Myofascial Trigger Points Pressure Release Versus Exercises Therapy in the Treatment of Chronic Cervical Myofascial Pain Dysfunction Syndrome

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ABSTRACT

The purpose of this study was to compare the effect of myofascial trigger points pressure release versus exercises therapy in chronic cervical myofascial pain dysfunction syndrome. It was found that each of the pain intensity, the neck disability index, and the range of motion of active neck side bending were more significantly improved in the group of myofascial trigger points pressure release. Three treatment sessions of myofascial trigger points pressure release are enough, while at least three sessions of exercises are necessary; for the treatment of chronic cervical myofascial pain dysfunction syndrome.

Key Words: *Cervical myofascial pain dysfunction syndrome, myofascial trigger points pressure release, exercises therapy.*

INTRODUCTION

Cervical myofascial pain dysfunction syndrome has a very high incidence; it also has a very high recurrence rate[3]. Among 164 patients suffering from chronic head and neck pain, 55% had myofascial pain dysfunction syndrome[17]. A study by Schifmann and colleagues (1990)[41] upon 269 subject showed that 33% of the neck pain patients have myofascial trigger points in the upper trapezius muscle.

Myofascial pain dysfunction syndrome is a result of hyperirritable spots located within a taut band of skeletal muscle fibers. These spots are called myofascial trigger points, which are painful in compression and give rise to referred pain, tenderness, muscle tightness, and fascial restriction[40]. Hou and colleagues (2002)[23] described neck pain, headache, muscle stiffness, dizziness, sweating, nausea, vomiting, and insomnia as the common complaints of patients suffering from cervical myofascial pain dysfunction syndrome. They mentioned that the most muscle to be affected by that syndrome is the upper trapezius muscle. Poor neck posture, acute trauma (whiplash injury), and muscle overload are the major causes of upper trapezius myofascial pain[3]. Simons and Travell (1999)[42] stated that trigger points in the upper trapezius refer pain to the forehead, angle of the mandible and side of the neck.

Several physical therapy modalities have been utilized for the treatment of myofascial pain dysfunction syndrome, such as; transcutaneous electrical nerve stimulation, iontophoresis, interferential current stimulation, ultrasonic, acupuncture, and hot packs[21,34]. Soft tissues manual therapy techniques can be used successfully, either as a sole modality or in conjunction with other physical therapy modalities; for the treatment of muscle-fascia disorders in myofascial pain dysfunction syndrome[38]. Manheim (2001)[31] recommended myofascial release as the treatment of choice, if the patient has a chronic condition that causes tightness and restrictions in the soft tissues; which are characteristics of cervical myofascial pain dysfunction syndrome.

Barnes (1999)[4], Manheim (2001)[31], and Baldry and Thompson (2005)[3] said that myofascial trigger points pressure release focuses directly on the restricted myofascial elements within which the myofascial trigger points are located. They stated that most of other treatment modalities rather than myofascial release are ineffective because the myofascial tightness remains untreated, and the normal pain-free function cannot be resumed.

Stretching is complementary to myofascial trigger points pressure release as Holey and Cook (1997)[22] demonstrated that, a myofascial trigger point is effectively deactivated if the muscle in which it lies is restored to its normal resting length. Exercises therapy has been used effectively in the treatment of musculoskeletal disorders such as

myofascial pain dysfunction syndrome. Exercises are intended to reduce pain, reduce muscle spasm, increase range of motion, and improve coordination of the muscles[35].

According to the literature, myofascial trigger points pressure release was used in treating trigger points of various body muscles, but not for the upper trapezius muscle, hence there is need to investigate the effect of myofascial trigger points pressure release in patients with chronic cervical myofascial pain dysfunction syndrome of the upper trapezius. Aim of the present study is to compare the efficacy of myofascial trigger points pressure release versus exercises therapy on the pain, functional status, and range of neck side bending in patients with chronic cervical myofascial pain dysfunction syndrome of the upper trapezius muscle.

