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EFFICACY OF MUSCLE ENERGY TECHNIQUE AND PASSIVE STRETCHING IN PATIENT WITH MECHANICAL NECK PAIN

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Abstract: **Neck pain is one of the most common muscle-skeletal disorders in the general population. Two thirds of the general populations have neck pain at some time in their lives and the prevalence of neck pain is highest in middle age (Binder, al, 2007). The main aim of this study is to compare the effect of muscle energy technique and passive stretching on cervical range of motion, pain and functional disability in patients with mechanical neck pain.**

Methods: 40 subjects, age between 18-50 years, both genders with mechanical neck pain were taken. All the subjects were assessed for pain and functional disability with visual analogue scale and neck disability index respectively. After the initial assessment, the subjects were divided into two groups, Group A and Group B. Group A received muscle energy technique where as Group B received passive stretching once a day for 6 days. Both groups received conventional therapy which includes strengthening of neck muscles and hot-pack. Patients were reassessed after the completion of treatment.

Result: After statistical analysis, a significant improvement was found in both groups. However, greater improvement was seen in the group that received muscle energy technique along with conventional exercise

Conclusion: The present study has concluded that both muscle energy technique with conventional exercises and passive stretching with conventional exercises were effective in the management of mechanical neck pain of cervical range of motion, neck disability and pain.

Keywords: **Neck pain, Muscle energy technique, passive stretching, Functional disability.**

1. INTRODUCTION

Musculoskeletal complaints totally or partially are due to their job situation (1). The World Health Organization defines musculoskeletal disorders as work- related when there is a causal relationship to the work environment and work tasks (2). Neck pain is one of the most common musculoskeletal disorders in the general population. The international association for the study of pain defines neck pain as "Pain perceived arising from anywhere within the region bounded superiorly by superior nuchal line, inferiorly by unoriginally transverse line through the tip of first thoracic spinous process and laterally by sagittal plane tangential to lateral border of neck" (3). Most patients who present with neck pain have 'non – specific (simple) neck pain', where symptoms have mechanical or postural basis (4).

A frequently seen cause of the neck pain is anxiety, stress, heavy lifting and physical demanding work (5). Awkward occupational postures, work with hands above shoulder level, sedentary work position, manual material handling, repetitive work, precision work and generally poor physical work environment are examples of mechanical factors that may be associated with neck and shoulder pain (6,7). Two thirds of the general populations have neck pain at some time in their lives and the prevalence of neck pain is highest in middle age (4). Prevalence of neck pain has an increasing trend up to 50 year followed by a decline and it has found to be more in females (8). According to Janda, postural muscle have

tendency to get shortens, in both normal and pathological conditions. Upper trapezius, levator scapulae, scalene, sternocleidomastoid, pectoralis muscles as well as inhibition of the deep cervical flexors, lower trapezius and serratus anterior are the most common postural muscles (9). A frequently seen cause of the neck pain is anxiety, stress, heavy lifting and physical demanding work (5). Exercise therapy is one commonly used treatment modality for mechanical neck pain. Exercise therapy incorporates a large variety of methods such as mobilizing exercises, stretching, isometric / static or dynamic strengthening and endurance training (10). MET is used to clinically restore range of motion in vertebral segments of the spine (11). Stretching has shown to have a variety of benefits including the treatment of neurological and musculoskeletal conditions, including an analgesic relief to a hypertonic muscle (12).

2. METHODS

The research design of present study is quasi-experimental in nature.The study was performed at the Out Patients Department (OPD) of University College of Physiotherapy, Faridkot, and Out Patients Department (OPD) of Department of Orthopedics, Guru Gobind Singh Medical College and Hospital, Faridkot between April 2016 to march 2017.the study was approved by the research and ethical committee of university college of physiotherapy, Baba Farid University Health Science, Faridkot. 40 subjects were taken, out of which 12 males and 28 females diagnosed with unilateral Mechanical neck pain. Aged 18-50 years both genders, Diagnosed cases of Mechanical Neck Pain, Sub acute (4 weeks- 12 weeks) and Chronic Cases Unilateral tightness (Upper trapezius and Levator scapulae) were selected in inclusion criteria. Fracture of the cervical spines, Neck Pain with radiation into arms, Headache and Facial pain Diagnosed with serious pathology like malignancy, infection, inflammatory disorder, osteoporosis, Diagnosed cases of cervical disc prolapsed , cervical stenosis, Cervical Spondylolisthesis ,Diagnosed pregnancy ,Any deformity like torticollis, sprengel's deformity, scoliosis, History of surgery of the cervical spine during the previous 12 months, Signs of cervical radiculopathy or myelopathy, Vascular syndromes such as basilar insufficiency were excluded from this study. All the subjects were assessed by using VAS scale, Universal goniometer, NDI. Patients were randomly assigned to one of the two groups: Group A (n-20) and Group B (n-20). Group A received muscle energy technique with conventional exercise and Group B received passive stretching with conventional exercise

