

Stress control as a method to reduce perceived pain in oral lichen planus

Michalina Szymczak-Paluch, Sebastian Kłosek

Department of Oral Pathology, Medical University of Lodz, Lodz, Poland

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Abstract

Introduction: Oral lichen planus (OLP) is a common chronic, T-cell-mediated, inflammatory and non-infectious mucodermatosis. Patients diagnosed with oral lichen planus are more prone to depression, anxiety and higher perceived mental stress than the rest of the population.

Aim: This study investigated stress control methods as a means of reducing pain levels in patients with oral lichen planus.

Material and methods: The study involved 62 adult oral lichen planus patients who have never received any OLP treatment before. Patients with a high level of perceived mental stress received, in addition to standard pharmacological treatment, herbal sedative medication or Jacobson's Progressive Muscle Relaxation guidance (JPMR), and the patients without a high level of perceived mental stress level did not receive any additional stress control methods. The research tool was the PSS questionnaire and NRS pain level scale.

Results: Before the treatment, the level of perceived pain did not differ in any of analysed groups. After the treatment, in the group not using any stress control methods, the mean NRS level was significantly higher than in the group performing Jacobson's Progressive Muscle Relaxation (2.79 ± 1.76 vs. 1.08 ± 1.29), and also significantly higher than in the group receiving the herbal sedative (2.79 ± 1.76 vs. 1.41 ± 2.06).

Conclusions: The use of mental stress control methods as an additional element of therapy has a positive effect on the success of oral lichen planus treatment since it helps to reduce the perceived pain level in the oral mucosa better than a standard pharmacological therapy alone.

Key words: oral lichen planus, PSS, NRS, Jacobson's Progressive Muscle Relaxation, stress control methods.

Introduction

Oral lichen planus (OLP) is a chronic mucocutaneous disease whose incidence in the general population varies between 0.5% and 3%. The disease is T-cell-mediated autoimmune, inflammatory and non-infectious, the symptoms may be diagnosed both on skin and mucous membranes [1, 2].

The disease may occur mostly in middle-aged adults (twice as often in women than men), but it may also be diagnosed in younger adults and very rarely in children [3].

In the etiopathogenesis of lichen planus, attention is drawn to the association with such systemic diseases as diabetes and liver diseases. In recent years, increased attention has been paid to the link between the occurrence of oral lichen planus and psychological stress, as well as the increased level of anxiety and depression [4].

Patients with oral lichen planus are more prone to depression, anxiety and higher perceived mental stress than the rest of the population. Autoimmune reactions caused by development of oral lichen planus may be initiated by the influence of chronically increased psychological stress. Many other diseases and pathological lesions observed in the oral cavity and in the head and neck area may have psychosomatic background, i.e. recurrent aphthous stomatitis (RAS), burning mouth syndrome (BMS), decreased or increased salivation, bruxism, dysgeusia, recurrent herpes, erythema multiforme, pemphigoid and self-inflicted injuries [5].

The spectrum of autoimmune diseases may be modified by increased levels of anxiety, stress and depression. Both, the first appearance of oral lichen planus and exacerbation of the disease may be associated with increased levels of mental stress [6].

Address for correspondence: Sebastian Kłosek, Department of Oral Pathology, Medical University of Lodz, 251 Pomorska St, 92-213 Lodz, Poland, e-mail: sebastian.klosek@umed.lodz.pl

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Material and methods

The study protocol was approved by the Bioethical Committee of the Medical University of Lodz in May 2015 (approval no. RNN/149/15/KE).

The study covered 62 adult patients at the age of 26 to 81 years who were diagnosed clinically and confirmed histopathologically with oral lichen planus, but have never been treated before.

The exclusion criteria were patients with active neoplastic disease, cancer in the past, pregnant women or women planning pregnancy, as well as nursing mothers and patients with hypersensitivity to herbs.

Clinical trials were conducted in three groups. All patients were treated according to the standard treatment protocol. The patients suffering from the influence of chronic mental stress (determined on the basis of a clinical interview and a questionnaire survey) were qualified into two study groups. The first test group additionally performed Jacobson’s Progressive Muscle Relaxation (JPMR), and the second test group received a herbal sedative containing a lemon balm leaf extract, peppermint leaf extract and valerian root extract. The third group (control group) comprised patients with low levels of perceived mental stress (determined on the basis of a clinical interview and a questionnaire survey). In the control group the treatment was limited to the standard pharmacological treatment without introducing additional methods of mental stress control.

The level of perceived mental stress was accessed with the use of Perceived Stress Scale (PSS) by Cohen S., Kamarck T., and Mermelstein R., in which higher scores suggested a greater intensity of perceived mental stress. Questionnaires were completed by patients at the first and last follow-up visit. The results allowed to distinguish groups of patients with and without stress.

