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Acupressure of acupoints versus ischemic compression release of trigger points in cervical myofascial pain

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Abstract

Background: Myofascial pain syndrome is a common nonarticular musculoskeletal chronic pain. It is one of the main causes of medical consultation, frequently leading to work disability. It is characterized by an intense and deep pain from skeletal muscles and their fascia and by the presence of one or more myofascial trigger points (MTrPs). An MTrP is described as a hyperirritable spot of skeletal muscle associated with a hypersensitive palpable nodule of a taut band able to originate specific patterns of pain referral associated with each MTrP, motor dysfunction, restricted range of movement and producing autonomous phenomena (eg, skin blood flow response).

Purpose: This study was conducted to investigate and compare the effects of acupressure of the classical acupoints versus ischemic compression release (ICR) of MTrPs in treating cervical myofascial pain (CMP).

Materials and methods: Forty-five patients participated in this study, They were selected from outpatient clinic of orthopaedic department of Ain Shams General Hospital in Cairo between October 2020 and October 2021, They were randomly assigned into three equal groups as follow: Group (A) (Acupressure of classical acupoints), Group (B) (Ischemic compression release of MTrPs), Group (C) (Control). Patients in all groups received a traditional physical therapy program which included hot packs and muscle energy technique. Treatment was applied by the rate of 3 sessions in 3 consecutive days for 4 consecutive weeks. VAS was used for assessment of neck pain and algometer was used for assessment of pressure pain threshold (PPT) of MTrPs, Myrin OB goniometer was used to assess ROM while Arabic version of neck disability index was used to assess neck disability.

Results: VAS scores, right PPT and right SB ROM yielded significant improvement post treatment in the 3 groups, and a significant improvement in left PPT and NDI in group B only and in left SB ROM in group A & B ($P<0.05$. Between group comparison revealed significant difference regarding VAS scores ($P=0.01$) and right and left SB ROM ($P=0.002$, 0.03) respectively.

Conclusion: Ischemic compression release better yielded improvement in increasing cervical range of motion, increasing pressure pain threshold and increasing neck function than acupressure in treating cervical myofascial pain.

Keywords: acupressure, acupoints, ischemic compression release, trigger points, cervical myofascial pain syndrome

Introduction

Myofascial pain syndrome (MPS) is a very common and costly condition affecting society today. Based on aging demographics, MPS promises to become an even greater medical challenge in the future. New research is revealing the mechanisms and therapeutic approaches for MPS that could have a significant impact on the way this condition is diagnosed and treated (Srbely *et al*., 2010) [32].

Myofascial trigger points (MTrPs) were in a well- defined area of the upper trapezius with a PPT that was clearly lower than in normal subjects and showing values like those reported in previous studies (Kuan *et al*., 2007) [18]

There are several methods of treatment such as massage, stretching, ultrasound therapy, muscle energy techniques, dry needling, acupressure, local injections, integrated neuromuscular inhibition technique and ischemic compression (Wang *et al*., 2018) [42].

In accordance with traditional Chinese medicine (TCM), acupressure uses pressure to stimulate specific acupoints for therapeutic purposes and stimulating these points can correct imbalance between Qi through channels and subsequently treat the diseases. (Acupuncture. National Institute of Health Consensus Development Conference Statement, 1997) [1]. Re-equilibrium of Qi achieve therapeutic benefits by improving the physiological functions of body systems (Lu *et al*., 2004) [27]. Acupressure influences the autonomic nervous system that could modulate the activities of the sympathetic and parasympathetic nerves. It could induce

sedation, thereby reducing pain, muscle tone, and disability and changing autonomic nervous activity in subjects with chronic neck pain (Matsubara *et al*., 2011) [28].

Ischemic compression release leads to a transient local ischemia followed by blood reperfusion (hyperemia) after interruption. This increase in local blood flow restores the energetic source of the tissue, resulting in an adequate metabolic status of muscle. As a result of this process, there is a decrease in pain sensitivity in the MTrPs, assisting in the tissue recovery, (Da Silva *et al*., 2020) [8].

So, this study was conducted to investigate and compare the effects of acupressure of the classical acupoints versus ischemic compression release of myofascial trigger points in the management of cervical MPS.

