

Effect of Upper Trapezius Ischemic Compression on Masticatory Myofascial Pain Syndrome

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Abstract

Background:Myofascial pain syndrome (MPS) is defined as pain that originates from myofascial trigger points in skeletal muscle. It is prevalent in regional musculoskeletal pain syndromes, either alone or in combination with other pain generators.

Purpose: The aim of this study was to investigate the effect of ischemic compression (IC) on muscles of mastication and upper trapezius muscle myofascial trigger points (MTrPs) on masticatory myofascial pain syndrome.

Subjects and Methods:Thirty two Masticatory MPS patients of both sexes, with their age ranged from 20 to 35 years were randomly divided into two groups. Both groups have been evaluated for maximal mouth opening (MMO). Patients in Group A (control group) have received IC on masseter and lateral pterygoid MTrPs followed by exercise programme, whereas patients in Group B (Experimental group) received the same treatment in addition to upper trapezius MTrPs ischemic compression, Also all patients received 2 sessions per week for 2 weeks.

Results: Both groups shared significant increase in MMO without significant difference between groups.

Conclusion:Ischemic compression and exercises are effective in improving MMO significantly in patients suffering from Masticatory MPS without a significant effect of adding upper trapezius active MTrPs.

Key words:Myofascial trigger points, Ischemic Compression Upper Trapezius, ,masticatory muscles, maximal mouth opening, temporomandibular joint,.

Introduction

The temporomandibular joint (TMJ) is a part of kinematic chain including the teeth, the opposite TMJ, the muscles of mastication and the upper cervical complex as well as the posterior cervical musculature. Temporomandibular joint dysfunction (TMD) refers to a group of non-specific related disorders of the muscles of mastication and the TMJ.¹

The most common signs and symptoms in patients with TMDs are the pain of the TMJ, pain in muscles, facial pain, headache, ear pain, pain in the region of the neck, limited mouth opening, jaw deviation, locked joint, ear buzzing and impaired hearing, dizziness, face swelling and vision disturbances.²

Masticatory muscles pain is transferred to the neighboring areas and vice versa, pain from neighboring areas can be reflected into the masticatory muscles. Patients with myofascial pain (trigger point myalgia) can often have medical history which can be confusing.³

Trigger points in the shoulder or in the cervical muscles can cause co-contractions and disorder in the masticatory muscles. If this persists, local muscular pain and sensitivity can be developed, which subsequently affect the TMJ function and mobility. This condition will not only be resolved by treatment of masticatory muscles but by treatment of trigger points in the shoulders and the cervical muscles.^{4,5}

MPS clinically presents as referred pain, limitation in joint range of motion and a twitch response which is caused due to mechanical deformation of fascia and muscular areas known as

myofascial trigger points (MTrPs). A high percentage of muscular pain leads to myofascial pain syndromes.^{6,7,8,9}

The factors influencing MTrPs include trauma, overuse, physical stress and emotional stress. The pathophysiology of its origin is not clear and recent research suggests that there is less oxygen and nutrition in injured/overused muscle fibres leading to involuntary muscle contractions.⁹

Patients who have MTrPs often reported regional, persistent pain that usually results in a decreased range of motion of the muscle. In the head and neck region, MPS patients with trigger points can manifest as tension headache, tinnitus, TMJ pain, eye symptoms.¹⁰

In a review of physiotherapeutic treatment for MTrPs concluded that the most used techniques for short term pain relief were trigger point pressure release, IC and dry needling.¹¹

Hence, the aim of this study was to investigate the effect of IC on MTrPs in muscles of mastication and active MTrPs in upper trapezius muscle on masticatory MPS.

Subjects, Instrumentations and Methods

Subjects:

Thirty two patients, between the age of both sexes, with their age of 20-35 years old, diagnosed as Masticatory MPS with active MTrPs in the upper trapezuis muscle have been classified randomly into two groups; Group

A(control Group), consisted of 15 subjects and have received IC on lateral pterygoid and masseter muscle followed by exercises program ¹⁶, Group B (Experimental group) consisted of 16

subjects received same treatment as Group A in addition to IC to the upper trapezuisMTrPs. The treatment period was four sessions, two sessions per week. Both groups have been evaluated for MMO by using digital vernier caliper as showed in fig (1); before the treatment, and after the treatment. showed in fig (1); before the treatment, and after the treatment.



