Positional Release Technique Versus Manual Pressure Release on the Upper Trapezius Muscle in Patients with Myofascial Pain Dysfunction Syndrome

Sahem A.M. AL-Shawabka*, Magdolin M. S.S. Shenouda and Alaa A. Balbaa****
* Faculty of Rehabilitation Sciences, University of Jordan.
** Physical Therapy Department for Musculoskeletal Disorders and its Surgery, Faculty of Physical Therapy, Cairo University

ABSTRACT

Purpose: *To compare between the effects of positional release technique (PRT) and manual pressure release (MPR) in comparison with a control group on pressure pain threshold (PPT) and improving range of motion (ROM) of cervical spine in patients with trigger points of the upper trapezius muscle.* ***Subjects:*** *Forty-five patients were randomly assigned into three groups, each consisted of fifteen patients.* ***Methods:*** *group A the control group; group B received MPR; and group C received PRT for one session. Pressure algometer (PA) was used to measure PPT of the involved upper trapezius trigger points (TrPs). Myrin OB Goniometer was used to assess ROM of cervical spine. Patients were assessed just before and just after the treatment session.* ***Results:*** *ANCOVA test was used for data analysis. Between groups comparison revealed that: for PPT, and ROM of cervical flexion, extension and contralateral side bending, there were significant differences between groups in favor of the MPR group with P<0.05. For ROM of cervical ipsi lateral side bending, ipsilateral and contralateral rotations, there were insignificant differences between groups with P<0.05.* ***Conclusion:*** *MPR is more effective than the PRT in relieving pain and improving cervical ROM for the short term effect. Further studies is required to search the long term effect of each intervention.*

Key words: *Positional release technique; manual pressure release; trigger points; upper trapezius muscle.*

INTRODUCTION

Myofascial pain syndrome (MPS) is a noninflammatory disorder of musculoskeletal origin. It is associated with local pain and muscle stiffness. MPS is characterized by the presence of hyperirritable palpable nodules in the skeletal muscle fibers which are termed "trigger points (MTrPs)"[26,31].

Although the exact cause of myofascial pain is unknown, Cummings and White[8] mentioned three studies that reported MTrPs as a significant primary source of pain. MTrPs were claimed to be the primary cause of pain in 74% of 96 patients with musculoskeletal pain presenting to a community medical center and in 85% of 283 patients admitted to a pain center[12].

MTrPs produce pain in response to any activating stimulus (direct or indirect trauma) and can provoke referred pain, referred tenderness, motor dysfunction, autonomic phenomena and hyper excitability of the central nervous system[8]. Additional complaints are reducing joint range of motion[33].

Simons et al.,[33] defined the trigger points as the presence of exquisite tenderness at a nodule in a palpable taut band (of muscle). They are able to produce referred pain, either spontaneously or on digital compression. The clinical definition came to be that trigger points are localized areas of deep tenderness within a taut band of muscle. They exhibit a local twitch response (muscle fasciculation) or jump sign (whole body movement) in response to digital pressure or dry needling.

Two main types of trigger points are described: active and latent. Active trigger points are those that may be responsible for the presenting pain complaint. They may also be associated with less readily definable symptoms such as weakness, parasthesia, or temperature changes, and they reproduce spontaneous pain. Latent trigger points present with muscle shortening and pain occurs only on the application of external pressure. These trigger points may become activated by a variety of stimuli, including poor posture, overuse, or muscle imbalance[6]. In the latent forms, the pain induced is not constant and tends to be less severe[29,30].

Manual therapy is one of the essential treatment options in the management of MTPs. MTPs are treated with manual techniques, spray and stretch, dry needling and injection therapy[14,33].

The studies have suggested a therapeutic effect of non-invasive treatments for upper trapezius MTrPs when used alone or in combination with electrical muscle stimulation, therapeutic ultrasound, electrical nerve stimulation, repetitive magnetic stimulation, hot packs, cervical range of motion exercises, ischemic compression, spray and stretch, transcutaneous electrical nerve stimulation, sustained stretching, massage, cervical manipulation and trigger point pressure release[32,34,35].

