

Treatment of Chronic Myofascial Pain by Infiltration of Myofascial Trigger Points

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Abstract

Chronic musculoskeletal pain covers many diagnostic categories including injuries, fibromyalgia, myofascial pain syndrome, tension headaches, and lower back pain. Myofascial pain is a very common pain syndrome characterized by the existence of trigger points (points that spontaneously create pain), spreading pain, and partial muscle spasms. The pain can either be primary or secondary. Treatment of chronic myofascial pain is complex and demands a multidisciplinary approach. Trigger point (TP) infiltration is part of a complex, multimodal treatment approach of this pain syndrome which aims to reduce pain and allow further treatment.

Keywords: *Myofascial Pain; Trigger Point; Infiltration; Local Anesthetic; Pain Management*

Introduction

Pain of the musculoskeletal system is one of the most common and accounts for about 45% of all painful states [1,2]. Myofascial pain syndrome is a term which describes various painful conditions which are characterized by the presence of partial, striped muscular spasms in which the pain triggers (trigger points). The pain is of a regional character and begins in the trigger points which are located in the muscle or muscle fascia [3]. The pain can be accompanied by symptoms of the autonomic nervous system such as pale, cold skin, erythema (redness), hyperesthesia or hyperalgesia locally or in the zone of transferred pain. That is a very common reason for headaches, neck pain, and pain of the shoulder region (cervicobrachial syndrome, rotator cuff syndrome), lumbar region (lumbar syndrome), chest pain and so on [2].

It is important to differentiate myofascial pain syndrome from fibromyalgia. Fibromyalgia is specific and can be recognized by generalized pain and tender points. According to the classification of the American College of Rheumatology, the diagnosis of fibromyalgia can be established if at least 11 out of 18 tender points are painful on finger pressure (digital palpation) (9 on each side of the body). The usual localization of the tender points on one side of the body are:

- Where the sub occipital muscles attach
- Transversal attachments of the spinal cord C5 to C7
- M. trapezius (central axis)
- M. supraspinatus
- Bone cartilage on the second rib
- Epicondylitis radialis (2 cm distal)
- Regio gluteus lateralis (upper exterior quadrant)
- Trochanter major
- Knee joint mass medially proximal to the joint line [4,5].

Fibromyalgia is generalized while the myofascial pain syndrome is usually regional.

The main characteristics of myofascial pain are as follows:

- Active trigger points
- Latent trigger points
- Transferred pain
- Partial striped muscle spasm
- Jump sign
- Twitch response

The pain is most often of the regional character. It is important to distinguish between trigger points and tender points. The main difference between them is that the tender points are only painful on the place where the pressure is applied (palpation), and they do not propagate the pain, whereas palpation of the trigger point induces a jump effect, twitch response and propagated pain [6,7].

The term “active trigger point” is well defined, a hyperexcitation zone within the muscle or muscle fascia. It is mainly composed of spastic muscle fibers which cannot relax spontaneously. The trigger points size can vary from the size of a pea to the size of a thumb nail and can be palpated deep within the muscle [8-10]. The pain caused by an active trigger point is spontaneous and increases with palpation of the painful area. Trigger points can be primary, major (they create the most intensive pain), satellite (active trigger points in the same muscle, but create a pain of weaker intensity), and secondary (active trigger points in adjacent muscles) [10-13].

Latent trigger points have the same characteristics as the active ones, but they do not cause spontaneous pain, yet only when palpated.

Transferred pain represents the appearance of pain in a remote zone, which is one of the main characteristics of myofascial pain syndrome [14-17,22]. The most likely reason for transferred pain is spasmodic tape-irritated nerve endings and irritation of the nerves which transfer the pain to the innervation zone [18-21]. Transferred pain is one of the basic methods used to determine the trigger point location and its basic characteristics [22-25].

Partial muscular spasm is a spasm of muscle fibers that are in contact with target points and are palpable as well during a clinical examination [26-28]. The effect or jump sign is a reflex reaction of the patient to a vigorous and sharp pain when palpated. The jump effect is caused by the patient trying to avoid the pain during palpation, and it is one of the signs that the trigger point has been located [28-31].

The twitch effect is a reflex reaction of the muscle that manifests itself with a muscular twitch when the needle enters the trigger point or when the trigger point is actively stimulated. This is one of the signs that the needle is in the right place [32].