The perceived oral mucosa pain level experienced by oral lichen planus patients was also analysed. In order to determine the level of pain experienced by the patients, the NRS scale (numerical rating scale) was used. Patients were asked about their pain levels at each follow-up visit [7, 8]. Two weeks after the initiation of pharmacological treatment (in all three groups) and in the study groups after additional implementation of mental stress control methods, patients reported for a follow-up visit. The aim of these visits was a comparative analysis of the condition of the oral mucosa and pain level after the phar-

macological treatment and application of stress control methods in the test groups. The follow-up visits took place every month.

Statistical analysis

The data were analysed with Statistica 13 software using the Mann-Whitney *U* test ($p < 0.05$).

Results

Before the treatment, no statistically significant difference was found between the mean NRS scores obtained in the group of patients with increased and low levels of perceived mental stress ($p > 0.05$). The mean level of perceived pain among the patients with increased levels of mental stress was only slightly higher than in the group with low levels of stress. In the group with an increased level of mental stress, the level of pain varied from 0 to 8, the mean was 5.42 ± 2.09 . Similarly, in the group with a low level of stress, the level of pain varied from 0 to 8, the average was 4.29 ± 2.37 (Table 1).

Comparison of the NRS scores before and after the treatment in all groups showed statistically significant differences, as the means decreased significantly in each analysed group (Table 2).

There was no statistically significant difference in the mean NRS between the groups using different stress control methods ($p > 0.05$). The averages in these groups turned out to be quite similar. On the other hand, a statistically significant difference was found between the group performing Jacobson’s Progressive Muscle Relaxation and not using any stress control methods ($p < 0.01$), as well as between the group using herbal sedative and not using any stress control methods ($p < 0.05$). In the group not using any stress control methods, the mean NRS level after the treatment was significantly higher than in the group performing Jacobson’s Progressive Muscle Relaxation (2.79 ± 1.76 vs. 1.08 ± 1.29), and also significantly higher than in the group receiving the herbal sedative (2.79 ± 1.76 vs. 1.41 ± 2.06) (Table 3).

As a result of the treatment, the levels of perceived stress in both test groups showed a statistically significant difference.

In the group that performed Jacobson’s Progressive Muscle Relaxation, before the treatment, the average scores of the stress level were seen in 42.3% of patients,

Table 1. NRS levels before the treatment.

Group	NRS level					
	Min.	Max.	X	Me	SD	V (%)
With stress	0	8	5.42	6.0	2.09	38.6
Without stress	0	8	4.29	4.5	2.37	55.2

$Z = 1.667; p = 0.096$

NRS – numerical rating scale.

Table 2. NRS levels before and after the treatment

Group	NRS level						z test	P-value
	Before the treatment			After the treatment				
	x	Me	SD	x	Me	SD		
Stress + JPMR	5.54	6.0	2.30	1.08	0.5	1.29	4.286	< 0.0001
Stress + sedative	5.27	5.0	1.86	1.41	1.0	2.06	3.928	0.0001
Without stress	4.29	4.5	2.37	2.79	3.0	1.76	2.934	0.0033

NRS – numerical rating scale, JPMR – Jacobson's Progressive Muscle Relaxation.

Table 3. NRS levels after the treatment

Group	NRS level after the treatment					
	Min.	Max.	x	Me	SD	V (%)
Stress + JPMR	0	4	1.08	0.5	1.29	120.1
Stress + sedative	0	9	1.41	1.0	2.06	146.4
Without stress	0	5	2.79	3.0	1.76	63.2

NRS – numerical rating scale, JPMR – Jacobson's Progressive Muscle Relaxation.

while 57.7% of patients achieved high scores. After the treatment, more than half of the respondents from this group had low levels of stress (53.8%), every third respondent had an average level of stress (30.8%), and in 15.4% of the respondents the result remained high. The difference in the results before and after treatment was statistically significant ($p < 0.001$).

In the group receiving herbal sedative, before the treatment, the average scores of the stress level were seen in 31.8% of patients and more than 2/3 of patients had high scores (68.2%). There was a statistically significant change after the treatment ($p < 0.05$). 22.7% of the respondents from this group obtained low scores of the stress level, more than half of the respondents had an average result (54.6%), while 22.7% of patients had high scores.

In the control group, no statistically significant difference was found in the level of perceived mental stress before and after the treatment ($p > 0.05$).

Discussion

Determining the level of perceived pain is very subjective. Despite having many tools in the form of various scales, there is a risk of misinterpretation of symptom intensity. Additionally, medications, chronic diseases and stress can modify perception and interpretation of pain intensity [9, 10]. Location of oral lichen planus lesions on the surface of oral mucosa presents further difficulties. A higher perception of pain may be caused by different factors such as repeated mechanical and chemical irritation of the area [11].

In the research, before the treatment, no statistically significant difference was found between the level of perceived pain reported by the patients both in the

group with increased and low levels of perceived mental stress. Nevertheless, among patients with increased levels of stress, the average level of reported pain was higher than that declared by patients with low levels of perceived stress.

Similar results were obtained by Mahmoud [12] who noticed that the level of pain measured using the VAS scale was statistically higher among people with high levels of stress, anxiety and depression compared to the other study groups, and statistically significantly higher in patients with moderate levels of the factors studied compared to the group with low stress levels.

