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ORIGINAL ARTICLE

Effectiveness of Stretching Exercises Versus Muscle Energy Techniques in the Management of Upper Cross Syndrome

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Keywords

Cervical pain, Cervical spine, Disability, Range of motion, Upper cross syndrome.

Author`s Contribution

[1] planning of research and manuscript writing
[2] Conceptions, SPSS, data analysis
[3] Methodology and literature,
[4]Interpretation and discussion

Article Info.

Received: Aug 10, 2017
Revised: Aug 19, 2017
Accepted: Sep 8, 2017

Conflict of Interest: Nil
Funding Sources: Nil

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Cite This article as: *Ali S, Ahmad S, Jalal Y,Shah B Effectiveness of Stretching Exercises Versus Muscle Energy Techniques in The Management of Upper Cross Syndrome.JRCRS.2017;5(1):12-16.*

A B S T R A C T

Background: Cervical pain can occur at any stage and can restrict daily activities of an individual. In Physical Therapy different manual therapy techniques are used for the treatment of upper cross syndrome. Muscle energy techniques and stretching are under consideration.

Objective: To compare the efficacy of muscles energy techniques and stretching exercises on pain and Range of motion in upper cross syndrome patients.

Methodology: This study was conducted at Physical Therapy Department of Helping Hand Institute of Rehabilitation Sciences Mansehra from January 2016 to August 2016 on 52 patients with upper cross syndrome. The patients were randomly assigned into two groups A and B. Group A was treated with muscles energy technique (MET) while Group B was treated with stretching exercises. Including this specialized treatment both groups were treated with conventional physical therapy and home exercise plan, 3 sessions per week for a period of 16 Sessions. The patient's outcome measures were Numerical Pain Rating Scale (NPRS), Neck Disability Index (NDI) and Goniometer. Data was analyzed using SPSS version 20.

Results: Statistically pain in Group A was improved from (Pre =5.38 +0.85, Post =1.23+0.42) is compared to Group B (Pre =5.53+1.06, Post =2.11+0.86). The cervical flexion ROM in group A (Pre=50.00 +4.24, Post=69.61+5.08) and in group B (Pre=53.26 +6.15, Post =65.76 +6.43). The cervical-extension ROM in group A (Pre=47.11 +4.04, Post =64.80 +5.19) and in group B was (Pre =47.88+5.13, Post=59.80 + 5.91). The mean of neck disability index (NDI) was improved from (Pre =19.80 +4.40, Post 4.42 +1.41) for group A. Group B mean for neck disability index (NDI) was improved from (Pre=19.38+ 5.25, Post= 9.57 +4.85). The pre-and post-results showed that both groups were statistically significant group A (p value 0.000) and group B (p value 0.000).

Conclusion: It is concluded that if patients with upper cross syndrome treated with muscles energy technique showed more improvement in decreasing pain, increasing ROM and improving function as compared to stretching exercises.

Introduction

Cervical pain is one of most commonly occurring musculoskeletal disorders if is left untreated can lead to severe complications.[1] Cervical spine and soft tissues disorders e.g. muscles, ligaments, discs, facet joints etc. are major causes for neck pain while neck pain caused by postural abnormality is termed as upper cross syndrome.[1,2,3]

In upper cross syndrome there is tightness of levator scapulae, upper trapezius, and pectoralis minor muscles with occasionally tightness of pectoralis major muscle with weakness of all the deep muscles of neck (cervical) flexors, lower trapezius and rhomboids muscles.[4] In general population the prevalence of neck pain was 15 to 44% per-year while in office workers its prevalence is higher which is up to 50 to 60%.

