



RESEARCH ARTICLE

COMPARISON BETWEEN THE EFFECT OF MYOFASCIAL TRIGGER POINT RELEASE THERAPY AND ULTRASONIC THERAPY IN TRIGGER POINTS OF UPPER TRAPEZITIS

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ABSTRACT

Objectives: To compare the effect of myofascial trigger point release and ultrasonic therapy in trigger points of upper trapezitis.

Design: Experimental design with randomized control trial type

Setting: The study was conducted at SRM Medical Hospital & Research Center, Kattankulathur.

Procedure: 30 subjects diagnosed with upper trapezitis, were divided into two groups, each group is given with different treatment method, one with myofascial trigger release where as other with ultrasonic therapy.

Results: The results shows that there was significant difference between two groups of pre and post-test and value of $P < 0.001$.

Conclusion: After intervention of both the groups pain was reduced, range of motion and muscle length increased.

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INTRODUCTION

Trigger points are described as hyperirritable spots in skeletal muscle that are associated with palpable nodules in taut bands of muscle fibers. Compression of a trigger point may elicit local tenderness, referred pain, or local twitch response. The trapezius commonly contains trigger points and has referred pain. The trapezius is a large kite shaped muscle, covering much of the back and posterior neck. A trigger point in the trapezius (or upper back) may result in pain that radiates up to the neck and down through the shoulder and the arm. In turn, as the body attempts to adjust to this pain, these secondary areas become vulnerable to the development of their own trigger points. As well, the activity that led to the development of the first trigger point will cause further exacerbation unless the behaviour is identified and altered. Stopping this progression requires treatment. Activation of trigger points may be caused by a number of factors mainly including acute or chronic muscle overload. It is associated with local or distant foci of irritation in the skin fascia subcutaneous tissue and muscle fibers. It may result from or irritated by trauma, over use, mechanical overload postural fault or psychological stress. Patient complaint is usually associated with a painful, restricted range of motion. Functional complaints include a decreased work tolerance, impaired muscle co-ordination fatigue and weakness.

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Later stages can be complaint of sleep disturbance mood changes and stress. According to Travel *et al*, three theories have been proposed to explain why Trigger points develop. The first theory suggests that Trigger points are caused by repetitive muscular overload (microtrauma) or direct muscle injury (macrotrauma). The local hypersensitivity and pain at the injury site leads to painful local muscle contraction and development of Trigger points. The second theory is based on pain neurophysiology, and proposes that the Trigger point is not a primary muscle lesion, but entirely a referred pain phenomenon. The primary nociceptive (pain producing) source is in the dorsal horn of the spinal cord or in the peripheral nerves. The third theory assumes that Trigger point originate from dysfunction at the muscles themselves. Local muscle spindle dysfunction and abnormal depolarisation of motor endplate, is thought to be the mechanism. The resultant muscle spasm may impair blood supply to the muscle leading to depletion of oxygen, calcium and other nutrients necessary to produce muscle relaxation. Continued spasm causes distortion and damage of involved tissues, leading to release of inflammatory chemicals, which further increases perception of pain.

The following factors are known to typically aggravate Myofascial Trigger Points (Myofascial trigger points):

1. Strenuous use of the involved muscle. This may indicate the muscle harbouring the Trigger points.

2. Forcible, passive stretch of the muscle, e.g., traction, conventional stretching
3. Sustained or repeated contraction of the involved muscle, e.g., while lifting weights or doing isometric or strengthening exercises
4. Local pressure on the Trigger points e.g., a vigorous massage
5. Keeping the affected muscle immobile in a shortened position for a long time, e.g., after sitting in a fixed position, driving, sleeping, and by using neck collars, back belts/corsets and braces
6. Cold, damp weather.
7. Excessive, uncompensated emotional stress or psychological tension.
8. Recurrent bouts of hypoglycemia
9. Hyperuricemia.

