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THE ROLE OF MUSCLE DYSFUNCTION IN THE ONSET AND CHRONICITY OF MUSCULOSKELETAL PAIN (LITERATURE REVIEW)

Actuality. *The article is dedicated to a relevant topic concerning the role of muscle dysfunction and myofascial trigger points (MTP) in the development and chronification of musculoskeletal pain (MSP). Considering the widespread prevalence of MSP among the working-age population, research into the causes and mechanisms of its onset is pertinent and important for improving diagnostic and therapeutic methods.*

Purpose of the study. *The purpose of the study is to clarify and summarize the existing evidence-based data regarding the role of muscle dysfunction and myofascial trigger points (MTP) in the development and chronification of musculoskeletal pain (MSP).*

Materials and research methods. *An analysis of modern foreign sources from the scientometric database PubMed regarding the role of muscle dysfunction and myofascial trigger points in the development and chronification of musculoskeletal pain was conducted.*

Research results. *The hypothesis about the leading role of myofascial trigger points (MTP) in the formation of chronic musculoskeletal pain remains controversial. It was established that the development of chronic muscle pain is secondary to the primary disease. The phenomenon of MTP is considered an area of secondary hyperalgesia resulting from neurogenic inflammation in muscles that were not structurally or physiologically damaged. Myofascial pain syndrome (MPS) is regarded as a form of neuromuscular dysfunction characterized by soft tissue damage, the development of peripheral and central sensitization due to neurogenic inflammation, and changes in the functioning of the limbic system structures of the brain. The diagnosis of MPS is clinical, based on the presence of painful spasmodic muscles, painful muscle nodules, and active trigger points with the formation of areas of referred pain. It is confirmed that there are currently no universally recognized diagnostic criteria for objectifying or quantitatively assessing MTP. MPS is diagnosed after conducting a differential diagnosis that allows distinguishing it from other diseases that can cause similar symptoms. The most effective non-drug therapies for MPS with the most proven efficacy are physical rehabilitation and psychotherapy, while other methods have auxiliary significance.*

Conclusions. *Muscle dysfunction associated with MPS requires further research for a complete understanding of the development and chronification of MSP. The causes and mechanisms of MPS development include neurogenic, ischemic, inflammatory, and psychosocial factors. The diagnosis of MPS is based on the defined clinical criteria by IASP, palpatory diagnosis, and instrumental visualization methods. It is important to exclude other diseases through differential diagnosis. Comprehensive and individualized therapy for MPS includes physical therapy, manual therapy, psychotherapy, and medication therapy.*

Key words: *muscle dysfunction, musculoskeletal pain, myofascial trigger points, myofascial pain syndrome.*

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РОЛЬ М'ЯЗОВОЇ ДИСФУНКЦІЇ У ВИНИКНЕННІ ТА ХРОНІЗАЦІЇ СКЕЛЕТНО-М'ЯЗОВОГО БОЛЮ (ОГЛЯД ЛІТЕРАТУРИ)

Актуальність. *Статтю присвячено актуальній темі, яка стосується ролі м'язової дисфункції та міофасціальних тригерних точок (МФТТ) у розвитку та хроніфікації м'язово-скелетного болю (МСБ). Ураховуючи широку розповсюдженість МСБ серед населення працездатного віку, дослідження причин і механізмів його виникнення є актуальним і важливим для поліпшення методів діагностики та терапії.*

Мета дослідження. *Уточнити та узагальнити наявні дані, засновані на доказах щодо ролі м'язової дисфункції та міофасціальних тригерних точок (МФТТ) у розвитку та хроніфікації м'язово-скелетного болю (МСБ).*

Матеріал і методи. *Проведено аналіз сучасних зарубіжних джерел із наукометричної бази PubMed щодо ролі м'язової дисфункції та міофасціальних тригерних точок у розвитку та хроніфікації м'язово-скелетного болю.*