MATERIALS AND METHODS

Thirty Subjects (9 males & 21 females), diagnosed as chronic cervical myofascial pain dysfunction syndrome (in one of the upper trapezei muscles), were selected for the study. Patients were excluded from the study if they have neck or shoulder surgery within the past year, clinical evidence of radiculopathy, or history of disk disease, degenerative joint disease, fracture, or dislocation in the cervical vertebrae. Subjects have been randomly assigned to two equal groups, so that 15 subjects have been assigned to group (A), and received myofascial trigger points pressure release of the upper trapezius muscle. The other 15 subjects have been assigned to group (B), and received an exercises program.

Both groups were evaluated for pain intensity, and neck side bending (to the opposite side of the treated upper trapezius muscle), before the first treatment session, after the fourth treatment session by two days, and also at three intermediate evaluations (before the second, third and fourth treatment sessions). Both groups were evaluated for the functional status before the first treatment session and after the fourth treatment session by two days. Pain intensity has been measured using visual analogue scale (VAS), the functional status has been assessed using the neck disability index (NDI), while the range of motion (ROM) of active neck side bending has been measured using OB Goniometer (Myrin Goniometer).

Myofascial trigger points pressure release technique was applied in the first group and consisted of two steps; the first step was to identify and locate the trigger points in the affected upper trapezius muscle, using trigger points palpation. Trigger points were identified and felt as firm and localized hyperirritable nodules within the belly of the muscle[40]. Palpation was followed by the second step; which is the trigger points pressure release technique[8]. As a beginning pressure, the length of time for each pressure varied from eight to twelve seconds, and then it was increased gradually for the maximum of twenty seconds[7,31]. The total duration of pressure was for five minutes or more (upon each trigger point) until the release was felt by the fingers[1].

Stretching of the upper trapezius was applied after the release technique[22,28]. Stretching was applied for four times in each set; and two sets were performed in each treatment session[26]. Stretching of the upper trapezius muscle was applied also in the second group. Then patients performed gentle range of motion exercises in the supine lying position[48]. Shoulder shrugging and isometric neck exercises were also applied, thereby strengthening the neck muscles[46]. All subjects were given postural exercises (as a home program), to be applied daily during the conduct of the study[48]. They were also instructed for advices to be followed[44].

RESULTS

The mean age of group (A) was 29, with a standard deviation of 7.8. Its minimum age was 21 years, and the maximum age was 45 years. The mean age of group (B) was 35.4, with a standard deviation of 8.9. Its minimum age was 20 years, and the maximum age was 49 years. A significant difference was found between the pre-treatment and post-treatment values of the pain intensity (VAS), and the functional scale (NDI); by the use of Wilcoxon signed ranks test. A significant difference was found between the pre-treatment and post-

treatment values of the range of motion (ROM) of active neck side bending; by the use of paired t-test.

Pain intensity curve (in group A) has been plotted according to the pre-treatment evaluation "1st evaluation" (before beginning of the first treatment session), and the post-treatment evaluation "5th evaluation" (after the fourth treatment session by two days), and also according to the three intermediate evaluations "2nd, 3rd & 4th evaluations" before each of the 2nd through the 4th treatment session (to determine the effect of the previous treatment session). The curve is shown in figure (1). The curve showed gradual decline of pain intensity. A mild decline of the pain curve occurred after the first treatment session, (evaluated before the second session). A moderate decrease of pain intensity was observed after the second treatment session. The most improvement began to occur after the third treatment session, and the decline decreased again, but with moderate improvement; recorded at the post- treatment evaluation (after the 4th treatment session by two days).

