

Regression Analysis of the Symptoms

Josipa S. Gruden-Pokupec¹, Vladimir Gruden² and Željko Orihovac³

¹ Stomatological Policlinic, Zagreb, Croatia

² Business Academy »Experta«, Zagreb, Croatia

³ University Hospital »Dubrava«, Zagreb, Croatia

ABSTRACT

Stomatopyrosis of 'burning mouth' syndrome, in a narrower sense of definition, is a condition characterized by sensation of burning and heating in mouth, despite its normal mucosa. This research has been directed towards treatment of stomatopyrosis, putting emphasis on the implementation of psychopharmacotherapy and psychotherapy. The research was conducted on altogether 120 respondents suffering from stomatopyrosis. The respondents were divided into two equal groups: each one comprising 60 members. All the respondents were treated by means of a standard topical therapy. All the patients were assessed clinically and by means of psychological tests measuring depression and anxiety four times: once before the treatment, after one month, after two months and after four months since the beginning of the treatment. The acquired data were afterwards statistically processed. Our research led to the conclusion that stomatopyrosis occurs with elderly people, primarily women. Regarding their occupation, majority of the respondents were clerks, followed by retirees. The burning sensation in mouth was present with all the respondents, the dominating site being the lips, while the nature of sensation was reported as mostly unbearable. Anxiety, tension and stress tend to aggravate the symptoms. When grading the symptoms on VAS, i.e. visual analogous scale, the subjective assessment of symptoms was marked as 7–8 cm, which shows a high degree of burning sensation. According to our study, the quantity of saliva, which was at the beginning of the research slightly decreased, normalized after the treatment. Apart from the clinical investigation of stomatopyrosis, we applied Depression and Anxiety questionnaires. During the therapy, the results of the depression test have shown a decrease in depression (from 56.7% to 0.00%), which is particularly apparent in the group treated by autogenic training and in the first group of respondents, i.e. the one treated with antidepressants. The Anxiety tests have shown a higher percentage and intensity of anxiety with men (62.5%, as opposed to women – 32.5%) in the beginning, which has dropped to 7.5% with men during the treatment and 8.8% with women. Clinical presentation of stomatopyrosis has also apparently improved. This improvement in clinical symptoms and psychological condition of patients is statistically significant. On the basis of our research, we have concluded the following: the comorbidity of stomatopyrosis with the phenomena of anxiety and depression proves that, among other factors, there is a psychogenic aetiology of this disease. Further research should provide answers to the questions whether stomatopyrosis is a psychosomatic or a conversive disorder. Antidepressants and anxiolytics have an important role in the therapy of stomatopyrosis. Autogenic training, which is a psychotherapeutic anxiolytic technique, is a therapy of choice for stomatopyrosis, which contributes not only to the elimination of oral complaints, but to the emotional rehabilitation of the patients as well.

Key words: stomatopyrosis, psychopharmacotherapy, psychotherapy, regression analysis

Introduction

Mouth is the mirror of our health. It is an opening through which our spirit, words, and food pass; it is a symbol of a person's creative power, and above all, his spiritual inspiration; mouth is the symbol of a person's emotional state. Many diseases of our system, both physical and psychical, are often manifested in the oral cavity; they can be seen as clinical pathological changes or pathological oral symptoms, like the sensation of pain

and burning in the oral cavity, for instance. Burning sensation and pain in the oral cavity may occur without the presence of pathological changes in oral mucosa.

Burning mouth syndrome is a state characterised by the sensation of burning in the oral cavity with a normal mucosa. Stomatopyrosis may occur as a symptom with general changes in the organism, with oral mucosa show-

ing some morphological or pathological changes or as an independent symptom which can often be associated with some etiological factor. Diagnosis of stomatopyrosis is best obtained by means of a detailed history and clinical investigation. Definition of stomatopyrosis as a disease is being limited to burning which is not accompanied with clinical pathological changes in the oral cavity.

Grushka et al.^{14–16} stressed that stomatopyrosis indicates the presence of dryness in the mouth, and that it is accompanied with a change in taste, as well as with disturbances of sleep and the occurrence of headaches. The occurrence of the burning sensation within the mouth is differently perceived by the patients: they range from being totally unbearable to being bearable.

Bergdahl et al.^{4–6} graded the symptoms of burning sensation from mild to very severe burning sensation.

Bascet et al.^{2,3} divided stomatopyrosis into the mild, moderate and severe type.

Lamb et al.²⁶ measured the intensity of the symptoms by means of a visual analogue scale, whose range is determined by numbers ranging from 0 to 10.

Gruden et al.¹³ used various criteria in order to objectivize the symptom of burning. The assessment of the symptom intensity was marked with 1–5 (ranging from *no symptom* to *unbearable*); frequency of the occurrence of the symptom was marked with 1–5 (from *rarely* to *continuous*).

The occurrence of the burning mouth symptom is often induced by various etiological factors, among which mental disturbances have a prominent function, as they intensify the symptom intensity and the frequency of its occurrence.

Browning et al.⁹ established that the burning sensation with patients suffering from both stomatopyrosis and mental illnesses is of higher intensity than with patients who suffer from stomatopyrosis only, with another etiological factor.

Gruden et al.¹³ determined that burning mouth sensation is common with patients suffering from mental diseases.

Many diseases of our bodily system can cause burning mouth sensation. Aetiological factors contributing to burning mouth sensation may be local, systemic and psychogenic. Local factors are mechanical irritations, infections, dysfunction of TMJ, salivary gland disturbances, etc.

Kaltz et al.²⁵ concluded that people with burning mouth syndrome often develop fusospirochetal infections.

James et al.²³ concluded that local allergic reactions may be accompanied with burning mouth sensation.

Lamey and Lamb^{28–30} determined that patients with stomatopyrosis often clench their teeth.

Boras et al.⁷ found out that the burning sensation is closely connected with the content of saliva. Systemic factors which contribute to the emergence of stomatopyrosis are the decreased amount of hormones, deficiency in nutritive elements, immunological diseases,

diseases of gastrointestinal tract, neurological disturbances, coronary diseases, some medications, etc.

Brook and Seganski⁸ established that 53% the patients with burning mouth sensation have iron deficiency.

Vidas et al.³² found out that menopausal women experience more frequent incidents of burning mouth sensation.

Epstein et al.¹⁹ determined that trigeminal neuralgia causes the burning sensation in the oral cavity.

Heneke et al.²² found out that the shortage in concentration of calcium and phosphorus lead to facial paresis and to the emerging of stomatopyrosis. Today, it is generally widely accepted that the burning sensation in the oral cavity may be caused by psychogenic factors. The most common psychogenic diagnoses are depression, anxiety and emotional instability, stress and inadaptability.

Depression is a state of a decreased psychophysical activity, characterized by sadness, apathy, lethargy and aggravated and slowed-down thinking. Psychodynamically, depression can be explained as autoaggression. Once the ego has lost a beloved object, it reacts in aggression; the libido that has lost a beloved object withdraws to the ego, which also withdraws, and allowing aggression to conquer it. This is why a depressed person strives for self-destruction.