Sustained manual pressure, is referred to as 'manual pressure release' (MPR). It is one of the techniques advocated for the treatment of MTrPs[33]. Several authors found that MPR was effective in relieving pain and disability caused by trigger points in different pathologies such as cervical spine[1,9,13,19,24,25] and chronic shoulder pain[15].

Other manual therapy technique, used for treatment of trigger points, is the positional release therapy (PRT). This technique involves passive body positioning, which is claimed to elicit immediate and prolonged reductions in tenderness at trigger points and to reduce pain and with musculoskeletal conditions[7]. PRT relies on precise positioning of dysfunctional tissues in ways that allow a spontaneous response that releases or reduces excessive tension and/or spasm. The mechanisms are thought to result from spindle resetting, reduction in nociceptive sensitivity and circulatory enhancement[22].

Recent studies that used pressure pain threshold (PPT) measures to quantify mechanical hyperalgesia or 'tenderness', have suggested that manual pressure release may elicit immediate reductions in tenderness at trigger points[6,28]. PRT, as used in osteopathy, involves the placement, for brief periods (90s), of soft tissues or joints, into positions of ease, to encourage self-regulating influences to operate more efficiently, resulting in greater range of motion and reduced pain[5].

The effect of positional release technique was found to be effective in treating the latent myofascial trigger points in the masseter muscle[27], tender points of low back pain[21] and tender points around the elbow joint following sports injury[4].

Despite the agreement that both pressure release and positional release are effective for patients with trigger points of the upper trapezius muscle[12,27], there is no evidence referring to which of them is better and more effective. Therefore, the aim of the current study was to compare between the efficacy of both techniques regarding pain threshold and active cervical range of motion in the upper trapezius muscle.

PATIENTS AND METHODS

Forty five patients with age ranges from 20-33 years, presented with Myofascial pain dysfunction syndrome with active trigger points in the upper trapezius muscle participated in the study. They were randomly assigned into three groups A, B, and C. An envelope contains 45 pieces of papers was used for randomization. 15 papers are written with A, 15 with B and 15 with C. Each patient was asked to select a paper with a letter shows his group and the papers were put again into the envelope. Patients were recruited from the faculty of physical therapy, Cairo University. The study was conducted from March 2011 to March 2012. All patients had signed a consent form as an agreement for participation in the study. Research proposal was approved from the ethical committee, Faculty of physical Therapy, Cairo University.

The inclusion criteria were the presence of a taut band in the upper trapezius muscle with an active painful trigger point at its middle, pain is produced upon palpation. Patients complain from neck pain restriction of neck ROM. Patients were excluded if they had fibromyalgia syndrome, whiplash injury, cervical spine surgery, cervical radiculopathy or myelopathy and myofascial pain therapy within the past month before the study.

Patients were assessed by the researcher just before and just after the treatment session. All procedures were explained to subjects

prior to any screening or measurements. Subjects underwent a screening process to establish the presence of MTrPs in the trapezius muscle. Patient feedback was elicited with regard to local and referred pain during the examination.

Pressure algometer (Wagner instruments. Greenwich) was used to measure pain threshold of the involved upper trapezius MTrPs[28,29]. The validity and reproducibility of pressure algometry to measure pressure pain threshold in the evaluation of MTrPs has been well established[3,17].

Myrin OB Goniometer (OB Rehab Co. Anlic Company, 5-17182 Solana, Sweden) was used to measure flexion, extension, lateral neck flexion and neck rotation. It is valid, and has a moderate to good reliability for measuring cervical spine range of motion[16].

Group A: consisted of 15 patients with a mean age of 21(±1.28) years, did not receive any treatment or manual sham procedure as a control group. Group B: consisted of 15 patients with a mean age of 23(±3.40) years received MPR program for one session of 60s duration. Group C consisted of 15 patients with a mean age of 22(±1.80) received PRT for one session of 90s duration.

Manual Pressure Release (MPR)

Subjects were encouraged to relax as much as possible before pressure was applied. The researcher applied slow pressure to the MTrPs until 70% of subject's pain feeling. The pressure was sustained for 60 seconds and was monitored to maintain constant pressure. If the subject reported that the pain decreased to 30%, the researcher slowly increased the pressure to restore the perceived pain to the original value of 70%[12].

