

## General procedures for treating myofascial pain syndrome with therapeutic exercises and massage

Valerii Yur

Master

Vinnitsia Social and Economic Institute of the University "Ukraine"  
21036, 6 Dmytro Maiboroda Str., Vinnitsia, Ukraine  
<https://orcid.org/0009-0002-8243-8462>

Oleksandr Lebediev\*

Lecturer

Vinnitsia Social and Economic Institute of the University "Ukraine"  
21036, 6 Dmytro Maiboroda Str., Vinnitsia, Ukraine  
<https://orcid.org/0009-0002-9079-1813>

**Abstract.** The purpose of the study was to determine the effectiveness of massage and therapeutic exercises for patients with myofascial pain syndrome. The study compared the results of a survey of patients before, during, and after treatment with massage, therapeutic exercises, and a combination of both. Pain characteristics were evaluated on an 11-point scale and functional performance on a 5-point scale. In the course of the study, it was found that the effectiveness of various methods of therapy for myofascial pain syndrome of the trapezius muscle was high. All patients successfully completed the full course of treatment, which demonstrated a significant reduction in pain and improvement in functional activity. The best results were demonstrated by the group that received combined treatment with massage and therapeutic exercises. In patients in this group, positive changes were observed as early as on Day 5 of therapy, while in the group with only massage, relief occurred on Day 6 and Day 7. Patients who had been treated with therapeutic exercises alone began to experience significant improvements towards the end of the course. According to statistics, pain in most patients after treatment decreased to 1-2 points on an 11-point scale. The highest effectiveness was demonstrated by the combined treatment group, in which pain decreased by an average of 5.55 points, and 85% of patients reported only minor pain. In the massage-only group, 75% of patients reported a reduction in pain levels to 1-2 points on an 11-point scale. In the therapeutic exercises group, pain decreased in 65% of patients, but the recovery process was slower. None of the patients reported pain of 7-8 points after the treatment. Overall results showed that a combination of massage and therapeutic exercises is the most effective method for reducing pain and restoring functional activity

**Keywords:** trigger points; physical rehabilitation; manual therapy; musculoskeletal manipulation; muscle relaxation

### INTRODUCTION

Myofascial pain syndrome (MFS) is a common condition that is accompanied by chronic pain in the muscles and fascia. This disorder is a common cause of disability and significantly reduces the quality of life of patients. Given that most treatments have a temporary effect, it is important to find optimal therapeutic approaches that would not only relieve symptoms, but also help to restore muscle function. Therapeutic exercises and massage are among the most common non-drug methods used in the treatment of MPS. Their popularity is conditioned by their availability, minimal health risks, and the possibility of long-term use.

The problematic issues of the study were determining the effectiveness of therapeutic exercises, massage, and their combination for the treatment of MPS, and comparing them. The rate of onset of pain relief with the treatment methods under study.

Z. Ostapyak *et al.* [1] compared electroneuromyographic parameters in patients with MPS on the background of multiple sclerosis under the influence of various physical therapy methods. 105 patients were examined with a course of reflexology, muscle stretching exercises, and massage. The results of tests after therapy in patients of the

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\*Corresponding author



experimental group showed a significant improvement in indicators, especially after reflexology with stretching. The use of reflexology in combination with stretching helped reduce muscle spasms and pain in patients with MPS in multiple sclerosis. O. Yaroshevskiy [2] considered the problem of the spread of MPS among young people with cervical-brachial localisation. The researcher evaluated the effectiveness of non-drug methods of therapy. Patients were divided into two groups: manual therapy, a combination of manual therapy with acupuncture. The combination of the two methods showed better results in reducing pain, emotional disorders, and autonomic dysfunctions.

The effectiveness of manual therapy in the treatment of MPS was assessed in a systematic review of L.A. de Melo *et al.* [3]. Of the five selected studies, 156 patients received manual therapy. It was found that this method was better than no treatment, and exceeded counselling. The study by F. Eslamian *et al.* [4] compared the effectiveness of electroacupuncture and biofeedback in the treatment of cervical MPS. The study included 50 patients with chronic neck pain. Specifically, 80% of patients in the electroacupuncture group achieved significant improvement, compared to 40% in the biofeedback group.

