



COMPARATIVE STUDY OF MUSCLE ENERGY TECHNIQUE AND DEEP TRANSVERSE FRICTION MASSAGE ON PAIN, CERVICAL LATERAL FLEXION AND FUNCTION IN INDIVIDUALS WITH UPPER TRAPEZIUS TRIGGER POINT

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Abstract:

INTRODUCTION: Trapezitis is defined as inflammation of trapezius muscle. The upper trapezius muscle is designated as postural muscle and is highly susceptible to overuse. Muscle energy technique (MET) is used for achieving tonus release in a muscle before stretching. Deep transverse friction massage (DTFM) is to maintain mobility within soft tissue structures and is applied transversely to specific tissue.

PURPOSE AND CONTEXT: The Purpose of the study is to compare the effect MET and DTFM on pain, cervical lateral flexion and function in individuals with upper trapezius trigger point.

MATERIALS AND METHODOLOGY: 30 participants between 18-35 years of age from different areas of Ahmedabad were included according to inclusion criteria. Pain was examined using NPRS, Functional disability was examined using NDI and cervical lateral flexion. The treatment was given to both the groups for 3 sessions per week for 4 weeks. Post data analysis was conducted.

RESULT: In Both the groups, Group 1 (MET) and Group 2 (DTFM), a significant result was found in terms of pain NPRS, disability NDI and CLROM in both groups ($P < 0.001$). There was no significant difference was found for between both the groups, Group 1 (MET) and Group 2 (DTFM) ($P < 0.05$).

CONCLUSION: The study shows that both MET and DTFM within group are equally effective. There was no statistical difference found between MET and DTFM.

KEYWORDS: Cervical lateral flexion, Deep Transverse Friction massage, Muscle Energy Technique, NDI, NPRS.

1. INTRODUCTION

- Neck pain is very common in region of the upper trapezius muscles. About two third of people experience neck pain at some point of their lives. In middle age prevalence is highest and women are more affected than men.⁽¹⁾ Rate of prevalence in male and female in India is 1:10. 3.5% of population is affected worldwide.⁽²⁾⁽³⁾⁽⁴⁾
- Trapezitis is defined as inflammation of upper, middle and lower fibres of trapezius muscle. trapezius is a big diamond shaped muscle with three parts: upper, middle and lower portions. trapezius forms the slope of the shoulder.⁽⁵⁾
- Upper trapezius muscles are designated as postural muscle and it is highly susceptible to overuse.
- The decrease in motion can negatively affect the mobility of the cervical joint .limited range of motion creates an increase in soft tissue tightness, with an ensuring pain – spasm cycle which can be difficult to break.⁽¹⁾⁽⁴⁾
- 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 movements of neck.⁽¹⁾⁽⁸⁾ For people who work at desks and computers, or who spend many hours in driving, faulty posture during walking, watching television for prolonged time in awkward posture, the upper trapezius becomes very sore and painful.⁽¹⁾⁽⁴⁾
- Treatment of Trapezitis requires a multifaceted approach. In the short term, the aim is to abolish the taut bands, trigger points and tender points for relief. In the long term, flexibility has to be restored to the muscle , so as to reduce the recurrence rate..⁽⁶⁾⁽⁷⁾ Simons and Travel defined myofascial trigger point (MTrP) as a hyperirritable spot, located within a taut band of skeletal muscle that is painful on compression or stretch and can give rise to typical referred pain pattern as well as an autonomic phenomena.⁽⁵⁾
- Acute trauma or repetitive micro trauma may lead to the development of stress on muscle fibers and the formation of trigger point.⁽⁸⁾ Muscle Energy Technique (MET) is a form of manual therapy which uses a muscle's own energy in the form of gentle isometric contractions to relax the muscles via autogenic or reciprocal inhibition, and lengthen the muscle. Post Isometric Relaxation is a technique developed by Karel Lewitt. Post Isometric Relaxation (PIR) is the effect of the decrease in muscle tone in a single or group of muscles, after a brief period of submaximal isometric contraction of the same muscle.⁽⁹⁾
- Muscle energy technique is an active technique in which patient is also an active participant. It is based on the concepts of autogenic inhibition and reciprocal inhibition. If the submaximal contraction of the muscle is followed by stretching of the same it is known as Autogenic inhibition and if a sub opposite muscle than this is known as reciprocal inhibition MET.⁽⁹⁾
- Transverse friction massage was advocated and popularised by Dr. Cyriax of England in the early half of this century. Transverse friction massage consists of small range oscillatory movement which is applied to the deeper structure with pressure by thumb or fingers. The direction of movement is transverse, i.e., across the long axis of the structure to be treated. It can be performed with tip of the thumb, index or middle finger which can be reinforced by placing one over the other, two or three fingers, the opposed finger and thumb.⁽¹⁰⁾
- The effect of MET for increase in range of motion can be explained on the basis of physiological mechanisms behind the changes in muscle extensibility- reflex relaxation, viscoelastic change and changes to stretch changes.⁽⁶⁾
- The reduction in pain with Cyriax transverse friction massage can be attributed to the hypothesis that deep massage offers effective stretching and mobilization to the taut band. Pain relief during and after Deep transverse friction massage may be due to modulation of the nociceptive impulses at the level of the spinal cord: the “gate control theory”.⁽⁶⁾

