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A STUDY TO COMPARE THE EFFECT OF MUSCLE ENERGY TECHNIQUE AND POSITIONAL RELEASE TECHNIQUE ON PAIN AND CERVICAL ROM IN PATIENTS WITH CHRONIC UPPER TRAPEZITIS

Physiotherapy

Dr. Saloni Thaker MPT(Musculoskeletal and Sports Conditions)- Assistant Professor at Chanakya College of Physiotherapy

Dr. Yagnik Dave* MPT(Cardiopulmonary Conditions)- Assistant Professor at Harivandana College of Physiotherapy *Corresponding Author

Dr. Sheetal Patel MPT(Musculoskeletal and Sports Conditions)- Associate Professor at Shree K.K. Sheth College of Physiotherapy

ABSTRACT

***Background*:** Mechanical neck pain is a common disabling condition in today's technological era. Due to constant flexion of neck for reading, writing or typing the postural muscles of neck like upper trapezius & levator scapulae tend to go for shortening which leads to pain and restricted range of motion.

***Aims and objectives*:** The objective of the study is to compare the effect of muscle energy technique and positional release technique on pain and active cervical range of motion in patients with chronic upper trapezitis.

***Methods*:** The study was conducted on 30 patients with mechanical neck pain of age 20-40 years were randomly selected as per inclusion and exclusion criteria and randomly divided into group A and group B which consist of 15 subjects in each group. Group A was treated with Muscle Energy Technique with conventional treatment which consisted of Ultrasound and Trapezius stretching and Group B was treated with Positional Release Technique with conventional treatment. The outcome measures were ROM and VAS taken prior to and at the end of six treatment sessions (6 times/week).

***Results*:** Data were analyzed by SPSS statistics 20.0 software. The results revealed that the Group A (MET) showed significant improvement in VAS (Visual Analogue Scale)($t = 20.4$, $p<0.05$), and Active cervical ROM (Range of Motion)score ($t = -11.8$, $p<0.05$) and Group B (PRT) did not showed significant improvement in VAS ($t = 9.461$, $p<0.05$), and Active cervical ROM score ($t = -10.07$, $p<0.05$). Also, between group comparison revealed significant difference between the two techniques in VAS ($t = -9.544$, $p>0.05$), and Active cervical ROM score ($t = -12.757$, $p>0.05$) in subjects with chronic upper trapezitis.

***Conclusion*:** It can be concluded that Muscle energy technique (MET) is an effective option in the treatment of chronic upper trapezitis.

KEYWORDS

Muscle Energy Technique (MET), Positional Release Technique (PRT), Upper Trapezitis, Range of Motion (ROM), Visual Analogue Scale (VAS).

INTRODUCTION

Mechanical neck pain affects 45–54% of the general population at some time during their lives and can result in severe disability. The exact pathology of mechanical neck pain is not clearly understood. Different authors often assume that mechanical neck pain is associated with muscular, joint and neural impairment.[1]

MTrPs are hyperirritable spots located in a taut band of a skeletal muscles, when compressed, overloaded or stretched generate pain in typical referred patterns. Trigger points form in the muscle fibres, close to the motor end plate(neuromuscular junction). Excess acetylcholine (ACH) is released at the synapse, usually associated with overuse or strain, leading to release of calcium. Resulting ischemia creates an O2 deficit and energy crisis.

The upper trapezius muscle is designated as postural muscle and it is highly susceptible to overuse. It is an inverted triangular muscle which starts at the base of the skull, spreads over the shoulders and down to the mid back. Fibers of upper trapezius muscle initiate rotation of the clavicle to prepare for elevation of the shoulder girdle. Any position which places trapezius in a shortened state for a period of time without rest may shorten the fibers and lead to dysfunction and restricted motions of neck.[5]

The prevailing view is that sustained low-level activity of the upper trapezius muscle day after day leads to overload of muscle fibers of low threshold motor units, and eventually it develops pain. In support of this hypothesis the previous studies showed the association between a low rate of short unconscious interruptions in trapezius muscle activity during light manual work and a high risk of future trapezius myalgia has been shown.[6,7]