Результати дослідження. *Гіпотеза про провідну роль міофасціальних тригерних точок (МФТТ) у формуванні хронічного м'язово-скелетного болю залишається спірною. Установлено, що розвиток хронічного м'язового болю є вторинним до первинного захворювання. Феномен МФТТ розглядається як зона вторинної гіпералгезії, яка виникає внаслідок нейрогенного запалення у м'язах, які не були структурно чи фізіологічно пошкоджені. Міофасціальний больовий синдром (МФБС) уважається формою нейром'язової дисфункції, що характеризується пошкодженням м'яких тканин, розвитком периферичної та центральної сенситизації через нейрогенне запалення та зміни у функціонуванні структур лімбічної системи головного мозку. Діагноз МФБС є клінічним, базується на наявності болючих спазмованих м'язів, болючих м'язових вузлів та активних тригерних точок із формуванням областей відображеного болю. Підтверджено, що нині не існує загальновизнаних діагностичних критеріїв для об'єктивізації або кількісної оцінки МФТТ. МФБС як діагноз установлюють після проведення диференціальної діагностики, яка дає змогу відмежувати його від інших захворювань, які можуть викликати схожі симптоми. Найбільш ефективними немедикаментозними методами терапії МФБС із найбільш доведеною ефективністю є фізична реабілітація та психотерапія, інші методи мають допоміжне значення.*

Висновок. *М'язова дисфункція, пов'язана з МФБС, потребує подальших досліджень для повного розуміння розвитку та хроніфікації МСБ. Причини та механізми розвитку МФБС включають нейрогенні, ішемічні, запальні та психосоціальні чинники. Діагноз МФБС базується на визначених клінічних критеріях IASP, пальпаторній діагностиці та інструментальних методах візуалізації. Важливо виключити інші захворювання шляхом диференційної діагностики. Комплексна та індивідуалізована терапія для МФБС включає фізіотерапію, мануальну терапію, психотерапію та медикаментозну терапію.*

Ключові слова: *м'язова дисфункція, скелетно-м'язовий біль, міофасціальні тригерні точки, міофасціальний больовий синдром.*

Introduction. Musculoskeletal disorders accompanied by chronic musculoskeletal pain encompass a broad spectrum of conditions that affect bones, joints, muscles, and connective tissue. These disorders are among the leading causes of chronic pain, disability, and reduced quality of life worldwide, especially in developed countries (Hootman et al., 2016).

According to data (Blackwell et al., 2012), back and joint pain are the most common manifestations of chronic musculoskeletal pain, affecting millions of people. The risk of developing these conditions significantly increases with age. A study (Camilloni et al., 2020) showed that the prevalence of chronic musculoskeletal pain in the elderly ranges from 18.6% in Switzerland to 45.6% in France.

Demographic trends indicate that the proportion of elderly people in the global population will continue to rise. This will likely lead to a significant increase in the number of individuals suffering from chronic musculoskeletal disorders, which, in turn, will place an additional burden on the healthcare system (Latina et al., 2019).

Chronic musculoskeletal disorders have a significant economic impact on society. In the United States, the annual costs for treatment and rehabilitation of people with chronic musculoskeletal disorders reach $874 billion, which is 5.7% of the GDP (Malik et al., 2018). These costs include direct medical expenses as well as indirect costs associated with reduced work capacity and loss of productivity.

Despite the substantial burden that chronic musculoskeletal disorders impose on society, their treatment and prevention are generally considered suboptimal. This is due to a number of factors, including the complexity of diagnosis, the lack of a universal treatment approach, and insufficient awareness of risk factors and prevention methods for these disorders (Latina et al., 2019; Malik et al., 2018).

The aim of the study is to identify and summarize current evidence regarding the role of muscle dysfunction and myofascial trigger points in the development and chronicity of musculoskeletal pain.

Materials and methods of the study. To achieve this aim, bibliographic and bibliosemantic research methods were utilized. The literature review was conducted using modern scientific sources from the PubMed scientometric database.

Results of the study and their discussion

Classification, etiology, and pathogenesis of chronic musculoskeletal pain. Chronic musculoskeletal pain is a common condition characterized by prolonged (more than 3 months) pain in muscles, bones, and connective tissue, significantly impacting functional activity and the psycho-emotional state of an individual (Treede et al., 2019).

Until recently, the classification of chronic musculoskeletal pain in the International Classification of Diseases, 10th Revision (ICD-10) was based solely on the anatomical location of the pain and did not consider psychosocial factors, which significantly influence the development and course of chronic musculoskeletal pain. The new ICD-11 classification introduces significant changes to the diagnostic approaches for chronic musculoskeletal pain. It proposes distinguishing between two main types: chronic primary musculoskeletal pain, as an independent condition that cannot be explained by a specific disease; and chronic secondary musculoskeletal pain, as one that arises as a symptom of another disease, such as arthritis, osteoporosis, fibromyalgia, lumbosciatica, etc. (Perrot et al., 2019).

