their orthodontic patients, dividing them into 3 groups according to their size: lesions up to 1 cm in size, lesions 1 to 3 cm in size, and lesions larger than 3 cm in diameter.

Edges of traumatic lesions.

At the primary examination of OTL, their edges were described, and according to their clinical appearance, the edges of the lesions were divided into smooth, sharp and those not belonging to any of the two groups. Lesions with smooth edges are the most common in the sample - a total of 35 of all 56 cases, which makes 62.5%. Lesions with sharp edges are 20 in number, constituting 35.7% of all lesions. One case (1.8%) of all described was not assigned to either of the two groups of lesions according to the type of edge.

Rupture in oral traumatic lesions.

In the process of occurrence and development of OTL, due to the nature of the traumatic agent, in some lesions, soft tissue rupture is observed. Of all registered lesions in the study, 10 in number showed such a macroscopic finding (n=10, 17.9 %), respectively, in the remaining 82.1 %, no rupture was observed, and statistical significance was present between the data thus shown.



According to Anura et al. 2014 the rupture of the lesions depends, both on the type of the traumatic agent and on the anatomical features of the damaged tissues. The authors also indicate that as a result of high-force trauma, tears occur accompanied by exposure of the underlying bone.

Val of oral traumatic lesions.

The presence or absence of a shaft is another characteristic describing OTL. This macroscopic finding represents the transition between damaged and healthy tissue, providing information on the spread of action of the traumatic agent. In our study, the presence of an erythematous and edematous shaft was established,

as well as in a smaller percentage of cases, a lesion was described in which it was absent.

42 of all 56 lesions were clinically presented with the presence of an erythematous shaft (75%). The erythematous shaft is the result of the microhemorrhages that have occurred in the tissues surrounding the lesion, usually surrounding the lesion like a halo, with a reddish color and a shape that repeats the shape of the corresponding lesion.

In three of the described cases or 5.4% there was an edematous shaft (n=3, 5.4%). In its essence, it is a raised tissue surrounding the lesion, representing a keratosis, the result of chronic irritation. The indicated photo shows a traumatic lesion on the cheek from a semi-retained lower third molar, and around the lesion a white-yellow shaft with an irregular shape can be seen, enveloping the pathologically changed tissues.



An erythematous rash around the cheek lesion

Eden shaft.

Bottom of the traumatic lesions.

The presence of a bottom is characteristic of lesions occurring as a defect in the structure of soft tissues, or defined by us as endophytic.

The distribution according to the type of floor is as follows: lesions with a crater-shaped floor are equal in number to those without a floor (n=17, 18.8%), followed by a floor with hemorrhages (n= 15, 26.8%). Haemorrhages are the result of the rupture of small vessels located under the covering epithelium of the oral mucosa. A bottom with plaque was found in 4 of all patients registered

in the study (n=4, 7.1 %). As described when presenting the tear factor, the presence of a plaque represents the damaged epithelium, defined by some authors as pseudomembranous (Phore S. et al. 2018). The most rare variant is a bottom with granulations - in three of the described patients with OTL (n= 3, 5.4 %).

5.2. Patients with oral traumatic lesions wearing prosthetic structures

To account for the peculiarities of the course of OTL in patients with prosthetic structures (replaceable and non-replaceable), the dynamics in the size of suspicious lesions were analyzed. The results of this measure in patients with lesions wearing prosthetic structures were compared with those who had traumatic lesions without wearing prosthetic structures. The results are shown in the table.

	Using a prosthesis	N	Mean	SD	Me	Q1	Q3	Min	Max	P (Манн-Уитни U)
size OTL 1 DAY	No prosthesis	33	7,59	2,84	7,5	5	10	4,5	15	0,401
	Prosthesis available	23	8,41	3,83	7,5	5	11	5	20	
SIZE OTL 5-6 DAY	No prosthesis	33	2,65	2,67	3	0	4	0	8	0,279
	Prosthesis available	23	3,89	3,53	3	1	6,75	0	12	
Dynamics in the size of OTL (1st/5-6th day)	No prosthesis	33	4,94	2,83	4,5	3,5	5	1,5	15	0,475
	Prosthesis available	23	4,52	2,4	4	3	5	2	11,5	

41.07% (n= 23) of all patients registered in the study reported wearing prosthetic structures. The average lesion size on the first day in patients wearing prostheses was greater than that of patients with OTL without available prostheses, and these data were not statistically significant. Also, the sizes of the smallest and the largest lesion in the group of patients with prostheses are larger than their identical ones in the group of patients without prostheses. The smallest lesion in patients with prostheses is 5 mm. and in patients without it is 4.5 mm. Respectively, the largest size in those with prostheses is 20 mm, while in patients without prostheses it is 15 mm.

When performing the control examination on day 5 - 6 and re-measuring the results, the average size of the lesions in patients with prostheses was 3.89 ± 3.53 , and in patients without prostheses 2.65 ± 2.67 . The mean size of the lesions in patients with prostheses was larger than those who did not wear

prostheses, and the standard deviation was also larger. The table also shows that on day 5 - 6, the smallest lesions have completely disappeared, that is, their complete healing has occurred. Regarding the dynamics - the difference between the size on the first and on the 5 - 6th day, approximately the same values are observed, by which all lesions have decreased in size.

In the group of patients with prostheses, the lesions decreased in size on average by 4.52 ± 2.4 mm, and those who did not wear prostheses by 4.94 ± 2.83 mm. As here again close values of the standard deviation are noticed. From the table thus presented, it can also be concluded that the lesions of small sizes disappear completely in a period of 5-6 days, after removal of the etiological factor. According to the thus presented data on the healing period of OTL on day 5 - 6, the lesions were divided into those that have completely healed and those with partial impact. The presented table gives information about this.

STATUS	Healing of OTL on the 5-6th day						p*
	Full n, %		Partially n, %		TOTAL n, %		
No prosthesis	13	39.4 %	20	60.6 %	33	100.0 %	0,394
Prosthesis available	6	26.1 %	17	73.9 %	23	100.0 %	
TOTAL	19	33.9 %	37	66.1 %	56	100.0 %	

Table 27. Recovery of OTL.

Localization of the lesion in patients wearing prostheses

For the detection of peculiarities regarding the localization of patients with OTL and wearing prostheses, the obtained data will be compared with those who have lesions and do not wear prosthetic structures.

status	localisation OTL										p(χ^2)		
	1. bucal mucosa n, %		2. Gingiva n, %		3. tongue n, %		4. lip n, %		5. palate n, %			total n, %	
No prosthesis	9	27.3%	8	24.2%	8	24.2%	7	21.2%	1	3.0%	33	100.0%	0,442
Prosthesis available	8	34.8%	9	39.1%	2	8.7%	3	13.0%	1	4.3%	23	100.0%	
total	17	30.4%	17	30.4%	10	17.9%	10	17.9%	2	3.6%	56	100.0%	

Table 31. Localization of OTL.

Regarding the lesions localized on the buccal mucosa, we have almost the same values in patients who wear prostheses and those without. 27.3% (n=9) of the patients who do not wear prostheses and 34.8% (n=8) of those with prostheses

have OTL localized on the buccal mucosa. In our study, as well as in the studies of other authors, lesions localized on the buccal mucosa are among the most common. According to Mandali G. et al. 2011 buccal mucosal lesions were second in frequency, after sublingual sulcus lesions, in patients with total dentures, accounting for 37.3% of all lesions in the study.

In the present study, gingival lesions were equal in number to those located on the buccal mucosa (n= 17). Patients with present lesions on the gingiva and wearing prostheses were 9 in number or 39.1% of all lesions with this location, while gingival lesions in patients without prostheses were n=8, 24.2%. The higher number of lesions on the gingiva in the group of patients with prostheses is explained by the presence of retainers in the composition of the manufactured prostheses, which with their edges are a factor directly damaging the soft oral tissues. Similar data are shared by Rawal et al. in a 2004 publication describing the most common causes of gum damage. Their report states that gingival damage from removable dentures is the third most common after gingival trauma from accidental self-injury and iatrogenic gingival damage.

Previous lesions in the history

STATUS	Presence of previous lesions in history						p(χ^2)
	NONE n, %		YES n, %		TOTAL n, %		
No prosthesis	22	66.7 %	11	33.3 %	33	100.0 %	0,159
Prosthesis available	11	47.8 %	12	52.2 %	23	100.0 %	
TOTAL	33	58.9 %	23	41.1 %	56	100.0 %	

From the graphs presented in this way, it can be seen that in the past 52.2% (n= 12) of patients wearing prostheses had traumatic lesions. For comparison, in the group of patients without prostheses, this percentage is lower – 33.3%.

According to Talacko A et al. 2010, the most frequent recurrent lesions are those with a traumatic etiology. According to the authors, it is of crucial importance for this type of lesions to follow their evolution and take into account the effect of the treatment carried out, for their definitive cur.

	Видове протези	N	Mean	SD	Me	Q1	Q3	Min	Max	P (Манн-Уитни U)
SIZE DAY 1, mm	Removable prostheses	14	8,5	4,41	7	5	11,25	5	20	0,747
	Fixed prostheses	9	8,28	2,96	8	5,5	10	5	12,5	
size 5-6 day mm	Removable prostheses	14	3,75	3,61	3	0,5	5,88	0	12	0,975
	Fixed prostheses	9	4,11	3,59	2,5	2	7	0	10	
Dynamics in the size of OTL (1st/5-6th day)	Removable prostheses	14	4,75	2,45	4,25	3,5	5	2	11,5	0/325
	Fixed prostheses	9	4,17	2,41	3	3	4,5	2	10	

We have similar results regarding the dynamics in the size of the lesions - on the first day, a minimal advantage in the size of the lesions was noticed in the patients with replaceable prostheses, compared to those with non-replaceable prostheses.

The results recorded at the control examination on day 5 - 6 show a smaller average size in the group of patients with replaceable prostheses, compared to those with non-replaceable ones. Patients with removable prostheses reduced the size of their lesions during the treatment period by an average of 4.75 ± 2.45 mm, compared with the fixed prosthesis group, where the values were 4.17 ± 2.41 mm. In other words, a faster healing process is reported in the group of patients with removable prostheses. These data are explained by the possibility of final elimination of the etiologic factor in patients with removable prostheses compared to those with fixed ones.

The results are similar when analyzing the degree of recovery and subjective clinical complaints (pain and discomfort) among the examined patients.

Type of construction	Healing of OTL on the 5-6th day						p*
	complete n, %		partially n, %		total n, %		
Removable prostheses	4	28.6 %	10	71.4 %	14	100.0 %	1
Fixed prostheses	2	22.2 %	7	77.8 %	9	100.0 %	
total	6	26.1 %	17	73.9 %	23	100.0 %	
* Fisher's ET							

Type of construction	pain						p(χ ²)
	no n, %		mild n, %		total n, %		
Removable prostheses	6	42.9 %	8	57.1 %	14	100.0 %	0,68
Fixed prostheses	5	55.6 %	4	44.4 %	9	100.0 %	
total	11	47.8 %	12	52.2 %	23	100.0 %	

The localization of lesions in patients wearing prostheses.

The distribution of lesions according to localization in patients with removable and fixed prostheses has the following graphic form.

tipe construction	localisation OTL										p(χ ²)		
	bucal mucosa n, %		gingivan, %		tongue n, %		lip n, %		palate n, %			total n, %	
Removable prostheses	3	21.4 %	8	57.1 %	2	14.3 %	1	7.1 %	0	0.0 %	14	100.0 %	0,072
Fixed prostheses	5	55.6 %	1	11.1 %	0	0.0 %	2	22.2 %	1	11.1 %	9	100.0 %	
total	8	34.8 %	9	39.1 %	2	8.7 %	3	13.0 %	1	4.3 %	23	100.0 %	

The most frequent among patients with dentures, in general, are the lesions located on the gingiva, they make up a total of 39.1% of all lesions in patients with dentures. The ratio of removable to fixed prostheses is 8:1. Next in frequency are the lesions located on the buccal mucosa, they are 8 in total, with a slight advantage in patients with non-replaceable prostheses over those with replaceable ones. 55.6% were lesions on the buccal mucosa in patients with non-removable prostheses and 21.4% in those with removable prostheses.