The effect of physical therapy on MPS in the neck and shoulder area was assessed in the meta-analysis by C.-M. Kim & J.W. Park [5]. The results showed that combined treatment with physical therapy and exercise showed the highest average degree of effect. The greatest effect was observed in the treatment groups lasting from 16 to 30 days or consisting of 6-10 sessions. Physical therapy and therapeutic exercises significantly reduced the manifestations of MPS. R.D. Gerwin [6] evaluated the treatment of musculoskeletal dysfunctions using evidence-based medicine. The effects of dry acupuncture on trigger points and the use of exercise to reduce myofascial pain were considered. The results confirmed that acupuncture and exercise are effective treatments for MPS.

Objective analysis performed by M.J. Guzmán-Pavón *et al.* [7] investigated the effect of exercise programmes on dysfunctions associated with myofascial trigger points. The effectiveness of the programmes in reducing pain intensity, increasing the pressure pain threshold, and

improving range of motion was determined. Exercise has been effective in relieving pain and improving motor function in patients with MPS. Diagnostic criteria for myofascial trigger points used in physical therapy interventions were investigated in a systematic review by L. Li *et al.* [8]. The researchers found that the most common criteria were a combination of “pinpoint pain”, “reflected pain”, and “local contraction response”. The study revealed significant variability in the diagnosis of myofascial trigger points, and a lack of transparency in reports on diagnostic criteria. The study by M. Rahbar *et al.* [9] compared the effectiveness of shock wave therapy and standard treatment for neck and upper back MPS. Both methods significantly reduced pain and disability during the first week of treatment compared to the control group. However, after four weeks, shock wave therapy showed better results in reducing pain intensity. This suggests that shock wave therapy was more effective in the long run.

The main gaps in these studies in the treatment of MPS are the lack of standardisation of diagnostic and therapeutic methods, which makes it difficult to compare the results and limits their applicability. Many studies did not consider the long-term effects of treatment, and the individual characteristics of patients, including psychoemotional state and level of physical activity. In addition, the choice of methods is often limited and possible side effects are not sufficiently analysed, which requires a more comprehensive approach to research and treatment. The purpose of the study was to determine the effectiveness of therapeutic exercises, massage, and their combination in MPS.

## ✦ MATERIALS AND METHODS

The study was based on investigating the effectiveness of various treatments for MPS in patients who worked at a computer for at least 6 hours a day. The study involved 60 patients aged 18 to 40 years who had complaints of chronic trapezius muscle pain lasting more than three months (Table 1). Patients were randomly assigned to three groups: the first group (20 patients) received only massage, the second group (20 patients) received therapeutic exercises, and the third group (20 patients) received combined treatment, which included both therapeutic exercises and massage.

**Table 1.** Distribution of patients with MPS by study groups and demographics

Category	Massage group	Therapeutic exercises group	Therapeutic exercises + massage group	Total
Total patients, n	20	20	20	60
<b>Age, n</b>				
18-20 years old	7	5	6	18
21-30 years old	5	6	7	18
31-40 years old	8	9	7	24
<b>Gender, n</b>				
Men	8	10	9	27
Women	12	10	11	33
<b>Nature of pain on an 11-point scale (points)</b>				
5-6	13	14	12	39
7-8	7	6	8	21
Functional performance, average value for all groups (points)	0.5			-

**Source:** compiled by the authors

Prior to the start of the study, all participants signed informed consent to participate in accordance with the Declaration of Helsinki of 1964 and its subsequent amendments [10]. All participants were pre-selected based on inclusion criteria. Only patients with active MPS in the trapezoid region (right, left, or both) with symptoms lasting more than three months were allowed to participate in the study. Patients had at least two signs of limited range of motion: flexion, extension, or lateral flexion below normal (45°). Men and women between the ages of 18 and 40 who had computer skills and experienced a pain level of at least 5 on a visual-analogue scale were allowed to participate. In addition, participants were required to have symptoms of muscle tension caused by pain and the appearance of trigger points on the trapezius muscle, and a doctor-confirmed diagnosis of MPS of the trapezius muscle.

The exclusion criteria were patients with a history of hypertension, cardiovascular disease, osteoporosis, cancer, herniated discs, and infectious skin diseases. Patients who had fractures or cracks in the neck or spine, pregnant women, and those who had received any other form of treatment or taken medications (such as diclofenac or steroids) during the previous month were excluded from the study. Patients who did not complete the full course of therapy, or those with worsening symptoms, were referred to conventional treatment and excluded from the study.