Muscle Energy Technique (MET) is a form of manipulative treatment using active muscle contraction at varying intensities from a precisely controlled position in a specific direction against a counterforce. The origin of muscle energy is credited to Dr Fred Mitchell Sr., an osteopathic physician, who described the technique in the 1950s.[10,11]

Post-Isometric Relaxation refers to the subsequent reduction in tone of the agonist muscle after isometric contraction. This occurs due to stretch receptors called Golgi tendon organs that are located in the tendon of the agonist muscle. These receptors react to overstretching of the muscle by inhibiting further muscle contraction. This is naturally a protective reaction, preventing rupture and has a lengthening effect due to the sudden relaxation of the entire muscle under stretch.[10,11]

Positional release technique (PRT) is an indirect (the body part moved away from the resistance barrier, i.e., in direction of greatest ease) and passive (i.e., the physiotherapist performs all the movements without help from the patient) technique & it places the body into a position of comfort (POC) and employs tender points to identify and monitor the lesion, include the use of body positioning, the use of tender points to identify the lesion and to monitor the therapeutic intervention. The purpose of the POC is to reduce the irritability of the tender point and to normalize the tissues associated with the dysfunction.[17]

Therefore this study will add to the growing body of knowledge whether these two techniques yield comparable outcomes or if one technique is superior to the other. In such a case it should be the preferred choice of therapy.

So, here the purpose of the study is to find out and compare the effectiveness of muscle energy technique &Positional Release Therapy on pain & Cervical Range of Motion in patients with chronic upper trapezitis.

Therapeutic Ultrasound is a method of applying deep heat to connective tissue which plays an important role in relieving plantar heel pain by both thermal and mechanical effect on target tissue resulting in increased local metabolism, circulation and extensibility of connective tissue and tissue regeneration. For superficial tissue heating 3MHz ultrasound is used and for greater depth efficiency 1MHz ultrasound is used.

Pain can be measured for severity on a visual analog scale. It is one of the most basic pain measurement tools. There is a 10 cm line and patient is asked to bisect line at a point representing self reported position on the scale. The patient's score is then obtained by measuring

from the zero mark to the mark bisecting the scale.[12]The reliability of VAS is 0.60 to 0.77 and validity is 0.76 to 0.84.[22]

Goniometry refers to the measurement of angles, in particular the measurement of angles created at human joints by the bones of the body. The universal goniometer is the instrument most commonly used to measure joint position and motion in the clinical setting. The reliability of goniometry is 0.98 and validity is 0.97-0.98.

AIM OF THE STUDY

The aim of this study is to compare the effect of muscle energy technique &Positional Release Therapy on pain & Cervical Range of Motion in patients with chronic upper trapezitis.

OBJECTIVES OF THE STUDY

1. To evaluate the effect of Muscle energy technique and Positional Release Therapy on pain & Cervical Range of Motion in patients with chronic upper trapezitis.
2. To evaluate the effect of Muscle energy technique and Positional Release Therapy on pain & Cervical Range of Motion in patients with chronic upper trapezitis.
3. To compare effect of Muscle energy technique and Positional Release Therapy on pain & Cervical Range of Motion in patients with chronic upper trapezitis.

HYPOTHESIS

Null hypothesis:

- There is no significant difference between effect of Muscle energy technique and Positional Release Therapy on pain and Cervical Range of Motion in chronic upper trapezitis.

Experimental hypothesis:

- There is significant difference between effect of Muscle energy technique and Positional Release Therapy on pain and Cervical Range of Motion in chronic upper trapezitis.

METHODOLOGY

Method of data collection:

30 patients with chronic upper trapezitis with age group of 20-40 years were selected from Shri K.K. Sheth physiotherapy college, Rajkot for the study that fulfilled the inclusion and exclusion criteria. The details and purpose of the study were explained to all subjects and written consent was taken from them. The total duration of study was 6 consecutive days.