Fig. (1)

IC technique was applied firstly by identifying the trigger points in the lateral pterygoid, masseter muscles and upper trapezuis muscle by trigger point

The IC for the masseter and lateral pterygoid muscle applied for maximum 60 seconds with 10 second rest between compressions as showed in fig (2,3), while applied in an

palpation. Then the second step has been applied, which was the ischemic comprssion.

intermittent manner initially and then continuously for 90 seconds according to patients tolerability for the upper trapezuis muscle as showed in fig (4).



Fig.(2):masseter ischemic compression technique



Fig.(3):lateral pterygoid ischemic compression technique



Fig. (4): upper trapezuis muscle ischemic compression technique

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 for 30 second, and controlled opening and closure of the mouth 15 times with discouragement of any mandibular deviation

RESULTS

A total number of 32 masticatory MPS patients were included in this study, they were assigned randomly into two groups: 15 of them served as control group and 17 served as experimental group with exclusion of 1 patient from experimental group as it was tested as outlier using box plot method in SPSS, so the number of group decreased to 16 instead of 17 with total number of 31 as shown in the below flow chart fig. (5).

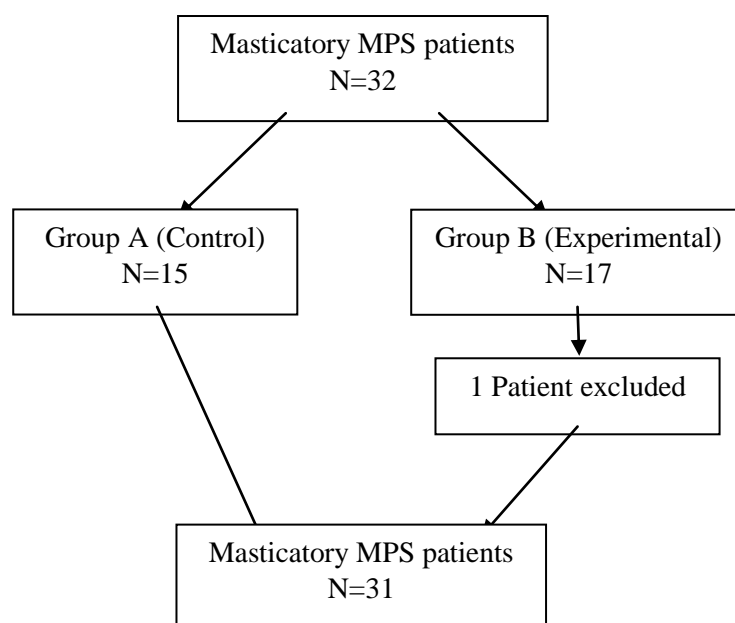


Fig. (5): flow chart.

The mean age of the control group was 28.5 ± 1.28 and the mean age of the experimental group was 30 ± 0.83 .

UN paired t-test was used to detect baseline characteristics

between groups before treatment. And it showed that there was no significant difference between groups regarding maximal mouth opening, and age as showed in table (1)

Table (1): Base line characteristics

Group	Control Group	Experimental Group	P.value	Significance
Maximal Mouth Opening	39.05 ± 1.72	42.84 ± 1.36	0.093	NS
Years	28.5 ± 1.28	30 ± 0.83	0.334	NS

- *Sd. : the standard deviation
- *NS: Non significant

Paired T test was used to detect MMO before and after treatment for the control group (GroupA) which revealed a significant increase in MMO as showed in table (2)

Table (2): pre and post treatment of control group maximal mouth opening

Control Group	Before	After	P.value	Significance
	Mean± Sd.	Mean± Sd.		
Maximal Mouth Opening	39.05 ± 1.72	43.14 ± 1.61	0.001	S

*Sd. : the standard deviation

*S : Significant

Paired T test was used to detect MMO before and after treatment for the Experimental group (group B), which revealed a significant increase in MMO as showed in table (3)

- Table (3): pre and post treatment of experimental group maximal mouth opening

Experimental Group	Before	After	P.value	Significance
	Mean± Sd.	Mean± Sd.		
Maximal Mouth Opening	41.1.67 ± 1.73	43.70± 1.70	0.003	S

*Sd.:the standard deviation

*S:Significant

Unpaired t-test was used to detect differences between groups after treatment, which revealed no significant difference before treatment between groups, as showed in table (4) and fig. (6).