All patients were treated in 14 sessions, lasting 60 minutes each. In the massage group, a classic therapeutic massage was performed. In the therapeutic exercises group, exercises were performed for the head, neck, shoulders, and

abdomen, which improved blood circulation in the upper body and stretched the muscles of the neck, back, and arms. In the combined treatment group, the session of therapeutic massage and therapeutic exercises was 60 minutes each. Before treatment, on Day 7 (interim survey), and after completing the course of treatment, patients underwent a survey that included pain assessment on an 11-point scale, including the evaluation of improvements in performance and quality of life. Functional performance was evaluated on a 5-point scale, where 0 – low performance and 5 – maximum functionality. Data processing was performed on a computer using a comparative method and a percentage ratio of indicators.

## RESULTS

All patients were able to complete the full course of treatment. The nature of pain and functional performance showed significant results after the completion of treatment. Table 2 shows data that characterise the pain syndrome in patients who have completed a full course of treatment in each group, and functional performance. It should be noted that during the interim survey on Day 7, patients from the combined massage and physical therapy group reported an improvement in their condition as early as Day 5. The group where only massage was used noted a decrease in pain on days 6-7. The group where only therapeutic exercises were used on Day 7 did not yet have significant changes in general condition and pain reduction. However, by the end of the treatment course, these data in the therapeutic exercises group improved significantly.

**Table 2.** Characteristics of pain after physical therapy, massage, or a combination of both

Category	Massage group	Therapeutic exercises group	Massage+therapeutic exercises group	Total
<b>Nature of pain on an 11-point scale</b>				
1-2 points	15	13	17	45
3-4 points	4	5	3	12
5-6 points	1	2	0	3
Functional performance, average value for each group (points)	3.5	3	4.4	

**Source:** compiled by the authors

The study found that before starting treatment with 60 patients, 65% of participants described pain of 5-6 points and 35% of patients had severe pain of 7-8 points, which was associated with MPS of the trapezius muscle. After completion of treatment, all patients were divided into 3 groups, of which 75% of patients characterised pain by 1-2 points, 20% described the intensity of symptoms by 3-4 points, and 5% of patients had pain by 5-6 points. Comparing the study of the treatment group, a significant improvement in the condition and a decrease in pain in all three categories can be noted. However, in the group using therapeutic exercises, the indicators were the lowest. Of the 20 participants who rated pain at 5-6 points (70% of patients) and 7-8 points (30% of patients) before therapeutic exercises treatment, pain indicators decreased to 5-6 points in 10% of patients, to 3-4 points in 65%, and to 1-2 points in 65% of patients after treatment.

Massage occupied an average position, although it also showed a separate high effectiveness of the method of treating MPS in the trapezius muscle. Pain characteristics before starting therapy with 20 participants in 65% of patients were rated at 5-6 points and in 35% of patients – was estimated at 7-8 points. After treatment, 75% of participants reported a reduction in pain to 1-2 points, 20% had a reduction in pain to 3-4 points, and 5% of patients maintained pain at 5-6 points.

The most effective treatment for trapezius MPS was a combination of massage and therapeutic exercises. Before the start of the treatment process, 60% of patients had pain syndrome, which was estimated at 5-6 points, in 40% of patients, pain was characterised at 7-8 points. After the end of the therapeutic process, a significant number of patients noted a decrease in pain to 1-2 points, which was 85%, a decrease in pain syndrome to 3-4 points was observed in

15% of patients. After combined treatment with massage and therapeutic exercises, none of the patients reported pain, which was estimated at 5-6 points. This suggests that it was the combined method of treatment that had the most effective result.

Functional performance, as shown in Table 3, generally increased from 0.5 to 3.6 points, which is 3.1 points higher than the value before the start of treatment. In the com-

combined massage+therapeutic exercises group, the average value of functional performance improved by 3.9 points, which is the highest indicator among all therapeutic methods. The second place was taken by the massage group, where performance improved by 3 points. The therapeutic exercises group also had positive results in functional performance, but among other groups showed a minimal indicator with an improvement of 2.5 points.