SELECTION CRITERIA:

Inclusion criteria:

- Age: 20-40 years[1]
- Gender: Male and Female[1]
- Unilateral Trapezitis[1]
- Subject with trapezius muscle spasm

Exclusion criteria:

- Fracture of the cervical spine[30,31]
- Neck pain with radiation into arms or upper extremity[30,31]
- Diagnosed cases of disc prolapse[30,31]
- Any neurological impairment[30,31]
- Tumour in cervical region[30,31]
- Any deformity(eg. spasmodic torticollis, sprengel's deformity, scoliosis)[30,31]
- History of surgery of the cervical spine during the previous 12 months[30,31]
- Patients who are taking analgesics[30,31]

Materials:

- Treatment Table
- Pen and paper
- Chair
- Scale
- Universal Goniometer
- Measurement form
- Consent form
- Ultrasound Apparatus

1. Procedure:

- The proposed title and procedure had been approved by ethical committee members. Subjects of both the genders were selected from OPD centre of Shri K.K. Sheth Physiotherapy College, Rajkot.
- The selection of subject was done by convenient sampling. All the subjects were explained about the purpose and the test procedures involved in the study before their enrollment in the study. Written consent was taken from subjects who fulfilled both the criteria and were willing to participate in the study.
- On the first visit, a complete physical assessment was done. Pre-participation evaluation form consisted of name, age, gender, duration of symptoms, pain history and Cervical Range of Motion. Pre treatment measurements were taken for all patients for pain intensity (on VAS) & Cervical Range of Motion (ROM).

2. Method for measurement of Visual analogue scale[12]:

- A Visual Analogue Scale (VAS) attempts to represent measurement quantities in terms of a straight line placed horizontally or vertically on paper.

No Pain	Worst Possible Pain

3. Method for measurement of active cervical range of motion[19]:

- **Cervical Lateral flexion:**

Position of the patient: The subject will be in sitting with the thoracic and lumbar spine well supported by the back of a chair.
Position the cervical spine in neutral position of flexion, extension, and rotation.

- **Cervical Rotation:**

Position of the patient: The subject will be in sitting with the thoracic and lumbar spine well supported by the back of a chair.
Position the cervical spine in neutral position of flexion, extension, and lateral flexion. The subject may hold a tongue depressor between the front teeth for reference.

- **Group A (MUSCLE ENERGY TECHNIQUE) for Trapezius[14]**

In order to treat all the fibers of upper trapezius, MET was applied sequentially. The upper trapezius is subdivided into anterior, middle and posterior fibers.

The patient was lying supine, arm on the side to be treated lying alongside the trunk, head/neck side bent away from the side being treated to just short of the restriction barrier, while the therapist stabilized the shoulder with one hand and cup the ear/mastoid area of the same side of the head with the other.

With the neck fully side bent and fully rotated contralaterally, the posterior fibers of upper trapezius were involved in the contraction. This facilitates subsequent stretching of this aspect of the muscle.

With the neck fully side bent and half rotated, the middle fibres were involved in the contraction.

With the neck fully side bent and slightly rotated towards the side being treated the anterior fibres of upper trapezius were treated. (as shown in Figure)

The patient introduced a light resisted effort to take the stabilized shoulder towards the ear (a shrug movement) and the ear towards the shoulder. The degree of effort was mild such that no pain was reported.

The contraction was sustained for 10 seconds and upon complete relaxation of effort, the therapist gently eased the head/neck into an increased degree of side bending and rotation, where it was stabilized, as the shoulder was stretched caudally.

When stretching was introduced the patient can usefully assist by initiating, on instruction, the stretch of the muscle.This reduced the chances of a stretch reflex being initiated.

Once the muscle was being stretched, the patient relaxed and the stretch was held for 20 seconds. This procedure was repeated for 3 times.

- **Group B (POSITIONAL RELEASE THERAPY) for Trapezius**[25]
- The scapula was elevated by taking shoulder in about 900 abduction position.
- Then neck was rotated, extended and side bent to same side.
- The fine tuning of the release was done through either the neck or shoulder internal-external rotation.
- This position was held for 90 seconds and after that patient was put back into the normal position.
- The same technique was repeated for 3 times.