3. INTERVENTIONS

Group A: -

Post isometric relaxation technique was a principle of Muscle energy technique. Post isometric relaxation technique was applied to upper trapezius and levator scapulae muscles for five repetitions using 20% of maximal isometric contraction. Stretch was held beyond resistance barrier for 20 seconds (13). The subjects were positioned in supine with the arm of the side to be tested stretched out alongside the trunk with the hand supinated. Subjects received muscle energy technique after cervical hot pack for 20 min. Muscle energy technique had been given according to Lewis's post-isometric relaxation approach.

UPPER TRAPEZIUS

Therapist stabilized the shoulder on affected side with one hand, while ear/mastoid area of affected side was held by opposite hand. The head and neck were then side bent towards the contra lateral side, flexed and rotated ipsilaterally, placing the subject just short of their upper trapezius restriction barrier. The subjects then shrugged the stabilized shoulder towards the ear at a sub maximal, pain free effort (20% of available strength). The isometric effort was held for 20 second while a normal breathing rhythm was maintained. During the relaxation phase, the head and neck were eased into increasing degrees of side bending, flexion and rotation to advance the stretch placed on the muscle. Each stretch had been held for 20-30 seconds and procedure was repeated for five repetitions.

LEVATOR SCAPULAE

The therapist standing at the head of the table passes his contra lateral arm under the neck to rest on the patient's shoulder on the side to be treated. The therapist other hand supports and directs the head into subsequent movement. The therapist forearm lifts the neck into full flexion. The head was turned fully into side flexion and rotation away from the side being treated. With the shoulder held caudally by the practioner's hand and the head/ neck in full flexion, side-flexion and rotation (each at its resistance barrier), stretch was being placed on levator from both ends. The patients was asked to take head backwards toward the table, and slightly to the side from which it was turned, against the therapist unmoving resistance, while at the same time a slight (20% of available strength) shoulder shrug was also asked for and resisted.

Following the 7- 10 second isometric contraction and complete relaxation and the neck was taken into further flexion, side-bending, and rotation, where it was maintained as the shoulder is depressed caudally with the patient's assistance (breathe out, slide your hand towards your feet). The stretch was held for 20-30 seconds and the procedure was repeated for five times.

Group B: -

Passive stretching was applied to upper trapezius and levator scapulae muscles for five repetitions with 20 second hold.Passive stretching were performed on upper trapezius and levator scapulae muscles. Each exercise was auto-passively repeated twice for 30 seconds and done slowly at normal breathing rhythm and with no compensations allowed. Passive stretching was repeated three times to each side. Static passive stretching was done with the muscles placed in a gentle yet firm stretch in neck flexion, lateral flexion (upper trapezius) and flexion with forty five degrees neck rotation (Yuksasir and Kaya, 2009).

Conventional exercise –

Isometric exercise were conducted for neck flexors, extensors, side bending, and rotators for 10 seconds contraction followed by 5 seconds relaxation, repeated 3 times for each direction (2 sets of 10 repetitions once a day). Participants were treated once daily for six consecutive days.

Parameters used in study:

1 Universal goniometer

2 Neck disability scale

3 Visual analogue scale

Assessment of all patients in both groups was taken on 1st day and reassessed at 7th day of the treatment through following scale. Universal goniometer was used to assess cervical range of motion (flexion, extension, right and left rotation). Functional disability was measured by neck disability scale and pain was measured by visual analogue scale