There are 3 localized lesions on the lips, two of which are in patients with fixed prostheses, and one is with a removable prosthesis. Lesions on the tongue (14.3%) occurred only in patients wearing removable prostheses, and one case of a patient with a lesion on the palate (11.1%) was in patients with fixed prostheses. A graphic representation of what has been said so far has the following form.

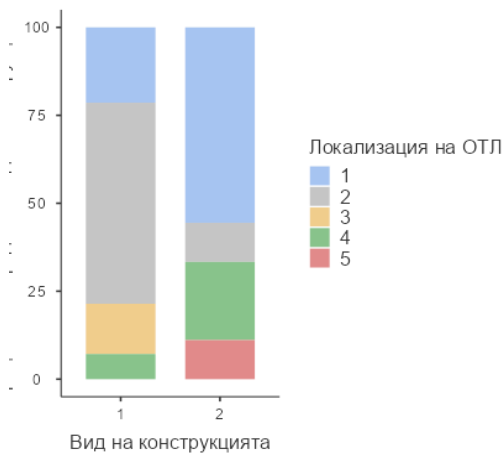


Figure 55. Localization of OTL according to the type of prosthetic structures.

The following table shows the relationship of the size of the described traumatic lesions in relation to the period of wearing the prosthetic structures.

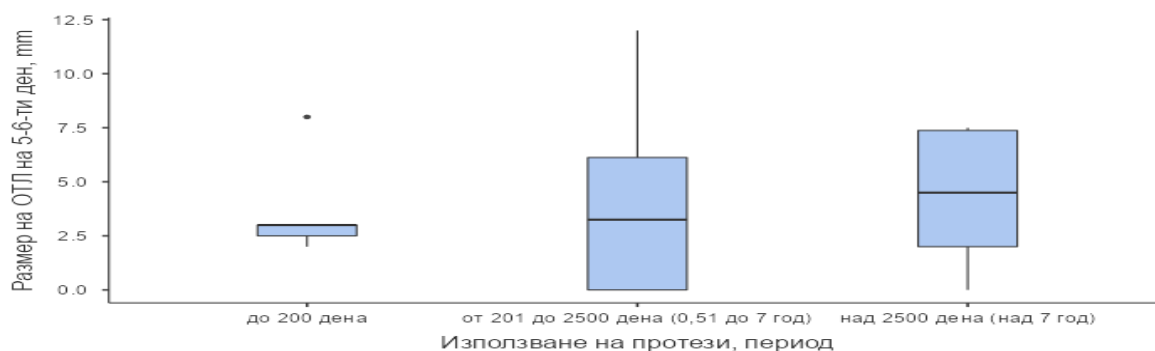
	Използване на протеза, период	N	Mean	SD	Me	Q1	Q3	Min	Max	P (Kruskal-Wallis)
size OTL Day 1, mm	to200 days	5	6,6	2,815	5	5	6,5	5	11,5	0,41
	201 to 2500 days	12	9,08	4,332	8,25	5,38	10,75	5	20	
	more than 2500 days	6	8,58	3,556	8,25	5,38	11,5	5	13	
size OTL DAY 5-6, mm	to200 days	5	3,7	2,439	3	2,5	3	2	8	0,854
	201 to 2500 days	12	3,75	4,175	3,25	0	6,13	0	12	
	more than 2500 days	6	4,33	3,371	4,5	2	7,38	0	7,5	
Dynamics in the size of OTL (1st/5-6th day)	to200 days	5	2,9	0,652	3	2,5	3,5	2	3,5	0,2105
	201 to 2500 days	12	5,33	2,98	4,75	3,38	5,75	2	11,5	
	more than 2500 days	6	4,25	1,037	4,5	3,38	4,88	3	5,5	

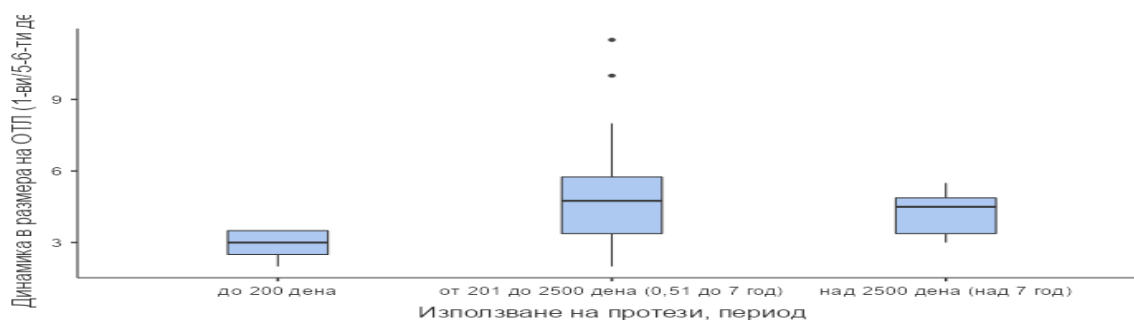
Table 40. Size of the lesions according to the period of wearing the prosthetic structures.

As mentioned, three periods were distinguished according to the duration of wear of the registered prosthetic structures. The first period is from the beginning of placing a new prosthesis until the end of 6-7 months, the second period is from the end of the 7th month to the beginning of 7 years and the third period lasts more than 7 years. The sizes of the OTL registered by us on the first day for the shortest worn prostheses was 6.6 ± 2.81 mm, the smallest in size during this period was 5 mm, and the largest 11.5 mm. The size of the lesions in the second longest period on the first day was on average 9.08 ± 4.33 mm, with the largest number of lesions appearing here ($n=12$). In the group of the longest-wearing prostheses, the mean size of the lesions was 8.58 ± 3.55 mm. There is no statistical relationship between the data thus presented ($p = 0.41$). In summary, the size of the traumatic lesions registered on day 1 was the largest in the group of patients who wore their prostheses between 7 months and 7 years.

The average size in the group of the shortest wearing prostheses at 5-6 days is 3.7 ± 2.43 mm. In the group with an average duration of wear, the average size of the lesions was 3.75 ± 4.17 mm, and in the group with the longest duration – 4.33 ± 3.37 mm. It is noticed that in this group the values from the individual periods equalize, and this also applies to their average deviation, again the data are without statistical significance.

Regarding the dynamics in the size of the OTL at the beginning and during the control examination, the smallest values of 2.9 ± 0.65 mm were reported in the group of the shortest worn prostheses. For the average duration group, they are again the highest – 5.33 ± 2.98 mm. and for the longest group (more than 7 years) the dimensions are 4.25 ± 1.037 mm. Also, the lesions with the smallest sizes in the medium-duration group and in the longest-duration group were completely healed at the time of the control examination, in contrast to the group of the shortest-duration prostheses.





Babu et al. (2017) described reactive oral lesions considering their size and other characteristics. The authors divided the lesions according to their size into 3 groups: up to 2 cm, between 2 and 4 cm and larger than 4 cm. The authors' conclusion is that the size of the lesions is not of decisive importance for the course of the healing process, giving greater importance of elimination of the cause, as well as the follow-up of the lesion and control of oral hygiene.

Degree of healing process according to the period of wearing the prosthetic structures.

An analysis was made of the degree of healing of the OTL (complete or partial healing) during the corresponding periods of wearing the prosthetic structures. The data can be represented by the following table.

Using a prosthesis, period	Healing of OTL on the 5-6th day			p(χ ²)	
	complete n, %	partially n, %	total n, %		
1. 200 days	0	0.0 %	5	100.0 %	0,169
201 to 2500 days	5	41.7 %	7	58.3 %	
more than 2500 days	1	16.7 %	5	83.3 %	
total	6	26.1 %	17	73.9 %	

Table 41. Healing of the OTL according to the period of wearing the prostheses.

In the patients who wore prostheses for the shortest time, only partial healing was observed at the control examination conducted on the 6th - 7th day. This applies to all 5 cases in total. In the average duration period (up to 7 years), 41.7% of the lesions healed completely, when conducting the control examination, while n=7, 58.3% showed only partial healing. The data have no available statistical relationship ($p(\chi^2) = 0.169$). In the longest period of wearing the prostheses (more than 7 years) we have registered only one case of complete recovery (16.7%) and 5 total (83.3%) cases of partial (incomplete) healing of the lesions.

The degree of healing of OTL and its division into complete and partial is not found in the literature as a criterion for describing the evolution of these lesions. Gilligan GM et al. 2020, define incompletely healed oral lesions as those with a certain carcinogenic potential based on the study of the immunohistochemical epithelial profile, thereby clarifying the relationship of non-healing oral lesions and their relation to the development of a malignant process.

Regarding the period of use of prostheses and the main subjective complaints from the patient (pain, discomfort and swelling), it is worth noting that pain and discomfort were reported mainly by patients who wore prosthetic structures for the shortest time.

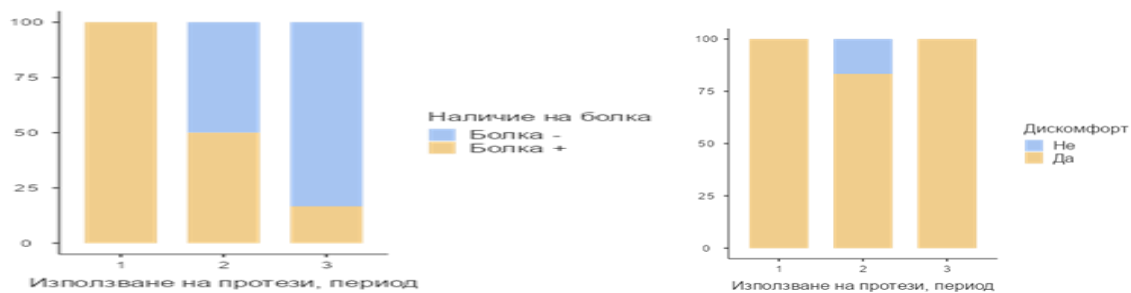


Figure 58. Presence of pain and swelling according to the period of wearing the prostheses.

The data from our studies are consistent with what Patil S et al. 2013, according to which the initial period of wearing removable prostheses is a critical moment for the occurrence of OTL in view of the new conditions in which this kind of patients are placed.

The localization of OTL with regard to the duration of wearing prosthetic structures has the following form.

Using a prosthesis, period.	localisation OTL										p(χ^2)		
	1. bucal mucosa n, %		2. Gingiva n, %		3. tongue n, %		4. lip n, %		5. palate n, %			total n, %	
1. up to 200 days	1	20.0%	4	80.0%	0	0.0%	0	0.0%	0	0.0%	5	100.0%	0,341
2. 201 to 2500 days	6	50.0%	3	25.0%	1	8.3%	1	8.3%	1	8.3%	12	100.0%	
3. more than 2500 days	1	16.7%	2	33.3%	1	16.7%	2	33.3%	0	0.0%	6	100.0%	
total	8	34.8%	9	39.1%	2	8.7%	3	13.0%	1	4.3%	23	100.0%	

Table 42. Localization of OTL according to the period of wearing the prosthetic structures.

In the shortest period, there are lesions located on the buccal mucosa (20%) and on the gingiva (80%). Lesions with other localization in the shortest-wearing

prostheses are not described. Patients who wore their prostheses between 7 months and 7 years have the most frequent lesions on the buccal mucosa (50% of all for the corresponding period), 25% are localized on the gingiva, and the lesions are equally localized on the tongue, lip and palate (8.3%). Patients with the longest period of prosthetic constructions have OTL most often on the gingiva and lips (33.3%), followed by the buccal mucosa and tongue, again equally (16.7%). From the data thus presented, a distribution identical to the presented data from the general sample can be observed, where again the lesions of the buccal mucosa and gingiva have the highest frequency.