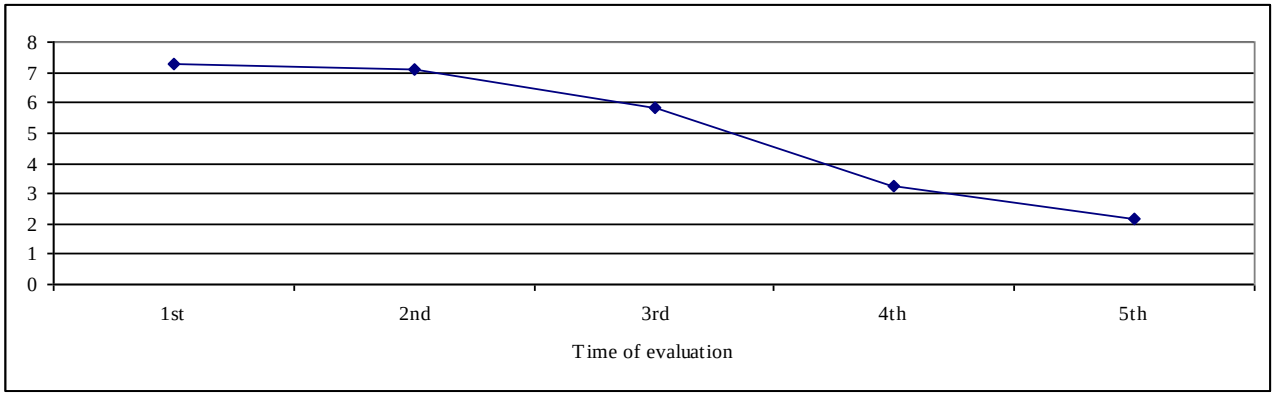

Fig. (1): Pain curve in group (A).

The range of motion curve for active neck side bending (in group A) has been made according to the five evaluation times. The curve is shown in figure (2). The curve illustrated that the range of motion of active neck side bending (to the side opposite to the affected upper trapezius) was increased gradually through the whole treatment sessions, with the most increase in the curve inclination recorded at the third evaluation, indicating that the most improvement was following the second treatment session.

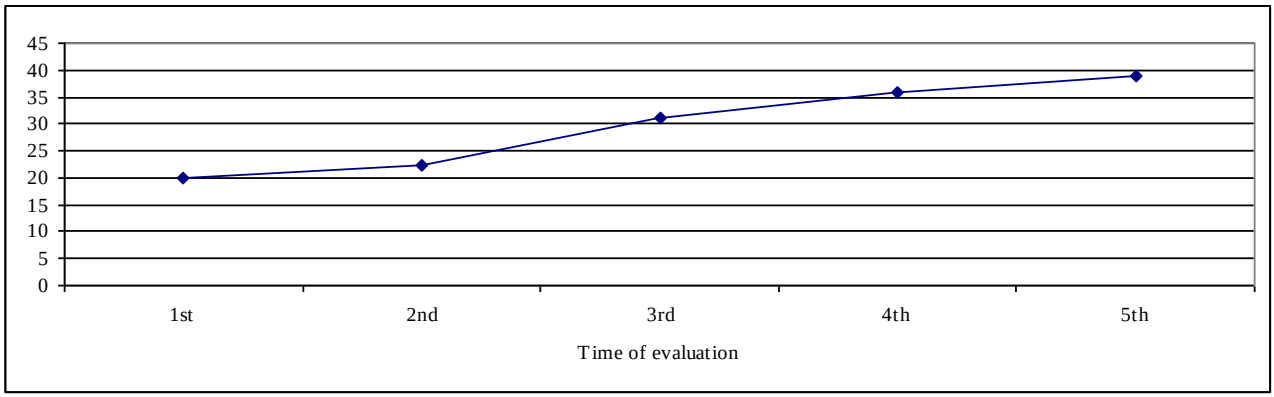

Fig. (2): Range of motion (ROM) curve of active neck side bending in group (A).

Pain intensity curve in group (B) is shown in figure (3). The curve showed a gradual decline of pain intensity. A mild decline of the pain curve occurred after the first treatment session, (evaluated before the second session). A moderate decrease of pain intensity was observed after the second treatment session. The most improvement began to occur after the third treatment session, and the decline decreased again, but

with moderate improvement; recorded at the post- treatment evaluation (after the 4th treatment session by two days).