Anxiety is a complex and unpleasant feeling of fear, tension, and insecurity, accompanied with activation of autonomous nervous system. Moderate anxiety often positively affects various activities. Anxiety is a response to an internal danger. It is the consequence of the inability of the ego to appropriately respond to emotional impulses which our ego refuses to accept, which may later develop as psychosomatic diseases.

Adaptation is a sign for fitting in, redoing or modifying. What we talk here about is any change in the structure or function, which enables the person to survive or to preserve the species. The term adaptation was introduced in physiology by Hans Seley, who connected it with stress.

Stress is a reaction to a danger; it helps a person to survive. Inability of a person to adapt to trauma destroys the balance and causes numerous and severe stressogenous diseases.

Hammeren and Hudson²¹ found out that the majority of patients with stomatopyrosis have experienced stressful situations in some point of their lives.

Hamf et al.²⁰ discovered that patients with stomatopyrosis suffer from mild, moderate and severe mental disturbances.

Brody and Nesbitt's³⁵ research proved that emotional factors have an important role in the emergence of stomatopyrosis.

Basket et al.^{2,3} concluded that anxiety and cancerophobia, which characterize hypochondriacs, cause stomatopyrosis as well.

TABLE 1
CANONIC DISCRIMINATING FUNCTIONS AT THE BEGINNING OF THE RESEARCH

Disc. Funct	Function value	Post. variable	Cumulated percentage	Canon Corel.	Post dysfunction	Wilksova λ	χ^2	df	p
					0	0.154	205.578	42	<0.001
1	2.218	71.5	71.5	0.830	1	0.496	77.029	26	<0.001
2	0.698	22.5	94	0.641	2	0.843	18.765	12	0.094
3	0.186	6	100	0.396					

TABLE 2
CORRELATION VARIABLES WITH THE DISCRIMINATED VARIABLES AT THE BEGINNING OF THE RESEARCH

Code	Variable Name	Funct. 1	Funct. 2	Funct. 3
TDEPR0	Depression Test	0.790	0.497	0.01
TANKS0	Anxiety test	-0.685	0.401	0.049
SEX	Sex	0.121	-0.077	0.118
DOB	Age	-0.092	0.004	0.086
VJS0	Times when Symptoms appeared	0	-0.250	-0.027
KON	Clinical oral findings	0.124	-0.198	-0.065
LS0	Symptom Localization	-0.025	-0.098	0.094
VAS0	Subjective estimate of the symptom intensity	-0.068	-0.317	0.621
PIS0	Evaluation of intensity of symptoms.	0.045	-0.495	0.542
UJS0	Symptom appearance rate	-0.132	-0.293	0.370
QSLINE0	Quantum slime Saliva quantum	0.149	0.181	-0.247
SPO0	Subjective taste test rate	-0.054	-0.046	-0.216
CPS	Factors that augment the symptoms	-0.056	-0.001	0.180
OS0	Symptom description	-0.076	-0.061	-0.154

Jerlang et al.²⁴ established that stomatopyrosis can be a result of a very complex dynamics, from hysterical conversions to mental separation (narcissist nucleus). What we talk about here is actually alexitemia.

Melan et al.³¹ established that psychotherapy gives better results than other techniques in treating stomatopyrosis.

As we can see, different authors have used different techniques while treating the cause of this disease, which is in this case of psychogenic nature. So, we implemented the therapy including antidepressants, anxiolytics and autogenic training.

Antidepressants belong into the group of psychotropic or psychoactive medications. Psychotropic medications change the chemical-transmitting system which in synapses with axon terminals of a neuron transmits the nervous stimuli on the next neuron, for example, acetylcholine, dopamine, etc. Antidepressants are medications which intensify the activity of the catecholamine of adrenaline and noradrenaline. They are usually taken 2–3 times a day. Anxiolytics are substances which depress the central nervous system. The most important indication for the implementation of benzodiazepine are the states characterized with anxiety and sleep disorders. Due to differences in distribution of benzodiazepine

receptors in the brain, it is possible to apply both anxiolytic and hypnotic means, which do not have to match, and which allegedly depends on the dosage of the medications.

There are three groups of anxiolytics:

- 1) benzodiazepines,
- 2) beta-adrenergic blockers,
- 3) antidepressants with a sedating function.

Benzodiazepines have a hypnotic, sedating and anti-convulsive function. They have a strong impact on reticular activating system of the brain, limbic system, and on hypothalamus. Benzodiazepines are used against anxiety, panic attacks, insomnia, somnambulism and epilepsy. Results of the intake of anxiolytics will be visible after a month.

Autogenic training is a psychotherapeutic technique which is deemed efficacious in the treatment of psychical disturbances, and it is a contemporary technique no. one in the treatment of depression and anxiety. Autogenic training is a child of hypnosis, but it is not its only source. Its sister, whose mother is also hypnosis, is psychoanalysis, whose father is S. Freud, who introduced this therapy at the turn of the 19th and the 20th centuries. Psychoanalysis is based on the 'opening' of the pa-

TABLE 3
GROUP CLASSIFICATION RESULTS AT THE BEGINNING OF THE RESEARCH

Actual Members	N	Estimated group members			
		Antidepressants	Anxiolytic	Autogenic training	Control
Antidepressants	30	27 90.0%	0 0.0%	2 6.7%	1 3.30%
Anxiolytic	30	0 0.0%	24 80.0%	4 13.3%	2 6.7%
Autogenic training	30	4 13.3%	0 0.0%	21 70.0%	5 16.7%
Control	30	5 16.7%	6 20.0%	1 3.3%	18 60.0%

TABLE 4
CANONICAL DISCRIMINATORY FUNCTIONS ONE MONTH AFTER RESEARCH

Disc. Funct	Funct. Value	Post. Variable	Cumulated Precent	Canon Corel.	After dis.fun.	Wilksova λ	χ^2	df	p
					0	0.256	149.736	42	<0.001
1	1.445	73.3	73.3	0.769	1	0.627	51.383	26	0.002
2	0.308	15.6	88.9	0.486	2	0.820	21.807	12	0.04
3	0.219	11.1	100	0.424					

tient and on the intensive 'discharging' of his feelings and it is considered to be the queen of psychotherapy. Its favourable effect not only treats and prevents the problem, but it also helps an individual to deal with his own role in the society, which leads to the development of a free personality, which becomes constructive in the realization of his/her rights and patient in coping with objective difficulties. By autogenic training, we consciously, positively and in an organized manner choose the thought which is important for us. Autogenic training is hypnosis rather than an autosuggestion. Autogenic training helps us re-direct the outer world towards the inner world, the outcome of which is focusing one one's own psychical life. Exercises last 2 to 3 minutes in the beginning, and after a while, in the end, they last up to 20 minutes. Autogenic training is a silence in which the person subjected to it may hear weak 'voices' of his/her inner life. Every formula is to be acquired within 2 weeks, which means that altogether the time devoted to autogenic training amounts to 3 months.