Other than ADL limitations neck pain effects occupational life as well. Which result in treatment costs and work loss leading both the person & society to bear substantial economic loss.[4] Specific physical therapy exercises are used for muscles lengthening, strengthening, stability and for pain relief associated with cervical spine. Manual therapy includes mobilization and manipulation which is used for restoring the normal joints ROM associated with the joints hypomobility. Soft tissue techniques include muscles energy technique (METs), active isolated stretching (AIS), strain-counter strain and massage etc. Many techniques are being used by Physiotherapists for the treatment of cervical pain and increasing ROM. The aim of this research was to compare the effectiveness of stretching exercises versus muscle energy techniques in the management of upper cross syndrome.[5-9] The MET technique helps to restore the strength of weak muscles through length tension relationship of contracted, spastic or shortened muscles through lymphatic pump thus restoring the normal joint ROM.[10] Muscles energy technique can be applied in two ways. Post isometric relaxation and post facilitation stretch technique. The post isometric relaxation technique was introduced for muscular imbalance (hypertonic muscle) while post facilitation stretch technique is useful for the shortened muscles.[11] The research studies showed that stretching is effective in muscle length improvement and decreasing the risk of injuries associated with activities, as it improves flexibility and consequently improves ROM. The stretch is either applied in the form of static stretch or dynamic stretch. [11]

Methodology

The individuals in the study have neck pain due to upper cross syndrome. Patients from both genders between the ages of 20 to 50 years were included in the study. While patients with any inflammatory arthritis including Rheumatoid arthritis, Ankylosing spondylitis, cervical spine surgery, cervical spine trauma, cervical spine instability were excluded from the study. The consent forms were signed by the eligible patients and the baseline measurements are performed.

Patients are randomly assigned to Group A and Group B. Individuals in Group A received muscle energy techniques for neck pain relief and ROM improvement due to upper cross syndrome while stretching exercise were applied in Group B to treat same problem.

Group A was treated with muscles energy technique (MET). In MET both post isometric relaxation and post facilitation stretch techniques were applied. This included 1 set of 5 repetitions per session, 3 sessions per week on alternate days plus conventional Physical therapy for a period of 16 sessions. The stretching duration in MET was 8-10 seconds for PIR and 15 seconds for PFS. Patient was positioned in supine lying and sitting.

The patient was instructed to contract the agonist muscle using 10-20% of the available strength for 5 to 10 seconds. Resistances were applied to the patient's effort to an equal counter force. After these patients were asked to fully relax and therapist moved to the next barrier with all slack removed but no stretching of muscles. The same procedure was followed at the new barrier and was repeated for two or three times. When treating the spinal muscles, the patient was asked to use eye movement in the direction during contraction phase and in the same direction of stretching during stretch phase[10] The procedure was repeated for 3 to 5 times, for 3 sessions a week for a total of 16 sessions.

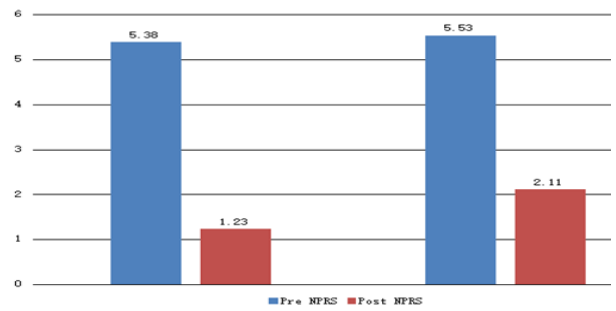
The shortened muscle was placed in a mid-range position about half way between a fully stretched and a fully relaxed state. The patient contracted the muscle isometrically, using a maximum degree of effort for 5-10 seconds while the effort was resisted completely. On release of the effort, a rapid stretch was made to a new barrier, without any 'bounce', and this was held for at least 10 seconds. The patient relaxed for approximately 20 seconds and in total 16 sessions the procedure was repeated for 3 to 5 times for 3 sessions per week.

Group B was treated with stretching exercises. The muscles were stretched without movement for a specific amount of time. Static stretching was performed by placing the body into position that the muscle which was being stretched under tension. Both muscles the agonist or muscle which were being stretched and antagonist muscle were relaxed. Then slowly with care stretching force was applied on the muscle to be stretched and this position was maintained to allow the muscle to be relaxed and lengthen. A minimum hold time for stretching was 20 seconds for the muscle to get relax and to start lengthening. The positions of patient for these exercises were supine and sitting. The stretching was repeated for 4 to 6 times in a single session, thrice a week for 16 sessions.