The essence of pathophysiological events and the cause of pain in trigger points are not clearly defined [33-36]. Some authors believe that algogenic substances, such as prostaglandins, histamine, and kinins produced in the target points are the cause of pain. Others believe that it's the result of prolonged muscle relaxation and subsequent ischemia, therefore the result and not the cause. There are opinions that denervation processes and consequent hypersensitization can be the cause of pain. It is possible that increased muscle spasms due to microlesions leads to prolonged contractions that cause prolonged ischemia, and this creation of algogenic substances and microlesions of the nerves, which results in denervation and hypersensitivity.

The basic clinical features of myofascial pain is that the pain is reflective and persistent and it can appear when the person is in a resting position as well as in movement. It's intensity increases during the night and when heated, it varies from a low degree of discomfort to a severe pain which prevents the patient from doing everyday activities. It rarely responds to classic analgesics [37-39].

In the institute “Niska Banja” multimodal therapy is carried out by a team of doctors which include an anesthesiologist, orthopedist, physiotherapist, rheumatologist, medical technicians and other medical staff.

Multimodal therapy, depending on the pain intensity, is an urgent method for the reduction of pain. The use of opioids (tramadol 400 mg) + Acetaminophen if pain intensity was more than 6 (VAS), NSAIDs highly selective COX2 inhibitors 7 - 14 days if the intensity of the pain was 4-6 (VAS), Acetaminophen if the pain intensity was 1-3 (VAS), use of antidepressants and antiepileptics in chronic myofascial pain. As far as the non-pharmacological treatment we cooled the are locally in the duration of 5 minutes for the first couple of days, after which we warmed the areas up, TENS, biofeedback, relaxation, massage, training abdominal breathing and relaxation.

After the reduction of pain under 3 (VAS) we started out with light stretching exercises (recovery of the muscles and restoration of movement), exercises to increase the aerobic muscle capacity and muscle strength exercises. We educated patients about the need and importance of daily exercise with moderate intensity in home conditions (aerobic exercises).

The goal of treating myofascial pain by infiltration of the trigger points

Infiltration of the trigger points with a local anesthetic is one of the methods in a complex multimodal treatment of chronic myofascial pain syndrome, which aims to quickly reduce the pain intensity and enable the patient to resume treatment (physical therapy) [40-44]. The aim of target point infiltration is to reduce the muscle spasm and intensity of the pain in order for the continuation of further treatment starting with physical therapy which is supposed to return the reduced volume of movement and increase the reduced muscle strength and aerobic capacity.

Post infiltration treatment

At the end of the infiltration, observation of the patient is necessary as well as post infiltration treatment which implies pharmacological and nonpharmacological treatment [40-45] (Table 1).

Pharmacological	Nonpharmacological
TIP – quick decrease of pain	
NSAID <ul style="list-style-type: none"> Highly selective COX2 inhibitors 7-14 days (VAS 4-6) Without gastroprotection if an ulcer is not present, or if the patient isn't taking an anticoagulant therapy. Absence of KI for COX2 inhibitors 	Local Cooling/Heating
Acetaminophen <ul style="list-style-type: none"> When the pain intensity is 1 - 3 VAS after NSAID if the pain decreased 7 to 10 days more. 	Change in lifestyle
Opioids (Tramadol) <ul style="list-style-type: none"> Pain intensity > 6 400 mg + Acetaminophen 	Physical therapy <ul style="list-style-type: none"> Light stretching exercises up to 0-3 Training for increased muscle strength and aerobic muscle capacity Biofeedback for relaxation Relaxation therapy through abdominal breathing
Antidepressives <ul style="list-style-type: none"> SRNI SSRI 	Education of Patients <ul style="list-style-type: none"> Protective positions The importance of continuous exercise Exercising at home
Anticonvulsives <ul style="list-style-type: none"> Pregabalin 75 - 600 mg Gabapentin 600 - 3600 mg 	
Myorelaxants	

Table 1: Post infiltration treatment

Experiences of the institute “Niška Banja” in treatment of myofascial pain by infiltration of target points

Multimodal therapy in the institute “Niška Banja” are carried out by an anesthesiologist, orthopedist, physiotherapist, medical technician, and others.

Work method

During 2013, 198 patients were treated for myofascial pain in our clinic, 78 male, and 120 female (Table 2).