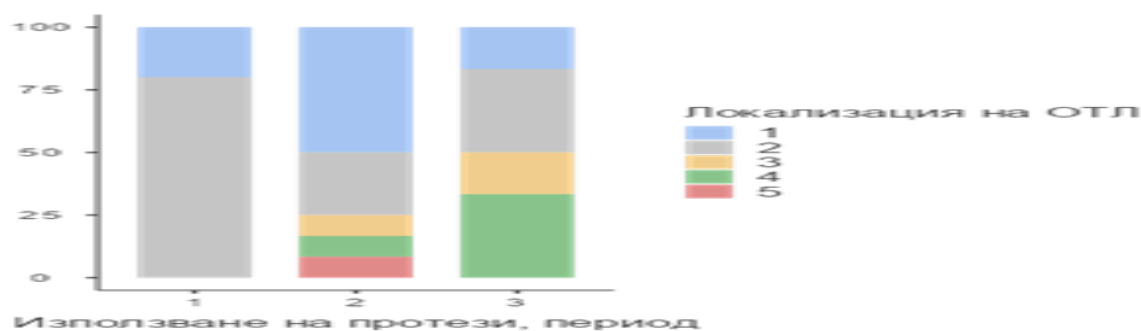


Figure 59. Localization of OTL according to the period of wearing the prosthetic structures.

According to the presence of previous lesions in the anamnesis, according to the period of wearing the prosthetic structures, the highest prevalence of this indicator is observed in the group of patients wearing their prostheses between 7 months and 7 years. This can be explained by the fact that this is the period that is the longest in duration, as well as the fact that it is associated with the greatest functional load. On the other hand, it is quite logical that as the time of wearing the prosthetic structures increases, the number of patients using them will decrease.

The given data can be visualized with the following diagrams.

Using a prosthesis, period	Presence of previous lesions in history			p(χ ²)
	none n, %	yes n, %	total n, %	
UP TO 200 DAYS	3 60.0 %	2 40.0 %	5 100.0 %	0,782
201 to 2500 days	5 41.7 %	7 58.3 %	12 100.0 %	
more than 2500 days	3 50.0 %	3 50.0 %	6 100.0 %	
total	11 47.8 %	12 52.2 %	23 100.0 %	

Table 43. Previous lesions during the period of wearing prosthetic structures.



Figure 60. Previous lesions during the period of wearing prosthetic constructions.

The distribution of lesions according to the type of growth (exo or endophytic) and the period of bearing has the following tabular form.

Using a prosthesis, period	Growth of OTL				total n, %	p*
	Endophytic n, %		Exophytic n, %			
1. up to 200 days	5	100.0 %	0	0.0 %	5	100.0 %
201 to 2500 days	6	50.0 %	6	50.0 %	12	100.0 %
more than 2500 days	6	100.0 %	0	0.0 %	6	100.0 %
total	17	73.9 %	6	26.1 %	23	100.0 %

Table 44. Type of growth of OTL according to the period of wearing the prostheses.

The majority of traumatic lesions in patients with prosthetic structures were endophytic in nature, and this was true for all three durations of prosthesis use. Lesions defined as exophytic occurred only in patients who wore their prostheses between 7 months and 7 years.

In connection with what has been said so far about exophytic traumatic lesions in patients wearing prostheses, it is worth describing the disease epulis fissuratum (EF). Khalifa C. et al. 2021, defined fusural epulis as an “inflammatory, “pseudotumorous” entity resulting from connective tissue hyperplasia in the gingivobuccal region.



Figure 61. Type of growth of OTL according to the period of wearing the prosthetic structures.

The majority of authors agree that EF occurs mainly in the sixth decade of the patient's life (41.4%) and mainly in female subjects (79.3%), in the frontal areas of the upper and lower jaw. Two thirds of patients with this disease report the presence of pain after the occurrence of EF (Mohammadi M. et al. 2017, Mohan RPS et al. 2017, Stern D. Et al. 2022).

1. Results and discussion on task 2.2

For the description of the characteristics of patients with OTL and certain chronic diseases, information was collected on the presence of hypertension (HB), diabetes and other chronic diseases, as well as the therapy received for them. All patients included in the study were assigned blood laboratory tests, the results of which were collected through the electronic system of the respective laboratories.

From the research we have obtained the following data.

	Systemic diseases	N	Mean	SD	Me	Q1	Q3	Min	Max	P (Манн-Уитни U)
size day 1, mm	HG -	22	7,59	2,83	7,00	5	10	5	12,5	0,666
	HD +	34	8,15	3,56	7,50	5	10	4,5	20	
	DM -	46	8	2,91	7,50	4,5	15	5	10	0,349
	DM +	10	7,6	4,81	5,25	5	20	5	7,25	
size OTL day 5-6	HD -	22	4,07	3,06	4,00	2	7	0	10	0,064
	HD +	34	2,57	3	2,00	0	4	0	12	
	DM -	46	3,3	2,97	3,00	0	10	0	5,75	0,298
	DM +	10	2,5	3,65	1,75	0	12	0	2,88	
Dynamics in the size of OTL (1st/5-6th day)	HD -	22	3,52	1,19	3,25	2,5	5	2	5	0,004
	HD +	34	5,57	3,01	4,75	3,5	6	1,5	15	
	DM -	46	4,7	2,66	4,25	1,5	15	3	5	0,604
	DM +	10	5,1	2,73	4,50	2,5	11,5	3,5	5	

(HD- hypertension disease, DM- diabetes mellitus)

As mentioned, of all patients included in the study (n= 56), 34 in total (60.71%) indicated that they had hypertension. Accordingly, patients with normal blood pressure are (n= 22) 39.28%. The description of the size of the lesions in hypertensives and those with normal blood are similar in values, with a slight advantage for patients with HB. The average size of the lesions in HB on the first day was 8.15 ± 3.56 , and in healthy patients it was 7.59 ± 2.83 mm. The smallest lesions are approximately the same size, while for the largest the advantage is for the group of patients with high blood pressure. There is no statistical relationship between the data thus presented. Regarding the disease diabetes, 10 (17.85%) of all 56 subjects noted that they suffer from this metabolic disorder. Again, the average size of the lesions in the diabetic and healthy subjects was approximately equal, with a slight preponderance in the healthy subjects. The average size of the lesions in the diabetic patients was 7.6 ± 4.81 mm, and in the non-diabetic patients it was 8 ± 2.91 mm. Again, we have identical values regarding the smallest size lesions in both groups, as well as an advantage in the size of the lesions in the healthy patients over the diabetics regarding the largest size lesions.

When measuring the size of the OTL on day 5-6 (the control examination), it can be seen that the lesions in the patients with HB have decreased more compared to the healthy patients with lesions. The average size of the lesions in patients with HB was 2.57 ± 3 mm. and in patients without hypertension 4.07 ± 3.06 mm. Therefore, controlled hypertension is not a factor aggravating the course of OTL.

With regard to diabetes, the tendency for the lesions in the group of patients without diabetes to be larger in size than those with diabetes can be seen at the follow-up examination. At the 5-6 day follow-up, the average size of the lesions in the diabetic patients was 2.5 ± 3.65 , while in the healthy it was 3.3 ± 2.97 mm. The smallest lesions in both groups were completely healed within 5-6 days, while the largest lesions recurred in the non-diabetic patient group. From what has been said about the relationship between diabetes and the healing of traumatic lesions, we can conclude that controlled diabetes is not a factor negatively influencing the treatment of OTL.

Regarding the dynamics (the difference in the values between the 1st and 5-6 days), patients with HB show higher values compared to patients without hypertension - 5.57 ± 3.01 mm. respectively 3.53 ± 1.19 mm. Patients in the group

of people with HB had reduced the size of their lesions compared to those without HB, and the data presented were statistically significant.

The group of patients with diabetes reduced the size of their lesions more than those without diabetes, and the values were roughly equal.

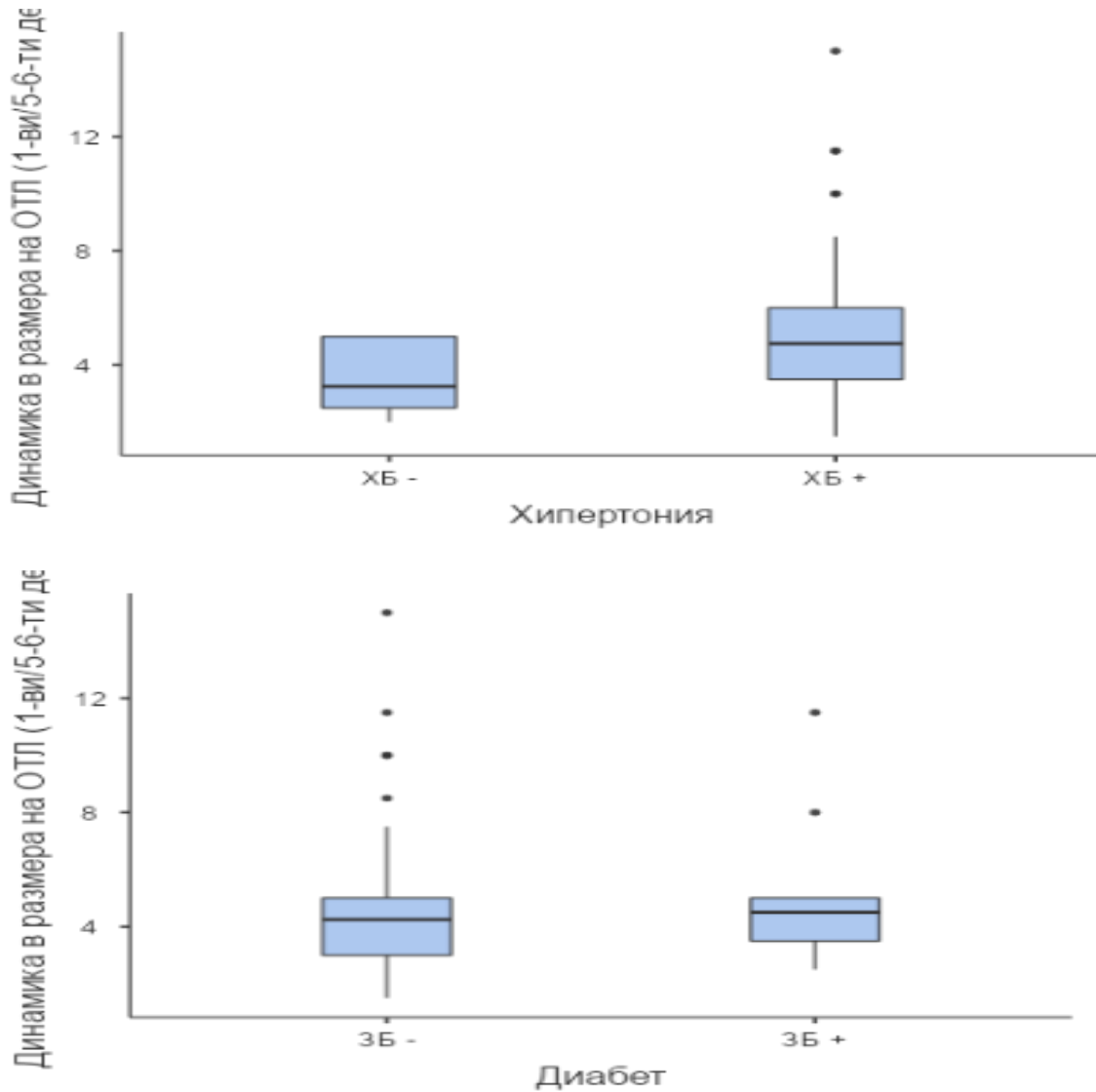


Figure 64. Dynamics in the size of OTL in patients with hypertension and diabetes.

In relation to the relationship between diabetes and traumatic lesions, blood sugar values are of interest.

Criterion	grupe	N	Values	SD	Median	p
Glucose(mm ol/l)	35 -	46		3,71	1,02	3,55
	35 +	10		4,58	1,04	4,53

Table 46. Average values of blood sugar in the examined patients.

