



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 8, Issue, 12, pp. 22490-22493, December, 2017

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Research Article

EFFECT OF MUSCLE ENERGY TECHNIQUE AND POSITIONAL RELEASE THERAPY ON NECK PAIN IN COMPUTER USERS-A RANDOMIZED CONTROL TRIAL

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DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0812.1276>

ARTICLE INFO

Article History:

Received 10th September, 2017
Received in revised form 14th
October, 2017
Accepted 08th November, 2017
Published online 28th December, 2017

Key Words:

Neck pain, Positional Release Therapy, Muscle Energy Technique, Numerical Pain Rating Scale, Neck Disability Index, cervical ROM Goniometry.

ABSTRACT

Prolonged sustained computer based activities can increase compressive loadings in spine which may lead to Work related musculoskeletal disorders. Aim of study was to compare the effect of Muscle Energy Technique (MET) and Positional Release Therapy (PRT) on neck pain in computer users. Total 80 Patients referred to Physiotherapy department with trapezius spasm were screened for inclusion criteria among which 45 subjects were selected. Participants were randomly divided into three groups, PRT Group (n=15, mean age 30.53 ± 6.83 yrs.), MET Group (n=15, mean age 29.2 ± 7.19 yrs.) and Control group which received conventional therapy (n=15, mean age 31.4 ± 6.39 yrs.). Participants were evaluated pre and post intervention with Numerical pain rating scale (NPRS), Neck Disability Index (NDI) and Cervical ROM. Treatment was carried out for 2 weeks. The NPRS reduced from 7±1.60 to 1.53±0.83 with PRT, from 6.66 ± 1.23 to 2±0.75 with MET and from 6.33 ± 0.81 to 2.8 ± 0.77 in Control group. NDI reduced from 15.6 ± 6.70 to 4.8 ± 4.50 with PRT, from 16.6 ± 5.24 to 8.13 ± 4.01 with MET and from 14.86 ± 5.27 to 7.73 ± 3.97 in Control group. Cervical Rotation in degrees increased from 65.2 ± 5.19 to 72.53 ± 2.10 with PRT, from 64.86 ± 2.85 to 71.4 ± 2.53 with MET and from 63.46 ± 3.50 to 68.8 ± 2.98 in Control group. Between group comparisons using ANOVA test showed significant difference in NPRS and NDI (0.0001). The study concluded that Positional Release Therapy and Muscle energy technique are effective in reducing pain and improving of function in computer users with neck pain.

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INTRODUCTION

Work related musculoskeletal disorders (WRMSD) of the neck are the most common problem experienced by the people who spend lot of time on computers. Work related musculoskeletal disorders are the disorders which are also termed as cumulative trauma disorders, overuse injuries and repetitive strain injuries. Neck pain caused due to computer work is a common problem for computer workers in office since the trend for computer use is seen increasing each year¹. There can be increase in Compressive loadings in the spine due to computer based activities. These forces can create a tissue response and cause pain and muscle strain in different parts of body. Highest prevalence of MSDs is reported in neck and shoulder to be 49 %².

Common neck disorders may be related to risk factors like stressful environment, continuous exposure to video display units, static arm and neck postures, poor ergonomics causing non-neutral positions of body, job demands which are high quantitative and less amount of rest breaks.² Sustained Neck rotation and shoulder abduction during computer use have been

identified as a risk factor for the symptoms related to areas like neck and shoulder. Slumped sitting over computer involves components like forward head posture and flexion of trunk. This forward head and trunk posture causes poor cervical alignment. Flexed cervical spine causes more activity of cervical erector spinae, trapezius and thoracic erector spinae muscles. Evidence shows that there is link between prolonged trunk flexed posture and increase in loading of muscle which thereby causes increase in risk of symptoms in the upper body³. Trapezius muscle is highly suspected for over use and is the most designated postural muscle. The pain is aggravated on activity and is also present at rest⁴. Trapezitis is the condition in which there is inflammation of the upper, middle and lower fibres of trapezius muscle causes severe neck muscle spasm⁵. When surrounding muscles and soft tissues are under stress, it tend to receive less amount of oxygen and glucose and therefore it leads to accumulation of high level of metabolic waste. This leads to formation of a trigger point and can cause higher rates of musculoskeletal complaints.⁴