Patients were guided about home exercise plane, active range of motion exercises 3 sets of 10 repetitions twice a day for six weeks and isometric exercises of cervical spine. Two set of ten repetitions for each exercise twice a day for six weeks.

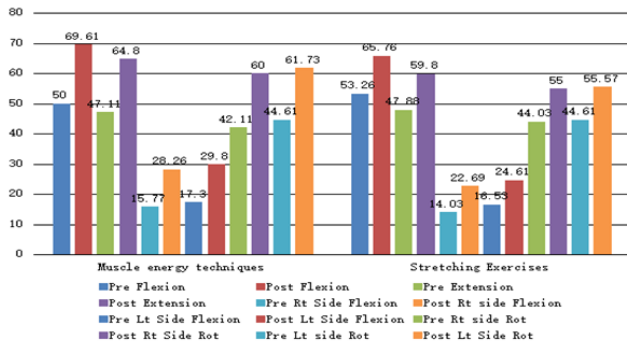
Results

Statistically the patients treated with muscles energy technique (Group A) improved pain (Pre =5.38 $\pm$0.85, Post =1.23$\pm$0.42). The patients treated with stretching exercises (Group B) improved pain (Pre =5.53$\pm$1.06, Post =2.11$\pm$0.86). The paired t-test showed that both groups were statistically significant, Group A (0.000) and Group B ((0.000) <P- Value (0.05).



Graph No. 1 showing Pre-NPRS and Post-NPRS for METS and SE.

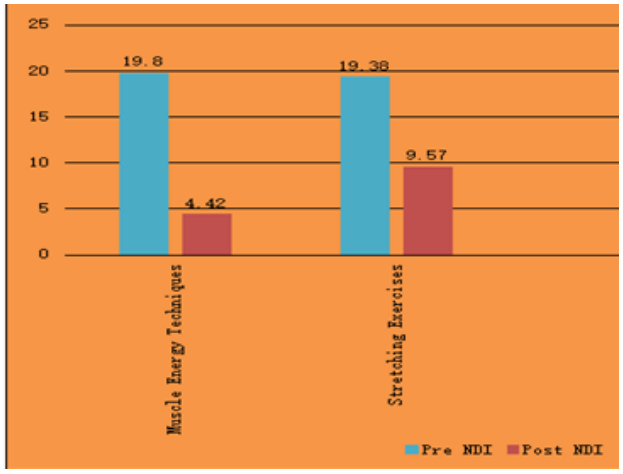
The cervical flexion ROM was also improved in both groups, Group A (Pre=50.00 ±4.24, Post =69.61±5.08). Cervical flexion for Group B (Pre=53.26 ±6.15, Post =65.76 ±6.43). Results showed that both groups were statistically significant Group A (0.000) and Group B (0.000). The cervical-extension ROM was improved (Pre=47.11 ±4.04, Post =64.80 ±5.19) for Group A. The Group B ROM was improved from (Pre =47.88±5.13, Post=59.80 ± 5.91). The Pre and Post results showed that both groups were statistically significant Group A (0.000) and Group B (0.000).



Graph No. 2 showing Cervical Range of Motion.

Table Showing paired t-test for Cervical Range of Motion.				
Variables	**Groups**	**Pre-Treatment Mean**	**Post Treatment Mean**	**P-Value**
Flexion	A	50.58 ± 4.24	69.61± 5.08	0.000
	B	53.26 ±6.15	65.76 ±6.43	0.000
Extension	A	47.11±4.04	64.80 ±5.19	0.000
	B	47.88 ±5.13	59.80 ±5.91	0.000
Rt side Bending	A	15.77 ±4.62	28.26±5.99	0.000
	B	14.03 ± 4.24	22.69 ± 6.36	0.000
Lt side Bending	A	17.30±3.23	29.80±3.86	0.000
	B	16.53± 2.35	24.61±4.45	0.000
Rt Rotation	A	42.11 ±5.86	60 ±6.16	0.000
	B	44.03 ±3.46	55 ±5.47	0.000
Lt Rotation	A	44.61 ±5.64	61.73 ± 5.46	0.000
	B	44.61 ±5.27	55.57±6.53	0.000

The mean of neck disability index (NDI) was improved from (Pre =19.80 ±4.40, Post 4.42 ±1.41) for group A. Group B mean for neck disability index (NDI) was improved from (Pre=19.38± 5.25, Post= 9.57 ±4.85). The pre and post results showed that both groups were statistically significant group A (0.000) and group B (0.000).