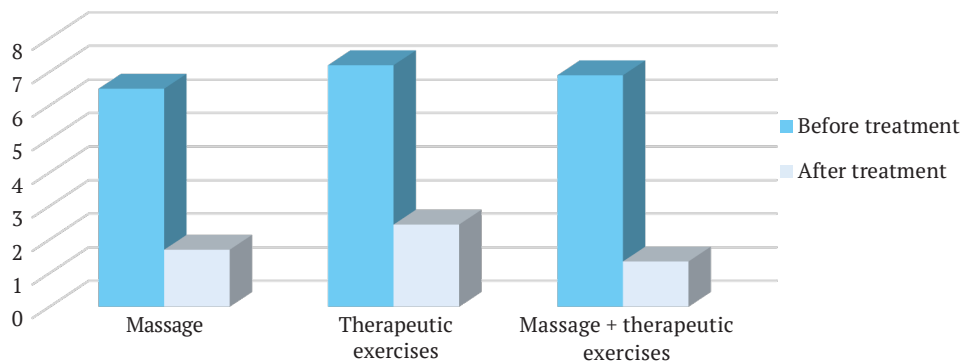
**Table 3.** Functional performance after treatment

Category	Massage group	Therapeutic exercises group	Massage+therapeutic exercises group
Functional performance, average value for each group (points)	3.5	3	4.4

**Source:** compiled by the authors

Figure 1 shows that the most effective treatment tactic was a combination of massage+therapeutic exercises, and the pain syndrome decreased by an average of 5.55 points. The use of massage alone led to a decrease in the indicator by 4.8 points. And therapeutic exercises had the lowest effectiveness, and reduced pain in patients by 4.75 points.

This means that the combination of massage+therapeutic exercises is the most effective compared to monotherapy of massage alone or physical therapy only. The effectiveness of trapezius muscle MPS monotherapy did not differ significantly, although it was found that the use of therapeutic exercises was less successful.



**Figure 1.** Comparative characteristics of pain syndrome by average score

**Source:** compiled by the authors

Thus, all patients noted an improvement in their condition, which indicates a high effectiveness of treatment with therapeutic exercises, massage, and a combination of them to reduce or eliminate MPS of the trapezius muscle. None of the patients after all treatment methods reported severe pain with a score of 7-8 points. Although therapeutic exercises had the lowest rates among all treatments, there was no significant difference between therapeutic exercises and massage. These methods require an individual approach, since long-term severe pain may require longer treatment. Massage shows high effectiveness with short-term use, and therapeutic exercises works for a long time, so the combination of these two methods had the best result. Functional performance was effective, with the maximum indicators for the combined treatment group and the minimum for the group in which only therapeutic exercises were practiced.

MPS is a regional pain disorder that affects all age groups and is characterised by the presence of trigger points in the muscles or fascia [11]. MPS is usually diagnosed during a physical examination, and common diagnostic criteria include the presence of trigger points, pain on palpation, a characteristic pattern of reflected pain, and a local muscle twitch response. The prevalence of MPS

among patients who went to medical facilities because of pain ranged from 30% to 93%. This significant change may be conditioned by the lack of clear diagnostic criteria and guidelines for the diagnosis of MPS. Although this syndrome is common, its pathophysiology remains poorly understood. There have been many approaches to treating MPS, including exercise, trigger point injections, medication, and alternative treatments. However, due to the variability of clinical approaches and the lack of uniform diagnostic standards, there is a need for further research to establish unified diagnostic criteria and treatment approaches. Thus, the importance of developing clear protocols for the diagnosis and treatment of MPS remains an urgent public health issue, especially given the significant percentage of patients suffering from this disorder.

The literary review by A. Galasso *et al.* [12] revealed key aspects of MPS, in particular, its prevalence, impact on quality of life, and treatment difficulties. Although MPS can be acute, it often becomes chronic, affecting a significant portion of the population, about 85% of adults. Patients with other chronic pain disorders were more likely to experience MPS, which further complicated treatment. MPS has been shown to reduce physical activity and social

functioning, worsen emotional state, and increase health care costs. The effectiveness of non-pharmacological methods, such as acupuncture and massage, has been noted in some patients.