Gupta *et al.* [13] added that pain and discomfort associated with cutaneous LP and OLP may additionally induce anxiety in these patients and they emphasized the role of corticosteroids in the treatment of lichen planus due to their discomfort-reducing effect.

Mehdipour *et al.* [14] noted that patients with OLP have a greater tendency to feel anger and do not know how to express it. OLP patients had higher levels of perceived anger compared to healthy people and experienced greater pain and suppressed anger, leading to increased emotional tension.

Adamo *et al.* [15] noticed higher levels of anxiety and depression in patients suffering from symptomatic OLP and BMS (burning mouth syndrome) compared to patients with asymptomatic OLP and healthy patients. Pain, measured by the NRS scale, was elevated and at the same level in symptomatic OLP and BMS. The mood disorders may modulate perception of intraoral symptoms in a subset of patients with reticular OLP, and may enhance peripheral neuropathy; in turn, peripheral neuropathy through the access of proinflammatory cytokines may worsen the psychological profile and cause chronic

symptoms. Researchers also suggest including screening for mood disorders in patients with OLP.

Zucoloto *et al.* [16] noted that both patients suffering from OLP and those with lichenoid lesions (OLL) had statistically higher diagnosed levels of mental stress and anxiety, which correlated with the severity of clinical symptoms, e.g. the level of pain. The authors suggest that greater severity of OLP and OLL symptoms may be associated with an increased level of anxiety.

Radwan-Oczko *et al.* [17] noticed that the level of perceived mental stress was associated with the deterioration of the patients' quality of life, but there was no correlation between psychological factors and extension of the duration and exacerbation of the disease course. Moreover, patients who had problems with coping with pain had a greater predisposition to depression, which had an impact on the exacerbation of the disease.

Lopez-Jornet *et al.* [18] noticed that patients suffering from the atrophic-erosive type of OLP felt more severe pain than in other types of OLP. An association was found between increased levels of anxiety in patients with OLP, but no association was found between anxiety and various clinical forms of OLP.

In our own research, we used Jacobson's Progressive Muscular Relaxation (JPMR), the purpose of which is gradual muscle relaxation, which is also expected to reduce the level of perceived mental stress and anxiety. Its ease of use, low cost and a small number of contraindications make it a good alternative to other methods of reducing mental stress [19].

Both, regular relaxation exercises as well as taking the prescribed herbal sedative medication had beneficial results in lowering the level of perceived stress. Performing exercises requires patient's discipline and regularity, which in many cases may lead to discouragement and failure, especially in long-lasting therapy. Nevertheless, satisfactory results were obtained in both study groups using additional methods of stress control. The appearance of higher scores in the level of perceived stress in the control group does not indicate improperly conducted therapy. Due to the time needed to conduct the entire study, the life situation of patients could have changed. Therefore, the diagnosis of the level of perceived mental stress during OLP therapy should be considered not only during the first examination of the patient, but also during the therapy, especially if it is limited only to standard procedures and does not bring the intended results.

Unfortunately, despite the availability of modern medicaments, the effects of treatment of OLP are still unsatisfactory. These are the reason for the search for new methods of treatment and support for standard pharmacological treatment and conducting this study [20, 21].

The level of perceived pain of the oral mucosa after treatment decreased significantly in all analysed groups. However, after the treatment, no statistically significant differences were found between groups using additional

stress control methods. This means that regardless of the choice of the stress control method, the effect after the treatment was similar. Nevertheless, a statistically significant difference was discovered between the two groups using additional stress control methods and the group using only pharmacological treatment. The level of pain experienced by patients after the treatment was significantly lower in both groups using additional methods of stress control as well as a better analgesic effect than pharmacotherapy alone.

Kalkur *et al.* [22] also noted the role of psychotherapy in the treatment of OLP. For its purposes, they included, among others: pro-health education aimed at eliminating harmful habits and addictions as well as oncological vigilance.

Delavarian *et al.* [23] noticed that a combination of standard OLP treatment with psychotherapy resulted in much better clinical outcomes than using standard treatment only.

The use of herbal oral preparations may be useful in the treatment of lichen planus. Some herbs that have a calming effect may be useful in controlling stress and anxiety [24].

As there is an increased level of perceived mental stress in patients suffering from OLP, the use of an additional stress reduction method is very promising.

Shahinfar *et al.* [25] noted that the use of a valerian root extract reduced anxiety and suggested that it could be an alternative to conventional premedication.

The diagnosis of the level of mental stress, as an additional study of risk factors for the development and modification of the course of OLP, is a useful tool for more effective therapy for dentists, otolaryngologists and dermatologists.

Conclusions

The diagnosis of the level of mental stress during the treatment of OLP may be very helpful at the beginning and during the treatment. Use of mental stress control methods as an additional element of therapy has a positive effect on success of oral lichen planus treatment, since it helps to reduce perceived pain in the oral cavity. Nevertheless, cooperation between the patient and the doctor during the treatment of oral lichen planus is essential for the satisfactory results of the therapy.

Conflict of interest

The authors declare no conflict of interest.

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