

Efficacy of Myofascial Release in Chronic Masticatory Myofascial Pain Dysfunction Syndrome

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ABSTRACT

The purpose of this study was to investigate the effect of myofascial release in chronic masticatory myofascial pain dysfunction syndrome. Thirty patients were randomly divided into two equal groups. The first group received myofascial release of the masticatory muscles followed by an exercises program. The second group received the same exercises program only. Six treatment sessions were given for two weeks. It was found that pain intensity was more significantly lowered in group (A) than in group (B), while it was found that the range of motion of active mouth opening was increased significantly in each group, but no significant difference was found between both groups.

Key Words: Myofascial pain dysfunction syndrome, temporomandibular joint, masticatory muscles, myofascial release, exercises therapy).

INTRODUCTION

Myofascial pain dysfunction syndrome is a common muscular pain syndrome, resulting from myofascial trigger points, which are hyperirritable spots, located within a taut band of skeletal muscle fibers. These spots are painful in compression and give rise to characteristic referred pain, tenderness, muscle tightness, and fascial restriction²⁶.

The most common symptoms associated with masticatory myofascial pain dysfunction syndrome are; masticatory muscles spasm, temporomandibular joint pain, limitation and incoordination of mandibular movements⁶. Patients may have some form of painless unilateral or bilateral temporomandibular joints noises that were described as clicking and popping¹⁴.

Several studies emphasized the use of different modalities for treating myofascial pain dysfunction syndrome of the masticatory muscles. Treatment was usually in the form of

oral splints, electromyographic biofeedback, dry needling, trigger points injection, and occlusal equilibration^{7,9,14,18,21}.

Modalities that have been utilized within the scope of physical therapy to treat myofascial pain dysfunction syndrome, included the use of transcutaneous electrical nerve stimulation, interferential current stimulation, iontophoresis, ultrasonic therapy, acupuncture, and heat application^{21,24,28,29,31}.

Manual therapy has been also used for the treatment of myofascial pain dysfunction syndrome, in the form of trigger points compression and/or exercises³¹. Manual therapy is an adjunctive therapy that can be used as a sole modality or in combination with other therapeutic modalities, with the aim of improving function between the articulating surfaces of joints, eliminating soft tissue restriction, and restoring the resting length of muscles²¹.

Myofascial release techniques can be used in the treatment of chronic pain conditions including myofascial pain dysfunction syndrome²³. Myofascial trigger points are present in specialized soft tissue restrictions, which prevent smooth muscle contraction throughout the length of the muscle. Myofascial release is used to release the restriction within the muscles and the fascia as it focuses directly on the restricted myofascial elements³, so the muscle containing the trigger points should be treated using myofascial release¹⁷.

Most of other treatments rather than myofascial release are ineffective because the myofascial tightness remains untreated, thus the normal pain-free function can't be resumed³. One of the myofascial release techniques is myofascial trigger points pressure release, that is a very effective manual therapy used for release of the trigger points¹⁷.

According to the literature, myofascial trigger points pressure release was used in treating trigger points of various body muscles, but was not used specifically for the masticatory muscles, therefore there is need to investigate the effect of using myofascial trigger points pressure release in patients with myofascial pain dysfunction syndrome of the masticatory muscles.

The precise mechanisms that might account for the apparent efficacy of myofascial release techniques were stated by Labib, 2002¹⁶; who described the physiological effects of myofascial release and said that the gentle traction forces applied to the facial restrictions elicit heat, a vasomotor response, and increases blood flow to the affected part; enhancing lymphatic drainage of toxic metabolic wastes. He said that these forces also realign fascial planes, and most important reset the soft tissue proprioceptive sensory mechanism which reprograms the central nervous system enabling a normal functional range of motion without eliciting the old pain pattern. It was hypothesized by Sucher, 1990²⁷; that gentle sustained pressure allows a Localized stretching of the short sarcomeres and produces a rapid release of the taut band associated with the trigger points.