Subjects, materials and methods

Forty-five patients participated in this study; patients were selected from outpatient clinic of orthopedic department of Ain Shams General Hospital in Cairo between October 2020 and October 2021. They were randomly assigned into three equal groups as follow: Group (A) (Acupressure of classical acupoints), Group (B) (Ischemic compression release of MTrPs), and Group (C) (Control). Patients in all groups received a traditional physical therapy program which included hot packs and muscle energy technique. VAS scores were used for assessment of neck pain and algometer was used for assessment of PPT, Myrin OB goniometer was used to assess cervical lateral flexion ROM while Arabic version of neck disability index was used to assess neck disability. All treatments were applied for 3 consecutive days for 4 consecutive weeks.

This work was approved by the institutional ethical committee of Physical Therapy Faulty with No (P.T.REC/012/002952).

Intervention

Acupressure of classical acupoints

Acupressure is applied on four acupoints: Shousanli (large intestine meridians, LI 10): It is located on the dorsal radial side of the forearm, 2 Cun below the transverse cubital crease. Hegu (large intestine meridians, LI4): It is in the middle of the 2nd metacarpal bone on the radial side. Waiguan (sanjiao meridians, TE 5): It is located 2 cun proximal to the dorsal wrist crease between the radius and the ulna. Houxi (small intestine meridians, SI 3): It is located at the ulnar end of the distal palmar crease proximal to the 5th metacarpal phalangeal joint. These acupoints are commonly used in the treatment of cervical myofascial pain syndrome (Chang *et al*., 2020) [6]. Acupressure was applied for 30 seconds on each point, 3 times per session, for 3 consecutive days, for 4 consecutive weeks (Matsubara *et al*., 2011) [28].

Ischemic compression release of MTrPs

First, using a pincer grasp moved throughout the fibers of the upper trapezius and made note of the any active trigger points. To locate a trigger point, palpate the muscle to feel for a taut band or a twitch response in the muscle belly. A common location of upper trapezius trigger points is in the middle of the muscle belly, approximately 1 to 2 inches medial to the acromion process of the scapula. Once located on the trigger point, apply an ischemic compression by gradually applying pressure to the trigger point with your thumb. The patient felt referred pain in a question mark pattern (along the back of the neck, around the side of the head, and then a focused pain right behind the eye). Keep in communication with the patient, checking to ensure that in staying within the limits of his pain tolerance. Hold this technique for approximately 20 seconds to 1 minute, patient tells you that pain has diminished, or until feels the muscle fibers begin to relax under your pressure. Once feel this release, gradually release pressure. All identified trigger points will be treated. Then apply a few effleurage strokes to flush out the area and follow up with a passive stretch to the muscle. This was repeated for 3 to 5 times per session, for 3 consecutive days, for 4 consecutive weeks (Nambi *et al*., 2013) [30].

Traditional physical therapy program

Patients received hot pack and muscle energy techniques.

A. Hot packs: Roscoe Reusable Hot Pack was applied for 20 min and given for all groups before any other form of treatment (Benjaboonyanupap *et al*., 2015) [5].

B. Muscle energy technique: Post isometric relaxation was used in the current study. The patients were placed supine and the therapist stabilized the shoulder on the affected side with one hand, while the ear/mastoid area of the affected side was held by the opposite hand. The head and neck were then side bent toward the contralateral side, flexed, and rotated ipsilaterally, placing the subject just short of their upper trapezius restriction barrier. The subjects then shrugged the involved/stabilized shoulder toward the ear at a submaximal, pain-free, effort (20% of their available strength). The isometric effort was held for 7-10 seconds while a normal breathing rhythm was maintained. During the relaxation phase, the head and neck were eased into increasing degrees of side bending, flexion, and rotation to advance the stretch placed on the muscle. Each stretch was held for 30 seconds. This was repeated for 3 to 5 times for 3 consecutive days for 4 consecutive weeks (Nambi *et al*., 2013) [30].

Evaluation

1. **VAS:** VAS consists of a line, usually 10 cm long labelled as the extremes of pain (e.g., no pain to unbearable pain) and with numbers in between Patients was asked to classify their pain according to the

visual-analogue scale, from 1 to 10. The pain severity was assessed by the visual analogue scale (VAS) before starting treatment (first record) then after 4 weeks (as second record) (Unal *et al*., 2017) [37].

