

A Study to Compare Manual Pressure Release Technique with Ultrasound Therapy in the Treatment of Patients with Upper Trapezius Myofascial Pain

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Abstract: Background of the study: Myofascial trigger point (MTrP) can be defined as a hyperirritable spot in skeletal muscle that is associated with a hypersensitive palpable nodule in a taut band. MTrP is associated with pain on compression and the pain is typically of a referred type. There are various treatment modalities used for treating myofascial pain which includes individual treatment techniques like Manual pressure release, Acupuncture, Ultrasound therapy, Low level laser therapy, dry needling etc. Among these conservative techniques, Manual pressure release and Ultrasound therapy are said to be very effective. However no study has compared these 2 conservative therapies in the treatment of patients with Myofascial pain. Hence the purpose of this study is to compare the short term effects of Manual pressure release technique with Ultrasound therapy in patients with Myofascial pain syndrome. Methodology: 30 subjects with Myofascial trigger points (MTrPs) of upper trapezius muscles were selected for the study and randomized into two groups Group A and Group B. Group A subjects received Manual pressure release technique twice a day for 30 minutes, 3 days a week for 4 weeks and Group B were treated with therapeutic ultrasound therapy for 3 days a week a period of 4wks. Outcome Measures: Pre and Post test values of all the subjects were evaluated using Visual Analog Scale (VAS) for measuring pain and Inch tape. Results: The results have revealed that there is extreme significance noted in Group A ($p < 0.0001$) when compared to group B. Significant difference was also noted in both outcome scales VAS and Inch tape measurements. Conclusion: The results of this study have shown significant reduction of pain and improvement in cervical lateral flexion range of motion in patients treated with Manual pressure release technique (Group A) when compared to (Group B) that is Ultrasound therapy.

Keywords: Myofascial Pain,, Manual pressure release technique, ultrasound therapy, Cervical lateral flexion range of motion.

1. Introduction

Myofascial Trigger Points (MTrPs) are claimed to be a common source of musculoskeletal pain in people. Simons et.al have identified Myofascial trigger points as discrete foci, often palpable as a nodule with in taut band of skeletal muscle that are tender on palpation and produce characteristic referred pain and autonomic phenomena¹. A Latent trigger point will only produce referred pain when manual pressure is applied, whereas an active trigger point produces pain without palpation. Common characteristics of MTrPs include a taut band, nodule, spot tenderness, consistent referred pain pattern, local twitch response (Ltr), restricted range of stretch motion and associated autonomic phenomena. Criteria for the reliable diagnosis and detection of MTrPs is contentious, because there are no definitive clinical tests. As such, Manual palpation skills combined with patient feedback, have been the primary way in which MTrPs are diagnosed and treated². Myofascial pain syndrome (MPS) is a syndrome characterized with pain and accompanying muscle spasm, referred pain patterns, stiffness, restricted range of motion caused by trigger points on constricted fibers of muscles and/or fasciae^{3,4}. Various physical therapy modalities such as trigger point injection, stretching-spray technique, Low level laser, Manual pressure release or ultrasound (US), heat packs and TENS are used for the treatment of MPS. These modalities inactivate the trigger point with their thermal and/or mechanical effects¹. Among them Manual pressure

release technique and ultrasound have been very effective. Simons (2002) has contended that Myofascial trigger points are often inadequately diagnosed and treated due to insufficient training and knowledge of practitioners

Myofascial trigger points are claimed to be a source of local and referred pain, any may create additional complaints by reducing joint range of motion and producing autonomic disturbance.

Gerwin et.al (1997) demonstrated acceptable inter examiner reliability for the detection of myofascial trigger points in the trapezius muscle using the criteria of taut band or nodule, spot tenderness and referred pain⁵.

Gerwin et.al (1997) recommends that the minimum acceptable criteria are the combination of spot tenders in a palpable taut band of skeletal muscle and characteristic referred pain. Manual therapy is one of the basic treatment options in the management of MTrPs and the role of orthopaedic manual physical therapists cannot be overemphasized. Sustained manual pressure, referred to as 'manual pressure release' (MPR), and previously referred to as 'ischaemic compression', 'inhibition', and 'trigger point pressure release'. It is one of a number of techniques advocated for the treatment of MTrPs. MPR is performed by applying tolerably painful persistent manual pressure usually with the thumb or fingertip against the tissue barrier of a MTrP¹.

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Manual pressures applied to the myofascial trigger point's contraction knot has been proposed to reduce the height of the sarcomeres and cause concomitant lengthening of the sarcomeres in the involved muscle fibers.