In the group of patients with diabetes, the mean values of blood sugar were higher compared to the group of patients without diabetes. 4.58 ± 1.04 mmol/l. is the average value in diabetics in contrast to healthy people, where it is 3.71 ± 1.02 mmol/l. The indicated numbers in both groups are within the reference values for blood sugar levels, with diabetics reporting higher levels compared to healthy patients. Elevated blood sugar levels are related to the healing process of oral wounds, as well as susceptibility to infections.

Regarding the relationship of diabetes with the development of oral lesions, there are enough studies in the literature confirming the higher percentage of lesions in diabetic patients (Trentin MS et al. 2017, Mauri-Obradors E et al. 2017). Among the most common lesions in diabetic patients are candida infection, lingual lichen varices and prosthetic stomatitis.

Mauri E et al. 2017, point out the presence of xerostomia as a common symptom in diabetic patients. The authors report the relationship of the reduced amount of saliva and the development of oral lesions, due to the lack of the protective effect that saliva has.

Regarding the dependence of hypertension and the development of OTL, there are not many data on this issue in the literature. More generally, Macedo ML, et al. 2014, elucidate the relationship between hypertension and oral diseases of infectious etiology. The authors share that periodontal diseases are considered a cardiovascular risk factor through the inflammatory, immunological and humoral changes they induce leading to the destruction of the epithelium. According to the authors, this leads to the entry of toxins into the bloodstream, resulting in atherosclerosis and thrombotic damage. With hypertension, changes in the microcirculation can lead to ischemia in the periodontal tissues, which favors the development of periodontal diseases.

Martins et al. in a 2016 study, they talk about the relationship between hypertension and periapical lesions, proving through an experiment with laboratory animals that hypertensive conditions lead to higher osteoclast differentiation - a condition that can affect the treatment of the described lesions.

From the examples given, it can be concluded that hypertension and diabetes, especially if not controlled, can negatively affect oral diseases.

On the other hand, Sun D. et al. 2019, show that patients with type 2 diabetes are more likely to develop CKD, and vice versa. In other words, there is mutual aggravation in the general health of the patients when these two diseases are combined.

As mentioned in the literature, HBV and diabetes can negatively affect the evolution of OTL. In this regard, we reported the healing of the lesions we examined in the patients with the mentioned diseases, and the results are presented in the following tables.

Systemic diseases	Healing of OTL on the 5-6th day						p(χ ²)
	TOTAL n, %		Partially n, %		TOTAL n, %		
HD-	5	22.7%	17	77.3%	22	100,00%	0,154
HD +	14	41.2%	20	58.8%	34	100,00%	
TOTAL	19	33.9%	37	66.1%	56	100,00%	

Table 47. Recovery of OTL in patients with hypertension.

From a total of 34 patients with hypertension, 14 patients (41.2%) had complete recovery of OTL on the 5-6th day, and the remaining 20 patients (58.80%) had partial recovery. Of the 22 patients without hypertension, 5 patients (22.70%) had complete recovery of OTL on the 5-6th day, and the remaining 17 patients (77.30%) had partial recovery. After the analysis, it was observed that there is no statistical significance between these values. What has been said so far can be illustrated with the following graph.

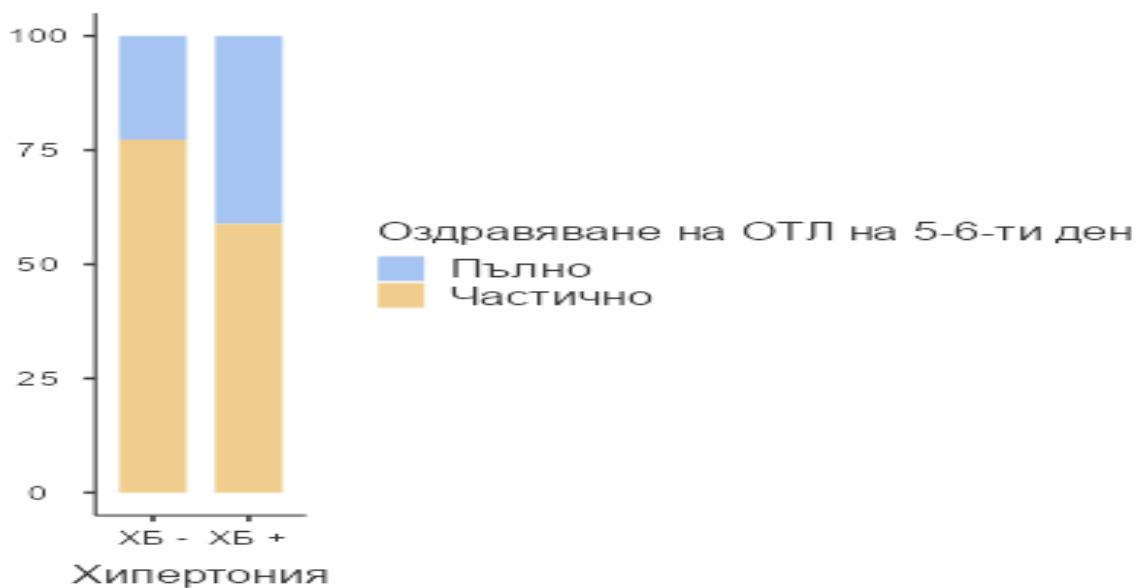


Figure 65. Recovery rate in hypertensive patients.

Systemic diseases	Healing of OTL on the 5-6th day						p(χ ²)
	total n, %		Partially n, %		total n, %		
DM -	15	32.6%	31	67.4%	46	100,00%	0,655
DM +	4	40.0%	6	60.0%	10	100,00%	
total	19	33.9%	37	66.1%	56	100,00%	

Table 48. Rate of recovery in patients with diabetes.

Out of a total of 10 patients with diabetes, 4 patients (40.00%) had a complete recovery of OTL on the 5-6th day, and the remaining 6 patients (60.00%) had a partial recovery. Of the 46 patients without diabetes, 15 patients (32.60%) had a complete recovery of OTL on the 5-6th day, and the remaining 31 patients (67.40%) had a partial recovery. After the analysis, it was observed that there is no statistical significance between these values.

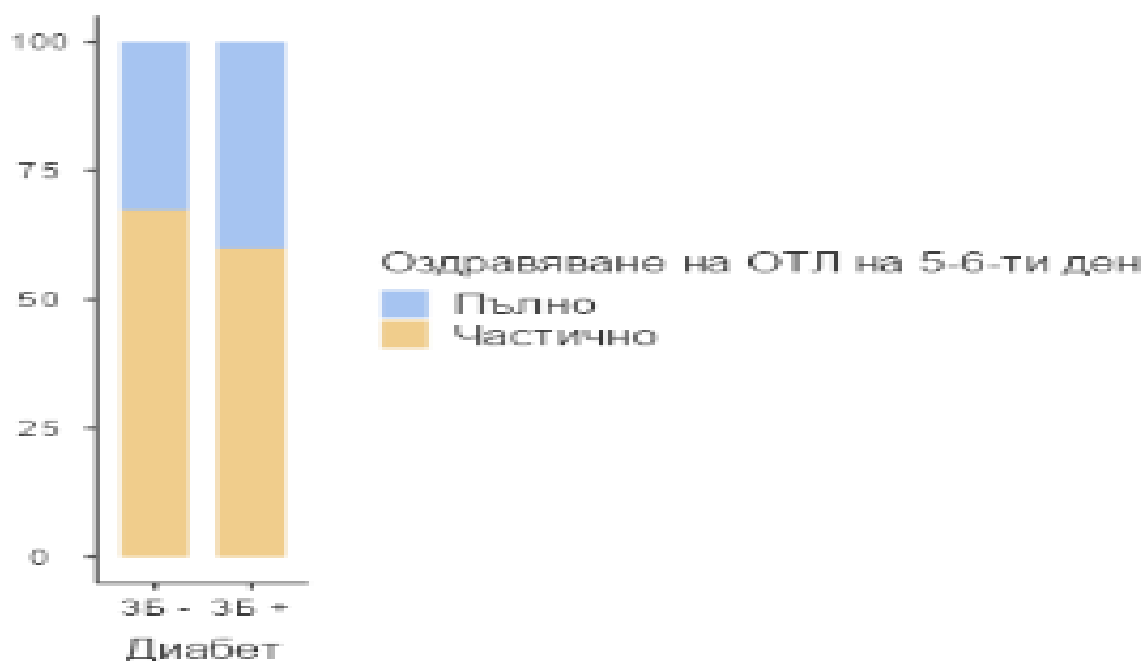


Figure 66. Rate of recovery in patients with diabetes.

Regarding the pain factor, the data for patients with HD and diabetes have the following form.

Systemic diseases	PAIN						p(χ ²)
	NONE n, %		Mild n, %		total n, %		
HD -	10	45.5 %	12	54.5 %	22	100.0 %	0,906
HD +	16	47.1 %	18	52.9 %	34	100.0 %	
TOTAL	26	46.4 %	30	53.6 %	56	100.0 %	

Systemic diseases	PAIN						p(χ ²)
	NONE n, %		Mild n, %		total n, %		
DM -	22	47.8 %	24	52.2 %	46	100.0 %	0,653
DM +	4	40.0 %	6	60.0 %	10	100.0 %	
TOTAL	26	46.4 %	30	53.6 %	56	100.0 %	

Table 49. Sensation of pain in patients with chronic diseases.

Out of a total of 34 patients with hypertension, 16 patients (47.10%) felt no pain and the remaining 18 patients (52.90%) felt mild pain. Of the 22 patients without hypertension, 10 patients (45.50%) had no pain and the remaining 12 patients (54.50%) had mild pain. After the analysis, it was observed that there is no statistical significance between these values.

Out of a total of 10 patients with diabetes, 4 patients (40.00%) felt no pain and the remaining 6 patients (60.00%) felt mild pain. Of the 46 patients without diabetes, 22 patients (47.80%) had no pain, and the remaining 24 patients (52.20%) had mild pain. After the analysis, it was observed that there is no statistical significance between these values.

The data on the feeling of discomfort in hypertensive patients and diabetic patients are identical.

Systemic diseases	Discomfort						p(χ^2)
	none n, %		yes n, %		total n, %		
HD -	4	18.2 %	18	81.8 %	22	100.0 %	0,959
HD +	6	17.6 %	28	82.4 %	34	100.0 %	
TOTAL	10	17.9 %	46	82.1 %	56	100.0 %	
Systemic diseases	Discomfort						p(χ^2)
	none n, %		yes n, %		total n, %		
DM -	9	19.6 %	37	80.4 %	46	100.0 %	0,474
DM +	1	10.0 %	9	90.0 %	10	100.0 %	
TOTAL	10	17.9 %	46	82.1 %	56	100.0 %	

Table 50. Feeling of discomfort in patients with chronic diseases.

Out of a total of 34 patients with hypertension, 6 patients (17.60%) do not feel discomfort, and the remaining 28 patients (82.40%) do. Of the 22 patients without hypertension, 4 patients (18.20%) did not feel discomfort, and the remaining 18 patients (81.80%) did. After the analysis, it was observed that there is no statistical significance between these values.

Out of a total of 10 patients with diabetes, 1 patient (10.00%) does not feel discomfort, and the remaining 9 patients (90.00%) do. Of the 46 patients without diabetes, 9 patients (19.60%) did not feel discomfort, and the remaining 37 patients (80.40%) did. After the analysis, it was observed that there is no statistical significance between these values.