Purpose of the work

Stomatopyrosis has recently been associated with stressogenous situations, which points at the significance of psychical conditions of the patients suffering from this symptom. Patients who suffer from burning mouth sensation are reported to suffer from a psychical disturbance of a kind. The data collected indicate that the possibility of psychogenous disturbance can be one of the etiological factors contributing to the incidence of stomatopyrosis. While investigating the efficiency of psychopharmatics and psychotherapy in the treatment

of patients suffering from burning mouth sensation, by means of a regression analysis we tried to test the change in the variables during a 4-month monitoring of the patients:

1. assessment of the intensity of the symptom,
2. frequency of the occurrence of the symptom,
3. subjective assessment of the intensity of the symptom.

Materials and Methods

This research is based on the treatment of psychogenous factor which is associated with the incidence of stomatopyrosis as a symptom. The research was conducted on 120 patients suffering from stomatopyrosis, with whom we had previously established the existence of a psychical disturbance. The patients were divided into 4 groups. Every group consisted of 30 subjects with burning sensation in their mouth as the basic and common symptom, with different other psychogenous disturbances.

The first group contained patients submitted to a treatment by means of antidepressants, and this group consisted of 23 women and 7 men.

The second group was comprised of the patients treated by anxiolytics, and there were 16 women and 14 men in it.

The third group was submitted to a treatment by means of autogenic training. It comprised 19 women and 11 men.

TABLE 5
CORRELATION OF THE VARIABLES ONE MONTH AFTER BEGINNING OF THE RESEARCH

Code	V	Funk. 1	Funk. 2	Funk. 3
TDEPR1	Depression test	0.839	0.228	0.192
TANKS1	Anxiety test	-0.613	0.477	0.258
OS1	Symptom description	-0.119	0.039	0.086
DOB	Age	-0.114	0.028	0.074
UJS1	Symptom frequency	-0.191	-0.428	0.26
KON	Clinical oral findings	0.137	-0.327	-0.098
PIS1	Evaluation of intensity of symptoms.	-0.019	-0.169	0.044
SPOL	Sex	0.14	-0.165	0.097
QSLINE1	Saliva Quantum	0.25	0.131	-0.499
VAS1	Subjective estimate of the intensity of symptoms	-0.087	0.045	-0.347
SPO1	Subjective taste test rate	-0.12	-0.181	-0.236
CPS1	Factors that augment the symptoms	-0.071	-0.001	0.16
LS1	Localization of the symptoms	-0.047	-0.088	0.149
VJS1	Times when symptoms appear	0.098	-0.053	-0.114

TABLE 6
GROUP CLASSIFICATION RESULTS ONE MONTH AFTER TEST BEGAN

Actual Members	N	Estimated group Members			
		Antidepressants	Anxiolytic	Autogenic training	Control
Antidepressants	30	23 76.7%	0 0.0%	2 6.7%	5 16.7%
Anxiolytic	30	1 3.3%	26 86.7%	1 3.3%	2 6.7%
Autogenic training	30	3 10.0%	2 6.70%	19 63.3%	6 20.0%
Control	30	7 23.3%	7 23.3%	2 6.7%	14 46.7%

TABLE 7
CANONICAL DISCRIMINATORY FUNCTIONS TWO MONTH AFTER RESEARCH

Disc Funct	Role Value	Post. Varia.	Kumu. postot.	Canon. Corel.	After dis.fun.	Wilksova λ	χ^2	df	p
					0	0.365	110.871	42	<0.000
1	0.901	69	69	0.688	1	0.694	40.232	26	0.037
2	0.271	20.8	89.7	0.462	2	0.882	13.851	12	0.31
3	0.134	10.3	100	0.344					

The control group (22 women and 8 men) was subjected to a psychiatric treatment only.

As far as age and sex of the patients is concerned, the patients suffering from stomatopyrosis belonged primarily to elderly group, aged between 50 and 70, of both sexes.

As far as profession of the patients is concerned, all four groups consisted primarily of old age pensioners, followed by clerks and workers.

For the purpose of this research, we conducted a general and mental check-up of the patients and applied two

psychological testings. The testing was conducted by means of an interview with the patients, whose answers were written in the questionnaire. The questionnaire contained not only the general data, but some other data significant for the investigation of stomatopyrosis. According to diagnostic criteria, the patients were assigned to one of the four groups. All four groups were submitted to psychotherapy, i.e. a psychotherapist interviewed them. Psychologists conducted psychological testing. A detailed clinical and psychiatric check-up was conducted before the treatment process started, and it followed af-

TABLE 8
CORRELATIONS OF VARIABLES WITH DISCRIMINATORY VARIABLES TWO MONTHS AFTER BEGINNING OF RESEARCH

Code	Name of Variable	Funct. 1	Funct. 2	Funct. 3
TDEPR2	Depression test	0.673	0.415	-0.133
TANKS2	Anxiety test	-0.358	0.258	-0.187
VJS2	Time when symptoms appeared	0.262	-0.166	0.116
OS2	Symptom description	-0.189	0.114	-0.040
DOB	Age	-0.146	0.059	0.015
QSLINE2	Saliva quantum	0.299	-0.367	0.152
SPO2	Subjective taste test	-0.108	-0.303	-0.282
CPS2	Factors which increase symptoms	-0.092	0.138	-0.027
UJS2	Symptom appearance rate	-0.123	-0.058	0.790
VAS2	Subjective symptom intensity estimate	-0.065	-0.418	0.515
KON	Clinical oral findings	0.186	-0.098	-0.461
PIS2	Estimate of the symptom intensity	-0.051	-0.112	0.347
SPOL	Sex	0.182	0.087	-0.232
LS2	Localization of the symptoms	-0.018	0.042	-0.170

TABLE 9
CANONICAL DISCRIMINATORY FUNCTIONS FOUR MONTHS AFTER RESEARCH BEGAN

Disc Func	Role Value	Post. varia.	Kumu. postot.	Canon Corel.	After dis.fun.	Wilksova λ	χ^2	df	p
					0	0.41	98.165	42	<0.000
1	0.607	56	56	0.615	1	0.658	45.99	26	0.009
2	0.355	32.7	88.8	0.512	2	0.892	12.604	12	0.398
3	0.121	11.2	100	0.329					

ter a month, after two months and after four months. The psychotherapist is the one who assesses the results regarding the treatment of psychogenic causes, and he is to decide whether the treatment will be aborted or continued, depending on the mental condition of the patient.