To treat the cause of disease of masticatory MPD, exercise therapy is a good choice. It has been used for a long time to treat musculoskeletal disorders, and has been claimed to be effective in the treatment of MPD. Exercise therapy is intended to improve coordination of the muscles of mastication, reduce muscle spasm, and alter the jaw closure pattern²² (Nicolas et al, 2000).

SUBJECTS, MATERIALS AND METHODS

Thirty female patients, between the age of 15-35 years old, having unilateral chronic myofascial pain dysfunction syndrome in one or both of the lateral pterygoid and masseter muscles have been classified randomly into two experimental groups; the first group (group A), consisted of fifteen subjects and have received myofascial trigger points pressure release in one or both of the lateral pterygoid (Fig. 1) and masseter muscle (Fig.

2), followed by exercises program. The second group (group B) consisted of fifteen subjects and have received the same exercises program. The treatment period was for six sessions, by the rate of three sessions per week. Both groups have been evaluated for pain intensity by the use of visual analogue scale and a standard ruler was used for measurement of the range of motion of active mouth opening; before the first treatment session, and after the sixth treatment session.

Myofascial Trigger Points Pressure Release technique was applied in two steps; the first step was to identify and locate the trigger points in one or both of the lateral pterygoid and masseter muscles by trigger points palpation. Then the second step has been applied, which was the trigger points pressure release. Trigger points were identified and felt as firm and localized hyperirritable nodules within the muscle fibers²⁵. The length of time, the pressure was maintained each time, has been varied from eight to twelve seconds as a beginning pressure, and then was increased gradually for the maximum of twenty seconds⁵.

The whole duration of application of the trigger points pressure release for each trigger point was for five minutes or more, until the discomfort level reported by the patient was decreased¹.



Fig. (1): Intraoral localization of the lateral pterygoid muscle.

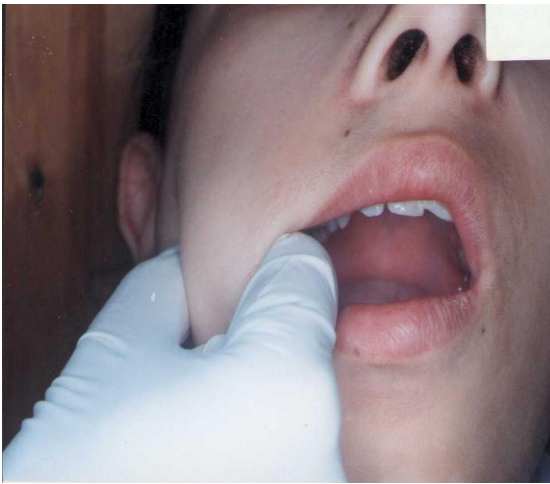


Fig. (2): Intraoral palpation of the masseter muscle.

The same exercises program has been received by both of the treatment groups in the form of stretching exercise of the masseter muscle and superior lateral pterygoid muscle by passive mouth opening, Passive mandibular side stretching exercise of the inferior lateral pterygoid muscle and controlled opening and

closure of the mouth with discouragement of any mandibular deviation.

RESULTS

The mean age of group (A) was 24.6, with a standard deviation of 6.81. The mean age of group (B) was 27.27, with a standard deviation of 7.15.

Within each group, the pre-treatment values of each one of the dependant variables; pain intensity and range of motion (ROM) of active mouth opening has been compared using the paired t-test, with the post-treatment values of the same parameters respectively, to find out the differences between the pre-treatment and the post-treatment results for each group.

Table (1) shows that paired t-test indicated a significant difference between the pre-treatment and post-treatment values for pain intensity in group (A). It also shows that a significant difference between the pre-treatment and post-treatment values for range of motion (ROM) of active mouth opening.

Table (1): Comparison between the pre-treatment and post-treatment values of the group of myofascial release and exercises program (group A).