Gradual development of Trigger points is usually due to incorrect posture, abnormal bone structure (short leg, tilted pelvis, short upper arms, etc.), poor body mechanics and ergonomic issues related to work station set up, job design, etc.

Myofascial Trigger Point pain is decreased by the following modalities:

1. By a very short period of rest.
2. By slow, steady passive stretching of the involved muscles, especially under a warm shower.
3. By application of moist heat on the Trigger points (and NOT at the site of pain). However, patients will need to be shown exactly where the Trigger points are located.
4. By short periods of light activity with movement (not by isometric contraction or strengthening exercises).
5. Specific manual therapy or myotherapy: Myofascial Trigger point pressure release, Myofascial Trigger release therapy (MFR), Muscle Energy Techniques (MET) and Positional Release Techniques (PRT).
6. Clinician administered Spray and stretch example: Vapocoolant spray.
7. Clinician administered Trigger point's injection example: Corticosteroid injections.

Trigger point pressure release (or Trigger point therapy) is done as a painless but uncomfortable barrier-release technique to release the contraction knot in the muscle. The amount of pain felt by the patient should not exceed 7 on a scale of 10 at the time of treatment (0 = no pain; 10 = maximum pain). Digital pressure or tools can be used to achieve Trigger point release; however, a very high order of manual skill and experience is required to achieve this. This technique relies entirely on accurate identification of Myofascial trigger points by means of palpation. With proper instruction, this can be achieved, in certain cases by patients themselves, using rubber balls and self massage devices. Having evaluated where a restricted area exists, Myofascial Trigger Point release (MTPR) techniques can be added to improve flexibility and restore musculoskeletal balance. MTPR is a hands placed on soft tissue technique that facilitates a stretch into the restricted fascia. During MTPR a sustained gentle pressure is exerted in the line with fibre direction of the tissue being treated, which engages the elastic component of the elastico-collagenous complex, stretching this until it commences, and then eventually ceases, to release. Muscle Energy Techniques (MET) are soft tissue manipulative methods in which the patient, on request, actively uses his muscles from a controlled

position, in a specific direction, with mild effort against a precise counterforce. Positional Release Technique (PRT) involves positioning an area or the whole body in such a way as to invoke a physiological response, which helps to resolve musculoskeletal dysfunction. The beneficial results seem to be due to a combination of neurological and circulatory changes, which occur when a distressed area is placed in its most comfortable, it's most easy, most pain free position. (As described by Chaitow, 1996) Clinician-administered spray and stretch involves sweeping a stream of vapocoolant spray over the muscle in a series of parallel sweeps that start at one end of the muscle and continue over the muscle belly to include the referred pain pattern. This is followed by a myofascial release manoeuvre or sequential isometric contraction and relaxation (Lewit technique). Spray and stretch produces an immediate increase in pain threshold accompanied by improved range of motion. Travell and Simons state, "Spray and stretch is the single most effective non-invasive method to inactivate acute trigger points (TrP's)." This needs to be maintained by a home-exercise programme of appropriate stretches and self-care of the in

Biomechanics

A Trigger point is simply a thick knot in the muscle - a way the muscle reacts to being overloaded. In some ways a Trigger point is the equivalent of a stress fracture in a bone. These are commonly seen in loaded muscles like trapezius etc. More specifically, a Trigger point is a palpable, tender, nodule point of muscle or fascia. It may also be found in skin, where scar tissue is present, in old ligament injuries or, occasionally, in periosteum (the lining of bone). Under a microscope, Trigger points appear darker, straightened out and thicker, ranging in diameter from 1-4mm. If located in muscle, they cause it to form taut bands or become 'ropy'. A focal area of inflammation develops fairly early on and a collagen matrix forms; scar tissue is laid down to bridge the weak link, and can become quite thickened and tough, depending on how long it has been present. The muscle in which a Trigger point is found will usually be weakened and shortened. The muscle - or the part containing the Trigger point - is commonly in a state of involuntary tension, or increased 'tone'. At worst, muscle spasm will present around a very nasty and inflamed Trigger point, which can result in cramping. The trigger point presents as either active/'alive' or latent/'sleeping', depending on whether or not it 'refers' pain. With an active trigger point (ATP), when you push on the point and try to elicit the 'local twitch response' (an involuntary twitch from the pain of pressing on a sensitive spot), it will begin to cause pain somewhere else in your body on a consistent basis. Latent trigger points (LTPs), on the other hand, are painful only in the area around the Trigger point. The more intense the pain when pressing on the Trigger point, and the more obvious the local twitch response, the greater the likelihood of referred pain being present. Sometimes an ATP can even set up 'satellite' Trigger points in the area to which pain is referred.