Advantages of the new ICD-11 classification (Nicholas et al., 2019):

– Comprehensive approach: It considers not only anatomical-biological but also psychosocial factors influencing the development of chronic musculoskeletal pain.

– Personalized treatment: The new classification promotes the development of more personalized and effective treatment methods for chronic musculoskeletal pain, taking into account the individual characteristics of each patient.

– Unification of epidemiological data: ICD-11 will allow for a unified epidemiological analysis of chronic musculoskeletal pain, helping to better understand the prevalence of this condition and its impact on society.

Non-specific degenerative lesions of the musculoskeletal system structures are the most common cause of pain in chronic musculoskeletal disorders. Their etiology is complex and not fully understood. In rheumatology, the term «osteoarthritis» is used to denote degenerative joint damage (Hootman et al., 2016). Neurologists have abandoned the term «osteochondrosis», preferring the terms «non-specific back pain» or «musculoskeletal pain» because clinical manifestations do not always correlate with the degree of degenerative changes, and etiological factors often remain unknown. In addition to degenerative changes, microtraumas and inflammation play a significant role in the development of chronic musculoskeletal pain. The chronification of any pain syndrome is also closely related to psychosocial factors (Bordoni et al., 2023).

Traditionally, the role of the muscle factor in the development of chronic musculoskeletal pain is considered within the framework of myofascial pain syndrome (MPS). Most people experience muscle pain after injury, overexertion, or strain during their lifetime, which usually disappears within a few days or weeks. However, in some cases, muscle pain becomes chronic and spreads to other body regions. This may be associated with (Puntillo et al., 2021):

– Prolonged muscle spasm: Spasms can lead to decreased blood circulation, accumulation of metabolic products, and, consequently, pain.

– Formation of myofascial trigger points: These are local areas in muscles that cause pain upon palpation, which can radiate to other parts of the body.

– Psychosocial factors: Stress, anxiety, and depression can exacerbate muscle pain and complicate its treatment.

The musculo-fascial complex of the musculoskeletal system is a complex structure composed of muscle and fascial tissues. The fascia is connective tissue that envelops muscles, ligaments, tendons, and other organs, providing support and forming a protective sheath. The innervation of the musculo-fascial complex significantly differs from the innervation of the skin. It is provided

by special sensory sympathetic fibers responsible for sensations of dull, aching pain and burning. These fibers regulate blood circulation, muscle tone, and pain sensitivity.

Nociceptors are nerve endings responsible for the sensation of pain. In the musculo-fascial complex, they are not located within the muscle fibers themselves but in the walls of arterioles and connective tissue. There are several types of nociceptors:

– Mechanoreceptors: Activated by mechanical stimuli such as pressure, stretching, or tissue damage.

– Chemoreceptors: Activated by chemicals such as bradykinin, prostaglandins, and other inflammatory mediators.

– Thermoreceptors: Activated by changes in temperature.

Most nociceptors in the musculo-fascial complex have a high threshold for stimulation, meaning they are not activated during normal movements or muscle stretching (Fernández-de-las-Peñas et al., 2023).

Muscle pain arises from the stimulation of nociceptors by specific factors such as (Dommerholt et al., 2019):

– Ischemic contractions: These lead to reduced blood flow and oxygen deficiency in the muscles.

– Ultrastructural damage: Can occur due to excessive load and microtraumas.

– Chemical substances: Such as lactic acid, glutamate, and capsaicin can stimulate nociceptors and cause pain.

Traditional views on the role of lactate in the development of muscle pain after physical exertion (with a peak of pain occurring 24-48 hours later) are not currently supported by research.

The term «myofascial pain syndrome» reflects the complex involvement of both muscle and fascial structures, leading to the onset and self-perpetuation of pain according to the «pain–muscle–spasm–pain» principle. Previously, two similar conditions were distinguished: reflex muscle-tonic syndrome and myofascial syndrome.

Reflex muscle-tonic syndrome was thought to arise as a reflex muscle spasm in response to painful irritation caused by primary pathology of the joints, ligaments, or other structures.

The cause of myofascial syndrome was considered to be primary damage to the muscles themselves, leading to the formation of trigger points. These trigger points can arise from (Graven-Nielsen, 2006; Puntillo et al., 2021; Quintner et al., 2014; Shah et al., 2015; Tantanatip & Chang, 2024): Acute muscle strain, Continuous microtraumatization of muscles due to excessive load (dynamic or static), Prolonged non-physiological postures, Repetitive monotonous movements, Hypothermia, Stressful situations.

