GNA Journal of
Management & Technology

ISSN - 0974-5726
Vol. 16 No. 1, January-June, 2025

TO STUDY THE EFFECTIVENESS OF MUSCLE ENERGY TECHNIQUE AND POSITIONAL RELEASE TECHNIQUE ON PAIN, RANGE OF MOTION AND DISABILITY AMONG DESK JOB PEOPLE WITH UPPER TRAPEZIUS MUSCLE SPASM: A COMPARATIVE STUDY

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Abstract

Background: The Upper Trapezius Muscle is the most commonly affected in neck pain. It is a heavily used muscle, and numerous causes can lead to strain or spasms. Muscle spasms are often accompanied by tingling, pain, stiffness, and weakness. The purpose of the study is to evaluate and compare the effects of MET and PRT techniques on upper trapezius muscle spasms. To compare the effectiveness of MET and PRT on pain, range of motion (ROM), and functional disability among desk job people with upper trapezius muscle spasm. A quasi-experimental study was conducted on 45 subjects with upper trapezius spasm, divided into three groups: Control group A (baseline therapy), Group B, MET, and Group C PRT. All groups received treatment over two weeks. NPDI, ROM, PPT, were used as outcome measures. Both experimental groups showed significant improvements. PRT yielded quicker pain relief, whereas MET showed greater improvements in ROM and strength. MET and PRT are both effective; MET offers better functional gains, while PRT is ideal for rapid symptom relief.

Keywords: *Muscle energy technique, positional release technique, upper trapezius, neck pain, myofascial trigger point*

1. INTRODUCTION

Neck pain is a common problem affecting an individual's physical and social functioning considerably and interfering with activities of daily living. Upper trapezius and levator scapulae are the most common postural muscles that tend to get shortened, leading to restricted neck mobility as they are most frequently used to maintain posture (Mahajan et al., 2012). The Trapezius muscle is a large triangular-shaped muscle that is located at the base of the back of the neck, running along the shoulder blades, one on each side. The upper trapezius muscle is most commonly affected in neck pain. It is a heavily used muscle in the body, and numerous causes can lead to strain or spasms (Rana and Brahmbhatt, 2017). Most cases of neck pain do not seem to be due to an anatomical disorder, but instead are associated with a functional abnormality. Neck pain can cause muscle pain, fatigue and

migraines. It may also trigger radiating pain, muscle weakness and atrophy, as radiculopathy related to restricted range of motion may develop because of neck stiffness and pain (Jeong et al., 2017).

The upper trapezius muscle is designated as a postural muscle, and it is extremely at risk of overuse. The pain is present even during rest and is aggravated by activity; it may be referred to other areas from the site of primary inflammation (Carvalho, 2014). The trapezius muscle works to move the neck in many directions, and its degree of tightness or looseness affects neck flexibility. Any position which places the trapezius in a shortened state for some time without rest may shorten the fibres and lead to dysfunction and restricted movements of the neck. People who work at desks and computers, or who spend many hours driving, often find that the upper trapezius becomes very sore and painful (Ravish and Helen, 2014). Literature has numerous studies explaining the effect of Mulligan technique and MET, effect of ischemic compression, effect of MET and static stretching, effect of petrissage massage on cervical muscle spasm. Hence purpose of this study to compare the effects of muscle energy technique and postional relaese technique on desk job people having upper trapezius muscle spasm.

1.1. Objective of the Study :

To compare the effects of Muscle energy technique and Positional release technique on neck pain , neck range of motion and neck disability among desk job people having upper trapezius muscle spasm.

1.2. Significance of the Study :

1. MET involves gentle, controlled contractions of specific muscles to relax and lengthen tight muscles.
2. MET can improve ROM by increasing flexibility and reducing muscle tension.
3. PRT helps relax contracted muscles, reduce pain, and improve ROM.
4. PRT can be particularly effective for individuals with acute neck pain or muscle spasms.

2. RESEARCH METHODOLOGY

Study Design: A quasi-experimental comparative study design was used to evaluate the effects of MET and PRT on patients with upper trapezius muscle spasm.