Apart from finding a sore spot, you can identify a Trigger point in one of three ways:

1. Pain - usually you will start to hurt somewhere. Pain may appear at quite a distance from the Trigger point (referred pain).
2. Motor pattern change: First indication of a Trigger point may be that along the line of biomechanics have

changed and the firing pattern of muscles has been altered because muscles with Trigger points may have a lower firing threshold (i.e. overactive) or a higher threshold (i.e. sluggish and late) because of the pain associated with contracting the muscle.

3. Weakness. A muscle with one or more Trigger points will lose its strength until the Trigger point is treated. This is either because its nerve supply is compromised by the Trigger point or because the Trigger point is causing a pain inhibition (i.e. it hurts to contract the muscle or move a joint associated with it).

If a joint is not being sufficiently protected from excessive shear forces by a muscle that is too weak, it will send pain messages, become inflamed and soon start to undergo degenerative changes. In this scenario it is definitely not enough to just get into the gym and 'work through the pain'. Often the pain will get worse unless the Trigger point is being treated at the same time and joint stability and relearning exercises are prescribed.

How to find your own trigger points:

Make sure that the affected muscle are completely relaxed, not on stretch, then use one of the following techniques to palpate the Trigger point:

Flat Palpation. This involves simply moving the fingertip(s) transversely across the muscle fibers with some pressure until a 'taut band' is located. Having found this tight section of the muscle, explore along its length to locate the spot of maximum tenderness with minimum pressure: that is the Trigger point. With some practice it doesn't take long to find the taut bands in a muscle. **Pincer Palpation.** Some muscles – example: the upper trapezius (neck) or gastrocnemius muscle (calf) - can be lifted from surrounding tissue between the thumb and forefinger to locate the Trigger point. The muscle will usually contain a 'taut band' which contains the Trigger point within it; if you flick over the right area it should cause a twitch in the muscle or that part of the body, known as the 'local twitch response' (LTR). If there is no LTR the Trigger point may be more chronic, in which case a part of the muscle will feel. To determine whether the Trigger point is active or latent, apply some firm pressure to the sore area: an ATP will be extremely tender compared to a LTP but, more importantly, it should refer pain to another area in the body. While different Trigger points refer to different areas, the referred pain pattern is quite similar from person to person. Sometimes a Trigger point needs to be pressed or flicked over for up to 10 seconds before the referred pain becomes evident.

Aim of the study

To determine and compare the effect of Myofascial soft tissue mobilization and ultrasonic therapy in trigger point release of upper trapezitis.

MATERIALS AND METHODS

The study was conducted at SRM Medical Hospital & Research Center, Kattankulathur. The study design was Experimental with randomized control trial, duration was 3 weeks, 30 subjects were divided into 2 groups with simple random sampling method.

Inclusion Criteria

- Subjects of age group 20-40 years.
- Gender- both males and females.
- Pain scale- on a 11 point Numerical Rating Scale greater than or equal to 4.
- Upper Trapezius Involvement.
- Range of Motion of cervical spine- reduced lateral cervical flexion and painful.
- Trapezius stretch test is positive.
- Duration of pain should be less than a month.