There are various treatment protocols used to reduce neck pain which includes technique like Muscle Energy Technique and

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Positional Release Therapy. Muscle Energy Technique described by Fred Mitchell in 1948 is used to reduce pain, stretching of the tight fascia and muscle, reduce the tone of muscle, improve circulation, mobilization of restrictions of joints and strengthening of the weak muscles⁶. It is a treatment that involves voluntary contraction of muscle which is against the counterforce given by the operator⁷. Post isometric relaxation is a type of muscle energy technique in which Gentle stretch is added with contract relax technique. The overactive muscle is placed up to the pathological barrier and gentle isometric contraction is achieved⁸.

Positional Release Therapy was developed by Lawrence H. This therapy involves passive positioning of the body. This technique claims that it causes immediate and prolonged reduction of tenderness and pain of trigger points. PRT is based on positioning of the dysfunction tissue precisely in various ways to allow release or reduction of spasm and spontaneous reduction excessive tension in the muscle. This may be caused due to resetting of spindle and proprioceptive activity, enhancement of circulation and nociceptive sensitivity reduction and improving lymphatic drainage.^{6,9}

The study was conducted to compare the effect of Muscle Energy Technique and Positional Release Therapy on neck pain in Computer users. There are various techniques used to reduce neck pain but there is lack of literature on the effect of Muscle Energy Technique and Positional Release Therapy for neck pain among computer users. So it is assumed that inclusion of these techniques in management of neck pain in computer users could prove to be more beneficial.

Aim and Objectives

Aim: To compare the effect of Muscle Energy Technique and Positional Release Therapy on neck pain in Computer users.

Objectives

To determine the effect of Muscle Energy Technique on neck pain in Computer users.

To determine the effect of Positional Release Therapy on neck pain in Computer users.

To compare the effect of Muscle Energy Technique and Positional Release Therapy on neck pain in Computer users.

MATERIALS AND METHODOLOGY

Study Duration: 6 months.

Study Design: Randomized control trial.

Study Setting: Hospitals and offices in Pune.

Target Population: Computer users with neck pain.

Sample Population: Patients referred to Physiotherapy Department with neck pain.

Sample Method: Random.

Sample Size: Total 45.

Inclusion

1. Presence of unilateral trapezius muscle spasm.
2. Computer users with trapezius trigger points, between age of 18 and 50years.

3. At least 2 hr in sitting position and work on computers per day.
4. Both male and female.

Exclusion

1. History of a whiplash injury.
2. History of surgery of cervical spine and shoulder.
3. Diagnosed with conditions like malignancy or spondylolysis thesis.
4. Radiating pain in upper extremity.

Outcome Measures

1. Neck Disability Index (NDI).
2. Numerical Pain Rating Scale (NPRS).
3. Cervical ROM by goniometer.

Procedure

Initially, Synopsis was presented and approval from ethical committee was obtained. Hospitals were approached and permission for data collection was taken. Total 80 patients referred to the Physiotherapy Department with neck pain were screened and 45 patients satisfying inclusion and exclusion criteria were recruited. Prior to participation, subjects were informed about study protocol and written informed consent was taken from all subjects. These subjects were randomly divided into three groups, Positional Release Therapy (Group A, n= 15) Muscle Energy Technique (Group B, n=15) and control (Group C, n=15). Baseline evaluation was done using Neck Disability Index (NDI) Numerical Pain Rating Scale (NPRS)^{10, 11} and cervical range of motion was assessed using Universal goniometer. Standardised procedure of Goniometry for placement of fulcrum and assessing Cervical ROM was used^{12,13,14,15}. Treatment was carried out for 2 weeks.