Currently, a single term, «myofascial pain syndrome» is used. It is recognized as a specific condition that should be clearly distinguished from other soft tissue pain syndromes such as fibromyalgia, tendinitis, bursitis, etc.

Myofascial pain syndrome can accompany pain of various etiologies, including: Discogenic radiculopathies, Non-specific back pain, Arthritis, Headaches, Pelvic pain, Complex regional pain syndrome, Pain associated with somatic diseases and more.

Myofascial pain, described as deep, aching, or burning pain that radiates from a specific point, has been a mystery for many years. Now, thanks to ongoing research, we are beginning to understand the complex mechanisms underlying it.

These mechanisms include:

– Prolonged ischemia and metabolic disturbances: Muscle overexertion can lead to reduced blood flow, resulting in a lack of oxygen and nutrients. This can cause the accumulation of harmful metabolic by-products that irritate nerve endings and cause pain.

– Changes in the synaptic plate: Prolonged ischemia can cause an uncontrolled release of the neurotransmitter acetylcholine, stimulating muscle contraction. This can lead to prolonged muscle spasm and pain.

– Changes in connective tissue: The fascia surrounding muscles can become denser and lose elasticity, leading to additional pressure on nerve endings and causing pain.

Although myofascial trigger points are considered a key factor in myofascial pain, recent research challenges this theory as specific morphological changes in the area of trigger points that would explain the pain have not been confirmed. Additionally, experimental models of myofascial trigger points in animals do not exist (Fischer et al., 2017).

It has been proven that myofascial trigger points and muscle pain develop secondarily as a result of an underlying disease, as an area of secondary hyperalgesia that arises due to neurogenic muscle damage, which was not initially injured. According to recent studies, myofascial pain is a form of neuromuscular dysfunction characterized by soft tissue damage with the development of peripheral and central sensitization due to neurogenic inflammation and changes in the functioning of the structures of the limbic system (Puntillo et al., 2021).

Neurogenic inflammation occurs when inflammatory mediators are released from nerve endings in response to peripheral pain stimulation. In a significant portion of patients with chronic myofascial pain syndrome, the pain takes on a neuropathic character, involving mechanisms of central and peripheral sensitization. A key role in this process is played by the reorganization at the level of segmental structures (dorsal horns of the spinal cord,

spinal root ganglia). There is evidence of the involvement of suprasegmental structures in this process: structural and functional changes in the limbic system (thalamus, cingulate gyrus, insula, parahippocampal gyrus) have been identified in patients with chronic myofascial pain syndrome (Puntillo et al., 2021).

Clinical Presentation and Diagnosis of Chronic Musculoskeletal Pain. The diagnosis of myofascial pain syndrome is based on clinical manifestations and specific criteria defined for this condition. In 2017, the International Association for the Study of Pain (IASP) proposed diagnostic criteria for myofascial pain syndrome, which are divided into three minimally necessary criteria and six additional criteria (Nicholas et al., 2019; Li et al., 2020).

Minimally Necessary Criteria (all three must be present):

1. A palpable taut band within the muscle tissue.

2. Presence of hypersensitive spots within the taut band that, when pressed, cause pain, tingling, or other unpleasant sensations.

3. A region of referred pain for the affected muscle that, when pressed, causes pain in distant areas of the body.

Additional Criteria (some or all may be present):

1. Local muscle contraction when the taut band is palpated or percussed intermittently.

2. The «jump sign» where sudden pressure on the taut band causes a sharp pain.

3. Patient recognition of the pain when an active trigger point is stimulated.

4. Predictable patterns of referred pain.

5. Weakness or tension in the involved muscles.

6. Pain upon compression or stretching of the involved muscles.

Types of Myofascial Trigger Points. Myofascial trigger points are classified into two types: active and latent.

Active Trigger Points:

– characterized by spontaneous pain in surrounding tissues and/or distant anatomical areas.

– upon palpation, there is an increase in pain and local muscle contraction.

– these phenomena are explained by the heightened sensitivity of peripheral mechanonociceptors.

Latent Trigger Points:

– typically do not cause spontaneous pain; pain appears only with deep palpation.

– both active and latent trigger points can lead to: Muscle dysfunction, Muscle weakness, Restricted range of motion.

– atrophic phenomena are not typical for these points.