Figure 8 : Identification of upper trapezius trigger point and PRT for upper fibres of trapezius

CONVENTIONAL TREATMENT:

- **Ultrasound therapy:** Frequency: 1 MHz, Intensity: 1.4 W/cm2, Time: 5 minutes, Mode:
- Continuous, and Number of sessions: one session.[30]
- Trapezius stretching was given to patient.

STATISTICAL ANALYSIS

Statistical software:

All statistical analysis was done by SPSS statistics version 20.0 for windows software. Microsoft excelwas used to calculate median and to generate graphs and tables.

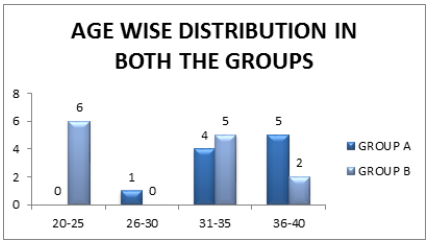
Statistical test:

Means and Median were calculated as a measure of central tendency for pain on VAS and Cervical Range of Motion respectively and Standard Deviation (SD) was calculated as a measure of dispersion. Pre treatment and post treatment data of visual analog scale and Cervical Range of Motion was analyzed by Paired t-test respectively and comparison between two groups of visual analog scale and Cervical Range of Motion was analyzed by unpaired t-test.

Level of significance (p value) was set to 0.05

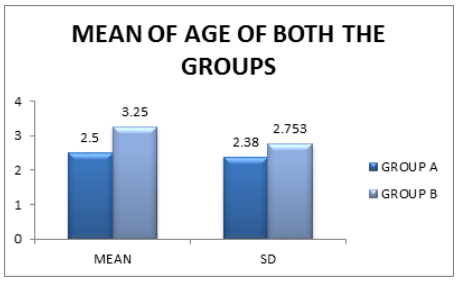
RESULT

Thirty subjects were randomly divided into two Groups: - Group A Muscle Energy technique with conventional treatment (n=15) and Group B Positional Release technique with conventional treatment (n=15). Outcome measures VAS for pain and cervical Range of Motion were taken before and after treatment.



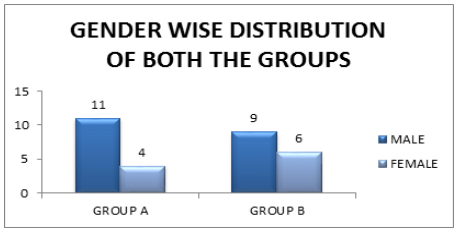
Graph 5.1: Age wise distribution in years

Interpretation: The above graph shows the age distribution (in years) of 30 subjects in Group A and Group B.



Graph 5.2: Mean of age (in years) and SD of both groups

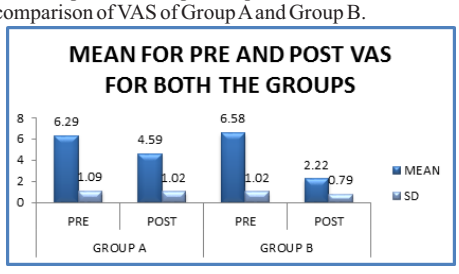
Interpretation: The above graph shows the mean age distribution (in years) of 30 subjects for Group A i.e. 2.5+2.38(SD) years and for Group B i.e. 3.25 + 2.75(SD) years taken for the study.



Graph 5.3: Gender Distribution

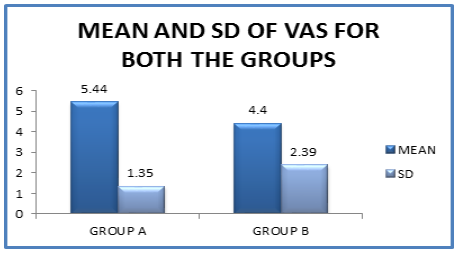
Interpretation: The above graph shows the gender wise distribution in Group A and Group B.