An objective assessment of the stomatopyrosis symptoms contained the following: apart from the general data regarding the patients, i.e. their age, sex, occupation, etc. we asked them to assess the intensity of their symptoms, offering them 5 possible answers: 1) *absence of any subjective symptoms*, 2) *bearable*, 3) *moderate*, 4) *severe*, 5) *unbearable*. The frequency of the symptoms was depicted in four possible answers they were offered: 1) *very rarely*, 2) *rarely*, 3) *often*, 4) *continuous*. Subjective assessment of stomatopyrosis symptoms is difficult to evaluate scientifically. This is why in this research we used well known techniques by means of which we tried to objectivize stomatopyrosis symptoms. Subjective assessment of the intensity of the burning sensation in the oral cavity was obtained by means of a visual analogous scale ranging from 0 to 10 cm, in which 0 shows the lowest intensity of the burning sensation and 10 the strongest one. The patients themselves defined the intensity of their burning sensation by marking the number (cm) on the scale, which means that we obtained objectivi-

zation of the measurement in centimetres. Apart from clinical testing, we conducted a psychological testing of the patients, by means of a psychotest. We applied two psychotests dealing with their specific psychological situation. These tests were necessary in order to assess psychological state of the patients, and to monitor their state while therapy was in progress. Testing was conducted in such a way that the patients filled in the questionnaires before the therapy started, after a month, after two months and after four months.

Previously conducted investigations confirmed that the most frequent psychological disturbances associated with the emerging of stomatopyrosis as a symptom are depression and anxiety. The depression questionnaire consists of 20 statements which describe psychical state of the patients. These are the questions which define depression, like : I am in a good mood, I feel like crying, I'm calm, I'm relaxed, etc. Each statement is accompanied by four answers which define the frequency of a respective psychological state of the patient, as follows: almost never, sometimes, often, and almost always. Anxiety questionnaire contained 20 questions, to which answers are either YES or NO, and which describe temporary states of the organism caused by a certain situation (for instance: do you suffer from headaches, do your hands

TABLE 10
CORRELATION OF VARIANTS WITH DISCRIMINATED VARIABLES AFTER 4 MONTHS OF RESEARCH

Code	Name of Variable	Func 1	Func. 2	Func. 3
VJS4	Symptom indication times.	0.397	-0.248	-0.109
OS4	Symptom description	-0.258	0.161	0.013
SPOL	Sex	0.228	0.141	0.053
DOB	Age	-0.178	0.041	-0.047
CPS4	Factors that influence symptom result	-0.112	0.105	-0.107
TDEPR4	Depression test	0.464	0.648	0.224
VAS4	Subjective prediction of symptom intensity	-0.007	-0.611	-0.32
UJS4	Intesivity of symptom occurrence	-0.121	-0.597	-0.325
PIS4	Prediction of the symptom intensity.	0.014	-0.518	-0.428
TANKS4	Anxiousity test	-0.225	0.399	0.338
LS4	Symptom localization	-0.035	0.125	-0.012
SPO4	Subjective taste evaluation	-0.1	-0.154	0.517
QSLINE4	Saliva quantum	0.429	-0.285	0.509
KON	Clinical Oral Findings	0.243	0.122	0.417

TABLE 11
GROUP CLASSIFICATION OF RESULTS AFTER FOUR MONTHS OF RESEARCH

Actual Members	N	Estimated group members			
		Antidepressants	Anxiolytic	Autogenic training	Control
Antidepressants	30	17 56.7%	2 6.7%	6 20.0%	5 16.7%
Anxiolytic	30	3 10.0%	20 66.7%	4 13.3%	3 10.0%
Autogenic training	30	5 16.7%	5 16.7%	18 60.0%	2 6.7%
Control	30	1 3.3%	6 20.0%	6 20.0%	17 56.7%

tremble, do you have sleeping problems, etc.). The presence of the described phenomena was explained by variables which were introduced in order to enable a statistical analysis.

Results

In order to test the efficacy of treatment, by means of regression analysis we investigated the changes of some variables during a 4-month monitoring of the patients, i.e. by means of the assessment of the intensity of the symptom, the frequency with which the symptom occurs and by means of a subjective assessment of the intensity of the symptom (VAS-scale) and implementation of psychological tests (depression test, anxiety test). We assessed all the three variables by means of a linear regression, depending on the temporal points/intervals of the investigation for each of the groups of patients. The assessment of the symptom intensity during the treatment is shown in the Figure 1. If you look at the figure, you will notice a significant improvement in the assessment

of the symptom intensity during the four-month treatment in the groups of patients who were given antidepressants, anxiolytics or were treated by means of an autogenic training. The control group displayed a hardly noticeable improvement.

The results of the regression analysis of the change in the assessment of the symptom intensity are shown in the Table 3. for each of the groups of the patients. In the first group (group treated with antidepressants) the coefficient of the stomatopyrosis symptom regression was -0.478, with correlation coefficient of 0.544. Both coefficients are statistically significantly different from a zero ($p < 0.001$). In the second group of patients (therapy by anxiolytics), the coefficient of regression of the stomatopyrosis symptom was -0.505, and correlation coefficient was 0.598, which also shows the value which is significantly different from the previous assessment of the symptom intensity ($p < 0.001$) before and after the therapy. In the third group, the one treated by means of autogenic training, the coefficient of the regression of stomatopyrosis symptom was -0.653, with correlation co-

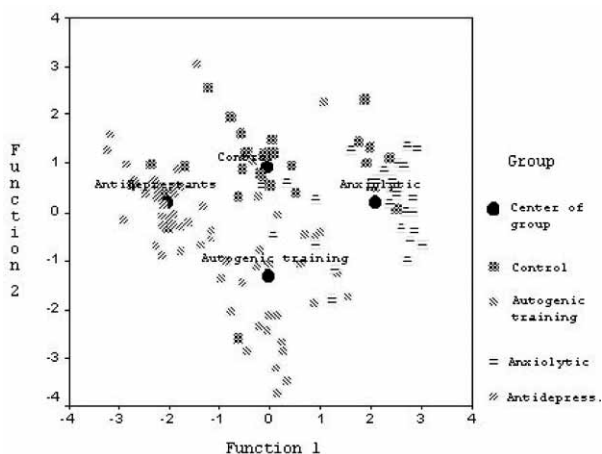


Fig. 1. Position of the groups in discernment space at the beginning of the research.

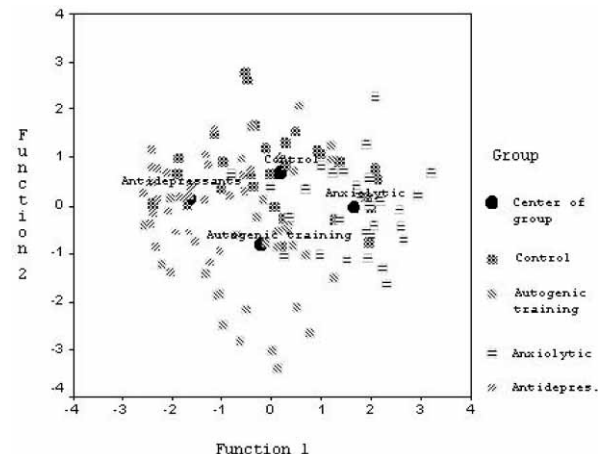


Fig. 2. Group positions in discriminated space one month into the research.