– in the absence of sustaining factors, trigger points may disappear on their own.

By recognizing and understanding these criteria and characteristics, healthcare professionals can more accurately diagnose and manage myofascial pain syndrome, improving patient outcomes.

Challenges in Diagnosing Myofascial Trigger Points. There is no single standard for diagnosing myofascial trigger points. The most common diagnostic criteria include local tenderness, referred pain, and twitch response during palpation. However, the primary method for diagnosing trigger points remains palpation (Barbero et al., 2019), despite its low sensitivity and specificity. Palpatory diagnosis is highly subjective and relies entirely on the experience and attentiveness of the specialist. It is particularly challenging to identify trigger points in deep muscle layers and in patients with excessive body mass. Even when assessed blindly by two independent experts, the examination data may not match. Active trigger points are almost always located in muscles such as the trapezius, levator scapulae, and occipital muscles. Latent trigger points can be found in healthy individuals who may not present any complaints (Lluch et al., 2015; Baeumler et al., 2023).

Currently, there are no universally accepted methods (biomarkers, electrophysiology, imaging, diagnostic blocks, etc.) for the objective assessment and identification of myofascial trigger points. The credibility, sensitivity, and specificity of clinical tests for diagnosing myofascial pain syndrome are also not established. Myofascial pain syndrome is usually diagnosed when no other clearly defined causes of pain are found (Lluch et al., 2015).

Some studies (Quintner et al., 2014; Shah et al., 2015) that used algotensiometry have shown that the pain threshold of active trigger points is lower than that of latent trigger points and healthy tissues, but this difference was not statistically significant. Microdialysis studies have investigated biochemical indicators in active trigger points of the trapezius muscle in patients with neck pain. They found a decrease in pH and an increase in the concentration of algogenic/inflammatory substances compared to latent trigger points and healthy tissues. Elevated levels of algogenic/inflammatory substances were also found in other areas of muscles not associated with trigger points. This may be explained by inflammation caused by tissue damage or changes in the function of peripheral nerves.

Myofascial Trigger Points and Diagnostic Imaging. There have also been attempts to use ultrasound diagnostics and elastography to detect myofascial trigger points (Ball et al., 2022; Chen et al., 2024). Some studies

have shown hypoechoic areas within the muscle thickness where trigger points are palpated, indicating zones of reduced echogenicity. Trigger point zones also had lower vibration amplitudes during external vibration due to their increased mechanical stiffness. This method is proposed for documenting identified myofascial trigger points.

Active trigger points are associated with significant heterogeneity in the affected muscle. For evaluating the vascular component, Doppler ultrasound was conducted, revealing increased retrograde blood flow in diastole in active and latent trigger points compared to healthy areas. The pulsatility index was higher in active trigger points compared to latent trigger points and healthy tissues.

Currently, besides ultrasound and elastography, other imaging methods are used to visualize myofascial trigger points (Do et al., 2018), such as magnetic resonance imaging (MRI), positron emission tomography (PET), and single-photon emission computed tomography (SPECT). However, these methods require further research to confirm their diagnostic value.

Principles of Treatment for Chronic Musculoskeletal Pain. The treatment of chronic muscle pain is based on the principles of treating the underlying disease. Based on a systematic analysis of international recommendations (Lin et al., 2019; Hawk et al., 2020, 2021) for managing various chronic musculoskeletal pains, the following main therapy principles are formulated:

– Patient-Centeredness: Actively involve the patient in decision-making regarding treatment and rehabilitation and support effective communication.

– Screening for Alarming Symptoms: Identify and evaluate potential serious diseases that may be masked as myofascial pain syndrome.

– Assessment of Psychosocial Factors: Determine and consider the impact of psychosocial factors on the course of pain.

– Imaging: Avoid indiscriminate use of imaging methods such as X-ray, MRI, CT, etc.

– Physical Examination: Conduct a thorough physical examination to identify myofascial trigger points and other possible causes of pain.

– Assessment of Treatment Dynamics: Regularly evaluate the effectiveness of proposed treatment methods and make necessary adjustments.

– Patient Education and Information: Provide the patient with information about myofascial pain syndrome, non-drug treatment methods, and prognosis.

– Support Physical Activity/Physical Rehabilitation: Encourage patients to engage in regular therapeutic exercises.

– Manual Therapy: Use gentle techniques (massage, post-isometric muscle relaxation, myofascial release, kinesiotaping).