The Statistical analysis

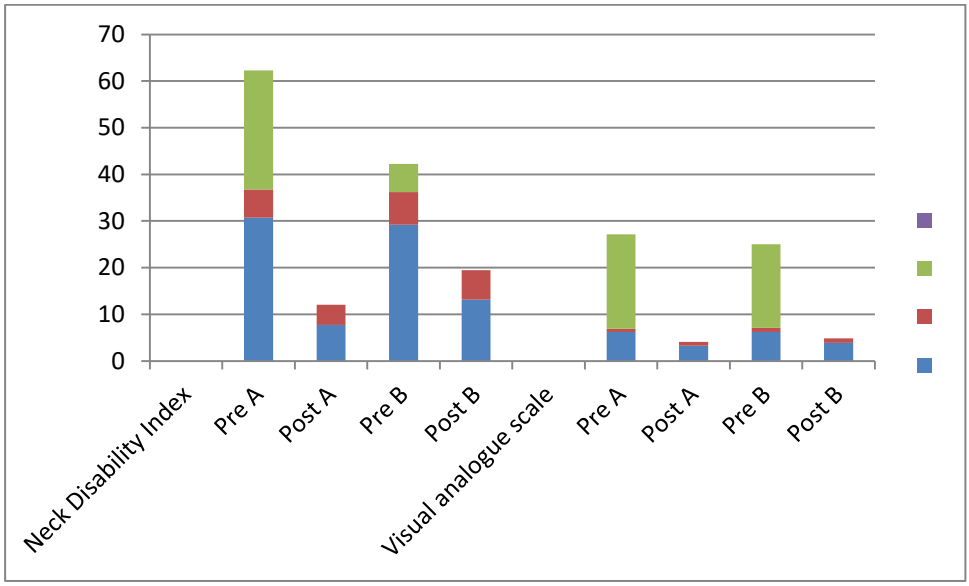
The Statistical analysis of the data was performed by statistical package for social science (SPSS) 20.0 for window. Student's t test was used for the intergroup comparison of independent variable, where paired t test was used for the time –dependent changes of intergroup variables. The results were presented as mean, P value<0.05 was considered statistically significant.

4. RESULTS

TABLE 1: Comparison of Neck Disability Index and Visual analogue scale in Mechanical Neck Pain: Pre and Post Intervention in Group A and Group B.

Neck Disability Index	Mean	Standard deviation	T value	P value
Pre A	30.7	6.027	25.547	0.000
Post A	7.7	4.366		
Pre B	29.21	6.965	6.073	0.00
Post B	13.143	6.318		
Visual analogue scale				
Pre A	6.2	0.6958	20.241	0.000
Post A	3.3	0.8013		
Pre B	6.25	0.8506	17.899	0.000
Post B	3.9	0.9679		

Table 1 describes the comparison of mean of NDI score in patients with mechanical neck pain: Pre and Post Intervention of Group A and B. The calculated t-value of NDI and VAS is 25.547,20.241 (group A) and 17.899,6.073 (group B)respectively, which indicates that the difference were statistically significant at p<0.05.

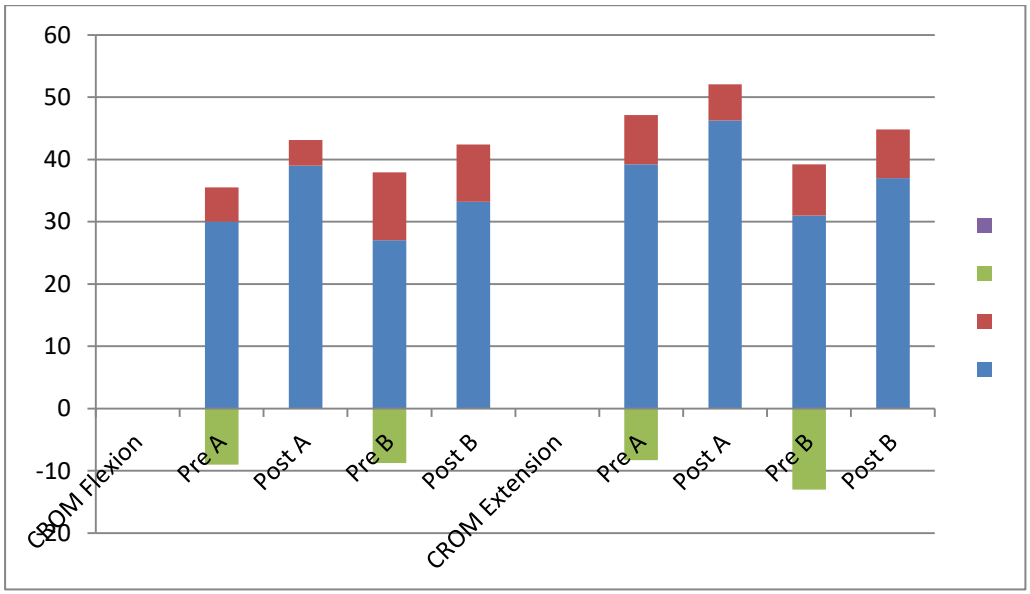


Graph 1 describes the comparison of mean of NDI score in patients with mechanical neck pain: Pre and Post Intervention of Group A and B. The calculated t-value of NDI is 25.547, 20.241 (group A) and 17.899,6.073 (group B)respectively, which indicates that the difference were statistically significant at $p<0.05$.