Positional release therapy

The patient was seated with the cervical spine in a neutral position. The therapist located the trigger point in the upper trapezius muscle by manual palpation. The therapist applied gradually increasing pressure until the sensation of pressure became one of pressure and pain. At that moment, the patient was then passively placed in a position that reduces the tension under the palpating fingers and causes a subjective reduction of pain by around 70%. The position was usually cervical extension, ipsilateral side-flexion, and a slightly contra-lateral cervical rotation (5-8 degrees). The patient's upper extremity positioned in passive abduction. This position was maintained for 90s. Finally, the patient was slowly passively placed in neutral position of the cervical spine[8].

SPSS package was used to test significance between variables. Paired t-test was used to calculate the differences between the pretreatment and post-treatment mean values within the manual pressure release group. ANCOVA test was used to compare between groups.

General Characteristics of the Subjects:

As a baseline measurement, there was no significant difference between groups regarding the age with $F=2.737$ and $P<0.05$.

Paired t-test for within group comparison revealed that:

MPR group (B) There were significant differences with $P<0.05$ between pre-treatment and post-treatment values in the MPR group for pressure pain threshold, flexion, extension, contra-lateral side bending and ipsilateral rotation variables. On other hand, the differences between the pre and post treatment means for the ipsilateral side bending and contra-lateral rotation variables were insignificant with $P>0.05$ as shown in table (1).

Table (1): MPR group: Within group differences.

Variable	Pre treatment Mean ±SD	Post treatment Mean ±SD	t-value	P value	Sig.
Pressure Pain threshold	1.859(±0.35)	2.343(±0.32)	8.473	0.0001	S
ROM of cervical:					
Flexion	47(±2.64)	50(±3.68)	8.473	0.005	S
Extension	62(±20.40)	64.8(±20.40)	2.871	0.018	S
Ipsilateral side bending	47.5(±7.91)	48.5(±7.09)	1.500	1.680	NS
Contralateral side bending	41.5(±4.74)	45(±4.08)	4.583	0.001	S
Ipsilateral rotation	68.5(±2.42)	70.5(±1.58)	2.449	0.037	S
Contralateral rotation	67(±3.49)	68.5(±4.74)	1.964	0.081	NS

Sig.: significance S: significant NS: non-significant ROM: Range of motion

PRT group (C): There were significant differences between pre-treatment and post-treatment values in the PRT group for pressure pain threshold, flexion, contra-lateral side bending and ipsilateral rotation variables with P<0.05. On other hand, the pre and post treatment for the extension, ipsilateral side bending and contra-lateral rotation variables indicate an insignificant difference P>0.05 as shown in table (2).

Table (2): PRT group: Within group differences.

Variable	Pre treatment Mean ±SD	Post treatment Mean ±SD	t-value	P value	Sig.
Pressure Pain threshold	2.47(±0.58)	2.84(±0.65)	5.987	0.0001	S
ROM of cervical:					
Flexion	51.4(±9.50)	54.4(±9.26)	3.674	0.005	S
Extension	51.5(±4.74)	52(±4.22)	1.000	0.343	NS
Ipsilateral side bending	43.5(±2.42)	43.5(±2.42)	0.000	NA	NS
Contralateral side bending	44.5(±5.50)	48.5(±8.83)	2.158	0.030	S
Ipsilateral rotation	59(±13.50)	63(±14.60)	4.000	0.003	S
Contralateral rotation	62.5(±12.70)	61.1(±8.82)	0.431	0.676	NS

Sig.: significance S: significant NS: non-significant ROM: Range of motion NA: not available

Between groups comparison

There were significant differences between the pretreatment mean variables for all groups. Thus, repeated measure analysis of covariance was used. To determine the differences in the mean values among the groups, repeated measure analysis of covariance (ANCOVA F-Test) was performed. The ANCOVA table and a comparison between the "F" value and the tabulated "F" were calculated. The results revealed that there were significant differences between the adjusted means of the three groups in pressure pain threshold, range of motion of cervical flexion, extension and contralateral sidebending with P<0.05 while there were no significant differences between groups in ipsilateral side bending and ipsilateral and contralateral neck rotation as shown in table (3).

Table (3): Between group differences.