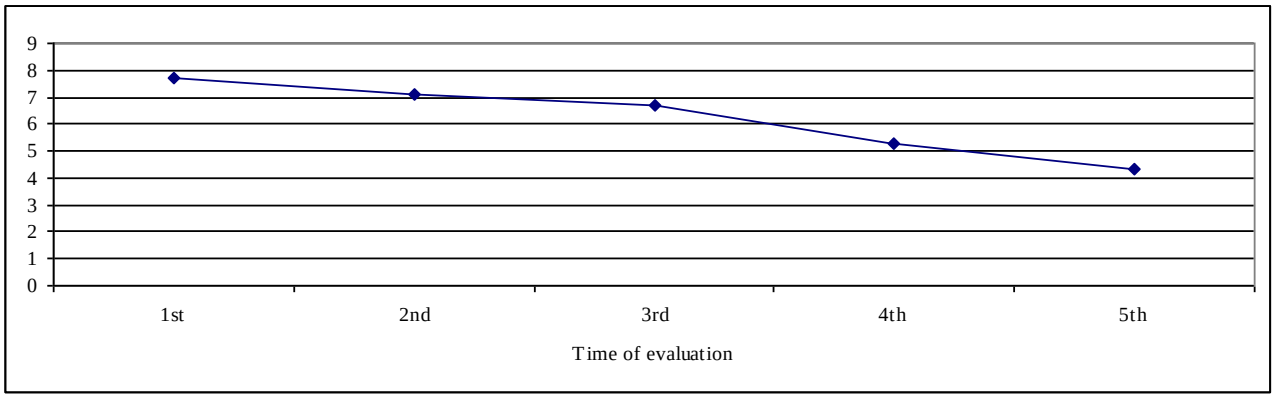

Fig. (3): Pain curve in group (B).

The range of motion curve for active neck side bending in group (B) is shown in figure (4). The curve illustrated that the range of motion of active neck side bending (to the side opposite to the affected upper trapezius) was increased gradually through the whole treatment sessions, with the most increase in the curve inclination recorded at the third evaluation, indicating that the most improvement was following the second treatment session.

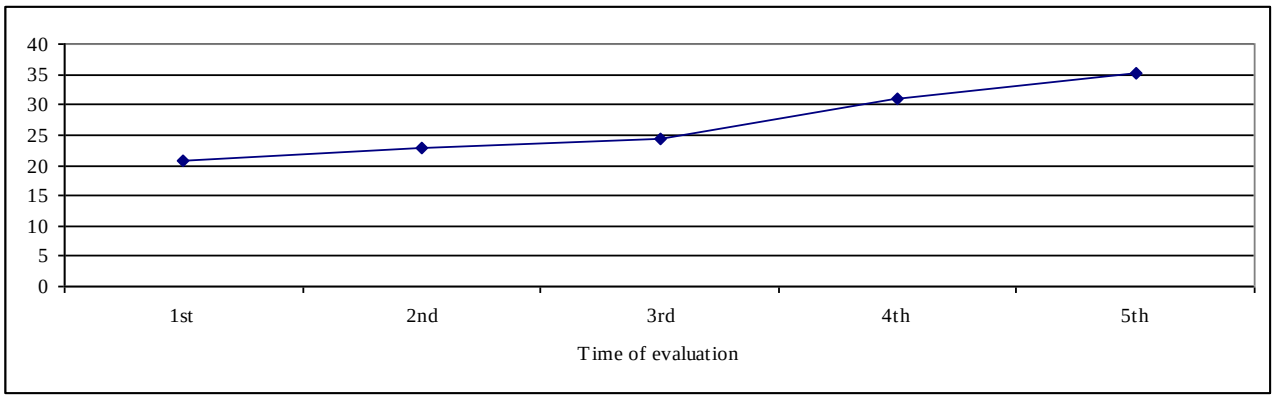

Fig. (4): Range of motion (ROM) curve of active neck side bending in group (B).