Study Setting: The study was carried out in the Outpatient Department of DAV Institute of Physiotherapy and Rehabilitation, Jalandhar, and affiliated hospitals.

Study Duration: The study was conducted throughout one and a half years, allowing for participant recruitment, intervention, and follow-up.

Sample Size and Sampling Method: A total of 45 subjects (n=45) were selected using a convenient sampling technique in 15 Subject each received Muscle energy technique, 15 subjects received positional release technique and 15 subject received conventional physiotherapy treatment.

2.1 Selection Criteria

1. Individuals aged 18–55 years doing bank and post office job
2. Both male and female participants
3. Subjects with unilateral trapezius spasm with a tenderness grade >2
4. Pain duration less than three months
5. NPDI score ≥ 20
6. Presence of a palpable myofascial trigger point in a taut band (Simons et al., 1999).

Exclusion Criteria:

1. Congenital anomalies such as cervical rib
2. Cervical radiculopathy
3. History of trauma or surgery to the cervical or upper limb region
4. Presence of psychological or psychiatric conditions

2.2. Procedure of the Study:

All participants underwent 10 treatment sessions over two weeks. Assessments were conducted pre-treatment (Day 1), mid-treatment (Day 5), and post-treatment (Day 10).

Group A (Control):

Moist heat application using a hydrocollator pack for 20 minutes.

Ultrasound therapy: 1 MHz, continuous mode, 1.0 W/cm² intensity for 5 minutes. (Özgen. M et al., 2021)

Neck isometric exercises to strengthen cervical musculature (Phadke et al., 2016)

Group B (MET Group):

Baseline treatment same as Group A

MET applied to the posterior, middle, and anterior fibres of the upper trapezius

Technique: 20% isometric contraction for 7–10 seconds followed by passive stretch held for 30 seconds. This was repeated 3–5 times per session (Shawabka et al., 2013).

Group C (PRT Group):

Baseline treatment same as Group A

PRT was applied by locating the trigger point in the upper trapezius muscle by manual palpation. The therapist will apply pressure by pinching the muscle between the thumb and fingers. The subject's head was in ipsilateral side-flexion and a slightly contralateral cervical rotation (5-8 degrees), then the therapist grasped the subject's forearm and abducted the shoulder to approximately 900 degrees with shoulder flexion or external rotation and added slight flexion or extension to fine-tune. The ideal position of comfort achieved was held for 90 seconds and followed by a passive return of the body part to an anatomically neutral position, continued for 5 minutes (Nambi et al., 2013).

3.DATA ANALYSIS AND INTERPRETATION

Table No. I Comparison Between the groups of NPDI

Descriptive Statistics and ANOVA							
		Mean	SD	N	F	P Value	Result
NPDI DAY- 1	Group A	42.00	15.78	15	1.739	0.188	Not Significant
	Group B	52.27	14.71	15			
	Group C	46.53	14.82	15			
NPDI DAY- 5	Group B	20.93	10.73	15	0.777	0.466	Not Significant
	Group C	21.73	6.40	15			
NPDI DAY- 10	Group A	4.87	3.42	15	2.124	0.132	Not Significant
	Group B	4.73	2.66	15			
	Group C	6.53	1.60	15			

Table No. I. One-way ANOVA was done between the day 1st, day 5 and day 10 for variable NPDI in Group A, B and C, to check the changes between the groups. The F-value for NPDI was 1.739, 0.777 and 2.124. The result showed no statistically significant difference ($p>0.05$) between all the 3 groups at day 1st, day 5th and day 10th.

Table No. II. Comparison Between the groups of PPT

	Descriptive Statistics and ANOVA						
		Mean	SD	N	F	P Value	Result
PPT DAY 1	Group A	0.76	0.25	15	0.030	0.970	Not Significant
	Group B	0.76	0.42	15			
	Group C	0.79	0.34	15			
PPT DAY 5	Group A	1.69	0.27	15	0.192	0.826	Not Significant
	Group B	1.61	0.48	15			
	Group C	1.67	0.29	15			
PPT DAY 10	Group A	2.49	0.26	15	4.057	0.025	Significant
	Group B	2.71	0.36	15			
	Group C	2.45	0.16	15			

Table No. II. One way ANOVA was done between the day 1st, day 5th and 10th for the variable PPT in Group A, B and C, to check the changes between the groups. The F- value for PPT was 0.970, 0.826 and 0.025. There was no statistically significant difference ($p>0.05$) found between all the groups at day 1st and day 5th but there was statistically significant difference ($p<0.05$) found between all the groups at day 10th.

