Original Article

The effectiveness of massage and muscle energy techniques in treating the myofascial syndrome in the back

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Abstract

The Myofascial Syndrome is characterized by a chronic, local, irradiating or reflex muscle pain, caused by myofascial trigger points determining a persisting contraction in the injured muscle and a limitation of the range of motion. The purpose of this paper is to particularize certain methods and techniques to diminish the symptoms of the myofascial syndrome. Thus, this article promotes a series of extremely effective methods and techniques that recorded beneficial long-term effects. The group of subjects consisted of 6 patients, divided in two, one experimental and one control group, the study being conducted over a period of 7 months. The experimental group benefited from multiple types, such as: myofascial, shiatsu, deep tissue (Cyriax) combined with muscle energy techniques, while the control group benefited from physiotherapy. This study used the following research methods: the theoretical documentation method, the observation, the inquiry, the experiment, methods of measuring, recording, analyzing and graphically representing the data. The assessment methods were complex, consisting in tests for the assessment of pain, contractures, and mobility, because knowing this data conducted the study toward adapting the rehabilitation program according to the subjects' particularities, from multiple points of view. At the end of the study, the data was presented and interpreted, with a global analysis of the group of subjects. The results show that the individualization of the treatment leads to an improvement of the symptoms by shortening the rehabilitation period and maintaining the beneficial effects on the muscle fiber for a long time.

Key Words: pain, pain reflex contracture, trigger points, massage.

Introduction

The myofascial pain syndrome (MPS) represents a substantial part of acute or chronic pain manifested by overcoming the limitations of the normal physiological reaction to certain stress factors, characterized by pain, caused by the presence of multiple trigger points (Starlanyl, Sharkey, 2013).

Pain causes muscle tension, which in turn intensifies stress, the latter increasing the physiological answer through muscle tension, thus forming a vicious circle: stress - spasm (muscle tension) - pain - spasm (Simons, Mense, 2003:419-424). Clinically, trigger points (TP) divide into: active, latent, central, attached, satellite, with a local spasmodic response, with radiating pain, etc. The first ones are rarer and are characterized by spontaneous pain that is intensified during muscle stretches, while the others are very common and can be identified only through palpation, causing the myofascial pain syndrome (<http://emedicine.medscape.com/article/313007>, <http://emedicine.medscape.com/article/305937>). The contraction nodules compress the capillaries accompanying each muscle fiber, determining ischemia or focal hypoxia areas (Davies Clair et al., 2001:15-35).

Central trigger points (CTP) always emerge from the middle of the muscle fiber, where there is a synaptic connection between the motor neuron and the muscle fiber (Mense S., Gerwin R.D., 2010:86-100). Histologically, in the TP one can see dystrophic changes in the muscle tissue; muscle fiber edema with an increase in the extracellular space; edema and constriction in the sarcomeres, tense stretch of the ones near the fiber; structural changes in the myofibril and a knitting of the sarcomeres with the connective tissue in a fan shape where there are more collagen fibers than elastic ones. When a hypertonic muscle is sectioned transversally, one can observe that some muscle fibers are larger, with a significant increase in their diameter, compared to other muscle fibers in the same muscle.

The mentioned substances contribute to the increase of the capillary wall permeability, and as a result the plasma proteins extravasate. Palpatory, the TP present themselves as solid nodules in the edema area (Resteghini, 2016).

Materials and methods

This study started from the *hypothesis* stating that the application of multiple types of massage could have an increased effectiveness in diminishing the symptoms caused by the myofascial pain syndrome and could shorten the rehabilitation period, thus contributing to maintaining certain beneficial effects on the muscle fiber

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for a longer period of time. The study was performed on a group of 6 female subjects, diagnosed with myofascial pain syndrome, divided into two groups, an experimental and a control one. The experimental group received multiple types of massage, such as: myofascial release, deep tissue massage, shiatsu, combined with Muscle Energy Techniques, applied on the injured muscles. Each patient benefited from 10 sessions, conducted three times per week, with one or two days break, in order to prevent muscle inflammation. The techniques applied during the treatment were carefully particularized and individualized according to the subjects' symptoms, both during and over the course of the treatment or sessions.