Variable	Control group Adjusted Mean ±SD	MPR group Adjusted Mean ±SD	PRT group Adjusted Mean ±SD	F-value	P value	Sig.
Pressure pain threshold	2.29(±0.65)	2.75(±0.32)	2.65(±0.34)	19.7	<0.5	S
ROM of cervical:						
Flexion	47.68(±4.21)	52.09(±4.74)	50.42(±9.63)	11.87	<0.5	S
Extension	56.05(±4.71)	58.19(±13.55)	56.25(±4.22)	5.421	<0.05	S
Ipsilateral side bending	46.11(±2.58)	47.17(±7.09)	45.72(±2.42)	3.192	>0.05	NS
Contralateral side bending	44.66(±2.58)	47.49(±4.08)	46.85(±7.15)	3.349	<0.05	S
Ipsilateral rotation	64.94(±4.22)	67.52(±2.11)	66.54(±13.50)	2.618	>0.05	NS
Contralateral rotation	65.39(±3.94)	67.14(±3.72)	67.96(±8.51)	2.281	>0.05	NS

Sig.: significance S: significant NS: non-significant ROM: Range of motion

Post hoc tests using the least squared difference (LSD) showed that the tests are in favor of MPR approach in pressure pain threshold and range of motion of neck flexion, neck Extension and Contra-lateral neck Side Bending, While There were statistically insignificant differences between the mean scores of the subjects for the range of motion of ipsilateral side bending, ipsilateral neck Rotation and contra-lateral neck rotation.

DISCUSSION

The result showed a significant difference regarding pressure pain threshold between pre and post treatment in MPR group. Treatment of upper trapezius MTrPs with 60s of MPR produced significant immediate decreases in sensitivity of MTrPs to manual pressure. These findings are consistent with reports from other authors including Hanten et

al.,[10], Hou et al.,[19] who found that MPR decreased the sensitivity of MTrPs. In addition, the results came in agreement with Aguilera et al.,[1] who examined the effect of myofascial therapy treatments using ischemic compression on latent MTrPs in the trapezius muscle. They found that MTrP sensitivity of the trapezius muscle gaining short-term positive effects with use of Ischemic Compression. Fernandez-de-las-Penas et al.,[9] compared the immediate effect of ischemic compression to that of transverse friction massage in 40 subjects. They found the ischemic compression effective in relieving pain. And Lake et al.,[25] who compared the treatment of ischemic compression and ischemic compression with stretching to a control group on myofascial trigger points. They demonstrated significant improvement in discomfort and referral patterns when compared to control.

The results also come in agreements with Kostopoulos et al.,[24] who searched the effect of ischemic compression (IC), passive stretching (PS), and the combination of compression and stretching on pain perception from myofascial trigger points. The results showed that all treatments demonstrated a decline in pain perception. And Gemmell et al.,[13] who explored the immediate effects of 90s of ischemic compression versus ultrasound and sham ultrasound in 66 subjects. There was an immediate decrease in MTrPs sensitivity after both modalities. In addition, the ischemic compression group also improved in cervical ROM. In addition to Hains et al.,[15] who examined the effect of myofascial therapy treatments using ischemic compression on shoulder trigger points in patients with chronic shoulder pain. They found it effective in decreasing functional disability in the shoulder joints.

There are a number of possible mechanisms behind the effectiveness of MPR. Simons[33] has proposed that MPR may equalize the length of sarcomeres in the involved MTrP and consequently decrease the palpable knot and pain. On the other hand, Hou et al.,[19] suggested that pain reduction in MTrPs following MPR may result from reactive hyperaemia in the local area, due to counterirritant effect or a spinal reflex mechanism that may produce reflex relaxation of the involved muscle.

There are some published papers that have previously analyzed the effectiveness of the MPR in the treatment of either latent or active MTrPs[10,12,18,38]. All these studies found that it induced an increase in PPT levels over the MTrPs, which is in agreement with our results.

