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# EFFECTS OF EXERCISES AND MUSCLE ENERGY TECHNIQUES FOR TENSION NECK SYNDROME IN COMPUTER PROFESSIONALS

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***Abstract***

***Background***

*Tension neck syndrome is one of the most common disorders occurring in computer professionals. The computer professionals maintain a restricted posture with activity of the forearms, while bracing the shoulders.*

**Methods**

*Potential subjects were identified and they underwent a standardized history and examination of the cervical spine. Total of 30 subjects were recruited and divided in to two groups. Group A was given MET technique, Group B was given Exercise. The outcome measures are VAS, NDI, ROM.*

***Result***

*The effects are observed from the significance obtained using the variables, ROM of cervical spine, VAS SCORE and NDI SCORE. The statistical test was paired t- test and the results were considered if p <0.05.*

**Conclusion**

*The conclusion of this study is there is a improvement in Muscle energy techniques on pain and functional activities among computer users.*

## Introduction

Tension neck syndrome is a common condition characterized by persistently stiff, aching neck, often accompanied by a headache. It occurs due to the chronic myofascial tension in the muscles of the neck, which results in increased sensitivity and irritability of the muscle tissue[1]. This type of extended muscle contraction results in local nutrient deficiencies due to ischemia, leading to pain. If this myofascial pain persists, the pain may radiate or refer to the head, causing a headache condition.

The physical findings include tenderness, decreased range of motion and pain on motion of neck. The static muscle strain occurs mainly in the posterior cervicals and lateral flexors. The specific muscles that are most affected are sternocleidomastoid, suboccipitals, upper trapezius and splenius capitis[2].

Tension neck syndrome is one of the most common disorders occurring in computer professionals. The prevalence rate ratio for tension neck syndrome in computer users was found to be 3.5 for work duration of 25 hours per week and was increased to 4.7 for work duration more than 30hours. The computer professionals maintain a restricted posture with activity of the forearms, while bracing the shoulders. In order to stabilize the proximal joints and allow fine movements of forearm and hands, the neck muscles contract vigorously. When this position is held for prolonged period, the muscles go for spasm, leading to tension neck syndrome.

Muscle energy technique is a direct technique originally developed by Fred Mitchell. Sr. Do. The purpose of this technique is to treat joint hypo mobility and restore proper biomechanical and physiological function to the joints. It is an active direct technique that promotes muscle relaxation by activating the Golgi tendon reflex. This relaxation relieves the increased myofascial tension in the neck muscles, thus decreasing the pain and the stiffness of the neck muscles. It is a safe technique that can be applied to even conditions with severe pain.

Exercises can also be given to treat the tension neck syndrome, as exercises can safely ease pain by providing stretching and strengthening of the neck muscles and thus, relieving the spasm and maintaining a good posture of the neck. Movements of joints and muscles also signal the nervous system to block the incoming pain, by releasing endorphins. Exercise also improves the co-contraction of the neck muscles during movement and also on maintaining a stable posture.

In this study, we will discuss the effectiveness of muscle energy techniques and a set of active neck exercises on a short term treatment schedule for tension neck syndrome in a group of computer professionals.

**Methodology**

Potential subjects were identified and they underwent a standardized history and examination of the cervical spine. Demographic information were collected which included the patient's age, gender, medications used, work durations and the location, nature and duration of symptoms. Self-report measures included the NDI and VAS pain scales.

The 'neck disability index' is the most frequently used functional outcome tool for cervical related disabilities. This outcome assessment tool was created by modifying the oswestry disability index and is extremely reliable (MIOR et al). The index consists of 10 categories of five to six statements in each. For each section of the index the subject selected one statement that best represented his or her perceived ability to perform a function and/or the quantity of pain experienced on the day of assessment. Each statement is scored on a 6 point scale (0-5), where a score of '0'was awarded if the subject selects the first statement of the section and a score of '5' was awarded if the subject selects the last statement. The section scores are tallied to produce the total score.

The 'visual analog scale' is a psychometric scale used to measure the patient's level of subjective pain. Operationally a VAS is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end. The subjects marks on the line the point that they feel represents their perception of their current state. The VAS score is determined by measuring in centimeters from the left hand end of the line to the point that the subject marks.