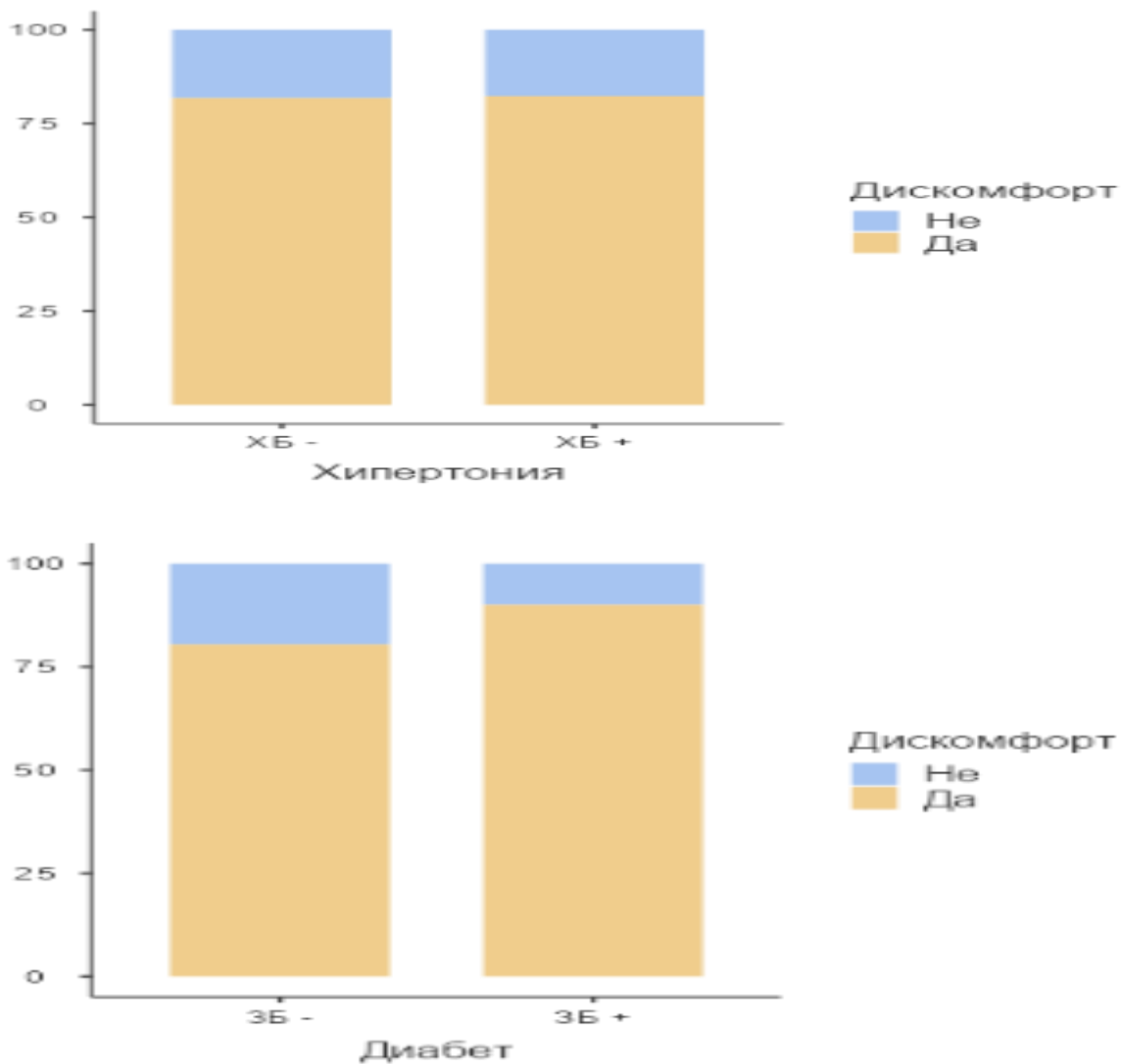


Figure 67. Feeling of discomfort in patients with chronic diseases.

Regarding the presence of edema accompanying OTL, out of a total of 34 patients with hypertension, 29 patients (85.30%) did not have edema, and the remaining 5 patients (14.70%) did. Of the 22 patients without hypertension, 19 patients (86.40%) did not have edema, and the remaining 3 patients (13.60%) did. After the analysis, it was observed that there is no statistical significance between these values.

Out of a total of 10 patients with diabetes, 7 patients (70.00%) did not have edema, and the remaining 3 patients (30.00%) did. Of the 46 patients without diabetes, 41 patients (89.10%) did not have edema, and the remaining 5 patients (10.9%) did. After the analysis, it was observed that there is no statistical significance between these values.

Systemic diseases	Swelling						p(χ ²)
	none n, %		yes n, %		total n, %		
HD -	19	86.4 %	3	13.6 %	33	100.0 %	0,449
HD +	29	85.3 %	5	14.7 %	23	100,00%	
total	48	85.7 %	8	14.3 %	56	100.0 %	

Systemic diseases	Swelling						p(χ ²)
	none n, %		yes n, %		total n, %		
DM -	41	89.1 %	5	10.9 %	46	100.0 %	0,117
DM +	7	70.0 %	3	30.0 %	10	100,00%	
total	48	85.7 %	8	14.3 %	56	100.0 %	

Table 51. Presence of edema in patients with chronic diseases.

Regarding the question of the presence of previous lesions in the anamnesis, the data are as follows.

Systemic diseases	Presence of previous lesions in history						p(χ ²)
	NONE n, %		YES n, %		TOTALn, %		
HD -	13	59.1 %	9	40.9 %	22	100.0 %	0,984
HD +	20	58.8 %	14	41.2 %	34	100.0 %	
TOTAL	33	58.9 %	23	41.1 %	56	100.0 %	

Table 52. History of previous lesions in hypertensive patients.

Out of a total of 34 patients with hypertension, 20 patients (58.80%) had no history of previous lesions, and the remaining 14 patients (41.20%) did. Of the 22 patients without hypertension, 13 patients (59.10%) had no history of previous lesions, and the remaining 9 patients (40.90%) did. After the analysis, it was observed that there is no statistical significance between these values.

Systemic diseases	Presence of previous lesions in history						p(χ ²)
	none n, %		yes n, %		total n, %		
DM -	29	63.0 %	17	37.0 %	46	100.0 %	0,179
DM +	4	40.0 %	6	60.0 %	10	100.0 %	
Total	33	58.9 %	23	41.1 %	56	100.0 %	

Table 53. History of previous lesions in patients with diabetes.

Out of a total of 10 patients with diabetes, 4 patients (40.00%) had no history of previous lesions, and the remaining 6 patients (60.00%) did. Of the 46 patients without diabetes, 29 patients (63.00%) had no history of previous lesions, and

the remaining 17 patients (37.00%) did. After the analysis, it was observed that there is no statistical significance between these values.

From the thus presented data from the anamnesis of the patients' subjective complaints, we can summarize that patients with replaceable and non-replaceable prostheses and suffering from the chronic diseases HB and diabetes are prone to experience pain more often during the traumatic lesions present. In contrast, edema is a symptom that is more often absent in patients with the indicated chronic diseases suffering from OTL. In addition, it was clarified that the wearing of prosthetic structures by the patients with OTL is not a factor leading to the more frequent development of such kind of lesions.

Cristina de Lima et al. 2008, conducted a comparative analysis of patients with removable total prostheses. The studied patients were divided into two groups: patients with diabetes wearing total prostheses (n=30) and patients with total prostheses without chronic diseases (n=30). The amount and buffer capacity of saliva, blood sugar, blood pressure values, presence of mucosal lesions, stability of the prosthesis and presence of harmful habits were recorded on all patients included in the study. The obtained results show that patients without diabetes have a greater amount of stimulated saliva, which is also confirmed in the studies of other authors, and that the development of traumatic lesions is not affected by the presence of diabetes. In the presented study, patients in the control group suffered more often from OTL compared to diabetic patients.

From the research done by us, as well as from the data from the world literature, it is clear that diabetes as a chronic disease has a greater importance for the evolution of oral lesions. This is explained on the one hand by the reduced amount of saliva in diabetic patients and by the negative effect that diabetes has on the development of infections on the other.

2. Results and discussion of Task 3.

For the purposes of Task 3, the effect of the application of a pharmaceutical preparation containing polyvinylpyrrolidone (PVP) as a means of treating oral traumatic lesions was investigated. PVP is a synthetic high-molecular polymer widely used in cosmetic and pharmacological practice, as a means of increasing the density and formation of a covering film of locally acting preparations. Its action is expressed in changing the consistency of medicines, making them easier to apply on the oral mucosa and also on the skin. Through these qualities, PVP has an immediate effect in the treatment of OTL by isolating the damaged tissues from the action of the traumatic agent (Burnett CL et al. 2017).

To determine the effect of the application of the indicated preparation, we reported the changes in the amount of OTL of the patients registered by us, comparing the data of those treated with the drug and those in which only the removal of the etiological factor was carried out, without carrying out anything else treatment. The data is presented in the following table.

	treatment with PVP	N	Mean	SD	Me	Q1	Q3	Min	Max	P (Манн-Уитни U)
size day 1 OTL	NO	40	8,16	3,51	7,5	5	10	4,5	20	0,569
	YES	16	7,34	2,61	7	5	8,88	5	12,5	
SIZE DAY 5-6	NO	40	2,76	3,24	2	0	4	0	12	0,056
	YES	16	4,16	2,48	3,75	2,88	5,25	0	10	
Dynamics in the size of OTL (1st/5-6th day)	NO	40	5,4	2,83	5	3,5	5,63	2	15	< .001
	YES	16	3,19	1,08	3,25	2,38	3,63	1,5	5	

Table 54. Size of OTL and treatment with preparation containing PVP.

Out of a total of 56 treated patients, 40 patients (71.40%) were not treated with PVP drug and the remaining 16 (28.60%) were included in the PVP treated group.

In patients not treated with PVP, the size of the OTL on day 1 was a mean of 8.16 ± 3.51 mm. In the rest of the patients who were treated with PVP-based drugs, the ATL size on day 1 averaged 7.34 ± 2.61 . After the analysis, it was observed that there is no statistical significance between these values.

Accordingly, at the beginning of the study, the size of the lesions in the control group was larger than that in the study group treated with the PVP preparation.

When conducting the control examination on the 5th - 6th day, the following results are reported. In patients not treated with PVP, the size of the OTL at day 5 - 6 had a mean value of 2.76 and a standard deviation of 3.24 mm. In patients who were treated with PVP-based drugs, the 5-6 day ACL size was a mean of 4.16 and a standard deviation of 2.48. After the analysis, it was observed that there is no statistical significance between these values. The data show that again the size of the lesions in the control group is larger compared to the studied group.

Regarding the dynamics (the difference in size at baseline and at the follow-up examination), it was observed that the patients who were not treated with PVP, the difference in size had a mean value of 5.40 mm and a standard deviation of 2.83 mm. In comparison, the mean for treated patients was 3.19mm with a standard deviation of 1.08mm. After the analysis, it is evident that there is statistical significance between these values ($p < 0.05$). From the indicated data, it is clear that the used preparation does not affect the healing process of the studied lesions and has nothing to do with faster epithelization.