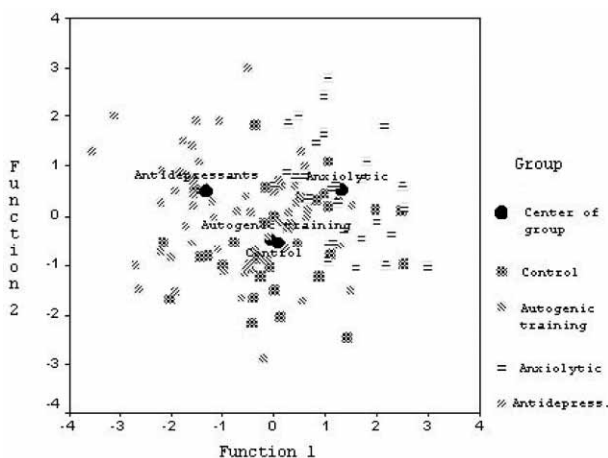


Fig. 3. Group positions in discriminated space two months after the research.

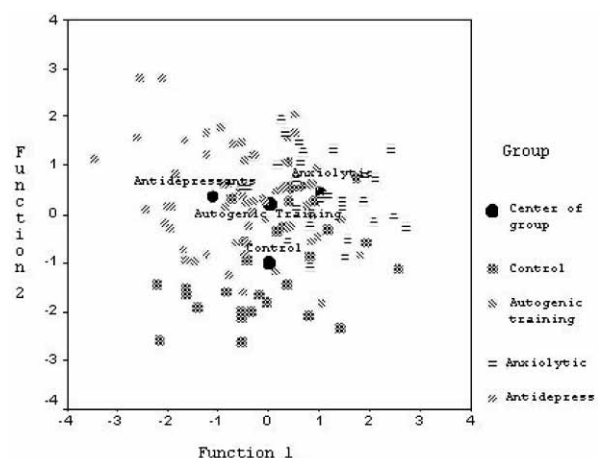


Fig. 4. Position of the groups in discriminated space four months after the research.

efficient of 0.738. Both coefficients are significant ($p < 0.001$). The control group displayed a noticeably lower values of the coefficient of stomatopyrosis symptom, i.e. -0.116 , which means that attributed correlation coefficient is lower, i.e. 0.149. Statistically, these two coefficients do not differ from a zero ($p = 0.104$), which means that the changes which took place in the control group cannot be taken as significant. In other words, in all groups except in the control group there was a significant decrease in the assessment of the intensity of the symptom before and after the therapy. The results of the regression analysis of the changes in the frequency of occurrence of stomatopyrosis symptoms are shown in Table 4 and Figure 2. Figure 2 shows even more intensive changes in the frequency of the occurrence of the stomatopyrosis symptoms in the three groups of patients who were submitted to either medicamentous or psychotherapeutic treatment. With this parameter, the control group showed a noticeably smaller change. In the first group (the group treated with antidepressants), the re-

gression coefficient was -0.487 , with attributed correlation coefficient of 0.666, which indicates a significant change in the frequency of the occurrence of the symptom ($p < 0.001$). In the second group (therapy by means of anxiolytics) the regression coefficient was -0.489 , correlation coefficient was 0.694 ($p < 0.001$). In the third group, the one treated with autogenic training, the regression coefficient was -0.569 , and correlation coefficient was 0.729 ($p < 0.001$). This significant decrease in the assessment of the frequency of symptom is the biggest of all, and is accompanied with a prominent change in the frequency of the occurrence of the symptom. The fourth, control group, showed the regression coefficient of -0.204 , with the correlation coefficient of 0.362. These groups showed significant results in temporal treatment but they are half the size of the ones treated by means of medicaments or autogenic training.

The results of the analysis of the change in the subjective assessment of the intensity of the symptoms ob-

TABLE 12
GROUP CLASSIFICATION OF RESULTS WITH LOCALIZATION OF THE SYMPTOMS

Research timing	Group		Localization of the symptoms					Total	χ^2 -test		
			Lips	tongue	mouth	palate	Cheek mucous membrane		χ^2	df	p
Begin- ning	Antide- pressants	n	15	11	2	2		30	17	12	0.15
		hp	50.00%	36.70%	6.70%	6.70%		100.00%			
	Anxiolytic	n	15	14			1	30			
		hp	50.00%	46.70%			3.30%	100.00%			
	Autogenic training	n	17	10			3	30			
		hp	56.70%	33.30%			10.00%	100.00%			
	Control	n	18	11			1	30			
		hp	60.00%	36.70%			3.30%	100.00%			
	Total	n	65	46	2	2	5	120			
		hp	54.20%	38.30%	1.70%	1.70%	4.20%	100.00%			
1 month	Antide- pressants	n	14	11	3	2		30	22.28	12	0.035
		hp	46.70%	36.70%	10.00%	6.70%		100.00%			
	Anxiolytic	n	14	15			1	30			
		hp	46.70%	50.00%			3.30%	100.00%			
	Autogenic training	n	19	8			3	30			
		hp	63.30%	26.70%			10.00%	100.00%			
	Control	n	18	11			1	30			
		hp	60.00%	36.70%			3.30%	100.00%			
	Total	n	65	45	3	2	5	120			
		hp	54.20%	37.50%	2.50%	1.70%	4.20%	100.00%			
2 months	Antide- pressants	n	16	10	3	1		30	18.13	12	0.112
		hp	53.30%	33.30%	10.00%	3.30%		100.00%			
	Anxiolytic	n	15	14			1	30			
		hp	50.00%	46.70%			3.30%	100.00%			
	Autogenic training	n	19	8			3	30			
		hp	63.30%	26.70%			10.00%	100.00%			
	Control	n	18	11			1	30			
		hp	60.00%	36.70%			3.30%	100.00%			
	Control	n	68	43	3	1	5	120			
		hp	56.70%	35.80%	2.50%	0.80%	4.20%	100.00%			
4 months	Antide- pressants	n	14	12	3	1		30	20.35	12	0.061
		hp	46.70%	40.00%	10.00%	3.30%		100.00%			
	Anxiolytic	n	14	15			1	30			
		hp	46.70%	50.00%			3.30%	100.00%			
	Autogenic training	n	20	7			3	30			
		hp	66.70%	23.30%			10.00%	100.00%			
	Control	n	18	11			1	30			
		hp	60.00%	36.70%			3.30%	100.00%			
	Total	n	66	45	3	1	5	120			
		hp	55.00%	37.50%	2.50%	0.80%	4.20%	100.00%			