Regarding ROM in this study there was no significant improvement in the active neck ipsilateral side bending and contra-lateral rotation ROM. On other hand there was significant improvement occurred in active neck flexion, extension, contra-lateral side bending, ipsilateral rotation ROM. The explanation for this result perhaps refer to that manual pressure release applied downward on a MTrP tends to lengthen sarcomeres and can be effective in increasing range of motion and reducing muscle tension[33]. Moreover, the increase of pressure pain threshold in tender myofascial triggers point permits some range of neck motion with pain-free. This study revealed significant improvement occurred in active neck flexion, extension, contra-lateral side bending, ipsilateral rotation ROM. If we note the position of the trapezius muscle in every range of them, we will find it in a stretching position; that is to say, furthermore the MPR program give pain- free movement, it tends to lengthen the sarcomeres as a result of sustained pressure and subsequently increase in the ROM.

The group who received Positional Release Technique demonstrated that trigger point sensitivity decreased in response to a single application of the PRT. Our results agreed with those of Meseguer et al.,[28] who found that positional release technique was effective in reducing tenderness represented by an increase in pressure pain thresholds of trigger points in the upper trapezius muscle of subjects with mechanical neck pain. Also came in agreement with Blanco et al.,[5] who conducted a study to compare the immediate effect of muscle energy technique in the form of postisometric relaxation, and the strain/counterstrain technique, in improving active mouth opening, following a single treatment of latent myofascial trigger points (MTrPs) in the masseter muscle. Within-group

changes showed a significant improvement in active mouth opening following application of the post-isometric relaxation technique, small increase of active mouth opening following application of strain/counterstrain, and Lewis et al.,[21] who conducted a study to elicit immediate and sustained reductions in tenderness of tender points in low back pain patients after Strain/Counterstrain (SCS) intervention. Results suggested that SCS intervention did elicit an immediate quantifiable reduction in tenderness at TPs but that some of this reduction is attributable to the manual-contact component of the treatment. Also, Hutchinson[4] who conducted study to investigate the efficacy of SCS technique on subjects with a history of a recreational sports injury of the upper extremity. And their results indicated that SCS technique may be an efficacious technique in treatment of tender points around the elbow in subjects with a history of a recreational sports injury of the upper extremity. Our data is also consistent with those of Wong and Schauer[11] who found that strain/counterstrain reduced sensitivity to palpation in subjects exhibiting tender points in the hip musculature.

The application of PRT is thought to decrease tissue tenderness by altering nociceptor activity in the soft tissues. An increase in PPT is synonymous with a decrease in tissue sensitivity. Thus, the increase in PPT in response to PRT provides a measure of the analgesic effect of PRT. Based on previous literature and our current findings, it appears that PRT techniques have the capacity to provide immediate relief of tenderness and local pain provoked by MTrPs[37].

In the PRT group there were no significant improvements in the active neck extension, ipsilateral side bending and contra-lateral rotation ROM. On other hand, there were significant improvements occurred in active neck flexion, contra-lateral side bending and ipsilateral rotation ROM.

It is hypothesized by Weiselfish[37] that PRT apparently begins to engage the fascial tension patterns associated with trauma, inflammation, and adhesive pathology. This process may involve an "unwinding" action in the myofascial tissue. A significant release response may be palpated during this phase and normalization of fascial tension.

Kerry and George[23] concluded that the application of PRT may be effective in producing reduction of joint hypomobility. When the muscles crossing joints become hypertonic or tight, the result is joint hypomobility. By using PRT, the affected muscles and fascial tissues relax. Clinically, it has been found that the first, or neuromuscular phase of the PRT treatment lasts approximately 90 seconds for general orthopedic patients' and 3 minutes for neurologic patients. PRT appears to affect inappropriate proprioceptive activity during this phase, thus helping to normalize tone and set the normal length-tension relationship in the muscle. This result in the elongation of the involved muscle fibers to their normal state and subsequently increase the ROM.

Range of motion, segmentally and globally, is largely dependent on the state of balance of the muscles that cross the involved joints, and restriction of motion may be directly attributed to abnormalities in the muscle tone and activity of this system[23]. Based on this the explanation for increase ROM in this group perhaps refer to that PRT applied 90s on trapezius muscle that have MTrP tends to normalize the muscle tone thus lengthen sarcomeres and subsequently permit more free movement and increasing ROM in the active neck flexion, contra-lateral side bending and ipsilateral rotation ROM.