Mann-Whitney test has been used to compare between the pre-treatment mean values of pain intensity in both groups to ensure that there was homogeneity between these pre-treatment values. The same was done for the neck disability index (NDI) (non-parametric data). There was no significant difference between both groups, at the pre-treatment evaluation concerning, each of these two dependant variables. Independent T-Test has been also used to compare between the pre-treatment mean values of the range of motion (ROM) of active neck side bending (parametric data) in both groups. There was no significant difference between both groups at the pre-treatment evaluation.

Mann-Whitney Test has also been used to compare between the post-treatment mean values of pain intensity in both groups. The same was done for the neck disability index (non parametric data). Independent T-Test has also been used to compare between the post-treatment mean values of the range of motion of active neck side bending "parametric data" of both groups. A significant difference was obtained between both groups; concerning the pain intensity, the neck disability index and the

range of motion of active neck side bending, in favor of group (A).

Post Hoc tests were used within each group, to determine whether the differences between the successive evaluation times of pain intensity, and the range of neck side bending are significant or not.

No significant difference between the 1st and the 2nd evaluations of pain intensity in group (A); indicating no significant improvement after the 1st treatment session. It also indicated a significant difference between each of the 2nd and 3rd, 3rd and 4th, and between the 4th and 5th evaluations. The highest significance (hence the most improvement of pain) occurred after the 3rd session (recorded at the 4th evaluation). A significant difference was found between the 1st and 2nd, 2nd and 3rd, and between the 3rd and 4th evaluations of the range of neck side bending in group (A); with the most significance (hence the most improvement) after the second session (recorded at the 3rd evaluation). No significant difference was found between the 4th and 5th evaluation, so the last significant improvement has occurred after the 3rd session.

A significant difference of pain intensity in group (B), was only found between the 3rd and 4th evaluations (after the 3rd session), with no significant differences between other evaluations. There are no significant differences between each of the 1st and 2nd, and 2nd and 3rd evaluations of range of motion of active neck side bending in group (B). Significant differences were also found between each of the 3rd and 4th, 4th and 5th evaluations, with the most significance (hence the most improvement) after the 3rd session.

DISCUSSION

This short term study was designed to compare the efficacy of myofascial trigger points pressure release versus an exercises program in cases of chronic cervical myofascial pain dysfunction syndrome of the upper trapezius. Results of the study revealed that both of the independent variables were effective treatment modalities; as within each group there was a significant improvement in each of the pain intensity, the functional status, and the range of motion of active neck side bending. However, the myofascial trigger point's pressure release was more effective, so more beneficial than the exercises program; concerning each of the three dependant variables. Results indicated that three treatment sessions of myofascial trigger points pressure release are enough, while at least three sessions of the exercises program are necessary; for the treatment of chronic cervical myofascial pain dysfunction syndrome.

Unfortunately, there was no available published research work on the individual effects of myofascial trigger points pressure release in the cases of upper trapezius myofascial pain. However, it had been used in combination with other treatment modalities[23]. Other authors reported similar researches to the present study. However, myofascial trigger points pressure release was used in the treatment of myofascial pain dysfunction syndrome in other body muscles, rather than the upper trapezius. These muscles are the subscapularis muscle[26], iliopsoas muscle[29], neck and upper back muscles[20], scalenei muscles[43], and shoulder girdle muscles[14].

The results achieved by Hanten et al (2000)[20], are not similar to the results of our study. They divided 40 subjects with myofascial pain dysfunction syndrome of the neck and upper back muscles into two equal groups and used trigger points pressure release of the trigger points, followed by stretching exercises in one group. The other group received exercises only. Pain was measured by visual analogue scale and pain intensity has been decreased significantly within each group after the fourth session in group (A), and the fifth treatment session in group (B). In the current study, beginning of the significant decrease of pain intensity occurred after the 2nd treatment session in group (A) with the major improvement after the 3rd treatment session. The significant improvement of pain intensity in group (B) occurred only after the 3rd treatment session. Results of the current study indicated earlier pain relief than in the study by Hanten and colleagues. It also indicated that only three sessions are enough for pain relief in the group of myofascial trigger points pressure release, while at least three sessions are needed in the group of exercises program. The study of Hanten and

colleagues supports our results in that a significant reduction of pain intensity was found between both groups in favor of the group of myofascial release.