Diagnosis	Male	Female	Total
Neck Pain	14	25	39
Shoulder Pain	20	31	51
Back Pain	19	29	48
Discopathy	10	9	19
Coxarthrosis	15	26	41
Total	78	120	198

Table 2: Patients treated in the clinic “Niška Banja” in 2013.

Before coming to our clinic, the patients were treated in institutions of primary and secondary level. All of them were on NSAID and physical therapy but without significant improvements.

In relation to the cause of myofascial pain, patients are divided into two groups. The first group was composed of patients with primary myofascial pain syndrome, where pain was the result of changes happening in the muscles. In our study there were 39 patients with neck pain (14 male, 25 female), 51 patients with shoulder pain (20 male, 31 female), 48 patients with back pain (19 male, 29 female). The aim of the therapy in these patients was completely pain management, secondary prevention and improvement of the quality of life. The second group was composed of patients with secondary myofascial pain syndrome where MF target points were present in addition with ligaments damaged by arthrosis, lumbar and cervical discopathy and similar. Pain was the result of poor posture because of the deformity and pain that caused the primary illness. Myofascial pain dealt synergistically with the pain caused by the primary illness, so the pain was grater in this group. The goal in this group was not complete elimination of the pain, yet only the myofascial pain, reducing the pain intensity, improving the quality of life, and finally solving the primary illness (arthrosis of the discus). If eliminating the main cause of pain is impossible, infiltration of the target points is used as a supportive therapy. Active target points can give similar symptoms to discopathy so a good evaluation is essential in order to avoid error. There were 19 patients in this group with discopathies (10 male, 9 female), 41 with coxarthrosis (15 male, 25 female). In total there were 78 male and 120 female patients.

Before the procedure, patients are orally informed about the advantages and risks of the method, as well about the way in which it was performed, after they gave an oral consent for the procedure. A direct and indirect “wet needle” technique was used. The needle size was 0.8 x 40; 0.8 x 50 and 0.6 x 30 mm. In one session 3 - 5 trigger points were treated, because it is shown that treatment of only one point did not give good results. The anesthetic used was 0.25% Bupivacaine so the patient received a total dose of 15 ml 0.25% of Bupivacaine.

Each target point has its own transmitted pain pattern. Knowledge of this form is important for recognizing and locating the target points.

Infiltration technique – when the partial muscle spasm is located, a massage is performed a long the muscle until the appearance of “jump signs”, the point of the strongest pain and paraesthesia. This confirmed that the trigger point has been found. The trigger point is fixated and after disinfection the needle is inserted. The “twitch sign” (twitch of the muscle) or paraesthesia insure that the target point is reached, and after aspiration, the anesthetic is injected. Patients on anticoagulant drugs were not injected.

To determine the success of the therapy we used an EQ-5D scale and VAS rating scale.

Results and Discussion

When it comes to neck pain, the target points were most commonly found in the following muscles: m. trapezius (Figure 1), m. levator scapulae (Figure 2), m. deltoideus, m. serratus sup. posterior – in multifeeds.

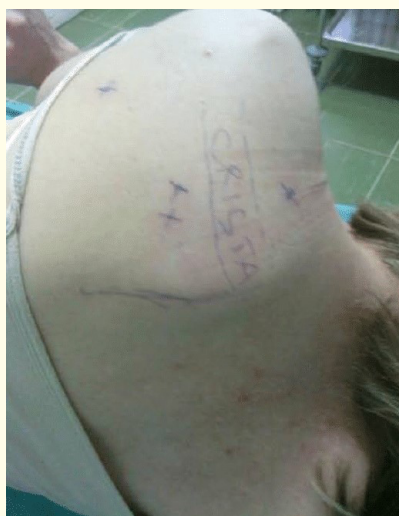
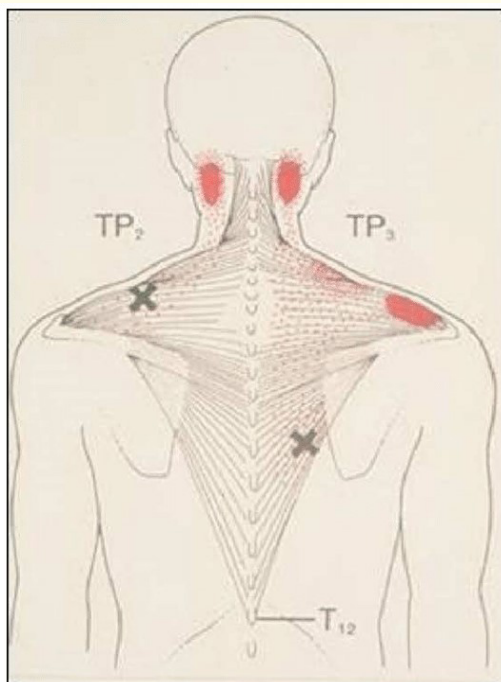


Figure 1: TP m. trapezius and transferred pain.