TABLE 2: Comparison of Cervical ROM Flexion and Extension in Mechanical Neck Pain: Pre and Post Intervention in Group A and Group B

CROM Flexion	Mean	Standard deviation	T value	P value
Pre A	30	5.5	-9.00	0.000
Post A	39	4.1		
Pre B	27	10.93	-8.75	0.00
Post B	33.2	9.215		
CROM Extension				
Pre A	39.2	7.9	-8.30	0.000
Post A	46.25	5.8		
Pre B	31	8.207	-13.0	0.00
Post B	37	7.8		

Table 2 describes the comparison of mean of CROM Flexion and Extension score in patients with mechanical neck pain: Pre and Post Intervention of Group A and B. The calculated t-value of is CROM Flexion and Extension-9.00,-8.30 (group A) and -8.75,-13.0 (group B) respectively, which indicates that the difference were statistically significant at $p<0.05$.

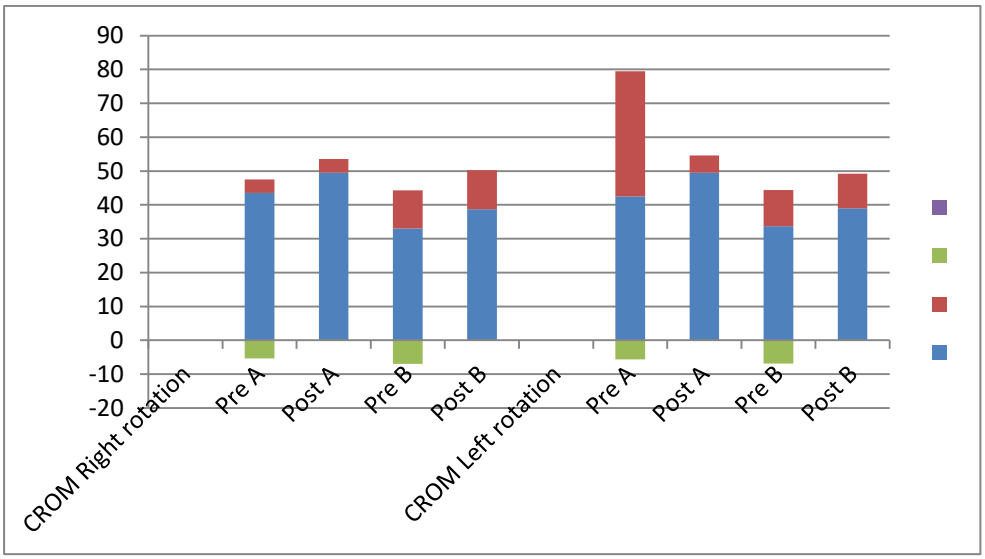


Graph 2 describes the comparison of mean of CROM Flexion and Extension score in patients with mechanical neck pain: Pre and Post Intervention of Group A and B. The calculated t-value of is CROM Flexion and Extension -9.00, -8.30 (group A) and -8.75, -13.0 (group B)respectively, which indicates that the difference were statistically significant at $p<0.05$.

TABLE 3: Comparison of Cervical ROM Right and Left Rotation in Mechanical Neck Pain: Pre and Post Intervention in Group A and Group B

CROM Right rotation	Mean	Standard deviation	T value	P value
Pre A	43.5	4.00	-5.33	0.000
Post A	49.5	4.05		
Pre B	33	11.28	-6.902	0.00
Post B	38.7	11.57		
CROM Left rotation				
Pre A	42.5	37	-5.6	0.000
Post A	49.5	5.1		
Pre B	33.7	10.7	-6.842	0.00
Post B	39	10.2		

Table 3 describes the comparison of mean of CROM Right and Left Rotation score in patients with mechanical neck pain: Pre and Post Intervention of Group A and B. The calculated t-value of is CROM Right and Left Rotation-5.33 and -5.6 (group A) and -6.902 and -6.842 (group B)respectively, which indicates that the difference were statistically significant at $p<0.05$.