– High-Quality Non-Surgical Care: Prefer the use of all conservative treatment methods before considering surgical intervention.

– Maintain Work Ability and Early Return to Work: Help patients maintain their work ability and return to work as soon as possible.

– Additional Treatment Methods: Medication therapy, physical therapy, acupuncture, psychotherapy.

– These principles aim to provide a comprehensive and patient-centered approach to managing chronic musculoskeletal pain, addressing both the physical and psychosocial aspects of the condition.

Discussion. Myofascial Pain Syndrome (MPS) is characterized by muscle pain related to trigger points, involving a complex interplay of neurogenic, ischemic, inflammatory, and psychosocial factors.

Mechanisms and Pathogenesis. Neurogenic Factors: Elevated nerve excitability and nociceptor sensitization are central to MPS. This aligns with findings from Fernández-de-Las-Peñas et al. (2023), who describe MPS as a nociceptive condition with potential neuropathic components.

Ischemic Factors: Localized hypoxia and reduced blood flow contribute to pain, reflecting insights from Graven-Nielsen (2006), who highlighted ischemia as a significant factor in muscle pain.

Inflammation: Inflammatory processes due to microtrauma are supported by findings from Li et al. (2020), which emphasize the role of inflammatory mediators in MPS.

Psychosocial Factors: Psychological stress and anxiety exacerbate pain, consistent with Camilloni et al. (2021), who noted the influence of psychosocial factors on chronic pain.

Diagnostic Approaches. Traditional diagnostics, including palpation, remain crucial but are limited by subjectivity. Chen et al. (2024) support the use of ultrasonography for detecting trigger points, while Ball et al. (2022) emphasize the importance of specificity in eliciting local responses.

Treatment Strategies. Physical Therapy: Effective for muscle pain relief, aligning with Barbero et al. (2019), who highlight physical therapy's role in managing musculoskeletal pain.

Manual Therapy: Techniques such as massage and myofascial release are beneficial, supported by Dommerholt et al. (2019), who review manual therapies' effectiveness in treating MPS.

Psychotherapy: Cognitive-behavioral therapy helps address pain's psychosocial aspects, as outlined by Hawk et al. (2021), emphasizing its role in pain management.

Medication: Pain relievers and antidepressants are used to manage symptoms, in line with the recommendations by the IASP Taskforce for the Classification of Chronic Pain (2019).

Prevention and Education. Preventive strategies focus on reducing stress, maintaining physical activity, and promoting a healthy lifestyle. Educating patients on self-care and non-medication treatments is crucial, supported by the guidelines from Hawk et al. (2020).

Conclusions

Muscle dysfunction associated with myofascial pain syndrome and its role in the onset and chronicity of musculoskeletal pain require further investigation. The etiology and pathogenesis of myofascial pain syndrome are not fully understood, but it is likely that multiple factors are involved, including: neurogenic mechanisms (increased excitability of nerve endings, sensitization of nociceptors); ischemic factors (disruption of blood flow in muscles, local hypoxia); inflammatory processes in muscles (microtrauma, inflammatory mediators); and psychosocial factors (stress, anxiety, depression).

Diagnosis of myofascial pain syndrome is based on clearly defined clinical criteria, palpatory diagnosis, and, in some cases, instrumental imaging methods. Differential diagnosis plays a crucial role in excluding other conditions that may mimic myofascial pain syndrome.

Treatment of myofascial pain syndrome should be comprehensive and individualized for each patient. The most effective treatment methods include:

– Physical Therapy: Exercises aimed at psychomuscular relaxation, improving blood circulation, and reducing pain.

– Manual Therapy: Gentle manual techniques targeting muscles and trigger points.

– Psychotherapy: Cognitive-behavioral therapy, psychorelaxation methods, mindfulness.

– Medication Therapy: Pain relievers, muscle relaxants, antidepressants.

It is important to make full use of all conservative treatment methods before considering surgical intervention. Additionally, educating patients on self-care, including non-medication-based methods and approaches, is crucial. Prevention of myofascial pain includes measures to: reduce physical and emotional stress, maintain regular physical activity, and lead a healthy lifestyle.

Prospects for future research. Further research should focus on: Exploring the mechanisms of action of various non-medication treatments for myofascial pain. Developing new methods for diagnosis and treatment. Continued investigation into these areas will enhance understanding and management of myofascial pain syndrome, potentially leading to more effective and targeted therapeutic approaches.

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