The Physical examination measures include the cervical range of motion measurements with a goniometer, which was performed with the subject made to sit in erect position with both the ear lobes at the same distance from the respective shoulders and the neck flexion, extension, lateral flexion and lateral rotations range were measured. For measuring the flexion range, the axis of the goniometer was placed on the ear lobe, the stable arm placed along the body line and the moveable arm perpendicular to the face, and the subject was asked to perform a neck flexion and the range was measured. The same position was maintained for measuring the extension too, where the subject was asked to perform an extension and the range measured. For lateral flexion, the axis was placed on the T1 spine and the stable arm parallel to thoracic spine and moveable arm parallel to cervical spine and the subject was made to perform lateral flexion on both sides and the range of motion measured for both the sides. For measuring lateral rotation, the axis was placed on the vertex of the skull and the moveable arm placed parallel to the saggital suture and the subject was asked to perform lateral rotation on both sides and the range of motion was measured.

The Subjects then recruited for the study were between the age group of 18-30, with primary complaints of neck pain without unilateral symptoms, who are working as computer professionals for a minimum of 1year with an average working time of 8hours, with a NDI score greater than or equal to 10 points and VAS score greater than or equal to 4 points, with out any history of previous spinal diseases or surgeries. Thus the subjects meeting all the inclusion and exclusion criteria were randomly put into one of the two treatment groups; 1- Group A treated with muscle energy techniques or 2- Group B treated with the exercise protocol.

Patients in group A received manual physical therapy for a duration of 1 week, consisting of active direct techniques namely muscle energy techniques of both reciprocal inhibition and post-isometric relaxation types which are commonly referred and used in clinical practice. The subjects were positioned in supine lying in a low couch with their head hanging off the end of the couch, which was supported by the therapist and specific techniques were done for muscle groups namely the posterior cervicals and lateral flexors and specific techniques performed for individual, specifically affected muscles namely the upper trapezius, the sternocleidomastoid and the sub occipitals.

Patients in group B were taught a neck exercise protocol consisting of stretching exercises for neck and upper back muscles followed by strengthening exercises for the neck muscles and finishing with a relaxation technique. The therapist instructed and supervised all the exercises on the first session to ensure proper patient technique and understanding. Then the subjects were asked to perform these exercises everyday at their home or at work place.

The intervention period lasted for 1week with both the groups receiving treatment for 7 sessions. The treatment time was standardized to 15 to 20 minutes per session for both the groups. At the end of the seventh session, the outcome measures were collected namely the NDI and VAS score and the cervical range of motion from each of the subjects to identify the effectiveness of the treatment programs.

**Data Analysis**

This is an experimental study on the effects of exercises and muscle energy techniques in tension neck syndrome. The effects are observed from the significance obtained using the variables, ROM of cervical spine, VAS SCORE and NDI SCORE. The statistical test was paired t- test and the results were considered if $p < 0.05$.

**Table 1: Range of motion group A**

| | | Mean | N | Std. Deviation | t-Value | Significance Level |
|---|---|---|---|---|---|---|
| Pair 1 | Pre FLX | 24.53 | 15 | 6.988 | -12.871 | .000 |
| | Post FLX | 41.27 | 15 | 3.369 | | |
| Pair 2 | Pre EXT | 40.00 | 15 | 3.024 | -6.296 | .000 |
| | Post EXT | 44.93 | 15 | .258 | | |
| Pair 3 | Pre RLR | 54.80 | 15 | 2.178 | -8.718 | .000 |
| | Post RLR | 59.87 | 15 | .352 | | |
| Pair 4 | Pre LLR | 54.53 | 15 | 2.167 | -9.518 | .000 |
| | Post LLR | 59.93 | 15 | .258 | | |
| Pair 5 | Pre RLF | 25.07 | 15 | 6.638 | -6.616 | .000 |
| | Post RLF | 38.80 | 15 | 4.092 | | |
| Pair 6 | Pre LLF | 23.27 | 15 | 6.135 | -8.916 | .000 |
| | Post LLF | 38.47 | 15 | 3.378 | | |