Paired't' test was used for pre treatment and post treatment comparison of VAS of Group A and Group B. Unpaired't' test was used for between group comparison of VAS of Group A and Group B.



Graph 5.6: Mean and SD of pre and post VAS for both the groups

Interpretation: The above graph shows mean and SD of pre and post VAS for group A and group B



Graph 5.7: Mean and SD of VAS for both the groups

Interpretation: The above graph shows mean and SD of VAS for both the groups.

Table 5.10: Comparison of pre and post of VAS for group A.

	t	p	Result
VAS	9.461	<0.05	Significant

Interpretation: Result shows significant difference for pre and post VAS (t=9.461, p<0.05) for Group A.

Table 5.11: Comparison of pre and post of VAS for group B.

	t	p	Result
VAS	20.4	<0.05	Significant

Interpretation: Result shows significant difference for pre and post VAS (t=20.4, p<0.05) for Group B

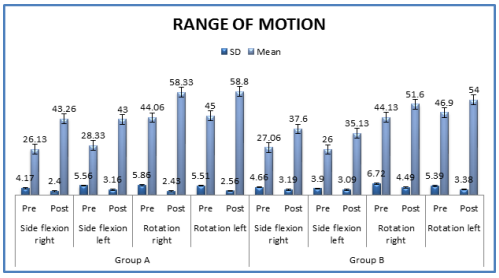
Table 5.13: Result of VAS between the groups.

	t	p	Result
VAS	-9.544	<0.05	Significant

Interpretation: Result shows significant difference for VAS (t=-9.544, p=0.008).

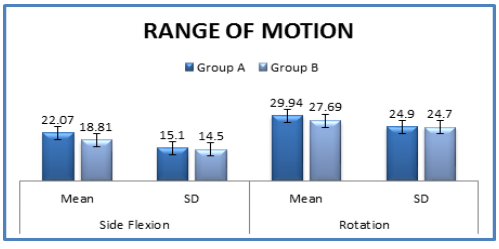
Paired't' test was used for pre treatment and post treatment comparison of Cervical Range of Motion of Group A and Group B.

Unpaired't' test was used for between group comparison of Cervical Range of Motion of Group A and Group B.



Graph 5.13: Mean and SD of pre and post Cervical Range of Motion for both the groups

Interpretation: The above graph shows mean and SD of CROM for group A and group B



Graph 5.14: Mean and SD of Cervical Range of Motion for both the groups

Interpretation: The above graph shows mean and SD of CROM for both the groups.

Table 5.14 : Comparison of pre and post of CROM for group A.

	t	p	Result
CROM	-11.8	<0.05	Significant

Interpretation: Result shows significant difference for pre and post CROM (t = -11.8, p<0.05) for Group A.

Table 5.15: Comparison of pre and post of CROM for group B.

	t	p	Result
CROM	-10.07	<0.05	Significant

Interpretation: Result shows significant difference for pre and post CROM (t = -10.07, p<0.05) for Group B.

Table 5.16: Result of CROM between the groups.

	t	p	Result
CROM	-12.757	<0.05	Significant

Interpretation: Result shows significant difference for CROM (t = -12.757, p<0.05).

RESULT

These above findings suggest that there is statistically significant difference in pre treatment and post treatment comparison of VAS in Group-A (Muscle Energy Technique) and Group-B (Positional Release Technique).

There is statistically significant difference for pre treatment and post treatment comparison for CROM in Group-A (Muscle Energy Technique) and Group-B (Positional Release Technique).

There is significant difference for between group comparisons of VAS and CROM in Group A. Hence, experimental hypothesis was accepted and null hypothesis was rejected.

DISCUSSION

Trapezius muscle pain accounts for the vast majority of nonspecific neck pain. Muscle energy technique (MET) and positional release therapy (PRT) have been proposed as an adjunct to conventional therapies in many literatures to treat trapezitis without any attempts of comparing the effectiveness. Hence the present study was aimed to compare the effect of muscle energy technique and positional release therapy (PRT) in the subjects with chronic upper trapezitis as it is the most commonly found musculoskeletal disorder amongst young age group.