n – number of cases, hp – horizontal percentage

TABLE 13
DIVISION OF THE RESULTS THE SYMPTOMS DESCRIPTION

Research Time	Sex	Symptoms Description						χ^2 - test			
		Pain	Burning	Numbness	Itch	Swell	Total	χ^2	df	p	
Beginning	Female	n	7	61	10		2	80	43.07	4	<0.001
		hp	8.80%	76.30%	12.50%		2.50%	100.00%			
	Male	n	25	11	3	1		40			
		hp	62.50%	27.50%	7.50%	2.50%		100.00%			
	Total	n	32	72	13	1	2	120			
		hp	26.70%	60.00%	10.80%	0.80%	1.70%	100.00%			
1 month	Female	n	7	58	11		4	80	32.14	4	<0.001
		hp	8.80%	72.50%	13.80%		5.00%	100.00%			
	Male	n	21	15	3	1		40			
		hp	52.50%	37.50%	7.50%	2.50%		100.00%			
	Total	n	28	73	14	1	4	120			
		hp	23.30%	60.80%	11.70%	0.80%	3.30%	100.00%			
2 month	Female	n	5	57	12	3	3	80	37.73	4	<0.001
		hp	6.30%	71.30%	15.00%	3.80%	3.80%	100.00%			
	Male	n	22	16	2			40			
		hp	55.00%	40.00%	5.00%			100.00%			
	Total	n	27	73	14	3	3	120			
		hp	22.50%	60.80%	11.70%	2.50%	2.50%	100.00%			
4 month	Female	n	5	58	8	6	3	80	35.47	4	<0.001
		hp	6.30%	72.50%	10.00%	7.50%	3.80%	100.00%			
	Male	n	21	17	2			40			
		hp	52.50%	42.50%	5.00%			100.00%			
	Total	n	26	75	10	6	3	120			
		hp	21.70%	62.50%	8.30%	5.00%	2.50%	100.00%			

n – number of cases, hp – horizontal percentage

tained by VAS-scale and linear regression model are shown in Table 5 and Figure 3. The results are similar to the ones obtained in the assessment of the frequency of the symptom occurrence. The changes noticed during the four-month treatment are significant in the three groups treated by means of medicaments or psychotherapy. The control group displayed much more insignificant changes.

In the first group of patients (the ones submitted to the antidepressant therapy), the regression coefficient was -1.181 , and correlation coefficient was 0.707 , with significant changes in the subjective assessment of the symptom intensity ($p < 0.001$). In the second group (the ones submitted to anxiolytic therapy) the regression coefficient was 1.128 , and correlation coefficient 0.660 , which indicates a significant change (decrease) in the subjective assessment of the symptom intensity ($p < 0.001$). In the third group, the one treated with autogenic training, the regression coefficient was 1.298 , and the correlation coefficient was 0.742 . Both coefficients are significantly different from a zero ($p < 0.0001$). Autogenic

training seems to have contributed to the decrease in both frequency and intensity, which is here bigger than in other two groups: in every temporal unit (monthly) there was a new decrease in the subjective assessment of the symptom for 1.298 units on the VAS-scale. The fourth, control group, showed the regression coefficient of -0.424 and it was almost four times smaller than in other three groups. However, this too is a statistically significant change ($p < 0.001$). Regression is here accompanied by a statistically significant correlation coefficient of 0.321 ($p < 0.001$).

In the period in which the groups of patients were monitored, salivation quantum was not statistically changed in any of the groups.

What is to be highlighted here is the fact that the coefficient as the index of the part of the explicit variant of the independent variable (assessment of the intensity of the symptom and the frequency of the occurrence of the symptom and subjective assessment of the symptom intensity) by a dependent variable (temporal points of the

TABLE 14
DIVISION OF THE RESULTS THE SYMPTOMS DESTRIPTION AND POSITION OF THE GROUPS

Research Time	Group		Symptom Description					χ^2 - test							
			Pain	Burning	Numbness	Itching	Swell	Total	χ^2	df	p				
Begin- ning	Antide- pressant	n	6	20	3	1		30	14.7	12	0.258				
		hp	20.00%	66.70%	10.00%	3.30%		100.00%							
	anxiolytic	n	11	16	3			30							
		hp	36.70%	53.30%	10.00%			100.00%							
	Autogenic training	n	10	14	4		2	30							
		hp	33.30%	46.70%	13.30%		6.70%	100.00%							
	Control	n	5	22	3			30							
		hp	16.70%	73.30%	10.00%			100.00%							
	Total	n	32	72	13	1	2	120							
		hp	26.70%	60.00%	10.80%	0.80%	1.70%	100.00%							
	1 month	Antide- pressant	n	4	19	5	1	1				30	13.1	12	0.36
			hp	13.30%	63.30%	16.70%	3.30%	3.30%				100.00%			
Anxiolytic		n	10	16	3		1	30							
		hp	33.30%	53.30%	10.00%		3.30%	100.00%							
Autogenic training		n	10	15	3		2	30							
		hp	33.30%	50.00%	10.00%		6.70%	100.00%							
Control		n	4	23	3			30							
		hp	13.30%	76.70%	10.00%			100.00%							
Total		n	28	73	14	1	4	120							
		hp	23.30%	60.80%	11.70%	0.80%	3.30%	100.00%							
2 months		Antide- pressant	n	4	17	6	3		30	22.25	12	0.035			
			hp	13.30%	56.70%	20.00%	10.00%		100.00%						
	Anxiolytic	n	10	16	3		1	30							
		hp	33.30%	53.30%	10.00%		3.30%	100.00%							
	Autogenic training	n	9	16	3		2	30							
		hp	30.00%	53.30%	10.00%		6.70%	100.00%							
	Control	n	4	24	2			30							
		hp	13.30%	80.00%	6.70%			100.00%							
	Total	n	27	73	14	3	3	120							
		hp	22.50%	60.80%	11.70%	2.50%	2.50%	100.00%							
	4 months	Antide- presiv	n	3	19	3	5		30				25.13	12	0.014
			hp	10.00%	63.30%	10.00%	16.70%		100.00%						
Anxiolytic		n	10	16	3		1	30							
		hp	33.30%	53.30%	10.00%		3.30%	100.00%							
Autogenic training		n	9	15	3	1	2	30							
		hp	30.00%	50.00%	10.00%	3.30%	6.70%	100.00%							
Control		n	4	25	1			30							
		hp	13.30%	83.30%	3.30%			100.00%							
Total		n	26	75	10	6	3	120							
		hp	21.70%	62.50%	8.30%	5.00%	2.50%	100.00%							