Results of the present study also conform to the results achieved by Ingber (2000)[26], concerning the decrease of pain intensity and increase of range of motion. Ingber used conservative care for three case studies of shoulder impingement syndrome in tennis racquetball players, they were treated with subscapularis myofascial treatment using weekly sessions of trigger points pressure release followed by therapeutic stretching. Patients had painful limited range of motion of shoulder abduction and internal rotation before the treatment sessions. Significant improvement of pain intensity and range of motion was reported after 2-3 treatment sessions, and subjects had almost returned to painless function after the treatment sessions, which were for six sessions.

The results of Kostopoulos and Lekkas (1995)[29] also support the results of the current study in the group of myofascial trigger points pressure release. They applied trigger points pressure release followed by stretching and strengthening exercises of the iliopsoas muscle in cases of iliopsoas myofascial pain dysfunction syndrome. The treatment resulted in a decrease of the pain intensity, decrease of the muscle tightness and restoring flexibility and range of motion, but they didn't specify the number of sessions needed for that.

It was found by Sucher (1990)[43] that myofascial release was very effective in cases of thoracic outlet with myofascial pain dysfunction syndrome. This technique helped to reverse the vicious circle of the syndrome and progressively decreased the myofascial tightness. Results of this study confirm our results because myofascial release caused decrease of pain intensity and increase of range of motion. He also did not determine the number of sessions needed to gain these beneficial effects. The study by Sucher differs from our study in the technique of myofascial release, as he used myofascial release as a general technique, while in the current study a specific myofascial release technique has been used for the trigger points themselves, which is myofascial trigger points pressure release.

Elpers and Griffith (1999)[14] demonstrated that the use of myofascial release techniques produced beneficial effects in cases of shoulder girdle myofascial pain dysfunction syndrome. It helped to reduce pain and release connective tissues and muscular restriction before therapeutic stretching exercises. The treatment sessions were given for 9 times while in our study it was only for 4 times. After 4 treatment sessions significant improvement occurred and resulted in an increase of the shoulder range of motion and a decrease of pain complaint. These results are near to the results of the current study in the group of myofascial release, concerning the most significant improvement of pain after the 3rd treatment sessions in the current study. However, our results contradict the their result concerning the range of motion in which the most increase occurred after the 4th treatment sessions, while in the current study the range began its significant improvement only after the third session.

There are multiple researches, which were case studies, such as that made by Ramsy (1997)[36] who investigated the effect of twelve sessions of myofascial release in one patient with masticatory myofascial pain dysfunction syndrome, the patient also received heat, massage and home exercises. After the treatment, there was significant improvement of pain intensity and no jaw pain was reported. However, twelve sessions are too much, our study was only for four treatment sessions and they were enough to produce significant improvement concerning the pain intensity, the functional status and the range of motion.

Manheim (2001)[31] also has found in his multiple case studies that myofascial release was effective in cases of masticatory myofascial pain dysfunction syndrome. He found that the treatment of the temporalis trigger point, using myofascial release was extremely effective and completely resolved the jaw pain complaint. Unfortunately, he also used general myofascial release techniques and not the technique that is specific for trigger points therapy; which is myofascial trigger points pressure release.

Case studies were chosen by researchers to investigate the effect of myofascial release in cases of myofascial pain dysfunction syndrome, because this design is particularly suitable for an in-depth investigation of the management of individual subjects. At the same time, they allow treatment to be tailored specifically to the needs of the subjects. However the results of such studies can not be generalized to the whole population[5]. So there was a need to make a study on a number of patients to determine the effect of myofascial trigger points pressure release in patients with cervical myofascial pain dysfunction syndrome, also there was a need to use the specific myofascial release technique for the trigger points themselves; which is the myofascial trigger points pressure release, therefore we applied our study.