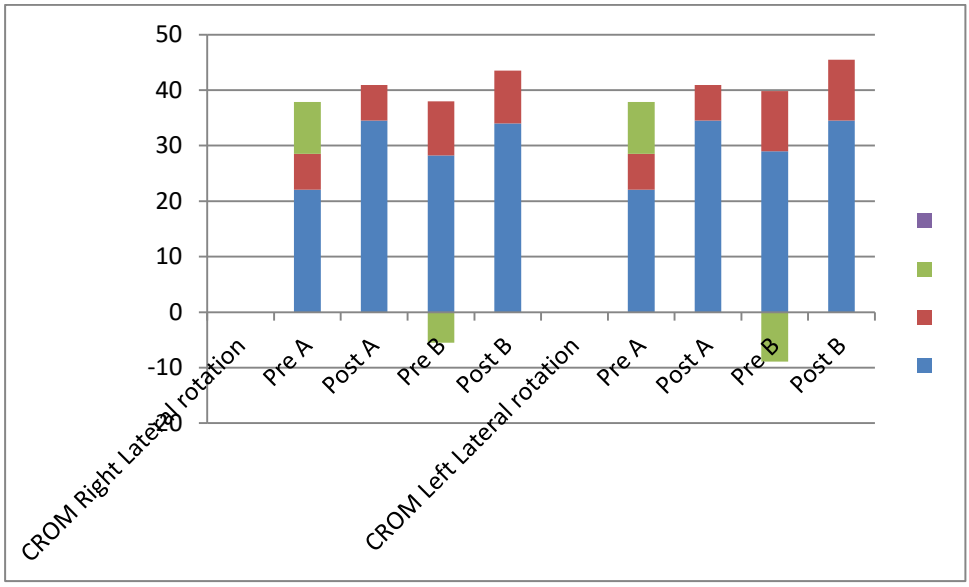


Graph 3 describes the comparison of mean of CROM Right and Left Rotation score in patients with mechanical neck pain: Pre and Post Intervention of Group A and B. The calculated t-value of is CROM Right and Left Rotation-5.33 and -5.6 (group A) and -6.902 and -6.842 (group B)respectively, which indicates that the difference were statistically significant at $p<0.05$.

TABLE 4: Comparison of Cervical ROM Right and Left lateral Rotation in Mechanical Neck Pain: Pre and Post Intervention in Group A and Group B

CROM Right Lateral rotation	Mean	Standard deviation	T value	P value
Pre A	22.05	6.5	9.3	0.000
Post A	34.5	6.4		
Pre B	28.25	9.7	-5.510	0.00
Post B	34	9.5		
CROM Left Lateral rotation				
Pre A	22.05	6.5	9.3	0.000
Post A	34.5	6.4		
Pre B	29	10.83	-8.904	0.00
Post B	34.5	10.990		

Table 4 describes the comparison of mean of CROM Right and Left Lateral Rotation score in patients with mechanical neck pain: Pre and Post Intervention of Group A and B. The calculated t-value of is CROM Right and Left Lateral Rotation 9.3 and 9.3 (group A) and -5.510,-8.904 (group B) respectively, which indicates that the difference were statistically significant at $p<0.05$.



Graph 4 describes the comparison of mean of CROM Right and Left Lateral Rotation score in patients with mechanical neck pain: Pre and Post Intervention of Group A and B. The calculated t-value of is CROM Right and Left Lateral Rotation 9.3 and 9.3 (group A) and -5.510,-8.904 (group B) respectively, which indicates that the difference were statistically significant at $p<0.05$.

5. DISCUSSIONS

The study indicated that the MET and passive stretching combined with conventional exercise were effective in improving the pain intensity (VAS), active cervical ROM (Goniometer), and neck disability (NDI).There was a higher statistically significant difference found in the Group A (received MET) as compared to the Group B (received Passive stretching) between the pre and post treatment applied to the patients with mechanical neck pain which is in accordance to study by Gupta et al (2008))on the effect of post- isometric relaxation versus isometric exercise in non-specific neck pain also concluded that MET showed significant improvement in pain and functional status(14). Our results for Group A are also supported by a study by Abha and Angusamy R (2010), who compared post-isometric relaxation with integrated neuromuscular inhibition technique on upper trapezius trigger points and concluded that MET is effective in improving pain, and functional status(15). Results of a study by Sharmila, (2014) on the effects of the MET versus conventional exercises in nonspecific neck pain in secondary school teachers are in accordance with our results for Group A, which concluded that post- isometric relaxation had better reduction in pain and disability(16). This study is in accordance to the study done by Falla D, (2008), who compared the PIR(Post isometric relaxation) and RI(Reciprocal inhibition) on fixed head and neck posture pain which concluded that PIR assumed effect of reduced tone experienced by a muscle , after brief periods following an isometric contraction. All the two treatments can be used for treatment of mechanical neck pain as statistically significant improvement was seen. For greater improvements in short duration, MET the shortened muscles and impaired activation during neck pain had shown clinically effective results in improving joint function and range of motion(17).