Table (4): Between Groups difference post treatment for maximal mouth opening

Group	Control Group	Experimental Group	P.value	Significance
	Mean± Sd.	Mean± Sd.		
Maximal Mouth Opening	43.14 ± 1.61	44.84 ± 1.33	0.419	NS

- *Sd. : the standard deviation
- *NS: Non significant

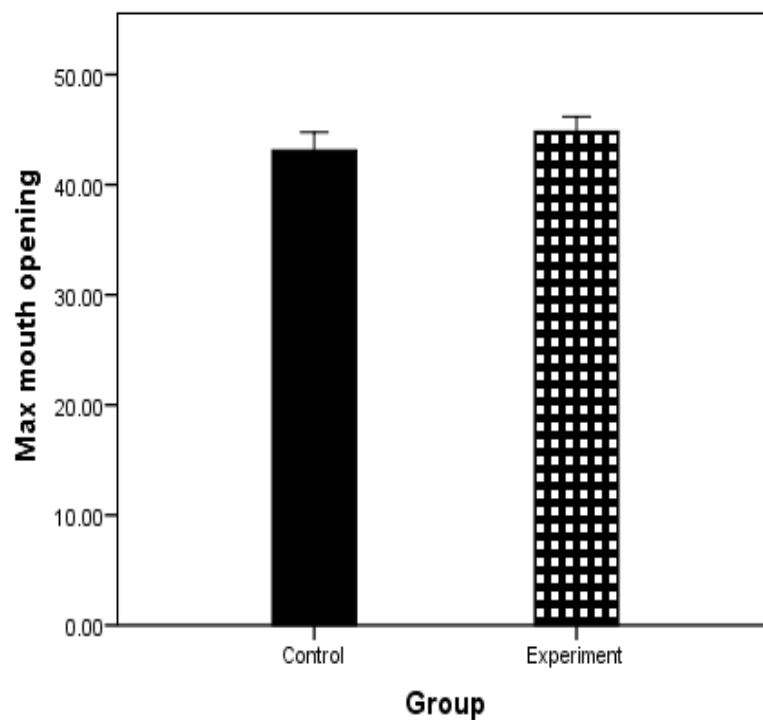


Figure (6): Between Groups difference post treatment for maximal mouth opening

DISCUSSION

The present study aimed to investigate the effect of active MTrPs upper trapezius IC on MPS of MMO using digital vernier caliper.

The current study age ranged from 20 to 35 years, with mean age of 29.5 which resembled those of Pallegama et al (2004)¹² and Mulla et al (2015)¹³

I. Control group

The results of the current study revealed a significant increase in MMO ($p = 0.001$), MMO after treating the masseter and lateral pterygoid muscles MTrPs by IC followed by the exercise program.

Regarding the MTrPs, Ischemic compression (IC) had been proven as an effective method of treating MTrPs (Ziaefar et al., 2014)¹⁴.

The technique of IC has been chosen as a specific technique for release of the triggerpoints, and was applied on masseter and lateral pterygoid muscles, because they are the most common masticatory muscles to be affected by myofascial pain dysfunction syndrome (Wright, 2000)¹⁵.

The present study results revealed a significant increase in MMO ($p = 0.001$), which come into agreement with results of Zaky et al., (2009)¹⁶ which reported an increase in MMO following the application of myofascial trigger points pressure release over MTrPs in the masseter and lateral pterygoid muscles.

Also this study results agreed with Ibanez-Garcia et al., (2009)¹⁷ results which applied a myofascial release technique using a neuromuscular or strain/counter-strain technique over latent MTrPs in the

masseter muscle on 71 female and male participants with latent MTrPs in the masseter muscle, either left or right sides, Resulting in improvement of 4 mm in active mouth opening, which could be due to the release of trigger points.

There are various therapeutic mechanisms for pressure treatments have been proposed by Hou et al. (2002)¹⁸ and by Simons (2002)¹⁹.

Hou et al. (2002)¹⁸ proposed that the pain relief from pressure treatment may result from reactive hyperemia in the MTrPs region, or a spinal reflex mechanism for the muscle spasm relief.

On the other hand, Simons (2002)¹⁹ proposed that local pressure may equalize the sarcomeres length in the involved MTrPs and consequently resulting in decreasing the pain.

II. Experimental group

Up to the best of the researcher's knowledge, no study applied IC method on active MTrPs in upper trapezius muscle to detect its effect on MMO in pain Masticatory MPS, so that explanations for the current study results can be made based on the following review.