MET may influence pain mechanisms and promote hypoalgesia. Some studies suggest MET and related post-isometric techniques reduce pain and discomfort when applied to the spine or muscles. The mechanisms are not known, but may involve central and peripheral modulatory mechanisms, such as activation of muscle and joint mechanoreceptors that involve centrally mediated pathways, like the periaqueductal grey (PAG) in the midbrain, or nonopioid serotonergic and noradrenergic descending inhibitory pathways.[11] Additionally, MET may increase fluid drainage and augment hypoalgesia. Rhythmic muscle contraction increases muscle blood and lymph flow rates and mechanical forces acting on fibroblasts in connective tissues change interstitial pressure and increase transcapillary blood flow.MET application may reduce pro inflammatory cytokines and desensitize peripheral nociceptors.[34]

Reflex muscle relaxation is commonly cited as the mechanism for length, range of motion (ROM),and tissue texture changes following MET. Muscle relaxation following isometric contraction is claimed to be mediated by the golgi tendon organ with its inhibitory influence on the α-motor neuron pool and by reciprocal inhibition from contraction of a muscle antagonists. However, studies support increased tolerance to stretching (hypoalgesia), not reflex relaxation, as the primary mechanism for increasing muscle length. An implicit assumption is that low-level motor activity, elevated in dysfunctional muscle, limits the passive stretch of muscles. Active motor activity does not appear to produce resistance to passive stretch, and increases in muscle length following passive stretching have occurred without change to the low-level EMG activity of the muscle. Thus, it seems factors other than reflex muscle relaxation are responsible for muscle extensibility and ROM following these techniques.[34]

Therapeutic Ultrasound refers to mechanical vibrations which are essentially the same as sound waves, but of a higher frequency. Therapeutic frequencies of ultrasound range from 0.5 to 5 MHz. It has been estimated that for an output of 1W/cm2 there is a temperature rise of 0.8°C/ min. Pain relief may also occur due to the non thermal effects of pulsed ultrasound in the form of stimulation of histamine release from mast cells and factors released from macrophages that accelerate the normal resolution of inflammation.

The second objective of the present study was to evaluate the effect of positional release technique (PRT) in the patients with chronic upper trapezitis.

Positional release therapy is an indirect myofascial technique focusing on the neurologic component of the neuro-vascular myofascial somatic dysfunction and is proposed to increase muscle flexibility by placing the muscle in a shortened position to promote muscle relaxation in contrast to placing the muscle in a lengthened or stretched position.

Hence it can be concluded that both Muscle Energy Technique (MET) and Positional Release Technique (PRT) with stretching are equally effective in managing upper trapezius muscle spasm, but more improvement can be achieved by Muscle Energy Technique (MET).

CLINICAL IMPLICATION

Results suggested that both the techniques i.e. muscle energy technique & positional release technique are proved to be effective in reducing pain and in improving Cervical Range of Motion in chronic upper trapezitis, but MET was found to be more effective in reducing pain and improving Cervical Range of Motion in patients with chronic upper trapezitis .

Thus, MET can be performed prior to other rehabilitation techniques, such as strengthening exercises, to decrease pain and improving disability.

LIMITATIONS

- Unequal ratio of male and female in study population.
- Blinding was not done in the study
- Sample size was kept small
- Study duration was short

FURTHER RECOMMENDATIONS

- Study can be done with large sample size.
- Treatment can be given for longer duration with follow up.
- Study can be done in other conditions like ankle sprain, Upper back pain
- Blinding can be done for the study

CONCLUSION

Muscle Energy Technique (MET) and Positional Release Technique (PRT) are equally effective in reducing pain and improving Range of Motion in subject with chronic upper trapezitis.However the subjects who received muscle energy technique (MET) showed an additional benefit in terms of reduction of pain on Visual Analogue Scale (VAS) and improving Cervical Range of Motion.Hence it can be concluded that muscle energy technique (MET) is an effective option in the treatment of chronic upper trapezitis.

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