Parameters	Mean difference	Standard deviation	t-test	Significance
Pain intensity	57.9333	12.0028	18.694	0.001
ROM	17.2667	2.6851	24.906	0.001

$P < 0.05$

Paired t-test for group (B) (Table 2) indicated a significant difference between the pre-treatment and the post-treatment values of pain intensity. It also shows a significant

difference between the pre-treatment and the post treatment values of range of motion (ROM) of active mouth opening.

Table (2): Comparison between the pre-treatment and post-treatment values of the group of exercises program (group B).

Parameters	Mean difference	Standard deviation	t-test value	Significance
Pain intensity	36.933	3.432	41.675	0.001
ROM	17.4667	3.4198	19.781	0.001

$P < 0.05$

Independent t-test has been used to compare between the pre-treatment values of pain intensity in both groups to ensure that there was homogeneity between these pre-treatment values. The same was done for the range of motion (ROM) of active mouth

opening. Table (3) shows that there was no significant difference between both groups at the pre-treatment evaluation; concerning each of the pain intensity, and the range of motion (ROM) of active mouth opening.

Table (3): Pre-treatment comparison between values of both groups.

Values	Group	Mean	Standard deviation	Mean difference	t-test value	Significance
Pain intensity	Group A	71.4	13.19	1.933	0.451	0.656
	Group B	69.466	10.098			
ROM	Group A	24.8	2.3	0.6	0.648	0.522
	Group B	25.4	2.746			

P < 0.05

At the post-treatment evaluation, independent t-test has also been used to compare between the post-treatment values of the measured parameters of both groups.

Table (4) shows that, a significant difference was detected between both groups

concerning pain intensity in favor of group (A). No significant difference was found between both groups concerning range of motion (ROM) of active mouth opening.

Table (4): Post-treatment comparison between values of both groups.

Values	Groups	Mean	Standard deviation	Mean difference	t-test value	Significance
Pain intensity	Group A	13.46	6.34	19.066	6.77	0.001
	Group B	32.533	8.8710			
ROM	Group A	42.06	2.71	0.8	0.964	0.345
	Group B	42.866	1.726			

P < 0.05

DISCUSSION

Results of the present study revealed in each group, a significant improvement in both of pain intensity and range of motion of active mouth opening, and showed that myofascial trigger points pressure release of the masticatory muscles followed by exercises, was more effective in reducing pain, compared to the exercises program only.

Unfortunately there was no available published research work on the use of myofascial release in cases of masticatory myofascial pain dysfunction syndrome. However similar results to the present study were reported by other authors, who used myofascial release in the treatment of myofascial pain dysfunction syndrome in other body muscles, such as; neck and upper back muscles¹², subscapularis muscle¹³, iliopsoas muscle¹⁵, scalenei muscles²⁷, and shoulder girdle muscles¹⁰.

The results achieved by Hanten et al., 2000¹², are 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 was found to be decreased significantly in each group. This study also supports our results in that a significant difference was found between both groups in favor of the first group; receiving myofascial release followed by the exercise program, concerning more significant reduction of pain intensity than in the second group that received the exercises program only.

Results of the current study also conforms to the results achieved by Ingber (2000)¹³, concerning decrease of pain intensity and increase of range of motion. Ingber (2000)¹³ used conservative care for 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 treatment sessions were of the same number of the current study but on weekly sessions.

The results of Kostopoulos and Lekkas (1995)¹⁵ support results of the current study, as 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 decrease of pain, decrease of tightness and restoring flexibility and range of motion. These results are similar to results of the present study in the group of myofascial release followed by the exercises program.

It was found by Sucher (1990)²⁷ 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 Sucher (1990)²⁷ confirm our results because myofascial release caused decrease of pain intensity and increase of range of motion, but the difference from our study was that Sucher 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.

The results of Elpers and Griffith (1999)¹⁰ were similar to that of Sucher (1990)²⁷. They demonstrated that the use of myofascial release techniques to reduce pain and release connective tissues and muscular restriction before therapeutic stretching exercises produced beneficial effects in cases of shoulder girdle myofascial pain dysfunction syndrome. The treatment sessions were given for 9 times while in our study it was only for 6 times. After 4 treatment sessions significant improvement occurred and resulted in both increase of shoulder range of motion and decrease of pain complaint.