To find out which of the three groups was more effective in improving pressure pain threshold, between groups comparison was done. The result revealed that the maximum improvement of the pressure pain threshold was in the group who received the MPR program. Therefore, the MPR was more effective than other two groups in increasing pressure pain threshold. It was also found that the second group received the PRT was more effective than the control group.

For the range of motion, the data revealed that the most significant increase in active neck ROM was in flexion, extension and contra-lateral side bending ROM in MPR group in comparison to the other two groups.

While the differences in active neck ipsilateral side bending ipsilateral rotation and contra-lateral rotation ROM were not significant change.

The main limitation of this study is that the treatment was applied for only one session thus, further studies should be conducted to test the effect of multi-sessions treatment and the long term follow up as well.

Conclusion

The MPR is more effective than the PRT in increasing PPT, reducing functional disability and improving the cervical ROM in patients with myofascial pain dysfunction syndrome for the short term effect. Further studies are required to test its long term effect.

Conflict of interest: none
Funding resources: none

REFERENCES

1- Aguilera, F.J.M., Martín, D.P., Masanet, R.A., Botella, A.C., Soler, L.B. and Morell, F.B.: Immediate effect of ultrasound and ischemic compression techniques for the treatment of trapezius latent myofascial trigger points in healthy subjects: a randomized controlled study. J Manipulative Physiol Ther; 32(7): 515-552, 2009.
2- Atkins, C., Zielinski, A., Klinkhoff, A., Chalmers, A., Wade, J. and Williams, D.: An electronic method for measuring joint tenderness in rheumatoid arthritis. Arthritis Rheum; 35(4): 407-410, 1992.
3- Balogun, J.A., Abereoje, O.K., Olaogun, M.O. and Obajuluwa, V.A.: Inter- and lntratester Reliability of Measuring Neck Motions with Tape Measure and myrin Gravity- Reference Goniometer. JOSPT; 10: 248-253, 1989.
4- Bendtsen, L., Jensen, R., Jensen, N.K. and Olesen, J.: Muscle palpation with controlled finger pressure: new equipment for the study of tender myofascial tissues. 59: 235-239, 1994.
5- Blanco, C.R., De las Penas, Xumet J.E., Algaba, C.A., Rabada´n, M.F. and Quintana, M.C.: Changes in active mouth opening following a single treatment of latent myofascial trigger points in the masseter muscle involving post-isometric relaxation or strain/counterstrain. J Bodyw Mov Ther; 10: 197-205, 2006.
6- Chaitow, L.: Ligaments and positional release techniques? J Bodyw Mov Ther; 13: 115-116, 2009.
7- Chaitow, L.: Muscle Energy & Positional Release Technique. Techniques 2005.
8- Cummings, T.M. and White, A.R.: Needling therapies in the management of myofascial trigger point pain: a systematic review. Arch Phys Med Rehabil.; 82: 986-992, 2001.
9- Fernandes-De-Las-Penas, C., Alonso-Blanco, C. and Miangolarra, J.C.: Myofascial trigger points in subjects presenting with mechanical neck pain: a blinded, controlled study. Man Ther; 12: 29-33, 2006.
10- Fernandez-de-las-Penas, C., Alonso-Blanco, C., Fernandez- Carnero, J. and Miangolarra-Page, J.C.: The immediate effect of ischemic compression technique and transverse friction massage on tenderness of active and latent myofascial trigger points: a pilot study. J Bodyw Mov Ther; 10(1): 3-9, 2006.
11- Fernández-de-Las-Peñas, C., Ge, H.Y., Arendt-Nielsen, L., Cuadrado, M.L. and Pareja, J.A.: The local and referred pain from myofascial trigger points in the temporalis muscle contributes to pain profile in chronic tension-type headache. Clin J Pain.; 23: 786-792, 2007.
12- Fryer, G. and Hodgson, L.: The effect of manual pressure release on myofascial trigger points in the upper trapezius muscle. J Bodyw Mov Ther; 9: 248-255, 2005.
13- Gemmell, H., Miller, P. and Nordstrom, H.: Immediate effect of ischaemic compression and trigger point pressure release on neck pain and upper trapezius trigger points: A randomised controlled trial. Clin Chiropractic; 11: 30-36, 2008.
14- Gerwin, R.D. and Dommerholt, J.: Treatment of myofascial pain syndromes. In: Boswell MV, Cole BE. Weiner's Pain Management: A Practical Guide for Clinicians. Boca Raton, FL: CRC Press, 477-492, 2006.
15- Hains, G., Descarreaux, M. and Hains, F.: Chronic shoulder pain of myofascial origin: a randomized clinical trial using ischemic compression therapy. J Manipulative Physiol Ther; 33: 362-369, 2010.
16- Hanten, W., Olson, S., Butts, N. and Nowicki, A.: Effectiveness of a home program of ischaemic pressure followed by sustained stretch for treatment of myofascial trigger points. Phys Ther; 80(10): 997-1003, 2000.
17- Hogeweg, A., Langereis, M., Bernards, A., Faber, J. and Helders, P.: Algometry measuring pain threshold, method and characteristics in healthy subjects. SCAND J REHABIL MED; 24: 99-103.
18- Hong, C.Z., Chen, Y.C., Pon, C.H. and Yu, J.: Immediate effects of various physical medicine modalities on pain threshold of an active