Graph No. 3. Showing Pre NDI and Post NDI.

Discussion

This study is comparative study on effectiveness of muscle energy technique compared to stretching. The main purpose of the study was to see the result of the supposed techniques on treatment outcomes, pain intensity, disability and range of motion limitation. The result shows that muscle energy technique is more effective as compare to stretching exercises in treating the patients with neck pain, ROM, and disability in upper cross syndrome patients.

The findings of our study regarding Muscle energy technique in reducing pain and increasing ROM are supported by the study of Mahajan R and his colleagues in 2012 on comparative effectiveness of muscle energy technique and static stretching conducted a study for treatment of sub-acute mechanical neck pain. A sample of 45 patients with sub-acute mechanical neck pain are randomly assigned to different groups receiving METS and static stretching the study concluded that both the treatments are effective in decreasing pain intensity and Increasing ROM of cervical Spine.[12]

A study was conducted in 2004 by Fryer G and his fellows to check the efficacy of muscles energy technique in increasing the range of motion of upper cervical spine and was to check the effect of contraction duration of MET on upper cervical spine for that purpose a sample of 52 asymptomatic patients in age range from 18-43 was selected and was divided into 3 groups. Group A included 17 patients with a Mets contraction duration of 4-5 seconds, group B include 18 patients

with 20 seconds contraction duration and group C was a control group. The study concluded that longer contraction of 20 seconds does not add any benefit in increasing the Range of motion. While the smaller duration 5- second contraction was very useful in increasing range of motion. Evidence supports the outcome of this study in improving range of motion.[13].

Kawaldeepkaur and his colleagues conducted a study in 2015 to investigate the effect of MET with deep heating (MWD) on non-specific neck pain. The groups treated with conventional physical therapy treatment along with METs for increasing ROM and decreasing pain intensity given the best treatment results. The evidence supports the outcome of our study that MET is effective in decreasing pain and increasing ROM at cervical spine. [14]

The results of our study in increasing ROM is supported by the evidence of the study of M. Manyamjyotsna and his colleagues in 2014 which concluded that MET has been documented to be very effective using PIR & PFS techniques for hypertonicity, dysfunctional joint mechanics and their associated mechanoreceptor hyperactivity. [15]

Day JM and his fellow conducted a study in 2010 on the efficacy of MET on ROM which supports the results of this study in improving ROM and this study concluded that immediate results include return to healthy ROM, spontaneous strengthening of inhibited muscles, lessening of localized irritation and associated micro-edema, decreased sympathetic overload and increase of structural and functional integrity along the movement chain.[16]

The effects of manual therapy and stretching exercises were compared by Ylinen Jari and his fellows both treatment plans given positive effect for decreasing neck pain & disability in nonspecific neck pain patient. This evidence supports our study that stretching exercises are effective in pain relief and improving range of motion in chronic neck pain patients.[17]

Hakkinen and his fellows conducted a study in 2007, also provided the evidence that both manual therapy and stretching exercises are effective for pain relief. They suggested that the decrease in pain may reduce motor system inhibition and a result in improvement in neck function. [18]

A study by Kostopoulos et al on "Reduction of spontaneous electrical activity and pain perception of trigger points in the upper trapezius muscle through trigger point compression and static passive stretching" also conclude that Golgi tendon organ inhibition by static stretching exercises results into relaxation of muscle & less pain perception.[19]

Conclusion

It is concluded that if patients with upper cross syndrome treated with muscles energy technique showed more improvement in decreasing pain, increasing ROM and improving function as compared to stretching exercises.

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