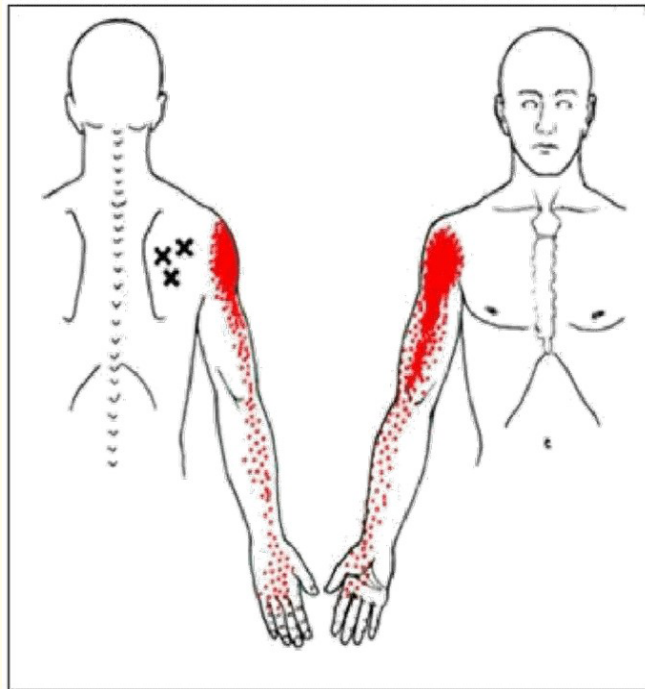


Figure 2: TP of *m. levator scapulae* and transferred pain.

In shoulder pain the most common location for target points are in: *m. suprascapularis* (Figure 3), *m. infrascapularis* (Figure 4), *m. subscapularis*, *m. deltoideus* and *m. teres minor*.

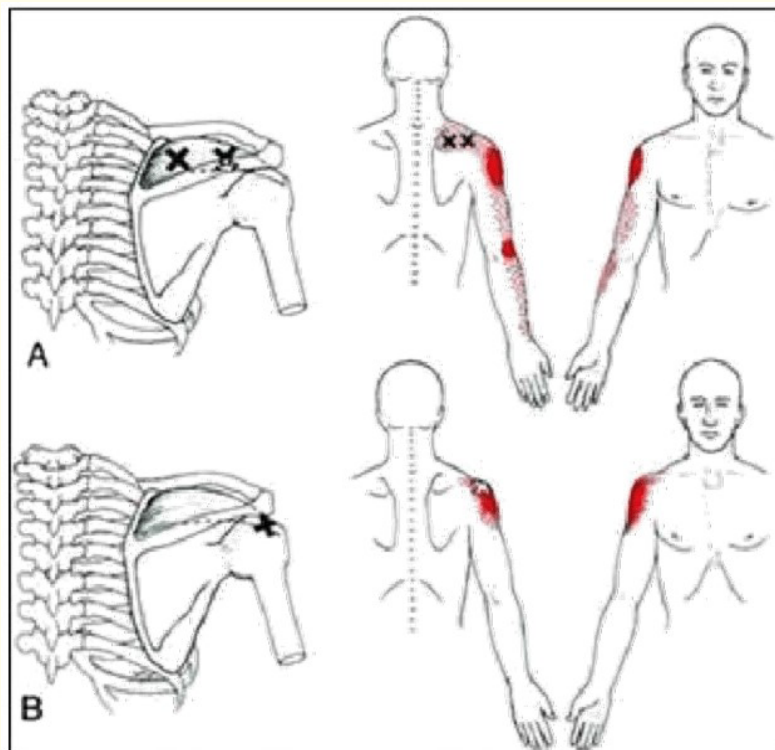


Figure 3: TP of m. suprascapularis and transferred pain.