The major Limitation of this study was no follow up was taken to see the long term effect of the treatment. Duration of the treatment was short. The sample size was small.

The present study has concluded that both muscle energy technique with conventional exercises and passive stretching with conventional exercises are effective in the management of mechanical neck pain of cervical range of motion, neck disability and pain. Further, the muscle energy techniques with conventional exercises are more effective as compared to passive stretching with conventional exercises. Thus, Muscle energy technique with conventional exercises should be implemented in physiotherapy protocol for treating mechanical neck pain, and it will be helpful in reducing the level of pain, improve neck disability and increase cervical range of motion of an individual suffering from mechanical neck pain.

Abbreviations: MET Muscle energy technique, PIR Post isometric relaxation, RI Reciprocal inhibition, NDI Neck disability scale, VAS Visual analogue scale, CROM Cervical range of motion.

Consent: All authors declare that written informed consent was obtained from the patient before starting the study for publication of this study report.

Ethical approval: This study was approved by Research and Ethical committee of University College of Physiotherapy, BFUHS University, Faridkot, and Punjab.

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Competing interests: Authors declare that no competing interests exit.

REFERENCES

[1] NOA. (Nasjonal Overvakning av Arbeidsmiljo og helse) (2011). Faktabok om arbeidmiljo og helse 2011. Status ogutviklingstrekk. [Facts about work environment and health 2011]. STAMI, Oslo, Norway.

[2] WHO. (1985). Identification and control of work – related diseases. Geneva. Report nr 174. P.7-11

[3] Misailidou V, Malliou P, Beneka A, Karagiannidis , Godolias G. Assessment of patients with neck pain: a review of definitions, selection criteria, and measurement tools. J Chiropr Med 2010.

[4] Binder AI. Cervical Spondylosis and Neck Pain. BMJ. 2007.

[5] Bovim G, Schrader H, Sand T. Neck pain in general population. Spine (Phila PA 1976) 1994.

[6] Ariens GAM, van Mechelen W, Bongers PM, Bouter LM, van der Wal G. (2000).Physical risk factors for neck pain. Scand J Work Environ Health 26(1); 7-19.

[7] Mayer J, Kraus T, Ochsmann E. (2012). Longitudinal evidence for the association between work related physical exposures and neck and / or shoulder complaints: a systematic review. Int Arch Occup Environ Health 85(6); 587-603.

[8] Cagnie B, Danneels L, Van Tiggelen D, De Loose V, Cambier D. Individual and work related risk factors for neck pain among office workers: a cross sectional study. Eur Spine J. 2007

[9] Chaitow l. Muscle Energy Technique. Third ed.; Churchill Livingstone; 2006

[10] H.Sarig-Bahat. Evidence for exercise therapy in mechanical neck disorders. Manual Therapy, Elsevier Science Ltd (2003).

[11] Goodridge JP.(1991). Muscle energy technique: definition, explanation, methods of procedures. Journal of American Osteopathic Association, 81, 249-254.

[12] Dreifus, L.(2003). Commentary: Facts, myths and Fallacies of stretching. Journal of Chiropractic Medicines.

[13] Chaitow L. Muscle Energy Technique. 3rd ed. Edinburgh: Churchill Livingstone; 2008. P.59 ,125,128,176-80.

[14] Yuktasir, B. and Kaya, F. (2009). Investigation into the long term effects of static and PNF stretching exercise on range of motion and jump performance. Journal of Bodywork and Movement T.

[15] Gupta S, Jaiswal P, Chhabra D. A comparative study between post isometric exercisessin non- specific neck pain. J Exerc Sci Physiother 2008.

[16] Abha S, Angusamy R. Efficacy of post –isometric relaxation versus integrated neuromuscular ischemic technique in the treatment of upper trapezius trigger points. Ind J Physiother Occup Ther 2010:4:1-5

[17] Sharmila B. Isometric muscle energy technique and non- specific neck pain in secondary school teachers- results of an experimental study. Ind J physiother Occup Ther 2014.

[18] Falla D, O'Leary S, Fagan A, Jull G. Recruitment of the deep cervical flexor muscles during a postural – correction exercise performed in sitting. Man Ther. 2007.