2. **PPT**: Measurement of PPT by algometer has an intra-rater reliability of 0.6 to 0.97 and an inter-rater reliability that varies from 0.4 to 0.98 (Ganesh *et al*., 2015) [10]. The MTrP assessed were in the middle of line between acromial angle (AC) and spinous process of the seventh cervical vertebra (C7). This point were assessed bilaterally. The point is considered 10mm wide (Barbero *et al*., 2013) [3].
3. **ROM**: Data were collected using the Myrin OB goniometer. It was aligned on the nose bridge and ears and was fastened to the head by a Velcrom strap. It was imperative that the patient's chair be positioned such that the magnetic field would zero the dial meter for the rotation component. Prior to testing, Subjects were instructed to sit erect in the chair, with their low back against the chair, midback away from the chair, arms hanging at sides, and feet flat on the floor. Active right and left lateral flexion components of cervical spine motion were measured twice on each subject. During testing, all dials read zero before the desired component was measured. A horizontal line was placed on the wall for the purpose of tracking; subjects were instructed to follow this line when the rotation component was measured (Rheault *et al*., 1992) [31].
4. **NDI**: Patient was asked to fill the questionnaire before and after treatment. Each section was scored on a 0 to 5 rating scale, in which zero means 'No pain' and 5 means 'Worst imaginable pain'. Points summed to a total score. The test can be interpreted as a raw score, with a maximum score of 50, or as a percentage. 0 points or 0% means: no activity limitations, 50 points or 100% means complete activity limitation. A higher score indicates more patient-rated disability. There was no statement in the original literature on how to handle missing data. To use the NDI for patient decisions, a clinically important change was calculated as 5 points, with a sensitivity of 0.78 and a specificity of 0.80 (Stratford *et al*., 1999) [33]

Results

The results of the current study were represented in tables (1), (2), (3) and (4).

Table 1: Demographics of the study groups

	Group A	Group B	Group C	F	Sig.
Age	36.33±12.34	40.33±16.62	42.67±11.37	0.165	0.851
Weight	90±33.6	75.33±15.01	75.67±8.14	0.444	0.661
Height	1.64±0.05	1.67±0.1	1.57±0.07	1.334	0.332
BMI	33.73±14.35	27.24±6.11	30.66±1.98	0.384	0.697

Sig.: Probability value

Table 2: Statistics of the study variables

Variable	Group A	Group B	Group C	F	Sig.
Pre_VAS	9±1	8.33±1.15	6.33±1.53	3.714	0.089
Post_VAS	8±1	4±1	5.33±1.53	8.615	0.017*
MD	1.000	4.333	1.000	5.556	
Sig.	0.002*	0.000*	0.002*		
Pre_LT PPT	7.15±1.54	6.4±4.35	8.25±0.84	0.354	0.716
Post_LT PPT	7.5±1.8	9.77±4.98	8.53±0.95	0.400	0.687
MD	-0.350	-3.367	-0.283	4.653	
Sig.	0.225	0.000*	0.316		
Pre_RT PPT	6.44±0.54	5.53±1.56	7.73±0.91	3.102	0.119
Post_RT PPT	6.9±0.6	9.41±1.86	8.8±0.93	3.299	0.108
MD	-0.463	-3.873	-1.067	4.967	
Sig.	0.018*	0.000*	0.000*		
Pre_LT SB ROM	45.9±5.4	44.7±5.7	46.1±5	0.736	0.518
Post_LT SB ROM	51.6±5.4	52.4±2.4	47.8±5.6	7.1	0.002*
MD	5.6	7.7	1.8	1.151	
Sig.	0.000*	0.000*	0.1		
Pre_RT SB ROM	44.8±5.5	43.8±5.4	42.8±5.3	0.650	0.555
Post_ RT SB ROM	51.6±4.8	51.9±3.3	46.7±4.5	3.6	0.03*
MD	6.7	8.1	3.9	0.896	
Sig.	0.000*	0.000*	0.001*		0.005
Pre_NDI	58.67±24.03	58.67±12.22	43.33±14.05	0.763	0.507
Post_NDI	53.33±22.55	29.33±5.13	39.33±11.02	1.994	0.217
MD	5.333	29.333	4.000	304.889	
Sig.	0.094	0.000*	0.186		

*: Significant; LT: Left; MD: Mean Difference; NDI: Neck Disability Index; RT: Right; SB: Side Bending; Sig.: Probability value; VAS: Visual analogue scale.