n – number of cases, hp – horizontal percentage

TABLE 15
POSITION OF THE GROUPS RELATIONS WITH EVALUATION OF INTENSITY OF SYMPTOMS

Research periods	Group		Evaluation of intensity of symptoms					χ^2 – test			
			NA	Low	Medium	Heavy	Unbearable	Total	χ^2	df	p
Beginning	Antidepressants	n		6	2	10	12	30	27.86	9	0.001
		hp		20.00%	6.70%	33.30%	40.00%	100.00%			
	Anxiolytic	n		1	5	14	10	30			
		hp		3.30%	16.70%	46.70%	33.30%	100.00%			
	Autogenic training	n		1	2	11	16	30			
		hp		3.30%	6.70%	36.70%	53.30%	100.00%			
	Control	n		11	7	8	4	30			
		hp		36.70%	23.30%	26.70%	13.30%	100.00%			
	Total	n		19	16	43	42	120			
		hp		15.80%	13.30%	35.80%	35.00%	100.00%			
1 month	Antidepressants	n	1	8	10	7	4	30	6.349	12	0.897
		hp	3.30%	26.70%	33.30%	23.30%	13.30%	100.00%			
	Anxiolytic	n	1	5	15	7	2	30			
		hp	3.30%	16.70%	50.00%	23.30%	6.70%	100.00%			
	Autogenic training	n		5	15	7	3	30			
		hp		16.70%	50.00%	23.30%	10.00%	100.00%			
	Control	n	1	10	10	6	3	30			
		hp	3.30%	33.30%	33.30%	20.00%	10.00%	100.00%			
	Total	n	3	28	50	27	12	120			
		hp	2.50%	23.30%	41.70%	22.50%	10.00%	100.00%			
2 months	Antidepressants	n	4	10	11	4	1	30	8.836	12	0.717
		hp	13.30%	33.30%	36.70%	13.30%	3.30%	100.00%			
	Anxiolytic	n	5	12	8	5		30			
		hp	16.70%	40.00%	26.70%	16.70%		100.00%			
	Autogenic training	n	4	14	7	5		30			
		hp	13.30%	46.70%	23.30%	16.70%		100.00%			
	Control	n	4	10	7	6	3	30			
		hp	13.30%	33.30%	23.30%	20.00%	10.00%	100.00%			
	Total	n	17	46	33	20	4	120			
		hp	14.20%	38.30%	27.50%	16.70%	3.30%	100.00%			
4 months	Antidepressants	n	14	5	9	2		30	30.53	12	0.002
		hp	46.70%	16.70%	30.00%	6.70%		100.00%			
	Anxiolytic	n	13	11		5	1	30			
		hp	43.30%	36.70%		16.70%	3.30%	100.00%			
	Autogenic training	n	16	7	7			30			
		hp	53.30%	23.30%	23.30%			100.00%			
	Control	n	5	11	5	6	3	30			
		hp	16.70%	36.70%	16.70%	20.00%	10.00%	100.00%			
	Total	n	48	34	21	13	4	120			
		hp	40.00%	28.30%	17.50%	10.80%	3.30%	100.00%			

n – number of cases, hp – horizontal percentage

therapy) was the biggest in the group submitted to autogenic training – somewhat above 50%. These coefficients are high in the case of the groups treated by medications – between 40 and 50% as far as the assessment of the frequency of the symptom is concerned; as far as the subjective assessment of the symptom intensity is concerned, they are between 30.7% and 35.7%. The control group had much lower coefficients (around 10% lower), which again pinpoints the effects of the applied therapies.

Discussion

After having investigated the assessment of symptom intensity and frequency, and having applied the VAS-scale, conducting this research found out that the majority of cases were described as primarily *unbearable*, and this assessment was followed by *severe*, *moderate*, and *bearable*.

Anneroth and Bergdahl^{4–6} also reported that the majority of the patients they tested declared their burning sensation as being unbearable.

Gruden et al.¹³ established that the burning sensation in the mouth is mostly unbearable.

Browning et al.⁹ concluded that a person suffering from stomatopyrosis whose cause is of a psychogenous nature declares his sensation to be unbearable, too.

Grushka et al.^{15,16} established that the presence of the burning sensation in the oral cavity is in the majority of cases reported as unbearable, which is in accordance with the outcomes of our research.

The majority of authors other than the quoted ones in their research state that persons suffering from stomatopyrosis, the cause of which is of a psychogenous nature, in the majority of cases declare their symptoms to be unbearable.

As far as frequency of the symptom is concerned, at the beginning of the investigation, 36.7–76.7% of the patients while assessing the frequency of the symptom described it with the term *often*, while 23.3–63.3% of the patients assessed the frequency of occurrence as *continuous*. As an answer, *rarely* was present in a very small percentage.

Grushka et al.^{15,16} obtained the results which said that their patients assessed their stomatopyrosis as being *continuous*.

Gruden et al.¹³ established that the burning sensation in the oral cavity is primarily of a *continuous* character.

Browning et al.⁹ established in their research that persons suffering from stomatopyrosis claim their symptom to be *continuous*.

Domb and Chole¹² revealed the incidence of canerophobia with persons suffering from stomatopyrosis

and established that the burning sensation in the mouth is of a *continuous* character.

During the treatment, our patients gradually started to change their assessment and the term *often* when referring to the occurrence of the symptom gradually changed and turned into *very rarely*. The control group didn't show any statistically significant difference, so the term *often* remained during the monitored period, which is rather indicative as far as the efficiency of the treatment is concerned.

Visual analogous scale shows the assessment of symptom intensity by patients themselves, who mark the value of the sensation on the scale ranging from 0–10 cm. The results show that the subjective assessment of the symptom is on average 6.93–7.8 cm, which indicates a high level of burning sensation. Some other authors who had been using the same method, for instance

Anneroth and Bergdahl^{4–6} came to similar outcomes: they recorded the mean value on the VAS-scale of 8 cm, which is analogous to our results.

Gruden et al.¹³ showed that the intensity of burning sensation is rather high (8cm).

Dobrenić et al.^{10,11} confirmed in our research that the burning sensation is of a rather high percentage as far as its intensity expressed on the VAS-scale is concerned.

During the treatment process, this assessment gradually decreases to 2.13 to 3 cm as far as bearability is concerned, even in the control group, which may be assigned to the placebo effect.

This method (VAS-scale) has been proven in our research as a unique and very useful method of objectivization of the assessment of a subjective symptom – in our case, the burning sensation in the oral cavity – stomatopyrosis.

Conclusion

Comorbidity of stomatopyrosis with anxiety and depressive phenomena proves, among other factors, a psychogenic etiology of the disease.

Antidepressants and anxiolytics have an important role in the treatment of stomatopyrosis. A subjective assessment of the symptom intensity has been gradually decreased. At the beginning of the therapy 36.7%–76.7% of the patients claimed their symptoms to be frequent (term *often*), and 23.3%–63.3% of them said that their symptom was *continuous*. At the end of the treatment, the most common grade assessing the frequency of the symptom was: *rarely*.

Autogenic training – a psychotherapeutic anxiolytic technique is the therapy of choice as far as stomatopyrosis is concerned, functioning both as a means of elimination of the disturbances within the oral cavity and of emotional rehabilitation of the patient.