Table 1. Experimental group

<i>Initials</i>	<i>Gender</i>	<i>Age</i>	<i>Diagnosis</i>
B.S.	F	36	Cervicalgia; neurovegetative disorder; myofascial pain syndrome
C.L.	F	42	Cervicalgia; persistent somatoform pain disorder
B.E.	F	28	Cervicalgia; neurovegetative disorder; persistent myofascial pain syndrome

Table 2. Control group

<i>Initials</i>	<i>Gender</i>	<i>Age</i>	<i>Diagnosis</i>
I.I.	F	48	Cervicalgia; neurovegetative disorder; persistent myofascial pain syndrome
B.S.	F	43	Neurovegetative somatoform disorder; persistent somatoform pain disorder
A.S.	F	32	Neurovegetative disorder; persistent myofascial pain syndrome

The selection criteria were: the absence of contraindications such as: infections diseases, phlebitides, major dermatoses, malign dyskeratoses, inflammatory rheumatism in the acute phase, vascular fragility, cutaneous disorders; the presence of clinical manifestations of MPS, such as: pain, muscle contractures and indurations, muscle stiffness; the patients' agreement; being over the age of 18.

The assessment used: the Visual Analog Scale (Mungiu, 2007, p.143) for the longitudinal and transverse palpation of the cervical-dorsal muscles (muscle insertions in the occipital area, upper trapezius, scalenus muscles, supraspinatus, infraspinatus, subscapularis, rhomboid muscles, latissimus dorsi), the contracture test (in the upper trapezius, supraspinatus, scalenus muscles), functional tests (Schober, Ott, the chin-sternum distance, occiput-wall distance, acromion-tragicus distance) (Balint, 2007). Based on the assessment, the functional diagnosis was established for each patient, however the general symptoms observed in the group of subjects were: pain during the muscle palpation, presence of trigger points, pain reflex contractures, muscle indurations, limitation of cervical motions. To achieve the desired goals (diminished pain, reduced muscle contractions and indurations, improved joint mobility and activated local circulation), the myofascial release, the deep tissue massage, shiatsu and Muscle Energy Techniques were used in an individualized manner.

The treatment sessions started with the myofascial release, because the slow performance rhythm and low tissue pressure helped decongest the fascias, at the same time producing an intense activation of blood and lymphatic circulation. After that, the effects were completed with shiatsu techniques, mobilizing the muscle mass every way, using the palms, the heel of the hand, and the thumb (according to how much the patients can stand, and the state of their tissue), and the deep tissue massage where needed, at the insertions of the following muscles: upper trapezius, neck, scalenus, sternocleidomastoid, supraspinatus, infraspinatus, subscapularis, rhomboid muscles, latissimus dorsi, and the intertransversarii and interspinales ligaments. The Muscle Energy Techniques were aimed to increase suppleness in the periarticular elements, especially in the muscles, because during the contraction the Golgi tendon organs send a signal to the central nervous system, which will dictate the relaxation of the muscle, protecting it against injury (Mârza Dănilă, Popa, 2015). For this, the muscles acted upon were: upper trapezius, scalenus, sternocleidomastoid, supraspinatus, infraspinatus, levator scapulae, subscapularis, rhomboid muscles, latissimus dorsi, etc. The control group benefited from pain management physical therapy, such as: electrotherapy using TENS currents, ultrasound and laser, for 10 sessions.

Results and Discussions

Visual Analog Scale results

This sub-chapter analyzes the results recorded by both groups of subjects, and calculates the averages of the results recorded during the initial and final assessments

Although the VAS assessment is considered to be subjective, because the patients must communicate from their perspective the intensity of their pain, a decrease in pain perception was observed in the entire group, after the massage, from values between 8 and 9, signifying an exacerbation of sensations with 5 active myofascial trigger points, to values between 0 and 2, representing a lack of pain, or a mild discomfort during palpation.

Fig.1. Visual Analog Scale results - experimental group

The most significant results were recorded by patient B.S. in the experimental group, who lost all of her pain. Patient C.L. reacted slower to the treatment, thus at the end she still felt a discomfort during muscle palpation, with values between 1 and 2.

Fig.2. The Visual Analog Scale results - control group

The control group subjects, who benefited from pain management physical therapy, did not record results as good as the experimental group, their final VAS values being between 1 and 7.