Table 3: Bonforroni correction in variables that showed significance

Groups		VAS		RT SB ROM		LT SB ROM	
		MD	Sig	MD	Sig	MD	Sig
Group A	Group B	4.000	0.02*	2.1	0.0001*	1.3	0.001*
Group A	Group C	2.667	0.104	3.8	0.0001*	3.2	0.0001*
Group B	Group C	-1.333	0.669	5.9	0.0001*	4.3	0.0001*

Discussion

Acupressure had no effect on cervical myofascial pain

The results of the current study came in disagreement with previous study stating that total of 712 patients were included in the seven studies of proximal acupressure. Of these, as 681 patients showed improvement in neck pain symptoms (Kwon and Lee, 2018) [20] as in our study the overall effect of acupressure group showed no significance

Wei JC. (1999) [38] performed one treatment session of proximal acupressure for 6–8minutes on 39 patients, and GB20, TE16, GB21, SI15, and A-Shi points were used. Massage on neck for1–2minutes was performed after the acupressure. As a result, 32 patients were cured, and 7 were markedly improved.

Wang. (2001) [39] performed one treatment session of proximal acupressure for 3–6minutes on 30 patients, and SI11was used. As a result, 15 patients were cured, 8 were markedly improved, 4 were improved, and 3 were not improved.

Xiang *et al*., (2003) [44] performed 1–3minutes of proximal acupressure per each treatment session, with 1–2sessions daily for 3–5 days on 112 patients, and GB6 andGB20 were used as basic acupuncture points. If the symptoms were severe, GB21, SI14, and GV14 were added. As a result, 93 patients were cured, 15 were improved, and 4 were not improved.

Huang, (2003) [12] performed one treatment session of proximal acupressure for 10minutes daily for3 days on 45 patients, and SI11 was used. Massage on neck and shoulder was performed after the acupressure. As a result,39 patients were cured, and 6 were markedly improved.

Lu DC, (2004) [26] Performed treatment sessions of proximal acupressure for 2–3minutes on 50 patients, and ST12 andLi17 were used. If the symptoms were severe, GB20 and EX-UE8were added. If periarthritis of the shoulder was presented, LI15and SI11 were added. Tuina, massage, and extension therapy were performed after the acupressure. As a result, 38 patients were cured, 2 were markedly improved, 1 was improved, and9 were not improved.

Wang (2014) [40] performed treatment sessions of proximal acupressure for 15–25minuteson 36 patients, and GB20, BL10, BL11, BL12, and A-Shi points were used. As a result, all of them were cured.

Li KF. (2014) [23] performed treatment sessions of proximal acupressure for 4minutes on 400 patients, and GB20, GB12, ST12, andGB21 were used. Concurrent treatments including massage on neck and shoulder, herbal medicine, hot massage, physical therapy, and acupuncture were performed. As a result, 340 patients were cured, 24 were markedly improved, 20 were improved, and 15 were not improved.

Unlike the results of the current study, A total of 316 patients were included in the seven studies on distal acupressure. Of these, as 314 patients showed improvement of symptoms. In six studies involving 262 patients, the number of patients whose symptoms were cured after one treatment session was 181 (Kwon, 2018) [19, 20]

Zhang (1961) [46] performed one treatment session of distal acupressure for 5–7minutes on one patient, and GB39 was used. Massage on neck and shoulder for 10–15minutes was per-formed after the acupressure. As a result, the patient was cured. Li *et al*. (1984) [21] performed one treatment session of distal acupressure for 2–5minutes on one patient, and BL57 was used. As a result, the patient was cured. Zhang *et al*, (1988) [45] performed treatment sessions of distal acupressure for 1–2minutes on 20 patients, and TE3 was used. As a result, 19 patients were cured, and 1 was markedly improved. Mao, (1989) [29]; performed each treatment session of distal acupressure for 3minutes, 1 session daily for 1–2 days on 24 patients, and GB39 and EX-UE8 were used. As a result, 17 patients were cured, and 7 were markedly improved.