REFERENCES

- 1 CHEVALIER J, GHEERBRANT A, The symbols of the words. (NZMH Mladost, Zagreb, 1994). — 2. BASKET RM, STRUDE DW, DAVERPORT JC, Br Dent J, 145 (1987) 9. — 3. BASKET RM, MAIN DMG, Br Dent J, 154 (1983) 206. — 4. BERGDAHL J, ANNEROTH G, PERRIS H, J Oral Med, 24 (1995) 312. — 5. BERGDAHL J, ANNEROTH G, Journal Pathol Med, 22 (1988) 433. — 6. BERGDAHL J, ANNEROTH G, PARRIS A, Acta Odon Scand, 52 (1994) 116. — 7. BORAS VUKIČEVIĆ V, The analysis of salivary and blood parameters in patients suffering from the burning mouth syndrome and xerostomia. (Stomatološki fakultet, Zagreb, 2001). — 8. BROOKE R, SEGANSKI DP, J Can Dent Assoc, 10 (1977) 504. — 9. BROWING S, HISLOP S, SCULLY C, SHIRLAW P, Oral Surg, Oral Med, Oral Pathol, 64 (1987) 171. — 10. DOBRENIĆ M, VIDAS I, STIPETIĆ M, Acta Stom Croat, 19 (1985) 41. — 11. DOBRENIĆ M, CEKIĆ-ARAMBAŠIN A, VIDAS I, Acta Stom Croat, 18 (1984) 217. — 12. DOMB GH, CHOLE RA, Ear Throat, 60 (1981) 310. — 13. GRUDEN-POKUPEC JS, ARAMBAŠIN-CEKIĆ A, GRUDEN V, Coll Antrop 43 (2002) 119. — 14. GRUSHKA M, Oral Surg, Oral Med, Oral Pathol, 28 (1987) 130. — 15. GRUSHKA M, SESSLE BJ, MILLER A, Pain, 28 (1987) 155. — 16. GRUSHKA M, Out Dent, 60 (1983) 56. — 17. DOBRENIĆ M, VIDAS I, STIPETIĆ M, Acta Stom Croat, 19 (1985) 41. — 18. DOBRENIĆ M, CEKIĆ-ARAMBAŠIN A, VIDAS I, Acta Stom Croat, 18 (1984) 217. — 19. EPSTEIN H, J Clin Perio, 40 (1985) 978. — 20. HAM G, VIK-KULA J, YLIPAAVALUIEN P, ADLGERT V, Int J Oral Max Surg, 16 (1987) 402. — 21. HAMMEREN M, HUDOSON A, Swed Dent J, 13 (1989) 77. — 22. HANEKE E, ERLANGER J, Dtsch Zahnart Z, 40 (1985) 104. — 23. JAMES J, FERGUSON MM, FORSYTH A, Tr Den. J, 159 (1985) 392. — 24. JERLANG BB, J Oral Pathol Med 26 (1997) 249. — 25. KALTZ J, BENILIER R, LEVINER E, Oral Surg, Oral Med, Oral Pathol, 62 (1986) 152. — 26. LAMB AB, LAMEY PJ, REEVE PF, Br Dent J, 165 (1988) 256. — 27. LAMEY PJ, LAMB AB, FORTHY A, Cont Derm, 17 (1987) 242. — 28. LAMEY P, LAMB AB, Br Med, 296 (1988) 1243. — 29. LAMEY PJ, LAMB AB, Oral Surg, Oral Med, Oral Pathol, 63 (1987) 664. — 30. LAMEY PJ, LAMB AB, Oral Surg, Oral Med, Oral Pathol, 67 (1989) 390. — 3.1 MALAN DH, OSIMO F, Butterworth-Heinemann Ltd. Oxford, 1994. — 32. VIDAS I, A Contribution to getting acquainted with the changes in the oral mucosa with women in a postmenopausal period (dissertation). (School of Dental Medicine, Zagreb, 1982). — 33. PORO A, Encyclopedia psychiatrist. (Pres Univer de France, Paris 1984). — 34. INGLEŠ HB, INGLEŠ AČ, Psychology and psychoanalysis conceptions. (Prosvjeta, Zagreb, 1972). — 35. BRODY HB, J, PRENDERGAST J, SILVERMAN S, Oral Surg, Oral Med, Oral Pathol, 31 (1971) 777. — 36. GRUDEN V, Autogenous Training (Training to the time of the happiness). (Erudit, Zagreb, 1996).

J.-S. Gruden Pokupec

Stomatological Polyclinic, Perkovičeva 3, Zagreb, Croatia

REGRESIJSKA ANALIZA SIMPTOMA

SAŽETAK

Stomatopiroza ili sindrom 'gorećih usta', je u užem smislu riječi stanje koje karakterizira osjećaj žarenja i pečenja u ustima unatoč normalnoj sluznici. Ovo istraživanje usmjereno je na liječenje stomatopiroze s naglaskom na primjenu psihofarmaka i psihoterapije. Cilj rada je bio ispitati utjecaj antidepresiva, anksiolitika i autogenog treninga na simptome stomatopiroze. Ispitivanje smo provodili na ukupno 120 ispitanika sa simptomima stomatopiroze. Ispitanici su bili podijeljeni u dvije podjednake skupine od po 30 osoba. Svi su ispitanici liječeni lokalnom standardnom terapijom. Prva je skupina, pored toga, dobivala antidepresive, druga anksiolitike, treća je liječena autogenim treningom, a četvrta je bila kontrolna skupina. Svi su bolesnici ispitani klinički i uz pomoć psiholoških testova za depresiju i anksioznost prije početka liječenja, a isto ispitivanje se dalje provodilo nakon mjesec dana, dva mjeseca i nakon četiri mjeseca liječenja. Podaci su nakon toga statistički obrađeni. Iz našega istraživanja smo zaključili da se kod stomatopiroze radi o osobama starije životne dobi, pretežno ženskoga spola. Većina ispitanika su službenici; na drugom mjestu po učestalosti zanimanja su umirovljenici. Pečenje u ustima je bilo prisutno kod svih ispitanika; najčešće je lokalizirano na usnama, po intenzitetu uglavnom nepodnošljivo. Napetost i stres pojačavaju simptome. Na vizualnoj analognoj skali (VAS skala) subjektivna procjena simptoma iznosi 7–8 cm, što je visoka razina pečenja. Kvantum salivacije pokazuje u našem istraživanju lagano smanjenje količine sline, a nakon liječenja dolazi do normalizacije. Osim kliničkog ispitivanja stomatopiroze, primijenjeni su: upitnik depresije i upitnik anksioznosti. Tijekom terapije, rezultati testa depresije pokazuju smanjivanje depresije (od 56,7% do 0,0%), što je najviše zapaženo u skupini koja je liječena autogenim treningom I u prvoj skupini bolesnika, koja je liječena antidepresivima. Test anksioznosti pokazuje veći postotak I intenzitet anksioznosti kod muškaraca (62,5%) nego li kod žena (32,5%), što se smanjuje tijekom liječenja kod muškaraca na 7,5%, odnosno na 8,8% kod žena. Došlo je do vidnog poboljšanja kliničke slike stomatopiroze. Poboljšanje kliničkih simptoma kao i psihičkog stanja statistički je bilo značajno. Na osnovi našeg istraživanja zaključujemo: komorbiditet stomatopiroze s anksioznim i depresivnim pojavama dokazuje, uz ostale faktore, i psihogenu etiologiju te bolesti. Daljnja bi istraživanja trebala dati odgovor na pitanje je li kod stomatopiroze riječ o psihosomatskom ili konverzivnom poremećaju. Autogeni trening – psihoterapijska anksiolitička tehnika – jest terapija izbora za stomatopirozu, kako u otklanjanju smetnji u ustima, tako i u emocionalnoj rehabilitaciji bolesnika.