myofascial trigger point. J Musculoskelet Pain; 1: 37-53, 1993.
19- Hou, C.R., Tsai, L.C., Cheng, K.F., Chung, K.C. and Hong, C.Z.: Immediate effects of various physical therapeutic modalities on cervical myofascial pain and trigger-point sensitivity. ARCH PHYS MED REHAB; 82: 1406-1414, 2002.
20- Huguenin, L.K.: Myofascial trigger points: the current evidence. Physical Therapy in Sport; 5: 2-12, 2004.
21- Hutchinson, R.: An investigation into the efficacy of strain- counterstrain technique to produce immediate changes in pressure pain thresholds in symptomatic subjects. School of Health Science Dissertations and Theses; 8, 2008.
22- Ibanez-Garcia, J., Alburquerque-Sendin, F., Rodriguez-Blanco, C., Girao, D., Atienza-Meseguer, A., Planella-Abella, S.: Changes in masseter muscle trigger points following strain-counterstrain or neuro-muscular technique. J Bodyw Mov Ther; 13: 2-10, 2009.
23- Kerry, J.D. and George, B.R.: Positional release technique, assessment and treatment of musculoskeletal dysfunction. Mosby year book, 35, 1997.
24- Kostopoulos, D., Nelson, A.J., Ingber, R.S. and Larkin, R.W.: Reduction of spontaneous electrical activity and pain perception of trigger points in the upper trapezius muscle through trigger point compression and passive stretching. J Musculoskeletal Pain; 16(4): 266-278, 2008.
25- Lake, D.A., Wright, L.L., Cain, J., Nail, R. and White, L.: The effectiveness of ischemic pressure and ischemic pressure combined with stretch on myofascial trigger points. JOSPT; 39(1): A-70, 2009.
26- Lavelle, E.D., Lavelle, W. and Smith, H.S.: Myofascial trigger points. Anesthesiol Clin.; 25: 841-851, 2007.
27- Lewis, C., Souvlis, T. and Sterling, M.: Strain Counterstrain therapy combined with exercise is not more effective than exercise alone on pain and disability in people with acute low back pain: a randomised trial. J Physiother; 57: 91-98, 2011.
28- Meseguer, A.A., Fernandez-de-las-Penas, C., Navarro-Poza, J.L., Rodriguez Blanco, C. and Gandia, J.J.B.: Immediate effects of the strain/counterstrain technique in local pain evoked by tender points in the upper trapezius muscle. Clin Chiropr; 9: 112-118, 2006.
29- Okeson, J.P.: Management of temporomandibular disorders and occlusion. 4th ed. St. Louis: Mosby; 1998.
30- Pongratz, D.E. and Sievers, M.: Fibromyalgia-symptom or diagnosis: a definition of the position. Scand J Rheumatol Suppl.; 113: 3-7, 2000.
31- Poveda Roda, R., Díaz Fernández, J.M., Hernández Bazán, S., Jiménez Soriano, Y., Margaix, M. and Sarrión, G.: A review of temporomandibular joint disease (TMJD). Part II: Clinical and radiological semiology. Morbidity processes. Med Oral Patol Oral Cir Bucal.; 13: 102-109, 2008.
32- Ruiz-Saez, M., Fernandez-de-las-Penas, C., Blanco, C.R., Matrinez-Segura, R. and Garcia-Leon, R.: Changes in pressure pain sensitivity in latent myofascial trigger points in the upper trapezius muscle after a cervical spine manipulation in pain-free subjects. J Manipulative Physiol Ther; 30: 578-583, 2007.
33- Simons, D.G., Travell, J.G. and Simons, L.S.: Travell & Simons' myofascial pain and dysfunction: The trigger point manual, Upper half of body, 2nd ed., vol. 1. Philadelphia: Lippincott Williams & Wilkins.; 278-307, 1999.
34- Smania, N., Corato, E., Fiaschi, A., Pietropoli, P., Aglioti, S.M. and Tinazzi, M.: Repetitive magnetic stimulation. A novel therapeutic approach for myofascial pain syndrome. J Neurol; 252: 307-314, 2005.
35- Srbely, J.Z., Dickey, J.P.: Randomized controlled study of the antinociceptive effect of ultrasound on trigger point sensitivity: novel application in myofascial therapy? Clin Rehabil; 21: 411-417, 2007.
36- Vanderweeen, L., Oostendorp, P., Vaes, P. and Duquet, W.: Pressure algometry in manual therapy. Manual Ther; 1(5): 258-265, 1996.
37- Weiselfish, S.: Manual Therapy for the Orthopedic and Neurologic Patient Emphasizing Strain and Counterstrain Technique. Hartford, CT, Regional Physical Therapy (self-published), 1993.
38- Wong, C.K. and Schauer, A.C.: The Effect of Strain Counterstrain on Pain and Strength in Hip Musculature. JMMT; 12(4): 215-223, 2004.