The complexity of diagnosing and treating MPS was noted in the study by J. Henson [13]. Due to the lack of uniform diagnostic criteria, clinicians relied on physical examination and identification of trigger points that reproduced localised pain or caused pain in remote areas. MPS was associated with prolonged muscle contractions that occurred as a result of insufficient or excessive muscle use, highlighting the importance of behavioural modification in managing this condition. Treatment required a comprehensive approach that included both non-drug and drug methods, including manual therapy and the use of local analgesics. Procedural techniques such as dry acupuncture and shock wave therapy have often been used to reduce symptoms in the early stages of the disease. However, with the chronicity of the process, MPS became less sensitive to treatment, making pain management more difficult. This study emphasised the importance of timely intervention to prevent the transition of MPS to a chronic form and reduce its impact on the quality of life of patients.

The study by Ü. Yalçın [14] compared two treatments for MPS – kinesiotaping, extracorporeal shock wave therapy (ESWT), and both in combination with exercise. Both approaches were found to be effective in reducing pain, raising the pain threshold, and improving patient functionality. However, ESWT showed better results compared to kinesiotaping for all key indicators, including the disability index and pain reduction. An important finding was that ESWT had a higher level of efficacy, making this method a higher priority in the treatment of MPS.

The results of intramuscular electrostimulation (IMES) in the treatment of MPS were considered in the study by M. Hadizadeh *et al.* [15]. Six randomised controlled trials involving 158 patients were evaluated. IMES was compared with placebo, dry acupuncture, or exercise. This helped to establish improvements in indicators such as pain and mobility. IMES was found to be more effective than placebo and other treatments. The research has shown that IMES can reduce pain and improve physical function in patients suffering from chronic pain caused by MPS.

The systematic review by F. Dach & K.S. Ferreira [16] investigated the efficacy of dry acupuncture as a treatment for MPS in patients with low back pain. MPS is a common cause of chronic pain that requires comprehensive treatment, including exercise, trigger point massage, and acupuncture. The study examined the most effective approaches to the use of dry acupuncture based on available scientific evidence. The review was based on meta-analysis and randomised controlled trials, with a total of 509 research papers analysed. They compared dry acupuncture with other treatments such as classical acupuncture, dummy acupuncture, laser therapy, physical therapy, local anaesthetic injections, and ischaemic compression. The results showed that dry acupuncture can significantly reduce pain intensity and improve mobility in patients with both acute and chronic low back pain. Although the effectiveness of the method varied depending on the duration of follow-up and comparable methods, dry acupuncture showed a marked reduction in pain after the intervention.

Thus, this method can be considered effective for treating low back pain in patients with MPS.

The study by M.F. Yasar *et al.* [17] compared the effectiveness of kinesiotaping and dry acupuncture for the treatment of MPS of the trapezius muscle. Participants were divided into three groups: a control group, a kinesiotaping group, and a dry acupuncture group. The results showed that both kinesiotaping and dry acupuncture significantly improved pain scores, pressure pain threshold, and neck disability index. In the control group, the improvement was minimal, which indicates the superiority of these methods over simple exercises. The dry acupuncture group showed slightly better results in pain reduction compared to kinesiotaping, which may indicate a more pronounced effect of dry acupuncture on pain reduction and restoration of function. The findings suggest that both methods have a positive effect on the treatment of MPS, but more research is needed to determine the long-term effects.

The results of kinesiotaping treatment for MPS were considered in the paper by F.M. Akpınar *et al.* [18]. The study used two different techniques, which showed that both variants of kinesiotaping significantly reduced the intensity of pain and improved the functional state of patients compared to a home exercise programme. Quality of life, particularly physical function and overall health, improved earlier in the kinesiotaping groups than in the control group. Although the difference between kinesiotaping techniques was minimal, the muscle inhibition technique showed a faster effect on role constraints associated with physical factors.

C.L.A. Ying *et al.* [19] evaluated the effect of Bowen therapy on patients with chronic myofascial neck pain. The results showed that this treatment significantly improved the pressure pain threshold and neck range of motion 12 weeks after starting treatment, and the effects persisted after 24 weeks. In addition to physical improvements, anxiety and depression scores on the General Anxiety Disorder-7 (GAD7) and Patient Health Questionnaire-9 (PHQ9) scales decreased, which had a positive effect on the mental health of patients. Improvements in both physical and mental quality of life indicators have shown the benefits of using this technique in the treatment of myofascial pain. However, given the small sample size, the results may require further confirmation in larger studies.