Table No. III. Comparison Between the groups of ROM Flexion

	Descriptive Statistics and ANOVA						
		Mean	SD	N	F	P Value	Result
ROM FLX AT DAY 1	Group A	45.67	5.96	15	2.636	0.083	Not Significant
	Group B	44.93	18.13	15			
	Group C	37.00	5.49	15			
ROM FLX AT DAY 5	Group A	52.13	4.87	15	3.084	0.056	Not Significant
	Group B	53.27	14.50	15			
	Group C	45.47	5.01	15			
ROM FLX AT DAY 10	Group A	59.33	3.18	15	1.688	0.197	Significant
	Group B	59.33	11.44	15			
	Group C	55.13	3.98	15			

Table No. III. One way ANOVA was done between the day 1st, day 5th and 10th for the variable ROM FLX in Group A, B and C, to check the changes between the groups. The F- value for ROM FLX was 2.636, 3.084 and 1.688. There was no statistically significant difference ($p>0.05$) found between all the groups at day 1st, day 5th and 10th.

Table No. IV. Comparison Between the groups of ROM EXT

	Descriptive Statistics and ANOVA						
		Mean	SD	N	F	P Value	Result
ROM EXT AT DAY 1	Group A	40.87	8.56	15	1.930	0.158	Not Significant
	Group B	35.87	9.02	15			
	Group C	40.33	4.59	15			
ROM EXT AT DAY 5	Group A	48.60	5.80	15	2.842	0.070	Not Significant
	Group B	43.60	8.40	15			
	Group C	48.27	4.42	15			
ROM EXT AT DAY 10	Group A	58.27	3.69	15	5.997	0.005	Significant

Table No. IV. One way ANOVA was done between the day 1st, day 5th and 10th for the variable ROM EXT in Group A, B and C, to check the changes between the groups. The F- value for ROM EXT was 1.930, 2.842 and 5.997. There was no statistically significant difference ($p>0.05$) found between all the groups at day 1st and day 5th. There was statistically significant difference ($p<0.05$) found between all the groups at day 10th

Table No. V. Comparison Between the groups of ROM ROTATION RT

	Descriptive Statistics and ANOVA						
		Mean	SD	N	F	P Value	Result
ROM ROT RT AT DAY 1	Group A	45.53	4.78	15	0.940	0.399	Not Significant
	Group B	47.40	5.95	15			
	Group C	47.93	4.22	15			
ROM ROT RT AT DAY 5	Group A	51.80	3.69	15	3.966	0.026	Significant
	Group B	56.13	5.22	15			
	Group C	54.80	3.88	15			
ROM ROT RT AT DAY 10	Group A	59.00	3.27	15	1.169	0.320	Not Significant
	Group B	60.80	4.55	15			
	Group C	60.87	3.42	15			

Table No. V. One way ANOVA was done between the day 1st, day 5th and 10th for the variable ROM ROT RT A in Group A, B and C, to check the changes between the groups. The F- value for ROT RT A was 0.940, 3.966 and 1.169. There was no statistically significant difference ($p>0.05$) found between all the groups at day 1st and day 10th. There was statistically significant difference ($p<0.05$) found between all the groups at day 5th.