The available explanation of beneficial effects of myofascial trigger points pressure release was summarized by Simons and Travell (1999)[42]. When digital pressure is applied then released upon the soft tissues, it improves the circulatory status in the area of the taut band, thus reversing the existent ischemia. In addition, there is mechanical stretching of the soft tissues until the elastic barrier is reached, and then a creep occurs. Local endorphin and enkephalin release also occurs in the brain, thus reducing the pain complaint[7].

Previous researches indicated that exercises have great benefits in cases of myofascial pain dysfunction syndrome even when used as a sole treatment modality. Lewitt and Simons (1984)[30] studied the effect of stretching on trigger points of various body muscles, and found that stretching produced immediate pain relief in 94% of 351 patients. These results are not similar to ours, as the exercises program in the current study produced a significant improvement of pain intensity only after the third session, and not immediately.

Burgess et al. (1988)[6] evaluated the effect of muscle chilling with ethyl chloride followed by stretching, compared with two groups of reflexive inhibition therapy, and a non-intervention in patients with myofascial pain of the trapezius, sternocleidomastoid, temporalis and masseter muscles. The dependant variables were the pain intensity, muscle tenderness and range motion. The first group had more significant improvement than the other two groups, in all of the dependant variables. This is similar to the results of our study in which there is beneficial effects on the pain and range of motion. Jaeger and colleagues (1986)[27] reported that vapocoolant spray could not produce anesthesia in the subcutaneous tissue or muscle because of the depth of the tissue. They suggested that, it is the stretch that resulted in the decrease of trigger point sensitivity, not the spray.

Ingber (1989)[25] recommended a home program of stretching exercises, following the trigger points dry needling. Sessions were at weekly intervals for 2-3 months. These long-term effects may be better than our short-term effects in the current study. That preference is because the short period of exercises application (in the current study) has resulted in a mild improvement of the pain until the third session (which produced the best improvement), and then the reduction of pain intensity was mild again, so a longer period of time may be needed to demonstrate the treatment effects more obviously.

Dall and colleagues (1993)[10] recommended that the treatment regimen for myofascial pain dysfunction syndrome should include stretching as it leads to a significant decrease of tenderness and a significant increase in the range of motion. These results confirm our results in the current study, in which there was a significant increase of the range of motion in the exercises group.

Arancio and Fricton (1993)[2] applied stretching exercises in a random controlled study, in cases of masticatory myofascial pain dysfunction syndrome. The results showed that the pain intensity decreased significantly, and the range of motion increased significantly only in the exercises group and not in the control group. These results confirm the beneficial effects of exercises on myofascial pain dysfunction syndrome.

Hou and colleagues (2002)[23] used spray and stretch technique, active range of motion exercises, TENS, hot packs, interferential current, ischemic compression, and myofascial release as a therapeutic combination in cases of myofascial pain dysfunction syndrome of

the upper trapezius. Results suggest that these therapeutic modalities are most effective for decreasing the pain, and increasing the neck side bending range of motion. This is different from the current study as the treatment has a combined effect, while in our study there is an individual effect for each one of the myofascial trigger points pressure release, and the exercises program.

The significant effects of the exercises are due to reducing the overlap between actin and myosin molecules, thus lengthening the shortened sarcomeres in the area of the taut bands. It also leads to wash of the metabolites caused by ischemia of the taut bands, hence reducing pain. Exercises also increase the range of motion restricted by muscle spasm, and strengthen the week muscles[12,19,33].

There are no pervious studies, that have compared the effect of myofascial trigger points pressure release of the upper trapezius muscle, versus the effect of exercises, in cases of cervical myofascial pain dysfunction syndrome. Hence this study has been made to compare their effect, on thirty patients with myofascial pain dysfunction syndrome of the upper trapezius muscle. The upper trapezius muscle was chosen in this study to be treated, because it is the most common cervical muscle to be affected by myofascial pain dysfunction syndrome[23].

There are other physical therapeutic modalities that can only add to the beneficial short term effects of myofascial trigger points pressure release or exercises. These modalities are such as ultrasonic[11,15,16], acupuncture[13,37], and TENS[18,49]. Such modalities cause an improvement in the signs and symptoms, and are not treatment for the pathological changes. That is because the short sarcomeres forming the taut bands are not stretched, and the release of the trigger points themselves does not occur[31], so they have only a temporary effect, without treatment of the pathology itself as do our treatments.