الملخص العربي

فاعلية الوضع الإنفراجي مقابل الضغط اليدوي الإنفراجي على العضلة شبه المنحرفة في مرضي متلازمة الاختلال الوظيفي المؤلم للنسيج العضلي الضام

الهدف من البحث : تهدف هذه الدراسة إلى التحقق من تأثير الوضع الانفراجي مقابل الضغط الانفراجي مقارنة مع المجموعة الضابطة على نقصان شدة الألم و تحسين المدى الحركي في مرضى الاختلال الوظيفي المزمن للنسيج العضلي الضام في الجزء العلوي للعضلة شبه المنحرفة. **المرضى و الطرق :** تم إجراء البحث على خمسة وأربعين مريضا قسموا إلى ثلاث مجموعات متساوية بشكل عشوائي كما يلي : مجموعة ضابطة (أ) : تحتوى هذه المجموعة على 15مريضا حيث لم تتلقى أي نوع من العلاج . مجموعة (ب) : تحتوى هذه المجموعة على 15 مريضا وقد تلقوا جلسة واحدة من العلاج بالضغط الانفراجي لنقاط النسيج العضلي الضام المستهدف ة بالجزء الأعلى من العضل ة المثلث لمدة 60ثانية . مجموعة (ج) : تحتوى هذه المجموعة على 15 مريضا وقد تلقوا جلسة واحدة من العلاج بالوضع الانفراجي لنقاط النسيج العضلي الضام المستهدفة بالجزء الأعلى من العضلة المثلث لمدة 90 ثانية . تم تقييم المرضى قبل العلاج وبعده ، وأيضاً لثلاث مرات وسيطة ، لكلاً من شدة الألم بواسطة جهاز ال (Digital algometer) والمدى الحركي للرقبة بواسطة جهاز ال (OB goniometer) . **النتائج :** أظهرت المقارنة بين نتائج المجموعات أن هناك فروق ايجابية بينهم لمصلحة المجموعة (ب) بخصوص العوامل المعتمدة على العلاج . **الاستنتاج :** لذا فان الضغط الانفراجي لنقاط النسيج العضلي الضام المستهدفه له تاثير افضل من الوضع الانفراجي، في حالات مجموعة الأعراض المصاحبة لألام الاختلال الوظيفي للنسيج العضلي الضام للجزء الأعلى من العضلة المثلث .