The study by I. Koukoulithras *et al.* [20] considered a psychosocial model of the MPS treatment approach, where trigger points, which are the main source of pain and discomfort, play a key role. The importance of taking into consideration not only physical but also psychological and social factors that affect patients with MPS was emphasised. Stress and chronic pain have been found to mutually exacerbate each other, worsening patients' condition and reducing their quality of life. Treatment included the use of exercise, posture correction, a balanced diet, and myofascial release and pharmacotherapy. The researchers emphasised the importance of a holistic approach to improving patient health, although the aetiology of MPS remains unclear, which requires further research. Thus, MPS is characterised by damage to all age groups, with the presence of trigger points in the muscles. Diagnosis of MPS in patients is based on physical examination and detection of pain on palpation. Treatment includes medical and non-medical techniques such as massage, exercise, acupuncture, and

shock wave therapy. However, due to the lack of uniform diagnostic criteria, further research is needed to improve the standards of diagnosis and therapy.

#### ◆ DISCUSSION

MPS therapy with therapeutic exercises and massage is relevant due to its non-invasive nature and minimal side effects, which makes it safe for a wide range of patients. Massage helps to reduce pain and improve blood circulation, while therapeutic exercises help to maintain muscle tone and increase flexibility. Complex application of these methods can improve the quality of life of patients, reduce the frequency of relapses and increase treatment effectiveness.

A comparison of two approaches to the treatment of myofascial pain in the upper trapezius muscle – Thai massage and Thai exercises – was described in the paper by J. Boonruab *et al.* [21]. Both methods significantly reduced pain and improved the volume of movement in the cervical vertebrae in patients. However, Thai massage has been shown to be more effective in reducing the intensity of pain at trigger points compared to exercise. Although both treatments showed similar effects on neck mobility, Thai massage had an advantage in the context of pain relief, making it a more effective method for patients with severe pain symptoms. These results are similar to this study, since the effectiveness of massage also had higher indicators compared to therapeutic exercises. However, the study described here did not investigate combined treatment and used Thai massage rather than therapeutic massage.

The study by S.S. Mansoori *et al.* [22] described how different stretch duration affects patients with chronic MPS. Stretching for 60 seconds was found to negatively affect nerve conduction, while stretching for 30 seconds provided optimal improvement without harming the nervous system. A shorter stretch (15 seconds) had less positive effects on pain and pain pressure threshold. Therefore, the optimal duration of stretching exercises for the treatment of chronic myofascial pain was 30 seconds, since this interval provided the greatest effectiveness with the least side effects. This study differs from the one described in that the details and duration of muscle stretching rights were not considered, however, it confirms the importance of this indicator for reducing pain in MPS.

The relevance of trigger points in the treatment of MPS in primary care settings was highlighted in the study by B. Shipton *et al.* [23]. Methods such as massage, physical therapy, and osteopathy have been found to have an advantage as initial approaches due to their low invasiveness. Injections at trigger points showed some efficacy, but the results were limited due to the small number of participants in the studies, as well as the possible placebo effect. None of the drugs were more effective than others or placebo, which led to recommendations to use injections only in cases where other methods were not successful. This approach emphasised the importance of integrating less invasive techniques before injection, and the need for a comprehensive approach to treating myofascial pain to achieve the best results. The similarity with the current study is to confirm the effectiveness of massage, therapeutic exercises, and combination treatment to reduce MPS.

Two methods of treating chronic mechanical neck pain among students – soft tissue mobilisation with

instruments and myofascial release therapy – were compared by F. Shewail *et al.* [24]. Both methods were used for four weeks, but no significant differences in results were found between the groups. Although there was some improvement in pain levels, functional status, and pain threshold after the sessions, the lack of a control group made it difficult to determine the actual effectiveness of the methods. This means that the improvement may have been caused by other factors, such as natural pain reduction or the placebo effect. Further studies with control groups may help to more accurately assess the effectiveness of soft tissue mobilisation using tools and myofascial release therapy. There was a similarity with this study in the use of treatment methods that were similar to massage and led to positive results.