Myofascial trigger points pressure release and exercises were chosen to be used in the current study, also in preference to some modalities which are doubtful and have contradictory results. These modalities are such as dry needling, trigger points injection and interferential. They are supported in their efficacy by some studies[9,24,39], but other studies negate these effects[32,47].

There are some modalities that were previously used for the treatment of myofascial pain dysfunction syndrome but recent studies demonstrated their minimum treatment effects. These modalities are such as analgesics and muscle relaxants[11,45]. Therefore these modalities are not suggested to be used in addition to myofascial release or exercises, or compared to any one of them in this study or in other ones.

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الملخص العربي

الضغط الانفراجي لنقاط النسيج العضلي الضام المستهدفة مقابل التمرينات العلاجية في علاج الآلام المصاحبة للاختلال الوظيفي المزمن للنسيج العضلي الضام لعضلات الرقبة

إن مجموعة الأعراض المصاحبة لآلام الاختلال الوظيفي للنسيج العضلي الضام هي أحد المشاكل الشائعة في العضلات . لقد وجد أن الضغط الانفراجي لنقاط النسيج العضلي الضام له تأثيراته المفيدة المتعددة في حالات مجموعة الأعراض المصاحبة لآلام الاختلال الوظيفي للنسيج العضلي الضام في عضلات الجسم المختلفة ، لكن هذه التقنية لم تستخدم من قبل في حالات مجموعة الأعراض المصاحبة لآلام الاختلال الوظيفي المزمن للنسيج العضلي الضام للجزء الأعلى من العضلة المثلثة . لذلك فقد تم اختيار الضغط الانفراجي لنقاط النسيج العضلي الضام المستهدفة في هذه الدراسة ، لمقارنة تأثيره مقابل تأثير برنامج تمارين . تم اشتراك ثلاثون من مرضى مجموعة الأعراض المصاحبة لآلام الاختلال الوظيفي المزمن للنسيج العضلي الضام للجزء الأعلى من العضلة المثلثة ، وتم توزيعهم عشوائياً على مجموعتين . مجموعة (أ) : تتكون من خمسة عشر مريض ، وقد تلقوا العلاج بالضغط الانفراجي لنقاط النسيج العضلي الضام المستهدفة بالجزء الأعلى من العضلة المثلثة . والمجموعة (ب) : تتكون من خمسة عشر مريضاً ، وقد تلقت العلاج باستخدام برنامج تمارين . كانت مدة العلاج لمدة أربع جلسات . تم تقييم المرضى في المجموعتين قبل العلاج وبعده ، وأيضاً لثلاث مرات وسيطة ، لكلاً من شدة الألم ، والمدى الحركي للثني الجانبي للرقبة . كما تم تقييم إعاقة الرقبة قبل العلاج وبعده . وقد أظهرت نتائج الدراسة أن كلاً من المجموعة (أ) والمجموعة (ب) على حده قد حققت فروق إيجابية في كل من شدة الألم ، مؤشر إعاقة الرقبة ، والمدى الحركي للثني الجانبي للرقبة . وأظهرت المقارنة بين نتائج المجموعتين أن هناك فروق إيجابية بينهم ، لمصلحة المجموعة (أ) بخصوص كل العوامل المعتمدة على العلاج . لذلك فبعد أن تم اختيار الضغط الانفراجي لنقاط النسيج العضلي الضام المستهدفة في هذه الدراسة ، لمقارنة تأثيره مقابل تأثير برنامج تمارين . قد وجد أن الضغط الانفراجي لنقاط النسيج العضلي الضام المستهدفة له تأثير أفضل من برنامج التمارين ، في حالات مجموعة الأعراض المصاحبة لآلام الاختلال الوظيفي المزمن للنسيج العضلي الضام للجزء الأعلى من العضلة المثلثة .