2. METHODOLOGY

30 subjects were selected from various clinics of Ahmedabad . Each subject underwent a screening relevant to the inclusion and exclusion criteria. The study purpose and procedure were explained to the patients and a written informed consent of all the patients were taken. Then the patients were divided into two groups. A Pre intervention measure of pain (NPRS), Neck disability Index (NDI) and Cervical lateral range of motion (CLROM) were taken for each patient. A detailed assessment and physical examination was carried out. Selected subjects who were willing to participate were divided into 2 Groups [Group 1=15 and Group 2=15]. Group 1 received MET and Group 2 received DTFM. Both the groups received same conventional therapy for 4 weeks. Post-procedure outcome data analysis was conducted.

INCLUSION CRITERIA:

- Age between 18-35 years
- Both male and female
- Taut band palpable in upper trapezius muscle
- Pain scale on point NPRS greater than or equal to 4
- NDI: mild disability (6-14) to moderate disability (16-24)
- Restriction in cervical lateral flexion
- Positive jump sign

EXCLUSION CRITERIA:

- History of recent surgery or open wound in the neck region
- CNS Deficits, Cognitive Deficits.
- Thoracic outlet syndrome
- Cervical Radiculopathy
- Neck and back deformities – Torticollis, scoliosis etc.
- Skin disease and infection
- The subjects currently on sedatives or muscle relaxant therapy

3. OUTCOME MEASURES:

NPRS ⁽¹¹⁾

The NRS for pain is a unidimensional measure of pain intensity in adults. NPRS is a segmented numeric version of the visual analogue scale (VAS) in which a respondent selects a whole number (0-10 integrals). The test reflects the intensity of the pain. It is a single 11-point numeric scale with “0” representing one pain extreme (e.g. no pain) and “10” represents the other pain extreme (e.g. pain as bad as you can imagine and worst pain imaginable). Respondent were asked to report pain intensity in the last 24 hours or average pain intensity.

Reliability: High test-retest reliability has been obtained in both literate and illiterate patients with rheumatoid arthritis ($r= 0.95$ and 0.95 respectively) before and after medical consultation.

Validity: For construct validity, the NRS was shown to be highly correlated to the VAS in patient with rheumatic and other chronic pain conditions (pain > 6 months); correlations range from 0.86 to 0.95. ⁽¹¹⁾

NECK DISABILITY INDEX: ⁽¹²⁾

Neck disability index is designed to measure neck specific disability. The questionnaire has 10 items concerning pain and activities of daily living including personal care, lifting, reading, headaches, concentration, work status, driving, sleeping and recreation. This measure is designed to be given to the patient to complete. Vernon and mirror suggest that a score between 0-4 33 represents no disability, 5-14 represents mild disability, 15-24 represents moderate disability, 25-34 represents sever disability and > 35 complete disability.

Reliability: The test retest reliability excellent – 0.96 for NDI. (50)

Validity: The concurrent Validity – 0.864 for NDI

CERVICAL LATERAL FLEXION ROM: ⁽¹³⁾

Universal double arm Goniometer is used to measure the cervical lateral flexion. The patient should be in sitting position, place the axis at C7 spine, stationary arm along the spine and moveable arm position toward the midpoint of head after placement patient is ask to laterally flex neck and Goniometer realigned at limit of neck flexion and record range of motion.

RESULT

TABLE 1 SHOWS THE MEAN AND STANDARD DEVIATION OF PRE AND POST NPRS OF GROUP 1 AND GROUP 2

GROUP 1	PRE TEST MEAN±SD	POST TEST MEAN±SD	T VALUE	P VALUE
NPRS	6.00±1.06	2.93±0.70	14.86	<0.001
GROUP 2	PRE TEST MEAN±SD	POST TEST MEAN±SD	T VALUE	P VALUE
NPRS	6.0±1.06	2.73±0.79	15.83	<0.001

TABLE 2 SHOWS THE MEAN AND STANDARD DEVIATION OF PRE AND POST NDI OF GROUP 1 AND GROUP 2

GROUP 1	PRE TEST MEAN±SD	POST TEST MEAN±SD	T VALUE	P VALUE
NDI	10.60±3.29	6.46±2.35	8.85	<0.001
GROUP 2	PRE TEST MEAN±SD	POST TEST MEAN±SD	T VALUE	P VALUE
NDI	11.60±2.64	7.46±2.09	11.80	<0.001