In another study, M. Sadeghnia *et al.* [25] investigated the effectiveness of three different treatments for active trigger points in patients with myofascial pain in the upper trapezius muscle. All three methods – deep transverse friction massage (DTFM), high pain threshold ultrasound, and whole-body vibration (WBV) – showed improvements in pain reduction, increased pressure pain threshold, and extended range of motion for contralateral lateral neck flexion. However, the greatest reduction in pain on the visual analogue scale was observed in the group receiving whole-body vibrations. This showed the potential of WBV as a more effective method for pain relief compared to other methods. The results also showed that although the difference in increasing the pressure pain threshold between the groups was not statistically significant, ultrasound techniques with a high pain threshold and WBV had a better effect on increasing range of motion compared to DTFM. This difference may be due to the fact that the DTFM method requires the therapist to exercise their fingers, which may limit its effectiveness compared to less skill- and effort-dependent methods such as WBV. Therefore, full-body vibration can be considered as a promising option for improving outcomes in patients with active trigger points, especially if resources are limited or less intensive physical intervention is required. In the present study, massage also had a positive effect, although it was also not the leader among all MPS treatments.

The addition of electro-massage to manual therapy in patients with bilateral myofascial pain in the temporomandibular joint was evaluated in the paper by L. Espejo-Antúnez *et al.* [26]. A total of 46 people took part, which were divided into two groups. The first group received only manual therapy, which included mobilisation and work with soft tissues, while the second group additionally underwent a course of electrical stimulation in the cervical region. Both groups underwent a 2-week course of treatment, during which pain intensity, pain sensitivity threshold, and painless mouth opening were assessed. According to the results of the study, the second group, which received electrical stimulation together with manual therapy, showed significantly better results in reducing the intensity of pain, increasing the threshold of pain sensitivity, and improving the mobility of the lower jaw. In addition, participants in this group showed an improvement in the active range of motion of the neck, in addition to rotational movements. Thus, the addition of electro-massage to standard manual therapy significantly improves the results of treatment of

patients with myofascial pain in the temporomandibular joint compared to the use of manual therapy alone. These results indicate similar results to the present study on the prophylactic effectiveness of combination treatment compared to MPS monotherapy.

Ö. Bingölbali *et al.* [27] determined the effect of deep tissue massage on the number of myofascial trigger points, neck mobility, pain, disability, and quality of life in patients with myofascial pain. The study involved 80 patients aged 20 to 57 years, who were divided into two groups: control and experimental. The control group received standard therapy, which included electrical stimulation through the skin of the neuromuscular system, heat packs, and ultrasound therapy. The experimental group underwent an additional 12 deep-tissue massage sessions. The results showed that patients in the experimental group had significantly higher rates of pain reduction (on the neck functional disability scale (NPDS), and quality of life compared to the control group. In addition, patients who received deep-tissue massage showed improvements in neck mobility, in particular, in extension, lateral tilt, and rotation in both directions. Moreover, the difference in flexion rates between the groups was not significant. Therefore, adding deep tissue massage to a standard rehabilitation programme is an effective and safe method to improve neck mobility, reduce pain, and improve the quality of life of patients with MPS. This study confirms the results on the effectiveness of an integrated approach to the treatment of MPS.

The effectiveness of ischaemic compression as a treatment method for MPS was investigated by W. Lu *et al.* [28]. Ischaemic compression was found to significantly improve the pressure pain threshold, demonstrating its positive effect on reducing pain sensitivity. However, when assessing subjective pain perception on a visual analogue scale, no significant differences were found between ischaemic compression and the control group. This may indicate that the method affected the body's physical response, but did not change the patients' sense of pain. The limited number of participants in the studies may influence the overall results, highlighting the need for additional studies with larger samples to more accurately determine the effectiveness of ischaemic compression in the treatment of MPS. However, the use of treatment methods similar to massage and manual therapy confirms their effectiveness.

Studies demonstrated the effectiveness of various treatments for MPS, in particular, massage, stretching, and electrical stimulation, which help to reduce pain and improve the functional state of patients. A combined approach that includes manual therapy with additional methods, such as electric massage or vibration, is more effective. The positive results of various methods indicate the importance of individualising treatment to achieve maximum effectiveness in MPS.

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## ◆ CONCLUSIONS

The study demonstrated the high effectiveness of various methods of treating MPS of the trapezius muscle. All patients successfully completed the full course of therapy. Significant improvements were recorded both in reducing pain and in improving functional performance.