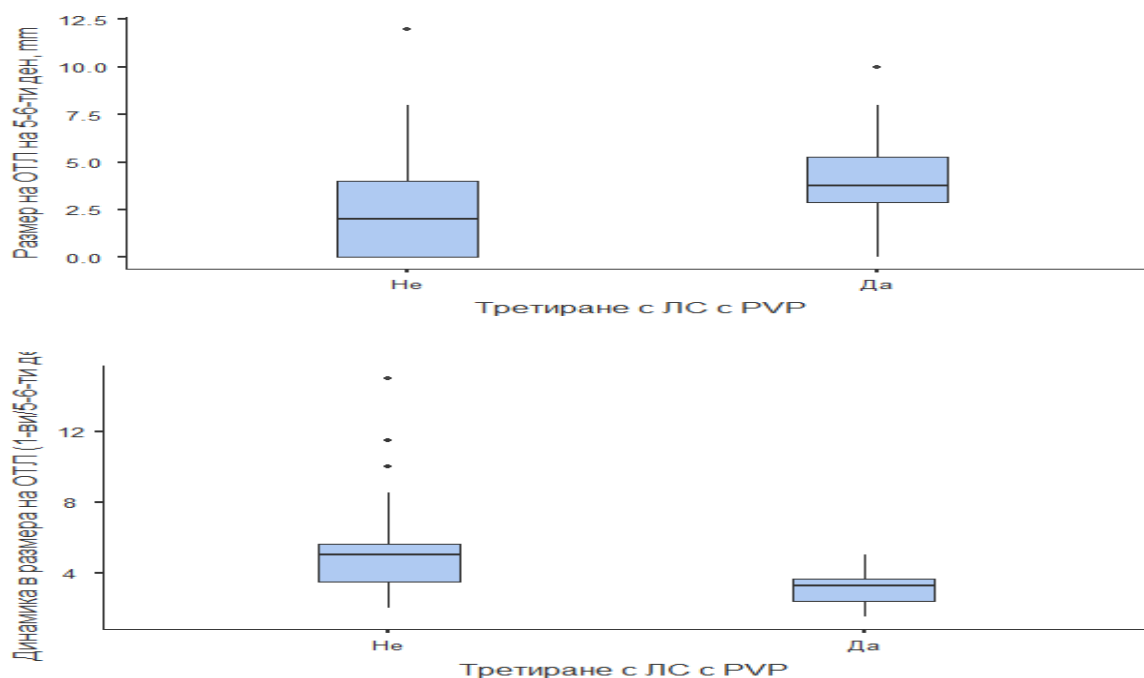


Figure 72. Dynamics in the size of OTL and treatment with a preparation containing PVP.

The data obtained by us can be explained by the fact that the studied preparation and the ingredient described in it act as a covering film, isolating the damaged tissues from the harmful effect of the environment, without having anything to do with accelerating epithelization.

Regarding the degree of healing of the lesions, the data are as follows.

treatment with PVP	Healing of OTL on the 5-6th day						p(χ^2)
	TOTAL n, %		Partial n, %		total n, %		
NO	18	45.0 %	22	55.0 %	40	100,00%	0,006
YES	1	6.3 %	15	93.8 %	16	100,00%	
TOTAL	19	33.9 %	37	66.1 %	56	100,00%	

Table 55. Healing of OPL when treated with a preparation containing PVP.

Out of a total of 40 patients who were not treated with PVP drugs, 18 patients (45.00%) had a complete recovery of OTL on day 5-6, and the remaining 22 patients (55.00%) had a partial recovery. Of the 16 patients who were treated with LP with PVP, 1 patient (6.30%) had a complete recovery of OTL on day 5-6, and the remaining 15 patients (93.80%) had a partial recovery. After the analysis, it was observed that there is no statistical significance between these

values. A higher percentage of partial recovery was reported in the group of patients treated with the PVP preparation.

In the present study, in order to more easily describe the examined lesions, they were divided according to their size into two groups. The first group included lesions up to 6 mm in size. including, and in the second, lesions larger than 6 mm. Their distribution according to this classification in the control and in the studied group has the following tabular form.

treatment with PVP	size OTL day 1						p(χ^2)
	up to 6mm.		more than 6 mm.		total n, %		
no	16	40.0 %	24	60.0 %	40	100,00%	0,80
yes	7	43.8 %	9	56.3 %	16	100,00%	
total	23	41.1 %	33	58.9 %	56	100,00%	
treatment with PVP	size OTL 5-6 day						p (Fisher ET)
	up to 6mm. .		more than 6mm.		total n, %		
no	31	77.5 %	9	22.5 %	40	100,00%	1,00
yes	13	81.3 %	3	18.8 %	16	100,00%	
total	44	78.6 %	12	21.4 %	56	100,00%	

Table 56. Magnitude of OTL.

From a total of 40 patients who were not treated with LP with PVP, 16 patients (40.00%) had an OTL size on the 1st day up to 6 mm, and in the remaining 24 patients (60.00%) it was over 6 mm. Of the 16 patients who were treated with LP with PVP, 7 patients (43.80%) had an OTL size of up to 6 mm on the 1st day, and in the remaining 9 patients (56.30%) it was over 6 mm. After the analysis, it was observed that there is no statistical significance between these values.

From a total of 40 patients who were not treated with PVP, 31 patients (77.50%) had an OTL size of up to 6 mm on the 5-6th day, and in the remaining 9 patients (22.50%) it was over 6 mm. Of the 16 patients who were treated with LP with PVP, 13 patients (81.30%) had an OTL size of up to 6 mm on the 5-6th day, and in the remaining 3 patients (18.80%) it was over 6 mm. After the analysis, it was observed that there is no statistical significance between these values.

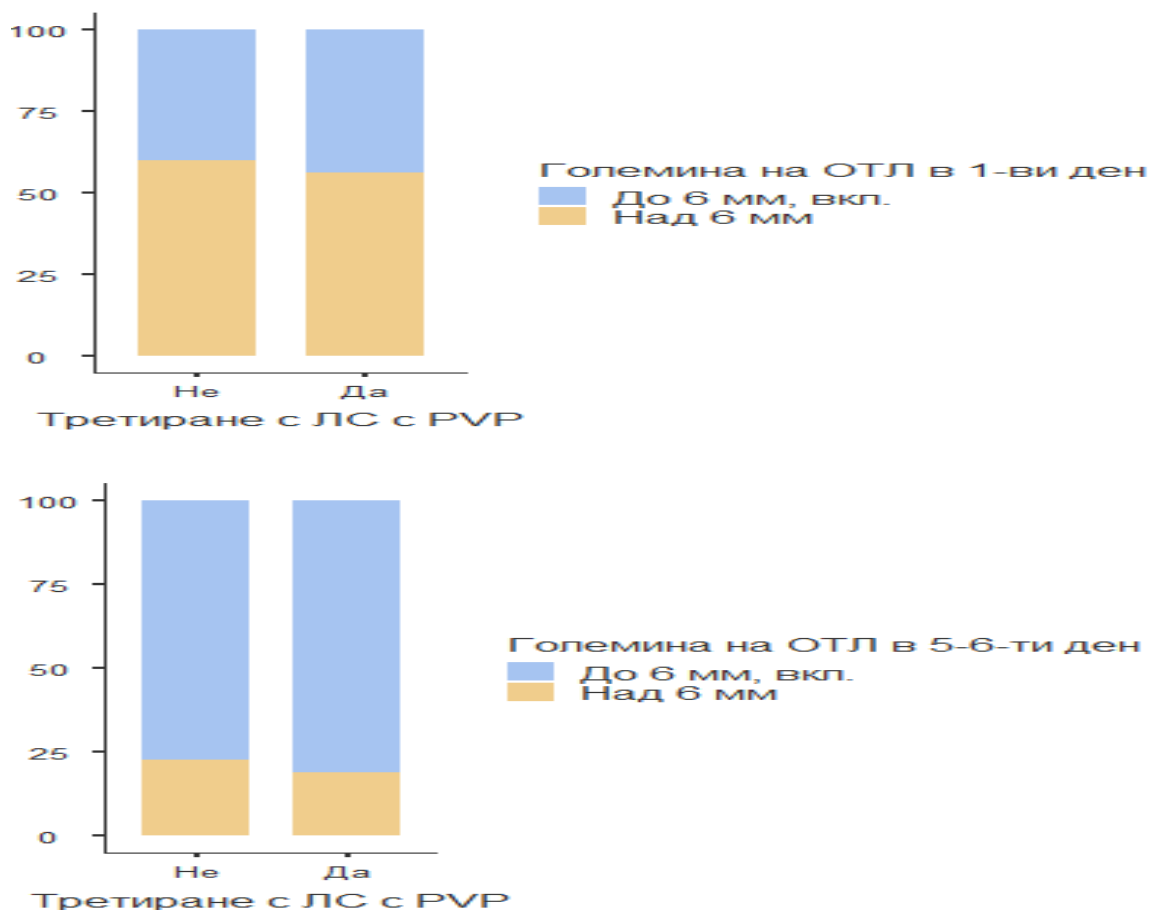


Figure 74. Magnitude of OTL in PVP treatment.

From the tables presented, it can be seen that during the period of 5-6 days, 21 lesions (n=21) decreased in size below 6 millimeters, passing into the group of small lesions according to our classification.

In the process of studying the effect of the treatment of OTL with the presented preparation containing PVP, the feeling of pain was measured in the group of treated patients, and the results were recorded on the first day and during the control examination (on 5-6 days).

	N	Mean	SD	Me	Mean dif	95 CI		p (t pared test)
						LL	UL	
VAS day 1	16	29,13	8,97	27	23,7	19,8	27,6	< .001
VAS day 5-6	16	5,44	6,49	2,5				

Table 57. VAS values on the first day and at the follow-up examination.

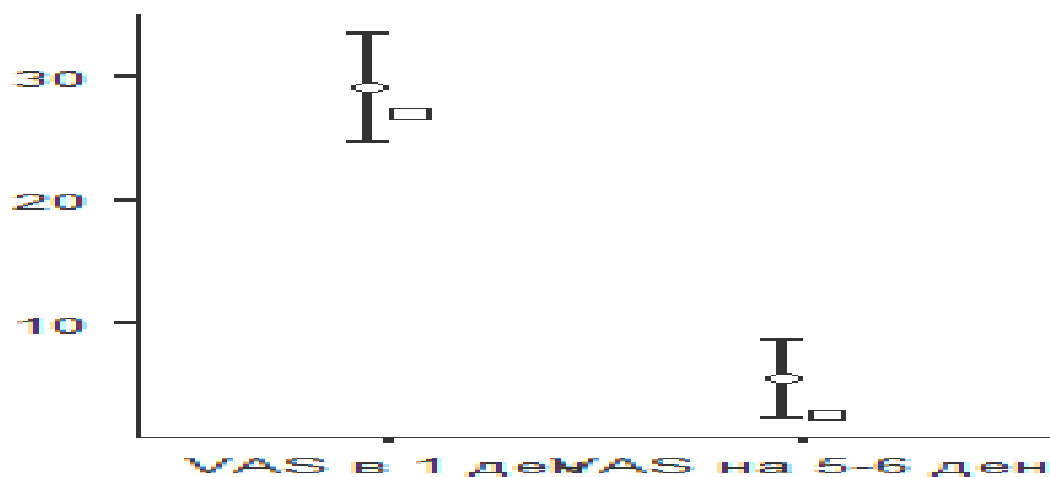


Figure 75. VAS values on the first day and at the follow-up examination

VAS pain score decreased to 23.7 (CI 19.8-27.6), the result being statistically significant ($p < 0.001$). A disadvantage of the conducted study is the lack of data on the dynamics of pain in patients who were not treated with the studied preparation. However, it can be concluded that the application of the indicated preparation has an effect on the feeling of pain rather than on the healing period of the treated lesions.

Data in the literature on the use of PVP as a means of treating oral lesions show that its action is expressed mainly in improving the stability and physico-mechanical properties of medicinal preparations, with the aim of improving their therapeutic effect. Michaels et al. 1966 prove the well-pronounced antiviral effect of PVP in an in vitro study, while other authors share information about the past use of this compound, as a blood plasma substitute or its subcutaneous administration in combination with other medications, as a means of delaying skin aging. Hizawa K et al. 1984 reported the formation of pseudotumorous masses with the injection of PVP.

3. Results and discussion on task 4.

A microbiological examination was performed on twenty counts of all 56 patients examined, comparing the results of the leukocyte count, the size of the lesions, the feeling of the subjective complaints by the patients (pain, discomfort, edema) and the dynamics in the size of the lesions, according to the type of the isolated flora or its absence. The results of the microbiological studies made it possible to divide the examined patients into two groups - patients in whom pathogenic or conditionally pathogenic flora were isolated and

a group in which microorganisms were not isolated. Klebsiela, strepto- and staphylococci, P. gingivalis, Fusobacterium spp fall into the group of isolated pathogenic or conditionally pathogenic. as well as the fungus Candida albicans.