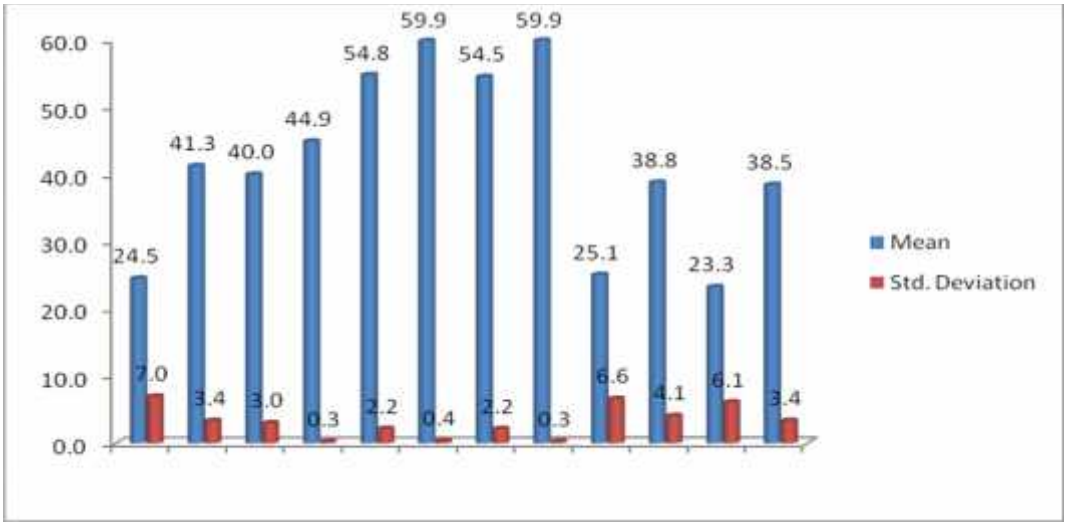


**Fig.1: This graph depicts the mean and standard deviation of ROM for group A**

**Table 2: Range of Motion of Group B**

| | | Mean | N | Std. Deviation | t-Value | Significance Level |
|---|---|---|---|---|---|---|
| Pair 1 | Pre FLX | 24.53 | 15 | 6.988 | -2.406 | .030 |
| | Post FLX | 29.60 | 15 | 6.080 | | |
| Pair 2 | Pre EXT | 34.53 | 15 | 5.617 | -1.527 | .049 |
| | Post EXT | 37.47 | 15 | 3.623 | | |
| Pair 3 | Pre RLR | 55.67 | 15 | 1.589 | 11.767 | .000 |
| | Post RLR | 58.20 | 15 | 1.320 | | |
| Pair 4 | Pre LLR | 54.13 | 15 | 2.875 | -6.253 | .000 |
| | Post LLR | 57.73 | 15 | 1.486 | | |
| Pair 5 | Pre RLF | 22.53 | 15 | 4.984 | 7.349 | .000 |
| | Post RLF | 29.47 | 15 | 6.140 | | |
| Pair 6 | Pre LLF | 23.80 | 15 | 6.224 | -6.959 | .000 |
| | Post LLF | 30.20 | 15 | 6.899 | | |

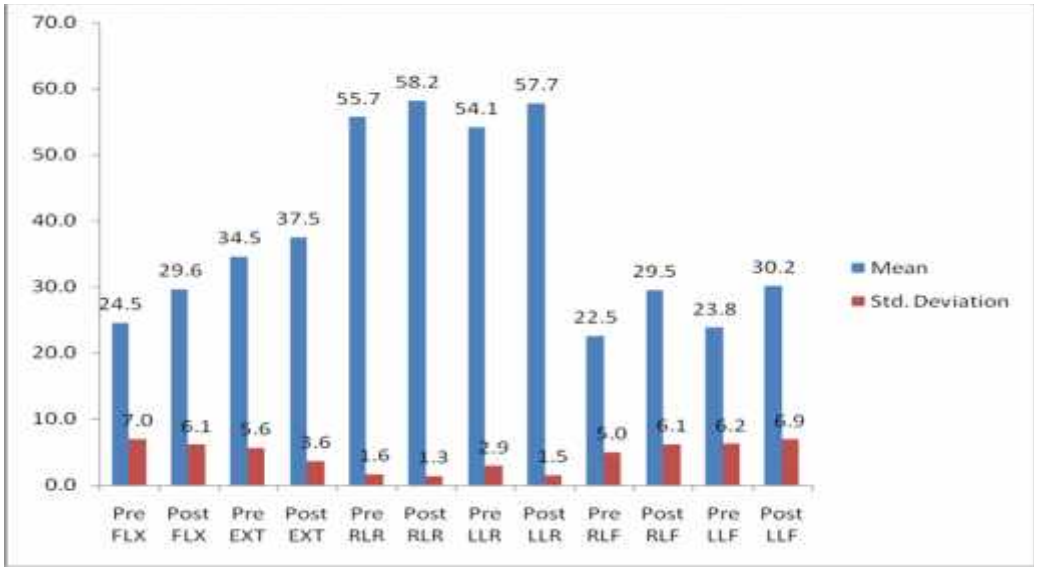


**Fig.2: This graph depicts the mean and standard deviation of ROM for group B**

**Table 3: VAS score for group A**

| | | Mean | N | Std. Deviation | t-Value | Significance Level |
|---|---|---|---|---|---|---|
| Pair 1 | Before VAS | 5.07 | 15 | 1.163 | 18.330 | .000 |
| | After VAS | 2.67 | 15 | .816 | | |