Liang (1999) [24] performed each treatment session of distal acupressure for 15–20minutes, 1 session daily for 2 days on 54patients, and BL57 was used. As a result, 41 patients were cured, 11 were markedly improved, and 2 were not improved. Li (2007) [22] performed each treatment session of distal acupressure for 3–5minutes, 1 session daily for 1–2 days on 136 patients, and GB39 was used. As a result, 118 patients were cured, and 18 were improved. Liu (2012) [25] performed each treatment session of distal acupressure for3–5minutes, 1 session daily for 1–2 days on 80 patients, andTE3 was used. As a result, all the patients were cured.

Ischemic compression release had an effect on cervical myofascial pain

IC is a popular and effective manual therapy method for treating TP-related pain. Bialosky *et al*., (2009) [4]. It has shown short-term and long-term positive effects on increasing PPT, joint ROM, and muscle strength. Wilke *et al*., 2018 [43]; Aguilera *et al*., (2009) [2] It is a well-researched and standardized method of therapy to treat TPs due to its ability to increase local blood circulation. In the present study, it is clear that ICT could improve the TP. (Hou *et al*., 2002) [14].

Moreover, several studies presented the short-term effect of ICT to diminish NDI scores within 2 weeks of treatment. On the other hand, the long-term effect was not sufficient to improve the NDI score for the 6 months'

therapeutic course. Cagnie *et al*., (2013) [7] Likewise, in the current study, the NDI score showed decreasing along the treatment.

In the same vein, ICT improved NDI scores on nonspecific NP patients. Kim *et al*., (2012) [16]. In this study, all patients experienced a statistically significant improvement in NDI scores within the duration of the therapeutic course.

IC therapy may be a more effective mediating method for pain and dysfunction than Extracorporeal shockwave therapy (Joo, *et al*., 2021) [15]

ROM improvement, lateral flexion, and extension and flexion are the most clinically significant movements for the upper trapezius muscle. Several studies that measured the effects of ICT on cervical lateral flexion revealed that one or more sessions could improve the lateral flexion of the neck. Ganesh *et al*., 2015) [10].

The result of our study very similar to study of Hanten *et al*. the effectiveness of a home program involving ischemic compression techniques in patient with myofascial upper trapezius trigger point was examined. The results of their study clearly revealed that the combination therapy along with home exercise programme was more effective in decreasing pain trigger point and functional status of patient. WP Hanten, (2000) [41] a study conducted by Fryer and Hodgson have concluded that the ischemic compression technique was better than sham treatment in reducing upper trapezius myofascial trigger point. Fryer and Hodgson. (2005) [9] Improvement in VAS may be result from hyperemia in upper trapezius myofascial trigger point region or spinal reflex mechanism for the relief of muscle spasm by receiving ischemic compression techniques and home exercises programme along with ultrasound. Hou *et al*., (2002) [14]. Local pressure may equalize the length of sarcomeres in the involved myofascial trigger point and consequently decrease pain. Simons, (2002) [34]. Deep pressure could offer effective stretching and mobilization of the taut bands. Since, the group A received Ischemic compression and home exercise programme along with ultrasound, so the higher gain in pain relief and increase pain pressure threshold may be attributed to the above mechanism explained and supported by different previous studies. Simons *et al*., (1999) [35].

Contradicting findings were evident in another study conducted by Gemmell *et al*. (2008) [11]. He established that ischemic compression did not significantly impact PPT and side bending CROM compared to a switched-off ultrasound placebo control group unlike the present study even he uses nearly the same treatment durations of 30 secs and 60 secs.

Strengths of the current study

This study was the first study that compare between acupressure and ischemic compression release. Also, randomization is computerized which increase external validity.

Weaknesses of the current study

The current study includes few limitations, the first one is small sample size while the second one is the lack of muscle strength assessment measure which may affects internal validity of the study.

Conclusion

Ischemic compression release is better than acupressure in treating cervical myofascial pain.

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Conflict of interest

Authors certify that there is no conflict of interest.

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