Exclusion criteria

- Patients with specific neck pain such as:
- Cervical spondylosis: compression test distraction test positive.
- Brachial Neuralgia: upper limb tension test is positive.
- Subjects of age group less than 20 and greater than 40 years.
- Pain scale NRS → not less than 4.
- Middle and lower trapezius are not taken.
- Pain free and full ROM of cervical spine.
- Trapezius stretch test is negative.
- Pain duration more than a month are not taken.
- Other diseases of spine and shoulder.

Materials required

- Universal Goniometer
- Numerical Pain Rating Scale
- Pencil
- Stool
- Ice cubes
- Ultrasound apparatus
- Ultrasound Gel (Aquasonic gel)
- Cotton

Procedure

In a total of 30 subjects, the subjects were randomly divided into two groups. They are Group-A and Group-B. An initial Pre treatment assessment had been taken before treatment and Post treatment assessment had been taken after the treatment for both groups.

Group-A: In this group 15 subjects had been assessed for pain and Range of Motion before the treatment by using Numerical Rating Scale and Goniometer. In this group subjects were received Myofascial Trigger Point Release Therapy followed by self stretching for 10-20 minutes per day for 6 days in a week for 3 weeks. The subjects were asked to sit on a stool in a relaxed manner and neck is placed in a neutral position and deep transverse friction or deep pressure massage like kneading applied on a taut band by applying pressure on that area of upper trapezius which is followed by self-stretching. The pressure given to the subject depends upon his tolerance and pain. It varies from person to person. After trigger point release therapy stretching should be given. Stretching should be given in such a way that the subjects head is laterally flexed to contra lateral side and rotated to same side with one hand and at the same time the subject's shoulder of the involved side was gently pressing downward with the other hand. Each static

stretching should be hold for 30 seconds. After treatment ice cube massage had been given for 5-8 minutes in treated area in circular manner to avoid further more damage in the treated area.

Group-B: In this group 15 subjects had been received Ultrasound therapy followed by self stretching for 5-7 minutes per day for 3 days in a week [alternate days] for 3 weeks. The subjects were asked to sit on a stool and ask them to lie down on a table or couch head is facing downwards and hands are placed or supported in a pillow. Then apply the aquasonic gel on the treatment head and also on the treating area. Before that the apparatus should be checked properly to prevent shocks or from any dangers to the subject. Treatment should be given by applying pressure moving the treatment head in a circular manner or figure of 8 manners in upper trapezius muscle using direct contact method. The following are the parameters in which ultrasound had been given to the subjects:

Mode	: Continous mode.
Intensity	: 1.5 watts cm ²
Frequency	: 1MHz.
Duration	: 5-7minutes.
Type of method	: Direct contact method.

RESULTS

The results shows that the Myofascial trigger point release therapy and Ultrasound therapy shows the significance difference of $p < 0.001$. But the subjects treated with Myofascial trigger point release therapy shows greater significant difference than subjects treated with Ultrasound therapy. So Myofascial trigger point release therapy is most effective in treating trigger points of subjects with upper trapezitis.

Conclusion

There is significant difference between both the groups of statistical value at $p < 0.001$. In Group-A there is significant difference between Pre-test and Post-test treatment for pain and cervical range of motion for lateral flexion in a duration of 3 weeks. In Group-B also there is a significant difference between pre-test and post-test for pain and cervical range of motion in duration of 3 weeks. After intervention of both the groups pain will reduced and range of motion will increases without pain and muscle length also increases. But Group-A is more significant than Group-B in treating trigger points of upper trapezitis. So, Myofascial trigger point release therapy is most effective treatment than ultrasound in treating the trigger points in upper trapezitis.

Limitations

- Limited number of samples was included.
- Shorter duration of treatment session.
- Upper fibers of Trapezius was only included.
- Age group of 20-40 years was taken.

Recommendations

- Larger number of samples also can be included.
- Longer duration of treatment session.

- Lower and middle fibers of trapezius can also be included
- Age group of above 40 years can also taken

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