Table No. VI. Comparison Between the groups of ROM ROT LT

	Descriptive Statistics and ANOVA						
		Mean	SD	N	F	P Value	Result
ROM ROT LT AT DAY 1	Group A	49.27	9.15	15	1.277	0.290	Not Significant
	Group B	53.00	8.93	15			
	Group C	48.40	6.87	15			
ROM ROT LT AT DAY 5	Group A	54.73	7.01	15	1.448	0.246	Not Significant
	Group B	58.40	7.39	15			
	Group C	54.73	5.96	15			
ROM ROT LT AT DAY 10	Group A	60.67	5.41	15	1.005	0.375	Not Significant
	Group B	63.20	6.18	15			
	Group C	61.53	2.61	15			

Table No.VI. One way ANOVA was done between the day 1st, day 5th and 10th for the variable ROM Rotation LEFT in Group A, B and C, to check the changes between the groups. The F- value for ROM ROT LT A was 1.277, 1.448 and 1.005. There was no statistically significant difference ($p>0.05$) found between all the groups at day 1st, day 5th and 10th.

Table No. VII. Comparison Between the groups of ROM Side flexion Rt.

	Descriptive Statistics and ANOVA						
		Mean	SD	N	F	P Value	Result
ROM SF RT AT DAY 1	Group A	28.93	6.81	15	0.032	0.969	Not Significant
	Group B	28.60	9.81	15			
	Group C	28.20	6.93	15			
ROM SF RT AT DAY 5	Group A	40.00	5.01	15	0.774	0.468	Significant
	Group B	36.73	8.69	15			
	Group C	39.13	8.11	15			
ROM SF RT AT DAY 10	Group A	51.53	5.28	15	0.133	0.876	Not Significant
	Group B	50.27	9.54	15			
	Group C	51.33	6.17	15			

Table No. VII. One-way. ANOVA was done between the day 1st, day 5th and 10th for the variable ROM Side flexion RT in Group A, B and C, to check the changes between the groups. The F- value for ROM SF RT A was 0.032, 0.774 and 0.133. There was no statistically significant difference ($p>0.05$) found between all the groups at day 1st, day 5th and 10th.

Table No. VIII. Comparison Between the groups of ROM Side flexion LT

	Descriptive Statistics and ANOVA						
		Mean	SD	N	F	P Value	Result
ROM SF LT A DAY 1	Group A	30.40	5.58	15	0.571	0.569	Not Significant
	Group B	29.53	9.79	15			
	Group C	27.73	4.35	15			
ROM SF LT A DAY 5	Group A	38.80	4.41	15	0.016	0.984	Significant
	Group B	39.13	8.33	15			
	Group C	38.80	4.20	15			
ROM SF LT A DAY 10	Group A	51.67	4.35	15	1.444	0.247	Not Significant
	Group B	47.87	8.95	15			
	Group C	50.67	4.67	15			

Table No. VIII. One way ANOVA was done between the day 1st, day 5th and 10th for the variable ROM Side flexion LT in Group A, B and C, to check the changes between the groups. The F- value for ROM SF LT A was 0.571, 0.016 and 1.444. There was no statistically significant difference ($p>0.05$) found between all the groups at day 1st, day 5th and 10th.

4. DISCUSSION AND RESEARCH IMPLICATIONS

This study was aimed to compare the effectiveness of Muscle energy technique and Positional release technique on pain, disability and range of motion among desk job people with upper trapezius muscle spasm. In this study three groups were taken, Group A (control group), Group B and Group C (experimental group).

When data was analysed using SPSS within group analysis of all the three groups was performed and the result showed that there was statistically significant reduction in pain, disability and improvement in cervical range of motion. In the present study, when the results were compared in between the groups and it showed that both Muscle energy technique and Positional release technique are found equally effective in decreasing pain, disability and increasing range of motion in upper trapezius muscle spasm.

In group B, MET was given, this approach involves the introduction of an isometric contraction to the affected muscle producing isometric relaxation through the influence of the Golgi tendon organs (autogenic inhibition). It is also be applied to the antagonistic muscle group producing reciprocal inhibition in the offending agonistic muscles leading to decrease in local odema and increased lymphatic fluid movement. Denise et al researched in 1994 reports that MET produced a significant increase in overall regional cervical ROM in the treatment group. The possible mechanism for the reduction in pain in the MET group can be attributed to the hypoalgesic effect of MET. MET inhibits the motor activation of Golgi tendon organs and isometric contraction causes lengthening of viscoelastic and plastic changes in myofascial connective tissue. Combination of contractions and stretches (as used in MET) might be more effective for producing viscoelastic change than passive stretching alone, because the greater forces could produce increased viscoelastic change and passive stretching.