Various studies investigated the effect of myofascial release as a general technique, and not specifically for the trigger points themselves, in cases of masticatory myofascial pain dysfunction syndrome.

These studies were case studies and were not applied on a number of patients, such as

that made by Ramsy (1997)²³ who investigated the effect of twelve sessions of myofascial release in one patient with 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. But twelve sessions are too much, our study was only for six treatment sessions and they were enough to produce significant improvement in both groups concerning pain intensity and range of motion of active mouth opening.

Manheim (2001)¹⁷ also has found in his multiple case studies that myofascial release was effective in cases of masticatory myofascial pain dysfunction syndrome and found that the treatment of temporalis active myofascial trigger point, using myofascial release was extremely effective and completely resolved the jaw pain complaint, but he also used a general myofascial release technique 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 masticatory 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 population⁴.

There was a need to make a study on a number of patients to determine the effect of myofascial release in patients with masticatory myofascial pain dysfunction syndrome, also there was a need to use the specific myofascial release technique for the trigger points which is "myofascial trigger points pressure release" that was used in our study. So this study has been made to determine the effect of myofascial trigger points pressure release on thirty patients with myofascial pain dysfunction syndrome of the masticatory muscles.

The technique of myofascial trigger points pressure release has been chosen as a specific technique for release of the trigger

points, and was applied on one or both of the lateral pterygoid and masseter muscles, in cases of masticatory myofascial pain dysfunction syndrome. Lateral pterygoid and masseter muscles were chosen in this study to be treated, because they are the most common masticatory muscles to be affected by myofascial pain dysfunction syndrome³¹.

The available explanation of the beneficial effects of myofascial trigger points pressure release in reducing pain intensity and increasing range of motion of active mouth opening, perhaps is due to the fact that; when digital pressure was applied to the soft tissues, various effects occurred such as; improving the circulatory status in the area of the taut band when the digital pressure was released, thus reversing the existent ischemia²⁶. Also there was mechanical stretching of tissues as the elastic barrier was reached, and creep occurred⁵. The mechanoreceptors were also stimulated so interfered with pain messages reaching the brain¹⁹. Local endorphin and enkephalin release also occurred in the brain, reducing the pain complaint⁵.

There are no previous studies that have compared the effect of myofascial release of the masticatory muscles followed by an exercises program, versus the effect of the same exercises program only, in cases of masticatory myofascial pain dysfunction syndrome.

Exercises have great benefits in cases of masticatory myofascial pain dysfunction syndrome even when used alone⁶.

Dall and Colleagues (1993)⁸ compared an exercises group, with a control group in patients with masticatory MPD. Subjects were treated using stretching exercises and showed a significant decrease of tenderness of masticatory muscles on palpation, and an increase of range of mouth opening. These results conform to results in the current study, in which there was increase of range of mouth opening in the exercises group.

The results of our study were similar to the results of Arancio and Friction (1993)² who studied the effect of stretching exercises on pain intensity and range of mouth opening in a group of masticatory myofascial pain dysfunction syndrome. Random controlled study was used as the study design. The results

showed that pain intensity decreased significantly and range of motion increased significantly only in the exercises group and not in the control group.

The significant effects of the exercises program, either combined with myofascial release in group (A) or used alone in group (B); concerning the reduction of pain intensity and the increase of range of motion of active mouth opening, perhaps is related to lengthening of the shortened sarcomeres in the area of the taut bands, and reducing the overlap between actin and myosin molecules, leading to decrease of the ischemia in the short sarcomeres²⁰.

Active exercises that were used after passive stretching was to restore the functional capacity of the masticatory muscles, increase mobility of the temporomandibular joint and enhance muscle coordination¹¹. These effects of exercises are convenient with the clinical picture of the masticatory myofascial pain dysfunction syndrome in which there is masticatory muscle spasm, temporomandibular joint pain, limitation and incoordination of mandibular movements⁶.