Majlesi J, unalan H suggested (proved) that the high power pain threshold ultrasound is effective in treating the myofascial trigger points of the upper trapezius⁶. US is one of the most commonly used therapies for the treatment of MPS. Generation of heat is the most important and best-known effect of US. The thermogenic effect of US results in a transient increase in the flexibility of dense collagenous structures such as tendons, ligaments and joint capsules, which consequently decreases the stiffness of the joint, pain and accompanying muscle spasm and increases the blood flow temporarily⁶. Besides, non-thermal effects are known to yield physiological effects and segmental analgesia. Reduction in muscular hyperalgesia may be followed by decreased nociceptive input to the central nervous system and, as a consequence, central and peripheral sensitization is decreased⁷. Despite the agreement that both manual pressure release and ultrasound are effective for patients with trigger points of the upper trapezius muscle, there is no evidence referring to which of them is better and more effective. Therefore, in the current study we compared between both techniques regarding pain threshold and active cervical range of motion in the upper trapezius muscle.

2. Methodology

All subjects diagnosed with upper trapezius myofascial trigger points were screened for inclusion and exclusion criteria. The subjects with the age group of 25-40 years were included in the study. Both males and females were included. Patients with clinically active, palpable MTrPs on one side or both sides were recruited. The criteria for excluding subjects were

- 1) Patients with CNS deficits
- 2) Patients with cognitive deficits
- 3) Patients receiving treatment by other methods like medicines, acupuncture etc
- 4) Patients with hypermobile joints

The nature and purpose of study was explained to subjects before recruiting them in the study. Informed consent form was taken from every subject.

3. Procedure

30 subjects (16 men, 14 women) were selected for study and were randomized into two groups Group A and Group B. Group A subjects received Manual pressure release technique whereas Group B subjects received ultrasound therapy for 4 weeks thrice a week alternatively. Group A subjects underwent training programme of Manual pressure release of the upper trapezius trigger points which incorporates thirty minutes session twice daily for five days in a week for four weeks.

Manual pressure release treatment technique: Subjects were asked to expose their shoulder and trapezius region and lay supine on treatment table. Subjects underwent a

screening process to identify Mtrps in upper trapezius muscle.

Screening process

With the subject supine and the therapist seated at the head of the subject, the therapist uses his right thumb to palpate the upper trapezius from medial and lateral to establish if myofascial trigger points were present. Initially thumb (or strong finger) was pressed directly on the trigger point to create tolerable, painful, sustained pressure. Pressure was gradually increased by adding a thumb or finger from the other hand as necessary for reinforcement. This pressure was continued up to 1 and half minute with as much as 20 to 30 lb of pressure. If the trigger point tenderness persisted, the procedure was repeated. Treatment was considered useless if the patient tend to abate.

Application of Therapeutic Ultra sound

In Group B 15 subjects were given Ultra sound therapy. The duration is thrice a day for alternate days in a week for 4 weeks.

Machine setting

Ultrasound head size-1cm, Mode-continuous, Intensity within 0.1-1.5 watts/cm² according to pain threshold, Size of the area to be treated - 5cm² in diameter, Treatment time is 5 minutes and the patient position is forward lean sitting on a couch. Speed at which head of the transducer should be moved is 1.25-2.5 cm/sec.

Direct contact method

A layer of gel should be applied to the treatment area in sufficient amounts to maintain good contact and lubrication between the transducer head and the skin. A thin film of gel should be applied directly to the transducer face before transmission begins. The treatment head should be moved in small concentric circles over the skin in order to avoid concentration at any one point, keeping the whole of the front plate in contact with the skin.

The pre and post test results were computed from visual analog scale (VAS) for pain sensitivity and Inch tape for the measurement of the cervical lateral flexion range before on the first day and at the end of 4 weeks. Cervical lateral flexion range of motion is measured by inch tape. The patient is in sitting position with head neutral. Inch tape is taken from mastoid process of the head to the lateral tip of acromion process and measured in centimeters. Then the patient is asked to laterally flex the cervical spine and measurement is taken, the difference between the first and second reading gives the lateral cervical range of motion in centimeters.