Positional Release Therapy (PRT)

Standardised treatment procedure for PRT was followed. In Group A, Patients were asked to be in supine position with therapist standing at the side of the table to the patients affected side. Tender points were located in the upper trapezius muscle. After identification of tender point, patient was asked to relax. Pressure was applied over the muscle by pinching it between the thumb and fingers and applying pressure by thumb over the tender point. Patients head was laterally flexed to the side of tender point. After lateral flexion of head to the same side therapist grasps patients forearm and abduction of shoulder was done to about 90 degrees. Addition of flexion and extension was done to fine tune. This position of comfort was maintained for about 90 seconds. After this patients hand and neck was passively taken to neutral position and this procedure was continued till 5 minutes.^{4, 6, 9}

Muscle Energy Technique (MET)

Standardised treatment procedure for MET was followed. In Group B, subjects were asked to be in supine position. Neck of the subject was placed into various positions to target fibres of upper trapezius. For posterior fibres of trapezius patients neck was placed in flexion and fully rotated contralaterally and side bend. For middle fibres neck was placed in flexion, fully side bend and half rotated. For upper fibres neck was flexed, fully side bend and slightly rotated toward side being treated.

Therapist placed cupped hand on the ipsilateral ear or mastoid area and with other hand stabilized the shoulder. Patient was asked to use about 20 % of available strength to introduce light resisted effort. Patient was asked to bring the stabilized shoulder towards the ear and bring ear towards the shoulder. The contraction done by patient was held for 7 to 10 seconds. Complete relaxation of effort was done after contraction. Neck was gently eased by bringing the head/neck into increased degree of rotation and side bending to place stretch on the muscle. During this stretching patient was asked to assist in stretching by asking him/her to slide hand towards feet while breathing out. This was maintained up to 30 seconds and was done for 5 repetitions.^{6,16}

Control group (Group C)

They received Ergonomic advice and routine Physiotherapy treatment.

RESULTS

Statistical analysis was done using ANOVA test. Between group comparisons using ANOVA test showed significant difference in NPRS and NDI (0.0001). We found that there was significant difference in NPRS and NDI among all the three groups. But NPRS and NDI improved significantly with PRT as compared to MET and conventional group. We found that there was increase in cervical ROM among all the three groups. Maximum improvement was observed in cervical rotation among subjects receiving PRT as compared to MET and control Group. (Table 1, Table2)

Table 1 Pre and Post intervention measures

| | | PRT Group A n=15 | MET Group B n=15 | CONTROL Group C n=15 | P value |
|-------------------------|------------|------------------------|------------------------|----------------------------|---------|
| Age in years (Mean± SD) | | 30.53±6.83 | 29.2±7.19 | 31.4 ±6.39 | |
| Gender | | 4 males, 11 females | 5 males, 10 females | 4 males, 11 females | |
| NPRS (Mean± SD) | Pre | 7 ±1.60 | 6.66 ±1.23 | 6.33±0.81 | 0.0001 |
| | Post | 1.53±0.83 | 2±0.75 | 2.8±0.77 | |
| | Difference | 5.47 ±1.35 | 4.66 ±0.81 | 3.53 ±0.74 | |
| NDI (Mean± SD) | Pre | 15.6 ±6.70 | 16.6 ±5.24 | 14.86 ±5.27 | 0.0001 |
| | Post | 4.8 ±4.50 | 8.13±4.01 | 7.73 ±3.97 | |
| | Difference | 10.8 ±3.64 | 8.46±3.09 | 7.13 ±3.94 | |

Table 2 Pre and Post Range of Motion

| Motion In degrees | PRT | | MET | | CON. | |
|--------------------------|------------|------------|------------|------------|------------|------------|
| | PRE | POST | PRE | POST | PRE | POST |
| Flexion | 37.73±4.02 | 42.6±1.72 | 38.8±2.24 | 41.86±1.30 | 38.26±3.12 | 41.26±1.90 |
| Extension | 40.13±1.95 | 43.6±1.24 | 40 ±1.89 | 43.46±1.24 | 39.66±2.89 | 42.66±1.54 |
| Lateral flexion right | 34.73±3.57 | 40.86±2.58 | 35.53±2.64 | 40.2±2.42 | 34.6±4.61 | 39 ±3.62 |
| Lateral flexion left | 34.8±5.68 | 40.73±3.30 | 34.13±6.16 | 40 ±3.42 | 33.06±3.45 | 37.93±3.08 |
| Rotation right | 65.2±5.19 | 72.53±2.10 | 64.86±2.85 | 71.4±2.53 | 64.73±3.75 | 69.73±2.68 |
| Rotation left | 65.06±5.77 | 71.73±3.5 | 64.8±3.68 | 71.13±2.99 | 63.46±3.50 | 68.8±2.98 |