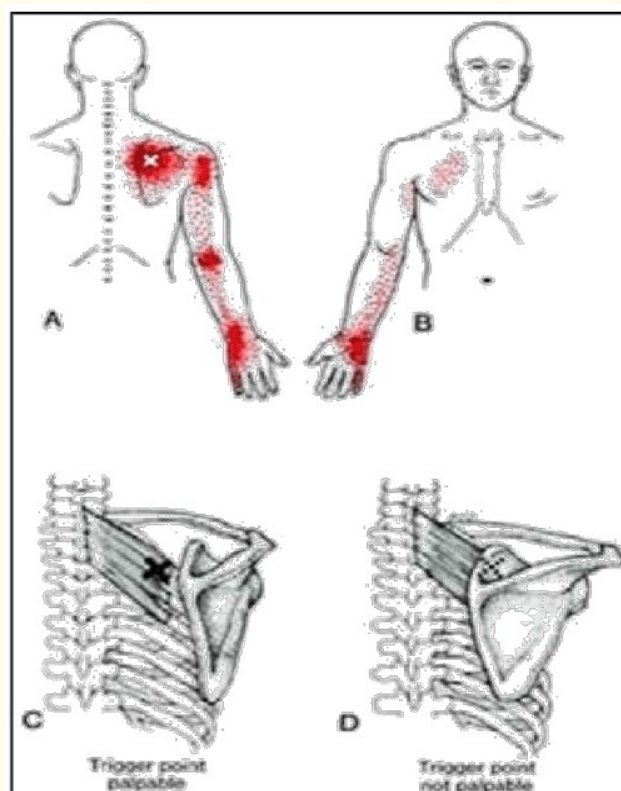


Figure 4: TP of m. infraspinatus and transferred pain.

In lumbar pain the most common muscles where the trigger points are discovered are: m. quadratum lumborum, m. iliopsoasis, m. gluteus minimus (Figure 5), m gluteus medialis (Figure 6), m.m. ileocostales and longissimus, m.m – multifeeds.

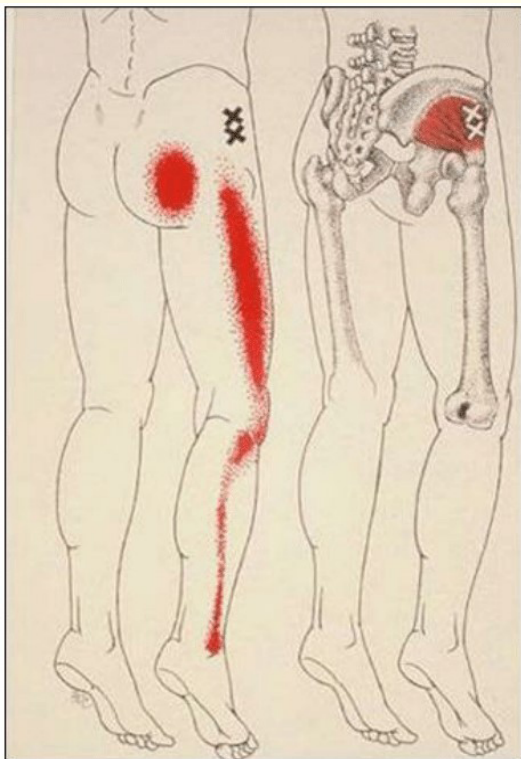


Figure 5: Target points of m. gluteus minimus and transferred pain.