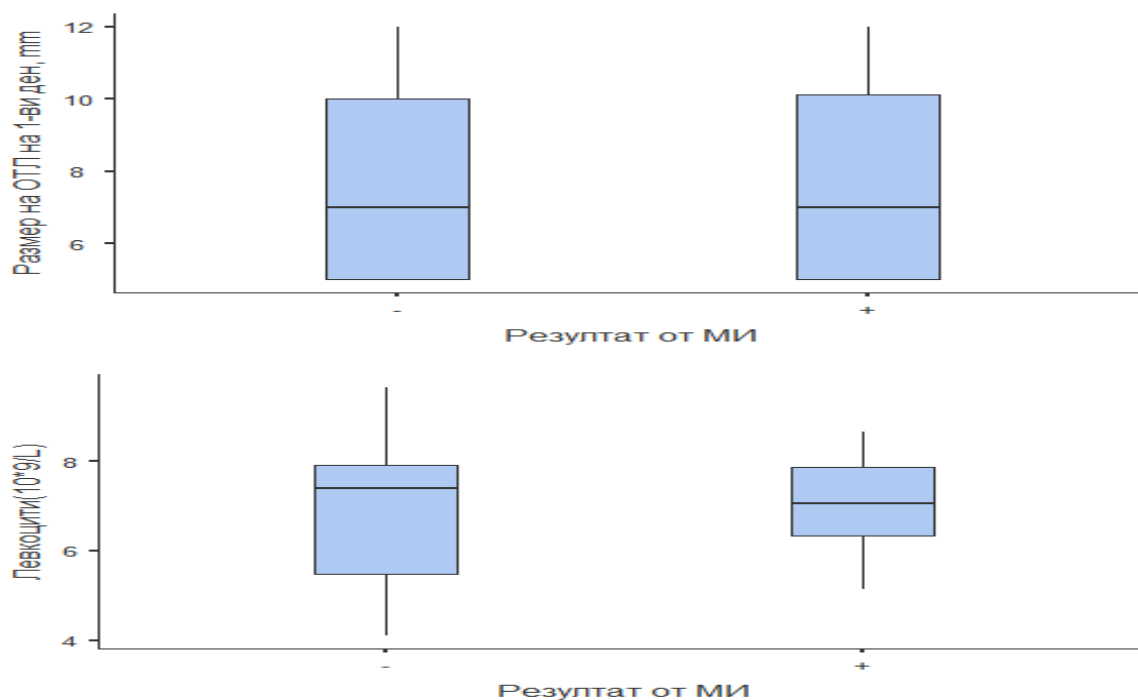
Pathogens or conditionally pathogenic organisms were isolated in 12 (n=60%) of the 20 patients examined, respectively, in 8 (n=40%) no flora was detected.

Criteria		N	Mean	SD	Me	Q1	Q3	Min	Max	p
size OTL day 1	Without isolated microflora (-)	8	7,75	2,92	7	5	10	5	12	0.937*
	Isolated conditionally pathogenic/pathogenic flora (+)	12	7,88	2,748	7	5	10,13	5	12	
Leukocytes(10 ⁹ /L)	Without isolated microflora (-)	8	6,99	1,87	7,39	5,48	7,91	4,1	9,65	0.839**
	Isolated conditionally pathogenic/pathogenic flora (+)	12	7,13	1,071	7,06	6,33	7,87	5,15	8,65	
*Манн-Уитни U, ** Student's t-test										

Table 58. Size of OTL and values of leukocytes in the patients with examined microflora.

The indicated table shows that the average size of the lesions in the two groups is approximately the same with a slight advantage for the group in which microorganisms are isolated. Apart from the average size of the lesions, the values of the smallest and largest lesions are the same, and the indicated data are without statistical significance.

Regarding the number of leukocytes, there is a preponderance of their quantity in patients with lesions from which pathogenic or conditionally pathogenic flora is isolated, and the standard deviation is also greater in the indicated group. The greater number of white blood cells, in the group of patients with isolated flora, is explained by the stronger response from the immune system, from the macroorganism in the presence of a specific microorganism on the lesion.



Фигура 76. Резултати от микробиологично изследване и стойности на левкоцити.

Regarding the size of the lesions and their conditional division into two groups according to the size, the results among the studied patients have the following tabular form.

Result microbiology	size OTL day 1						p (Fisher ET)
	up to 6mm.		more than 6mm.		total n, %		
Without isolated microflora (-)	3	37.5 %	5	62.5 %	8	100,00%	1,00
Isolated conditionally pathogenic/pathogenic flora (+)	4	33.3 %	8	66.7 %	12	100,00%	
total	7	35.0 %	13	65.0 %	20	100,00%	

Table 59. Magnitude of OTL and isolated microflora.

In the group of the so-called small lesions (up to 6mm) we have a total of 7 lesions (n=7, 35%) from all microbiologically examined patients, in four (n=4, 33.3%) flora was isolated, while in the remaining three - not.

For lesions over 6mm in size. in 8 in total (n= 8, 66.7% of all) they have an isolated flora, and in the remaining 5 such flora is not isolated.

From the presented table it can be seen that a specific microbial causative agent is isolated in the lesions which are the largest in size. Accordingly, the larger size of the described lesions may be due to the more pronounced inflammatory

reaction, a result of the larger microbial number. What has been said so far can also be described with the following diagram.

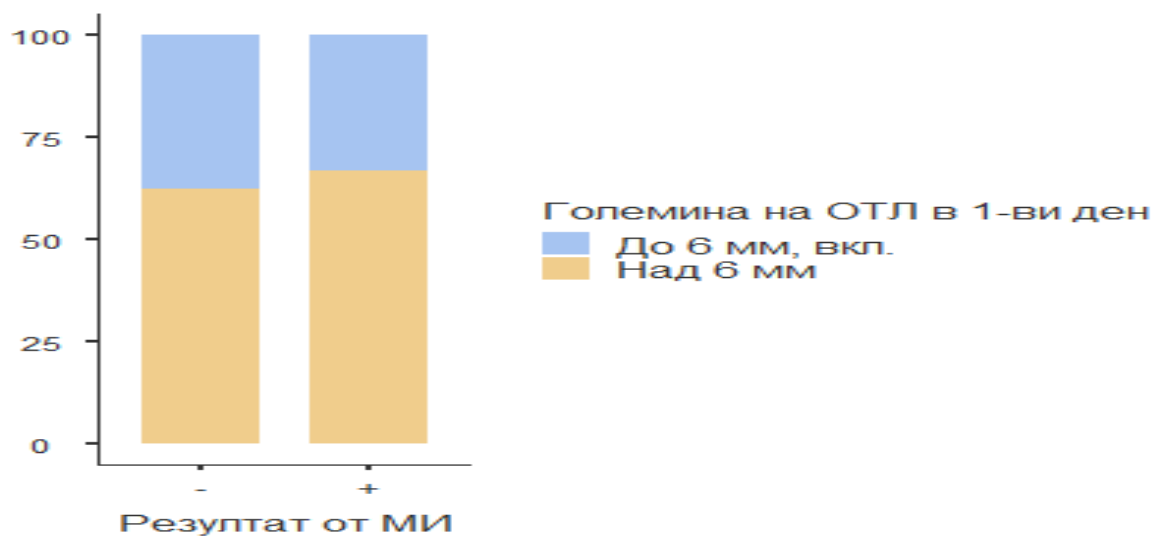


Figure 77. Magnitude of OTL and isolated microflora.

In the case of the main subjective complaints from the patient obtained from the questionnaire, the results among the microbiologically examined are as follows.

Result microbiology	pain						p (Fisher ET)
	pain -		pain +		total n, %		
Without isolated microflora (-)	2	25.0 %	6	75.0 %	8	100,00%	1,00
Isolated conditionally pathogenic/pathogenic flora (+)	4	33.3 %	8	66.7 %	12	100,00%	
total	6	30.0 %	14	70.0 %	20	100,00%	
Result microbiology	Discomfort						p (Fisher ET)
	none		yes		total n, %		
Without isolated microflora (-)	1	12.5 %	7	87.5 %	8	100,00%	0,619
Isolated conditionally pathogenic/pathogenic flora (+)	3	25.0 %	9	75.0 %	12	100,00%	
total	4	20.0 %	16	80.0 %	20	100,00%	
Result microbiology	Swelling						p (Fisher ET)
	no		yes		total n, %		
Without isolated microflora a (-)	7	87.5 %	1	12.5 %	8	100,00%	0,40
Isolated conditionally pathogenic/pathogenic flora (+)	12	100.0 %	0	0.0 %	12	100,00%	
total	19	95.0 %	1	5.0 %	20	100,00%	

Table 60. Results of microbiological examination and presence of pain and swelling.

In 2 patients (25.00%) out of a total of 8, who were without isolated microflora, there was no pain, and in the remaining 6 (75.00%) there was pain. In 4 patients (33.30%) out of a total of 12 with an isolated condition. pathogen/pathogenic flora there is no presence of pain, and in the remaining 8 patients (66.70%) there is. After the analysis, it was observed that there is no statistical significance between these values.

In 1 patient (12.50%) out of a total of 8, who are without isolated microflora, there is no presence of discomfort, and in the remaining 7 (87.50%) there is. In 3 patients (25.00%) from a total of 12 with an isolated condition. pathogen/pathogenic flora has no presence of discomfort, and in the remaining 9 patients (75.00%) there is. After the analysis, it was observed that there is no statistical significance between these values.

In 7 patients (87.50%) out of a total of 8, who are without isolated microflora, there is no edema, and in the remaining 1 (12.50%) there is. In 12 patients (100.00%) out of a total of 12 with isolated cond. the pathogen/pathogenic flora has the presence of edema. After the analysis, it was observed that there is no statistical significance between these values.

The summarized results from the presented tables show that the patients experiencing more pronounced pain and discomfort in the presence of oral traumatic lesions are those in whom a certain pathogenic or primarily pathogenic flora is detected. The same can be concluded about the size of the lesions. Therefore, the presence of pathogenic flora in OTL is associated with the development of larger lesions and those with more pronounced symptoms. This is confirmed once again by the values of leukocytes, which are higher in number in the group of patients with isolated flora. The presence of edema was reported by only one patient in the group of patients without isolated flora. From this we can conclude that the presence of edema is not a common symptom accompanying the development of OTL.

Regarding the dynamics in the size of the lesions, the data have the following graphical form.

	grups	N	Mean	SD	Me	Q1	Q3	Min	Max	p
size OTL 5-5 Day	Without isolated microflora (-)	8	4,25	3,06	3,5	2	7,25	0	8	0.765**
	Isolated conditionally pathogenic/pathogenic flora (+)	12	4,63	2,451	4	2,75	7	1	8	
Dynamics in the size of OTL (1st/5-6th day)	Without isolated microflora (-)	8	3,5	1	3,5	2,88	4,13	2	5	0.539**
	Isolated conditionally pathogenic/pathogenic flora (+)	12	3,25	0,783	3,25	3	3,63	1,5	4,5	
** Student's t-test										

Table 61. Dynamics in the size of OTL in patients with examined microflora.

The average value of the size of OTL on the 5-6th day of 8 patients without isolated microflora was 4.25 with a standard deviation of 3.06, and in the remaining 12 patients with isolated cond. pathogen/pathogenic flora mean value of OTL size on day 5-6 was 4.63 with standard deviation 2.451. The average value of dynamics in the size of OTL (1st/in 5-6th day) of 8 patients without isolated microflora was 3.5 with a standard deviation of 1.00, and in the remaining 12 patients with isolated cond. pathogen/pathogenic flora the average value of dynamics in the size of OTL (1st/on 5-6th day) is 3.25 with standard deviation 0.783.

Although the indicated values are quite close and taking into account the large number of patients in whom flora was isolated compared to those in whom it was not isolated, we can generalize that the lesions of patients with an established microbial agent heal more slowly compared to the control group.