Gupta et al in 2008 conducted a study among non-specific neck pain patients. Muscle energy technique was given to the patients, and the result of the study found that there was significant improvement in pain and functional status.

Group C was treated with PRT also showed a significant reduction in pain and disability and improvement in range of motion. PRT aims at removing restrictive barriers of movement in the body. This is accomplished by decreasing protective muscle spasm, facial tension, joint hypomobility, pain, swelling and increasing circulation and strength.

The analgesic effects of positional release technique can be explained by the nociceptive hypothesis. According to this hypothesis, placing patients in a position of ease may relax the injured tissues and lead to the local perfusion of fluids such as blood and lymph. This arterial filling can result in the removal of sensitizing inflammatory mediators, followed by pain relief and ROM improvement.

According to the proprioception theory, movement in the direction of greatest ease reduces the tension on the affected tissues and minimizes stimulation of the affected proprioceptors in PRT. In fact, positioning the muscle in position of ease for a short period in PRT 90 seconds reduces the gamma gain, thereby allowsing the hyperactive reflex arc to return to its original state and increase ROM.

A similar study was conducted by Kaur, Kumar, & Kaur, 2025 and Mohammadi Kojidi in 2016, investigated the effects of PRT on the latent MTrPs of upper trapezius among computer users. The results of the study revealed that significant improvement in pressure pain threshold value which is confirmed with the findings of the present study.

There is another study conducted by Alagesan et al in 2012 and Kaur,Kumar, & Partap, 2025 indicated that with 7 consecutive treatment sessions of PRT decreased pain and significantly increased the active range of lateral flexion.

Meseguer et al in 2006 found that PRT 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.

Conventional treatment was given to all the three groups i.e. Group A, B and C, which includes hydrocollator pack and ultrasound therapy. The combination of hydrocollator pack followed by ultrasonic therapy could be explained by hydrocollator pack inducing an increase of blood circulation in the superficial tissue and leading to fluid distribution in the trigger point area and therefore decreasing tissue density. Thus, the ultrasound wave can transmit through deeper layer of tissues and can be absorbed by those tissues easier and lead to increase both of deep and superficial tissue blood flow.

Benjabooyanupap et al in 2015 conducted a study on effect of hydrocollator pack and ultrasound on physiological response over trigger point of upper trapezius and concluded that the application of hydrocollator pack followed by ultrasound therapy seems to promote physiological responses on the MTrPs better than that of the ultrasound followed by the hydrocollator pack treatment.

Acoustic cavitation mechanism of the micro-bubbles from ultrasonic wave also enhances mechanical micro-massage oscillation that may be able to stimulate neural circuit for promoting tissue blood circulation.

Aguilera et al in 2009 conducted a similar study over trapezius muscle trigger points and indicated that ultrasound therapy helps to decrease pain, but did not significantly increase active range of motion.

While using ultrasound therapy, the gate control mechanism could be mentioned again due to excitation of Aß mechanoreceptors. In this condition, messages produced from mechanoreceptors enter the spinal cord and quick pain impulses at the spinal cord become inhibited and pain would be blocked.

Majlesi et al in 2004 conducted a study on high-power pain threshold ultrasound technique in the treatment of active MTrPs and reported that ultrasound decreases the subjective pain intensity at trigger point sites, as measured by visual analogue scale.

5. CONCLUSION

This study concludes that there is a statistically non-significant difference between the effectiveness of the muscle energy technique and the positional release technique on pain, disability and range of motion among desk job people with upper trapezius muscle spasm. Muscle energy technique and positional release technique are both effective for treating upper trapezius muscle spasm.

6. FUTURE SCOPE OF THE PRESENT STUDY

1. The study can be performed with a large sample size.
2. Follow up studies can be done to see the long-term effects of the approaches.
3. Other electrotherapy modalities can be added along with MET and PRT.
4. Home exercise regimen can be added.
5. Samples from different population can be taken rather than population with desk job to see the possible effects.

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