Muscle contracture test results

Table 3. Contracture test (experimental group)

Initials	Trapezius Initial	Trapezius Final	Supraspinatus Initial	Supraspinatus Final	Scalenus Initial	Scalenus Final
B.S.	positive	negative	positive	negative	positive	negative
C.L.	positive	negative	positive	negative	positive	negative
B.E.	positive	negative	positive	negative	positive	negative

Table 4. Contracture test (control group)

Initials	Trapezius Initial	Trapezius Final	Supraspinatus Initial	Supraspinatus Final	Scalenus Initial	Scalenus Final
I.I.	positive	positive	positive	negative	positive	positive
B.S.	positive	positive	positive	positive	positive	positive
A.S.	positive	negative	positive	negative	positive	positive

During the initial assessment for the muscle contracture test, each subject recorded positive values, while during the final assessment the experimental group recorded negative values, meaning that the effects of the treatment were beneficial to the contracted muscles. The control group patients recorded muscle contractions also during the final assessment.

Spine mobility test results

At the end of the massage and Muscle Energy Techniques intervention, a considerable increase in the spine mobility was recorded in the experimental group subjects, the mobility being increased by minimum 1 cm in each subject. The control group subjects kept almost the same spine mobility values, the highest improvement being of 1 cm.

Fig.3. Spine mobility test results - experimental group

Fig.4. Spine mobility test results - control group

In the case of *patient B.S.* of the experimental group, the initial positive tests were observed for the scalenus, trapezius, and supraspinatus muscles. The spine mobility testing was necessary to observe the effectiveness of the techniques applied to fight muscle contraction and improve ligament elasticity. Initially, for the Schober sign, the values were of 2 cm, and finally the distance between points has increased by 2 cm; the Ott sign has increased from 2.5 cm to 3.9 cm; the chin-sternum distance has decreased by 4 cm, getting from 5 cm to 1 cm; the occiput-wall distance has decreased from 1 cm to 0 cm; the trapezius-acromion distance has decreased from 3.5 cm to 1 cm. The dynamics of the recorded values shows a rehabilitation of the spine mobility close to the normal values. At the end, the experimental group patients were able to perform motions in different planes, freely, without muscle stiffness and tension. Also, their pain had almost completely disappeared.

Subject C.L. During the initial testing of muscle contraction, it was observed that the most affected muscles were upper trapezius, supraspinatus, and scalenus. Initially, for the Schober sign, the values were of 1.8 cm, and finally the distance between points has increased by 2 cm; the Ott sign has increased from 2.5 cm to 3.8 cm; the chin-sternum distance has decreased by 4 cm, getting from 5 cm to 1 cm; the occiput-wall distance has decreased from 1.5 cm to 0 cm; the trapezius-acromion distance has decreased from 4 cm to 1 cm. The dynamics of the recorded values shows an improvement of the spine mobility close to the normal values.

Subject B.E. The positive initial tests were on the scalenus, trapezius, and supraspinatus, which finally showed negative results. Thus, it can be concluded that the application of the decontracting procedures were beneficial to muscle elasticity. Initially, for the Schober sign, the values were of 2 cm, and finally the distance between points has increased by 2.5 cm; the Ott sign has increased from 2.5 cm to 4.2 cm; the chin-sternum distance has decreased by 3 cm, getting from 4 cm to 1 cm; the occiput-wall distance has decreased from 1.5 cm to 0 cm; the trapezius-acromion distance has decreased from 3.8 cm to 1 cm.

As shown in Figure 4, the control group patients did not record an obvious improvement, their initial and final results being at almost the same level. The values for the myofascial trigger points assessment test remained positive, except in patient B.S., who recorded negative values because of other factors related to her lifestyle.

Conclusions

The initial hypothesis was confirmed, the application of multiple types of massage has had an increased effectiveness in diminishing the symptoms caused by the myofascial pain syndrome, and has shortened the rehabilitation period, thus contributing to maintaining certain beneficial effects on the muscle fiber for a longer period of time.

The types of massage that were used, adapted, and particularized according to each patient's symptoms did help improve pain, fight contractures, indurations, and improve the muscle fiber elasticity.

The Muscle Energy Techniques that were applied to the injured muscles have improved the cervical spine mobility and have contributed to correcting the muscle imbalances caused by maintaining the pain reflex positions for a long time. The results recorded by the experimental group were better than the ones recorded by the control group, because the treatment methods had a direct mechanical influence on the fascias and the injured muscles.

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