The present study results revealed a significant increase in MMO after treating the masseter and lateral pterygoid muscles MTrPs and upper trapezius active MTrPs as described by (Simons et al., 1999)²⁰, by IC followed by an exercise program.

Carlson et al., (1993)²¹ reported in a study of 20 patients with upper trapezius muscle MTrPs and ipsilateral masseter muscle pain received a single trigger point injection of 2% lidocaine solution in the upper trapezius muscle,

resulting in a significant decrease in pain intensity in the masseter region. In addition, there was a significant reduction in EMG activity in the masseter muscle.

Wright (2000)¹⁵ found in a sample of 190 temporomandibular pain patients that the upper trapezius (60%), lateral pterygoid (50%), and masseter (47%) muscles were the most sources of referred pain into the craniofacial region.

In the craniocervical region, the upper part of the trapezius muscle can lead to an increased sensitivity of the spinal trigeminal nucleus. Non-nociceptive stimuli from the masticatory system would then lead to painful sensations from the trigeminal region. In these cases, the patient will experience temporomandibular and cervical spinal pain at the same time (Visscher et al., 2001)²².

In the same year, A study proposed by Visscher et al., (2001)²² to determine the prevalence of cervical spinal pain in persons with or without temporomandibular pain, and the results have shown that chronic temporomandibular pain patients more often suffer from cervical spinal pain than persons without temporomandibular pain.

Also Mellick and Mellick (2008)²³ reported that treatment of the cervical spine with intra-muscular injections was effective for reducing symptoms in patients with orofacial pain.

Moreover, A preliminary evidence suggested that application directed to cervical spine was beneficial in decreasing pain intensity and increasing of pain free MMO over the

masticatory muscles in patients with myofascial temporomandibular dysfunction (La- Touche et al., 2009)²⁴

Conclusion:

Ischemic compression and exercises are effective in improving MMO significantly in patients suffering from Masticatory MPS without significant effect of adding upper trapezius active MTrPs.

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تأثير الانضغاط الاقفاري لاعلي العضله شبه المنحرفه علي متلازمه الم النسيج العضلي الضام لعضلات المضغ

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الخلفية: متلازمة ألم النسيج العضلي الضام لعضلات المضغ يعرف بأنه الألم الذي ينبع من نقاط الزناد العضلي في العضلات . وهو سائد في متلازمات الألم العضلي الهيكلي ، إما وحدها أو بالاشتراك مع مولدات الألم أخرى.

الغرض: هدفت هذه الدراسة الي التعرف علي تأثير الانضغاط الاقفاري علي عضلات المضغ و نقاط الزناد الليفي العضلي للعضله شبه المنحرفه علي متلازمه الم النسيج العضلي الضام لعضلات المضغ .

الطرق و الادوات : تم تقسيم 32 مريضا للذين يعانون من متلازمه الم النسيج العضلي الضام لعضلات المضغ من كلا الجنسين بصوره عشوائيه تتراوح اعمارهم بين 20 الي 35 عاما الي مجموعتين للحد الاقصى لفتح الفم .

المجموعه (أ): قد تلقت المجموعه الاولى علي الانضغاط الاقفاري علي العضله الماضغه و العضله الجانيه الجناحيه متبوعا ببرنامج تمارين ، في حين المجموعه (ب): قد تلقت علي نفس العلاج بالاضافه الي الانضغاط الاقفاري علي نقاط الزناد الليفي للعضله شبه المنحرفه . و قد تلقي جميع المرضى علي جلسنتين اسبوعيا لمدته اسبوعين .

النتائج : كلا من المجموعتين حققوا نتائج ايجابيه بدون فروقات ايجابيه بين المجموعتين .

الاستنتاج : الانضغاط الاقفاري و التمارين العلاجيه فعاله في تحسين الحد الاقصى لفتح الفم بشكل ايجابي للمرضي اللذين يعانون من متلازمه الم النسيج العضلي الضام لعضلات المضغ بدون تأثير ايجابي من اضافته الانضغاط الاقفاري علي نقاط الزناد الليفي للعضله شبه المنحرفه .

الكلمات الداله : العضله شبه المنحرفه ، الانضغاط الاقفاري ، نقاط الزناد الليفي العضلي ، العضلات الماضغه، المفصل الفكي الصدغي ، الحد الاقصى لفتح الفم