The combination of massage and therapeutic exercises showed the best results among all the study groups. Patients who received combination treatment reported improvement on Day 5, while in the group where only massage was used, pain relief began on days 6 or 7. In patients who underwent only a course of therapeutic exercises, significant changes were recorded only at the end of the course. Statistics confirm that after treatment, pain in most patients decreased to 1-2 points on an 11-point scale. According to the results obtained, the combined treatment group (massage+therapeutic exercises) showed the highest effectiveness, reducing pain by an average of 5.55 points. In this group, 85% of patients had minimal pain, and none of the patients complained of pain in the range of 5-6 points. This highlights the high efficiency of the combined approach.

The group that used only massage also showed high results. After the course of treatment, 75% of participants reported a reduction in pain to 1-2 points, 20% reported an intensity of 3-4 points, and only 5% continued to experience moderate pain at 5-6 points. Functional performance in this group increased by an average of 3 points, which is quite a high result. Instead, the group that used only therapeutic exercises had the lowest efficacy in the short term. Only 65% of patients reported a reduction in pain of up to 1-2 points, and 10% continued to experience moderate pain of 5-6 points after treatment. However, functional performance in this group increased by 2.5 points, which indicates a positive effect of therapeutic exercises on long-term recovery of physical activity, although this method was inferior to others in terms of symptom relief.

Patients' functional performance also improved significantly after treatment. The highest rates were recorded in the combined treatment group, where the average performance value increased by 3.9 points. This confirms that the combination of massage and therapeutic exercises is the most effective method for both reducing pain and restoring the functional capabilities of patients. The limitations of this study were a small sample of patients and the absence of a control group. Future research should be devoted to the study of methods of treating myofascial pain syndrome that would accelerate the speed of recovery of patients.

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None.

## ◆ CONFLICT OF INTEREST

None.

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## Основна методика лікування міофасціального больового синдрому лікувальною фізкультурою та масажем

### Валерій Юр

Магістр

Вінницький соціально-економічний інститут Університету «Україна»

21036, вул. Дмитра Майбороди, 6, м. Вінниця, Україна

<https://orcid.org/0009-0002-8243-8462>

### Олександр Лебедєв

Викладач

Вінницький соціально-економічний інститут Університету «Україна»

21036, вул. Дмитра Майбороди, 6, м. Вінниця, Україна

<https://orcid.org/0009-0002-9079-1813>

**Анотація.** Ціллю дослідження було визначити ефективність масажу і лікувальної фізкультури для пацієнтів з міофасціальним больовим синдромом. В дослідженні було проведено порівняння результатів опитування пацієнтів до, під час та після лікування за допомогою масажу, лікувальної фізкультури та їх комбінації. Оцінювалися характеристика болю за 11-бальною шкалою та функціональна працездатність за 5-бальною шкалою. В ході дослідження було встановлено що ефективність різних методів терапії міофасціальним больовим синдромом трапецієподібного м'яза була високою. Усі пацієнти успішно пройшли повний курс лікування, що дозволило відзначити значне зменшення болю та поліпшення функціональної активності. Найкращі результати продемонструвала група, яка отримувала комбіноване лікування масажем та лікувальною фізкультурою. У пацієнтів цієї групи позитивні зміни спостерігалися вже на 5 день терапії, тоді як у групі з лише масажем полегшення настало на 6-7 день. Пацієнти, які отримували тільки лікувальну фізкультуру, починали відчувати значні поліпшення ближче до завершення курсу. За статистичними даними, біль у більшості пацієнтів після лікування зменшився до 1-2 балів за 11-бальною шкалою. Найвищу ефективність продемонструвала група комбінованого лікування, у якій біль зменшився в середньому на 5,55 балів, причому 85 % пацієнтів відзначали лише незначний біль. У групі пацієнтів, які отримували лише масаж, 75 % учасників відзначили зниження болю до 1-2 балів за 11-бальною шкалою. У групі лікувальної фізкультури біль знизився у 65 % пацієнтів, але процес відновлення був повільнішим. Жоден пацієнт після проведеного лікування не зазначав біль у 7-8 балів. Загальні результати показали, що комбінація масажу та лікувальної фізкультури є найефективнішим методом для зменшення болю та відновлення функціональної активності

**Ключові слова:** тригерні точки; фізична реабілітація; мануальна терапія; маніпуляції з опорно-руховим апаратом; розслаблення м'язів