Figure 1: Showing Myofascial Trigger Points of Upper Trapezius



Figure 2: Showing Manual Pressure Release Technique (Group A)



Figure 3: Showing Application of Ultrasound on Upper Trapezius Myofascial Trigger Points (Group B)



Figure 4: Showing Measurement of Lateral Cervical Range of Motion Using Inch Tape

4. Data Presentation and Statistical Analysis

Table 1: Comparison between pre and post values for vas in group A

	Mean	Standard Deviation	P- Value	T- Value
PRE	7.93	0.8837	< 0.0001	22.556
POST	1.73	0.5936		

Table 2: Comparison between pre and post values for vas in group B

	Mean	Standard Deviation	P-Value	T-Value
PRE	8.13	0.8338	<0.0001	10.201
POST	4.93	0.8837		

Table 3: Comparison between pre and post values for vas between Group A and Group B

	Mean	Standard Deviation	P- Value	T- Value
PRE	1.53	0.5164	< 0.0001	12.865
POST	4.93	0.8837		

Table 4: Comparison between pre and post values for cervical lateral flexion Range of motion in Group A

	Mean	Standard Deviation	P-Value	T-Value
PRE	12.4	1.549	<0.0001	12.234
POST	6.8	0.8619		

Table 5: Comparison between pre and post values for cervical lateral flexion Range of motion in Group B

	Mean	Standard Deviation	P-Value	T-Value
PRE	12.53	1.457	<0.001	5.682
POST	10.13	0.7432		

Table 6: Comparison between pre and post values for cervical lateral flexion Range of motion between Group A and Group B

	Mean	Standard Deviation	P-Value	T-Value
PRE	6.8	0.8619	<0.001	11.344
POST	10.13	0.7432		

5. Discussion

From the above results it is observed that both Groups A and B showed reduction in Myofascial pain and improvement in lateral cervical range of motion. However significant reduction in pain and lateral cervical flexion Range of motion is seen in Group A subjects treated with Manual pressure release (MPR) technique. These findings are consistent with reports from other authors including Fischer (1987) and Hou et al (2002) who both found that MPR decreased the sensitivity of MTrPs^{8,11}.

There are a number of possible mechanisms behind the effectiveness of MPR..Simons (2002) has proposed that MPR may equalize the length of sarcomeres in the involved MTrP and consequently decrease the palpable knot and pain¹⁵. Thus reduction in pain increased cervical lateral range of flexion. Hou et al(2002) suggested that pain reduction in MTrps following MPR may result from reactive hyperaemia in the local area, due to counter-irritant effect or a spinal reflex mechanism that may produce reflex relaxation of the

involved muscle¹¹. These proposals are speculative and further research is required to establish the therapeutic mechanisms. It has been argued that in order to prevent an ongoing cycle of MTrPs treatment and relapse, contributing factors such as posture should be addressed^{1,11}.

On the other hand there was reduction in pain and increase cervical lateral flexion range of motion in subjects treated with Ultrasound therapy (Group B). The use of High Power ultrasound is recommended as clinical therapy for chronic MTrPs (ESenvel, 2000; Majlesi, 2004). In this literature that support the use of ultrasound it was found that pain relief was due to its thermal and mechanical effects such as increase in local metabolism, circulation, regeneration and extensibility of connective tissue with its assuming thermal and mechanical effects^{16,17}. This might have reduced pain and increased cervical lateral range of motion in subjects treated with Ultrasound therapy (Group B). Draper et al reported that ultrasound therapy decreases the tenderness of latent trigger points. However results in the studies related to its efficacy in the musculoskeletal system problems are conflicting^{12,13}. But the reduction in pain and increase in cervical lateral flexion range of motion was significantly more in Group A than Group B which is in accordance with Simon and travel (1992) who reported that manual pressure applied to the myofascial trigger points 'contraction knot' has been proposed to reduce the height of sarcomeres and cause concomitant lengthening of the sarcomeres in the involved muscle fibers. Contractions knots are nothing but the areas of localized sarcomere shortening, which are in a state of continual contractions and result in the local ischemia and Hypoxia. The combination of increased energy demand in the face of loss of energy supply causes the release of sensitizing noxious substances which are proposed to be responsible for the pain, so with the manual pressure release there is lengthening of the sarcomeres, so there is decreased ischemia and Hypoxia. So there is decrease in pain sensitivity¹⁸. This effect of Manual pressure release technique might have been the cause for significant reduction in pain and increase in cervical lateral flexion range of motion seen in Group A subjects when compared to Group B subjects.

6. Conclusion

The results of this study have shown significant reduction of pain and improvement in cervical lateral flexion range of motion in patients treated with Manual pressure release technique (Group A) when compared to (Group B) that is Ultrasound therapy. Therefore Manual pressure release technique can be safely and effectively used in treating patients with Upper Trapezius Myofascial pain (MTrPs) for better treatment outcome.

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