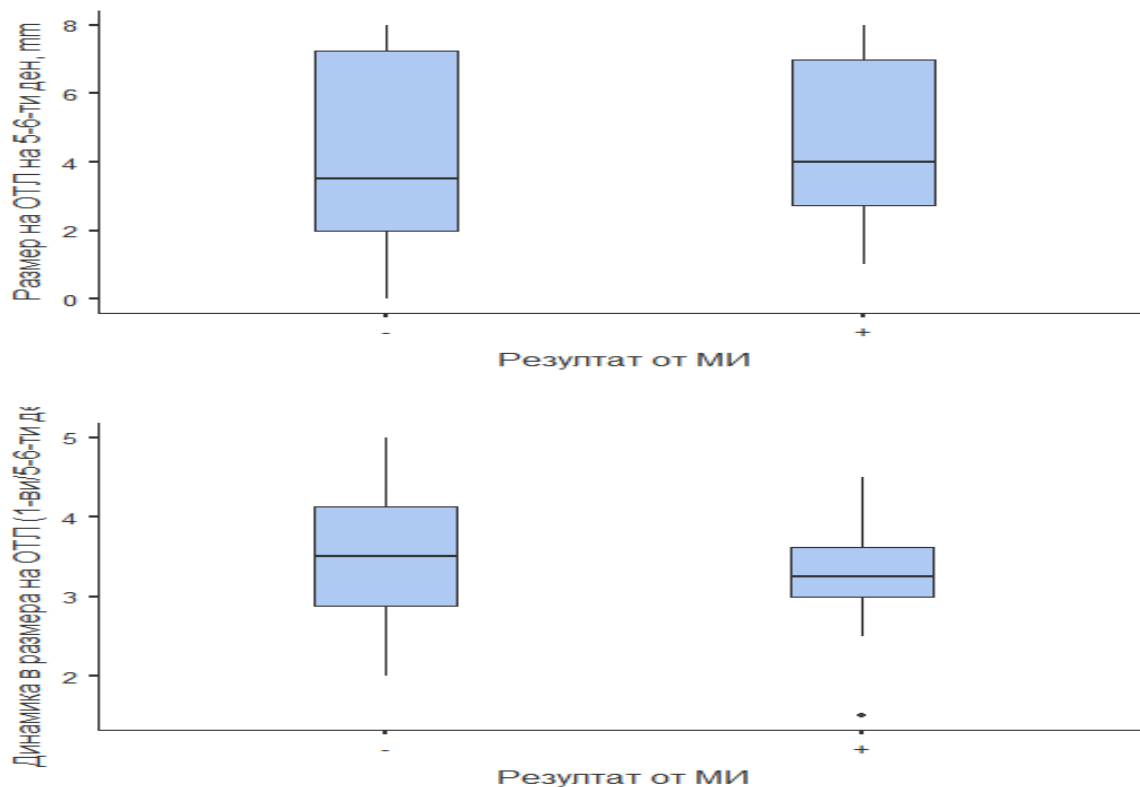


Figure 79. Dynamics in the size of the OTL in patients with the studied microflora.

5 patients (62.50%) out of a total of 8 who were without isolated microflora had an OTL size of up to 6 mm on the 5-6th day, and in the remaining 3 patients (37.50%) they were over 6 mm. Of the 12 patients with isolated cond.

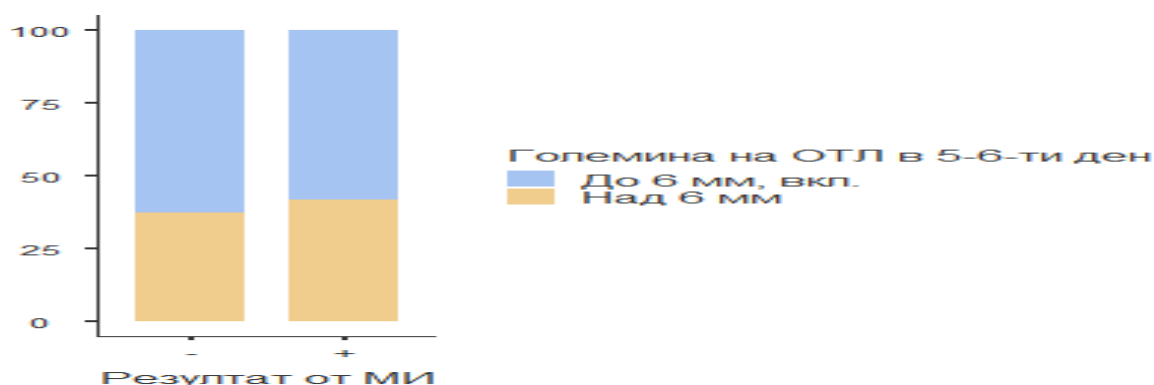
pathogen/pathogenic flora 7 patients (58.30%) had an OTL size of up to 6 mm on the 5-6th day, and in the remaining 5 patients (41.70%) they were over 6 mm.

One patient (12.50%) out of a total of 8 who were without isolated microflora had a complete recovery of OTL on the 5-6th day, and in the remaining 7 patients (87.50%) the recovery was partial. Of the 12 patients with isolated opportunistic/pathogenic flora, all 12 patients (100.00%) had partial healing of the OTL on day 5-6 to 6 mm. After the analysis, it was observed that there is no statistical significance between these values.

Result microbiology	size OTL Day 5-6 /mm.						p (Fisher ET)
	up to 6mm.		more than 6mm.		total n, %		
Without isolated microflora (-)	5	62.5 %	3	37.5 %	8	100,00%	1,00
Isolated conditionally pathogenic/pathogenic flora (+)	7	58.3 %	5	41.7 %	12	100,00%	
total	12	60.0 %	8	40.0 %	20	100,00%	
Result microbiology	Healing of OTL on the 5-6th day						p (Fisher ET)
	total		partial		total n, %		
Without isolated microflora (-)	1	12.5 %	7	87.5 %	8	100,00%	0,40
Isolated conditionally pathogenic/pathogenic flora (+)	0	0.0 %	12	100.0 %	12	100,00%	
total	1	5.0 %	19	95.0 %	20	100,00%	

Table 62. Recovery of OTL.

It can be seen that during the control examination, in the group of patients with isolated microflora, partial healing of the described lesions was observed, in contrast to those without isolated flora, where there was both partial and complete healing of the lesions. The presented data can also be visualized with the following diagrams.



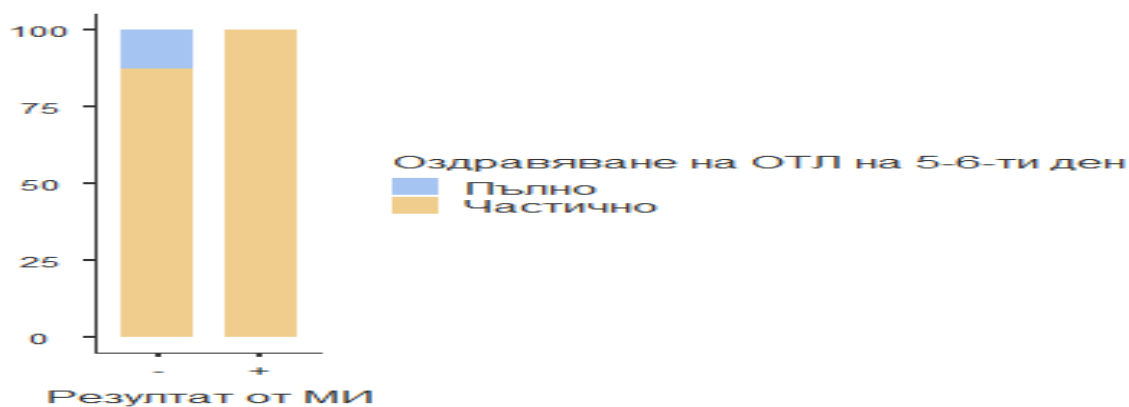


Figure 79. Healing of OTL.

From the results thus presented, it can be concluded that the presence of certain microbial agents can have a negative effect in the healing process of oral traumatic lesions.

In the literature, there are many sources on the relationship between oral microorganisms and diseases such as aphthous stomatitis and oral cancer (174, 175), while data on oral traumatic lesions are scarce.

Santonocito S et al. 2022 investigated changes in the microbiome of orthodontic patients by comparing the quantity and quality of microorganisms during orthodontic treatment and comparing the results with a control group of patients. The authors found that over a period of three months, changes were observed in both the amount and the type of plaque examined, and the results were influenced by the type of orthodontic appliances (removable or fixed) and the time they were worn. In addition, they describe the presence of "white dot-like lesions" in patients with impaired hygiene - a clinical finding identical to the subject of our study - the traumatic lesions.

Min Z et al. 2023, investigating the changes in the oral microbiome, came to the conclusion that the changes in the oral biofilm have an indisputable relation to the local immune response of the body, which clarifies the relationship with the development of oral mucositis and lesions in such changes. The authors determine a number of factors affecting the change in the oral microbiome - smoking, radiotherapy, hematopoietic stem cell transplantation, etc. Because the presented study focused on oral mucositis and recurrent autogenic stomatitis, according to the researchers, further studies are needed to determine the relationship between changes in the oral flora and the development of oral lesions and other diseases.

6. Conclusions

Based on the results we obtained, we made the following conclusions about the characteristics of oral traumatic lesions:

1. Traumatic lesions manifesting as a defect in the structure of soft tissues are more common than exophytic traumatic lesions;
2. The distribution between the sexes in OTL is approximately equal with a minimal preponderance for the female gender;
3. Oral traumatic lesions are most often found at a young age and in the age range of 15-44 years;
4. The most frequent chronic diseases have a negative relation to the occurrence and progression of oral traumatic lesions;
5. Taking certain medications is also related to the occurrence and development of OTL;
6. Harmful habits such as biting the lips, tongue and cheeks are a common and neglected cause of OTL;
7. Wearing prosthetic structures is a major factor in the occurrence of OTL, especially in the age over 55 years;
8. The buccal mucosa and gingiva are the most frequent localizations of oral traumatic lesions;
9. Histological examination is a necessary method for specifying the diagnosis of exophytic traumatic lesions;
10. Medicines based on PVP used for the treatment of OTL do not accelerate the healing process but have a good effect in controlling pain in this type of lesions;
11. The higher microbial number and the presence of defined pathogenic and conditionally pathogenic microorganisms has a negative effect on the course of OTL.

7. Conclusion

Oral traumatic lesions are caused by various factors and manifest themselves in a variety of clinical forms, localized in different places in the oral region. Because of this great diversity there is the need for different approaches in influencing them.

On the other hand, in most of the lesions described, the main healing factor is the removal of the cause that led to their occurrence.

There is a need to discover new methods and drugs to affect traumatic lesions.

8. Contributions

Affirmative Contributions:

1. We have confirmed that the removal of the etiological factor is the main method of treatment of oral traumatic lesions.
2. We confirmed that the wearing of removable prosthetic structures and the presence of harmful habits are a major factor in the development of oral traumatic lesions.
3. We confirmed that the presence of certain chronic diseases has a negative effect on the treatment of lesions in the oral cavity.

Contributions original to the country:

1. For the first time in the country, a study aimed at clarifying the factors related to the occurrence and development of oral lesions with a traumatic genesis is being conducted.
2. For the first time in the country, the effect of the treatment of oral lesions with a preparation creating a barrier, which isolates the damaged tissues from the damaging factors, is being studied.
3. For the first time in the country, a study aimed at clarifying the relationship of the oral microflora to the development and progression of traumatic lesions is being carried out.

9. Publications related to the dissertation work.

1. Dzhongova E, Mihaylova V, Dimitrov I, Georgieva V. A clinical case report of an epidermoid cyst of the mandible. J of IMAB. 2023 Jan-Mar;29(1):4770-4774.

2. Dimitrov I, Dzhongova E, Classification and Management of Oral Traumatic Lesions: A Comprehensive Review. International Journal of Science and Research (IJSR), Volume 12 Issue 9, September 2023.
3. Dimitrov I, Oral traumatic lesions – demographic and clinical characteristics. Medinform 2023; 10(2):1739-1745.