DISCUSSION

This study showed that there was significant pain relief and improvement in function and cervical ROM with maximum improvement in cervical rotation in computer users with neck pain receiving PRT. Mechanism of PRT is based on proprioceptive theory that includes neuromuscular activity mediated by muscle spindles. PRT causes resetting of spindle and proprioceptive activity, nociceptive sensitivity reduction and improves lymphatic drainage.⁶ Effect of PRT is based on local circulation, inflammatory reaction and neurophysiologic

regulation of activity which is influenced by sympathetic nervous system. PRT removes restricted barriers of movement by decreasing muscle spasm, trigger point, pain and swelling and increasing circulation¹⁷. Similar study was conducted by M.Kojidi on influence of PRT on myofascial trigger points on upper trapezius muscle in computer users where they found that PRT was more effective than control group in alleviation of pain and increase in Pressure Pain Threshold (PPT).²

Among computer users with neck pain receiving MET, also had significant pain relief and improvement of function and cervical ROM. Similar study was conducted by Gupta et al. on effects of post isometric relaxation versus isometric exercises in nonspecific neck pain^{18,19}. In this study they concluded that MET showed significantly better improvement in functional status and pain of patients with nonspecific neck pain. PIR reduces reflex activity and modifies perception of stretch as compared to isometrics. This may be a reason for effectiveness of PIR over isometric exercises of neck²⁰.

In our study, Positional Release Therapy and Muscle Energy Technique were both effective in reducing pain and improving function and cervical ROM in computer users with neck pain. The between group comparison showed that Positional Release Therapy was more effective as compared to Muscle Energy Technique and Conventional Therapy. A comparative study was conducted by Priyanka and colleagues on effect of PRT and MET on computer users with upper trapezius muscle spasm which showed that PRT with TENS was statistically and clinically superior in decreasing pain and NDI score and also in improving ROM as compared to MET with TENS.⁶ Similar study was conducted by Reema Joshi and colleagues where they found that Muscle Energy Technique was clinically more effective in patients with trapezititis having nonspecific neck pain as compared to Positional Release Therapy.¹⁷

This may be because Muscle energy technique has its effects over the stretch receptors called as Golgi tendons and spindles which react to overstretch of muscle and inhibit further muscle contraction. When GTO is triggered, afferent nerve impulses enter spinal cord dorsal root and reaches inhibitory motor neuron which stops impulses discharge from efferent motor neuron. This prevents muscle contraction causing lengthening and relaxation of agonist. They also react to movements of body and this may have relaxing effect over the muscle. When muscle gets shorten, the discharge through spindle decreases and it relaxes the muscle. MET may be effective due to production of viscoelastic change and passive extensibility of muscle^{7, 16}

This study was done to evaluate and compare the effects of Positional Release Therapy and Muscle Energy Technique on neck pain in computer users. The results of the study signify that Positional Release Therapy is more effective than Muscle Energy Technique among computer users with neck pain. Physical therapist can incorporate these techniques for rehabilitation programme as they are useful to reduce neck pain and improve function and cervical ROM.

CONCLUSION

This study concluded that, both Muscle Energy Technique and Positional Release Therapy were significantly effective in reducing pain and improvement of function and cervical ROM

which was assessed through outcome measures like Numerical Pain Rating Scale, Neck Disability Index and Cervical Goniometry.

After comparison it showed that Positional Release Therapy was statistically more effective in Pain relief, improvement of function and cervical ROM than Muscle Energy Technique (PIR) among Computer users with neck pain.

Limitations and Scope of Study

There was limited sample size in the study. The study could not evaluate long term effects of the therapy as well as reoccurrence of symptoms after the intervention had stopped. A longitudinal follow up study can be done to evaluate long term effects and effects of home exercise programme.

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How to cite this article:

Ujwal L Yeole et al.2017, Effect of Muscle Energy Technique And Positional Release Therapy on Neck Pain In Computer Users-A Randomized Control Trial. *Int J Recent Sci Res.* 8(12), pp. 22490-22493.
DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0812.1276>