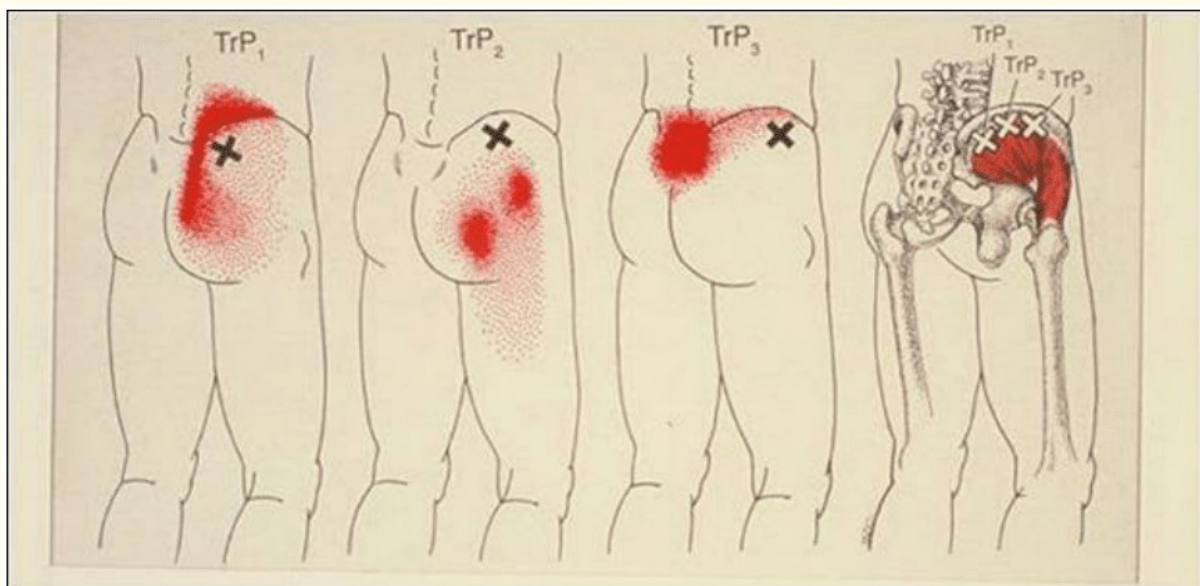


Figure 6: Target points of m. gluteus medialis and transferred pain.

Ultrasound can be used for locating the target points and administering anesthetics. We have used a linear probe at 15MHz. The target point is shown in m. trapezius in figure 7.

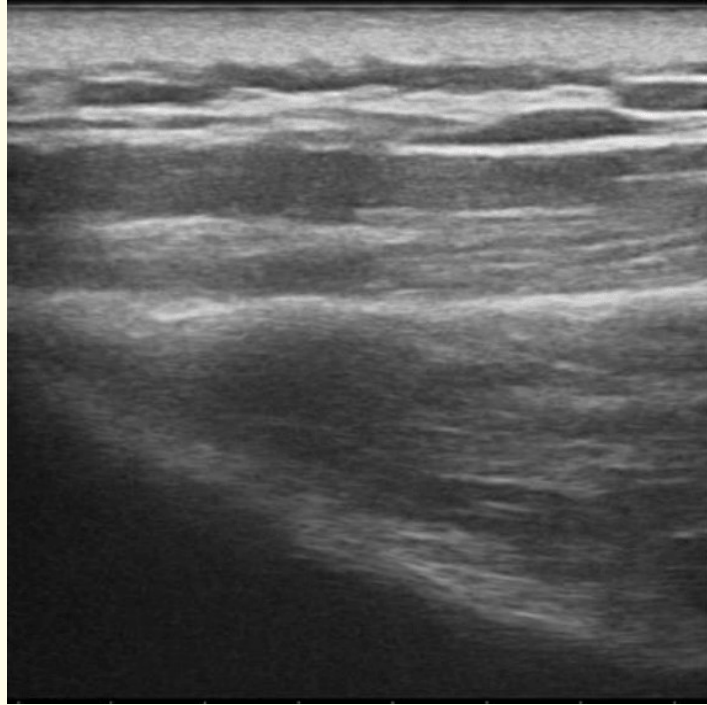


Figure 7: TP of m. trapezius under ultrasound.

The negative effects and complications that our patients experienced were

- Collapse of 5 patients (especially in sitting patients)
- Dizziness in 7 patients (lying position). The most probable cause of these negative effects is the duration of the procedure. The patients where the procedure was quick, there were no negative effects.
- Subcutaneous bleeding with visible skin hematoma in 11 patients
- Damaged muscle blood vessels in 4 patients (verified by aspiration of blood).

Other complications described in the literature (nerve damage, intravascular administration, pneumothorax infection) was absent.

For evaluation of the success of the treatment we used the EQ-5D and VAS scale rating. The average results of EQ-5D, in the primary myofascial pain syndrome before therapy, were 2.4 and 1.3 after therapy. The average values of the EQ-5D scale in the secondary myofascial pain syndrome were 2.7 before therapy and 2.1 after therapy.

Conclusion

Infiltration of the trigger points is a useful method in myofascial pain syndrome therapy, which can quickly reduce the pain. This therapy is only one segment in a complex multimodal treatment of chronic pain conditions. Because of the possible complications a good selection of patients and a good knowledge of the treatment technique are needed.

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