Myofascial trigger points pressure release followed by exercises program, or the exercises program alone can be very effective when added to the dental procedures, so that the interactive role of the physical therapist and the dentist is very important. When the physical therapy modalities investigated in our study, which gained beneficial short term effects are to be added to the dental procedures, long term effects are suspected to occur, that is because the causative factors, such as tense jaw muscles due to teeth clenching also will be treated. Such dental modalities are as oral splints which relax the tense jaw muscles, and reduce clenching of the teeth.

The purpose of the present study was to investigate the short term effects of myofascial release of the masticatory muscle; as these short term effects were not studied before in cases of masticatory myofascial pain dysfunction syndrome.

As this study is a short term effect study, so the data have been collected only during the period of the study. Long term effects has not been studied in the current study and follow up

study is recommended to be made as a next experiment to determine the long term effects of myofascial release of the masticatory muscles in cases of masticatory myofascial pain dysfunction syndrome.

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الملخص العربي

تأثير انفراج النسيج العضلي الضام على مجموعة الأعراض المصاحبة لآلام النسيج العضلي الضام لعضلات المضغ

إن مجموعة الأعراض المصاحبة لآلام الاختلال الوظيفي للنسيج العضلي الضام هي أحد المشاكل المزمنة الشائعة في عضلات المضغ . تم تصميم الدراسة الحالية لدراسة المدى القصير لتأثير انفراج النسيج العضلي الضام في هذه الحالات . وقد تم تجميع البيانات المختصة بمدى شدة الألم ومدى الحركة لفتحة الفم . إن انفراج 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 لعضلات المضغ . لذلك فقد تم اختيار انفراج النسيج العضلي الضام في هذه الدراسة لمقارنة تأثيره عند إضافته لبرنامج تمارين ، بتأثير استخدام نفس برنامج التمارين فقط . تم اشتراك ثلاثون من المرضى لمجموعة الأعراض المصاحبة لآلام الاختلال الوظيفي المزمن للنسيج العضلي الضام لعضلات المضغ في الدراسة الحالية . تم توزيع المرضى عشوائياً على مجموعتين : المجموعة (أ) : تتكون من خمسة عشر مريضاً وقد تلقوا العلاج بانفراج النسيج العضلي الضام بأسلوب الضغط على نقط الزناد في عضلات المضغ متبوعاً ببرنامج تمارين . المجموعة (ب) : تتكون من خمسة عشر مريضاً وقد تلقوا العلاج باستخدام نفس برنامج التمارين مثل المجموعة (أ) ، بدون استخدام انفراج النسيج العضلي الضام ، كانت مدة العلاج 6 جلسات . تم تقييم المرضى في المجموعتين قبل العلاج وبعده ، وأيضاً لخمس مرات وبسيطة باستخدام مقياس الألم بالبصر لقياس شدة الألم ، والمسطرة القياسية لقياس المدى الحركي لفتحة الفم . أظهرت نتائج الدراسة أن كل من المجموعة (أ) والمجموعة (ب) حققوا فروق إيجابية في كلاً من شدة الألم والمدى الحركي لفتحة الفم عندما تم مقارنة الوسط الحسابي للمتغيرات المقاسة قبل وبعد العلاج في كل مجموعة على حده . أظهرت المقارنة بين نتائج المجموعتين أن هناك فروق إيجابية بينهم بخصوص شدة الألم لمصلحة المجموعة (أ) مع عدم وجود فروق إيجابية بين المجموعتين بخصوص المدى الحركي بفتحة الفم . لذا فإن انفراج النسيج العضلي الضام عند إضافته إلى برنامج تمارين له تأثير أفضل من برنامج التمارين فقط بخصوص شدة الألم في حالات مجموعة الأعراض المصاحبة لآلام الاختلال الوظيفي المزمن للنسيج العضلي الضام لعضلات المضغ .