**Table 4: NDI score for group A**

| | | Mean | N | Std. Deviation | t-Value | Significance Level |
|---|---|---|---|---|---|---|
| Pair 2 | Before NDI | 11.80 | 15 | 1.859 | 14.789 | .000 |
| | After NDI | 7.27 | 15 | 1.438 | | |

**Table 5: VAS score for group B**

| | | Mean | N | Std. Deviation | t-Value | Significance Level |
|---|---|---|---|---|---|---|
| Pair 1 | Before VAS1 | 5.60 | 15 | 1.298 | 10.458 | .000 |
| | After VAS1 | 3.93 | 15 | 1.100 | | |

**Table 6: NDI score for group B**

| | | Mean | N | Std. Deviation | t-Value | Significance Level |
|---|---|---|---|---|---|---|
| Pair 1 | Before NDI1 | 12.73 | 15 | 2.187 | 15.370 | .000 |
| | After NDI1 | 9.73 | 15 | 1.981 | | |

**Discussion**

This study shows the effect of muscle energy techniques and exercises on tension neck syndrome in treatment duration of 7 days.

The statistical result of study for muscle energy techniques for group **A** shows that there is marked increase in the range of motion and decrease in the neck disability index and visual analog scale score from pre treatment to post treatment in duration of 7days which shows a statistical significant value at $p<0.005$. The statistical result also indicates the increase in range of motion and decrease in NDI and VAS score from pre treatment to post treatment for group **B** treated with an exercise protocol at statistical significant value at $p<0.05$.

The study design included an experimental group **A** (muscle energy technique) and a control group **B** (exercise) that allowed us to investigate the efficacy of 2 different treatment procedures for tension neck syndrome.

The result of this study suggests that both muscle energy techniques and the exercise protocol were effective in reducing the symptoms of tension neck syndrome in the treatment period of 7 days. The range of motion for cervical spine was found to increase from its initial range measured before the treatment in both the groups but the difference between the two values is more in group A than group B which indicates that muscle energy techniques were more effective in improving the range of motion than the exercise given. This is because the muscle energy technique produces instant muscle relaxation by activating the golgi tendon reflex and this relieves the chronic muscle spasm which in turn improves the range of the cervical spine. Exercises also increase the range of motion of cervical spine by stretching of the muscles and improving the flexibility.

The result also indicates the pain reduction, physical work capacity, exercise tolerance, functional mobility and other objective signs of improvement through the neck disability index and visual analog score. There is a decrease in both the scores after the 7days treatment but the difference between the pretest and post test values is markedly higher in group A (muscle energy technique) than in group B (exercise protocol).

The muscle energy technique included therapist-assisted lengthening and stretching of the cervical paravertebral muscles. The stretching procedure invoked relaxation through reciprocal innervations mechanisms (i.e) the antagonist musculature was isometrically contracted followed by passive stretching of the agonist muscles and by post isometric relaxation where the agonist is isometrically contracted followed by passive stretching. This relaxation of cervical muscles in chronic spasm provides pain relief and better functional mobility in the neck.

As stated by Jensen. C in 1990 muscle energy technique is effective in relieving tension headaches. This study confirms the statement given by American physical therapy association in an article in April 2003 that METS are appropriate for treating patients whose symptoms are aggravated by certain postures or bodily positions[7].

Exercises like stretching increase the flexibility of cervical muscles and thus reduces pain and prevents reinjury. As stated by the Canadian center for occupational health and safety in 2005 active exercises with stretching are beneficial because it promotes circulation and reduces muscle tension. Strengthening exercises are focused on the muscles that support the neck and maintain it in good posture. The last relaxation part of the exercise protocol promotes muscle relaxation and stress relief which also helps in reduction of pain by decreasing the cervical muscle tightness and improving the breathing capacity.
This study shows that both muscle energy techniques and exercises are effective for treating tension neck syndrome with muscle energy technique providing better and quicker relief than exercises.

**Conclusion**

The result of the present study supports the experimental hypothesis that muscle energy techniques and exercises have effect on treating tension neck syndrome in computer professionals they increase the range of motion of cervical spine, they decrease pain and other functional symptoms of the condition .

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