TABLE 3 SHOWS THE MEAN AND STANDARD DEVIATION OF PRE AND POST CLROM OF GROUP 1 AND GROUP 2

GROUP 1	PRE TEST MEAN±SD	POST TEST MEAN±SD	T VALUE	P VALUE
CLROM	33.73±3.127	42.93±1.579	-11.095	<0.001
GROUP 2	PRE TEST MEAN±SD	POST TEST MEAN±SD	T VALUE	P VALUE
CLROM	35.20±3.62	42.46±1.76	-9.065	<0.001

- The intervention produced statistically significant improvements in NPRS, NDI and CLROM. Before the intervention, the mean and SD for Group 1 MET and Group 2 DTFM was (6.00±1.06) and (6.0±1.06) and Post intervention, the mean and SD for Group 1 and Group 2 was (2.93±0.70) and (2.73±0.79), P value is P<0.001 shows significant improvement in NPRS. Similarly before the intervention the mean and SD for NDI, Group 1 and Group 2 is (10.60±3.29) and (11.60±2.64) and Post intervention, the mean and SD was (6.46±2.35) and (7.46±2.09), P value is P<0.001 shows significant improvement in NDI. Similarly before the intervention the mean and SD for CLROM, Group 1 and Group 2 is (33.73±3.127) and (35.20±3.62) and Post intervention, the mean and SD was (42.93±1.579) and (42.46±1.76), P value is P<0.001 shows significant improvement in CLROM.
- As per the statistical analysis of this study, within group comparison of NPRS within group 1 is p=>0.001 and within group 2 is p=>0.001 which is p>0.05 and thus statistical difference of NPRS is significant within group 1 and 2. In between group comparison between group 1 and 2 is not significant because p value is 0.49 which is p<0.05.
- As per the statistical analysis of this study, within group comparison of NDI within group 1 is p=>0.001 and within group 2 is p=>0.001 which is p>0.05 and thus statistical difference of NDI is significant within group 1 and 2. In between group comparison between group 1 and 2 is not significant because p value is 0.10 which is p>0.05.
- As per the statistical analysis of this study, within group comparison of CLROM within group 1 is p=>0.001 and within group 2 is p=>0.001 which is p>0.05 and thus statistical difference of CLROM is significant within group 1 and 2. In between group comparison between group 1 and 2 is not significant because p value is 0.10 which is p>0.05. Since the p - values for all the comparisons are reported as < 0.001 and considered as Statistically significant.

DISCUSSION

- The present study was conducted to compare the effectiveness of muscle energy technique and deep transverse friction massage on pain cervical lateral flexion and function in individuals with upper trapezius trigger point. The study was completed with 30 patients of the age group between 18-30 yrs both male and females. Group –A Treated with muscle energy technique and subjects in Group – B treated with deep transverse friction massage.

- The effect of MET for increase in range of motion can be explained on the basis of physiological mechanisms behind the changes in muscle extensibility- reflex relaxation, viscoelastic change and changes to stretch changes.⁽⁶⁾
- G.Yathendra Kumar, P Sneha , N Sivajyothi 2014 showed a significant improvement in MET in upper Trapezius TrP.⁽¹⁴⁾
- Another study was conducted by Nagrale et al. has conducted a study on upper trapezius MTrP with help of muscle energy technique concluded that this technique may have a significant role in improved range of motion, reduced pain of upper MTrP.⁽¹⁵⁾
- The purpose of deep transverse friction massage is to maintain the mobility within the soft tissue structures of ligament, tendon, and muscle and prevent adherent scars from forming. The massage is deep and must be applied transversely to the specific tissue involved unlike the superficial massage is given in the longitudinal direction parallel to the vessel which enhances circulation and return of fluids.⁽¹⁰⁾
- The reduction in pain with Cyriax transverse friction massage can be attributed to the hypothesis that deep massage offers effective stretching and mobilization to the taut band. Pain relief during and after Deep transverse friction massage may be due to modulation of the nociceptive impulses at the level of the spinal cord: the “gate control theory”. The centripetal projection into dorsal horn of spinal cord from the nociceptive receptor system is inhibited by the concurrent activity of the mechanoreceptors located in the same tissues.⁽¹⁴⁾
- Amna Aamir Khane, et al. 2015 conducted a study on Efficacy of deep transverse friction massage and ultrasound in treatment of upper trapezius Spasm - A Randomized control trial. The data analysis revealed that there was a significant improvement in flexion and rotation statistically.⁽¹⁶⁾
- Akhtar Pooja M,ivnish Gujral, conducted a study on immediate effects of kinesio taping and Cyriax transverse friction massage on latent myofascial Tigger points in computer users. (2017) concluded that cyriax transverse friction massage was more effective in reducing pain as compared to kinesio taping.

CONCLUSION

- According to the statistical analysis, the study shows that both muscle energy technique (Group 1) and deep transverse friction massage (Group 2) within group are equally effective on Pain, function and Cervical range of motion (ROM) in upper trapezius trigger point.
- There was no statistical difference between groups in improvement on Pain, function and Cervical range of motion (ROM) in upper trapezius trigger point between muscle energy technique and deep transverse friction massage.

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