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Effects of Static Stretching in Comparison with Muscle Energy Technique in Treatment of Non-Specific Neck Pain

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ABSTRACT

Background: Neck pain is the one of the most common musculoskeletal problem and most of the neck pain non-specific in nature which means that a pain that originates from poor neck posture and mechanical strain. It involves any area between upper cervical and upper thoracic spine.

Objective: The purpose of this study is to evaluate the effectiveness of Muscle Energy Technique and static stretching on pain and active cervical range of motion ROM in the treatment of non-specific neck pain.

Methodology: This interventional study was conducted at physiotherapy department Mayo hospital Lahore Pakistan from September 2015 to February 2016. There were two groups and each group was allocated with 22 patients. Group A received static stretching of neck muscles and Group b received Muscle Energy Techniques. Patient included in both groups have to age between 18 and 60. Neck Disability Index (NDI) was used in this study.

Results: Paired sample t-test was used for analysis. Statistically significant improvement is found in both groups as the p value is <0.005.

Conclusion: The result shows both the treatment techniques, muscle energy technique and static stretching were effective in alleviating the non-specific neck pain in terms of decreasing pain intensity and increasing active cervical range of motion as there was no significant difference between the two groups, however MET was superior than static stretching in decreasing pain intensity and increasing active cervical range of motion.

Introduction

Neck pain is one of the most common musculoskeletal problems and most of the neck pain is non-specific in nature which means that a pain that originates from poor neck posture and mechanical strain.[1] It involves any area between upper cervical and upper thoracic spine.[2] Neck pain is characterized by a sensation of hyperalgesia in the skin, muscles, and ligaments. Neck pain is the commonest site of non-traumatic musculoskeletal pain.[3] The prevalence is highest in middle age, roughly 71% of elderly has neck pain.[4] It is found more in females and prevalence of neck pain has an increasing trend up to 50 years followed by a decline.[5] There is a low prevalence of neck pain in European and Asian countries than in Scandinavian countries.[6] According to Binder, neck pain can be: acute (<4 weeks duration),sub-acute (1-4 months duration) chronic (>4 months duration).[7] The origin of neck pain is multifactorial.[8] Neck pain may result from many causes (inflammatory conditions, infection or trauma, congenital diseases, and rheumatic disorders) but most often the condition is labeled as nonspecific neck pain because no specific cause is found.[9] Etiological factors are poorly understood and it usually involves depression, poor posture neck strain, anxiety, and occupational injuries.[4] It is observed that neck pain may be linked to mechanical restriction between two or more vertebrae which, cause a

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range of motion reduction.[10] Neck pain is the most common complaint with a limitation of mobility.[11] A subjective feeling of stiffness and limited range of motion may accompany neck pain, which is often aggravated or precipitated by sustained neck postures or neck movements.[12] A patient with neck pain mostly present with posture imbalance resulting from increased activation and shortening of the following group of muscles: sternocleidomastoid, upper trapezius, Levator scapulae, suboccipital, scalene.[13] Most of the treatment regarding neck pain is based on clinical diagnosis done by clinical sign and symptoms, patient presentation and clinical examination.[14] The classification of the patient is based on signs and symptoms identified during clinical examination and when it is used to categorize subgroups of patients that are homogenous with respect to the outcomes of particular intervention.[15]

There are different physical therapy interventions for the treatment of neck pain. Such as, mobilization and massage are used but no evidence is found for long-term effectiveness.[16] Neck stretching and strengthening exercise have also improved neck function shown in addition to reducing pain.[8] METS may be used to stretch tight muscles and fascia, decrease pain, reduce muscle tonus, mobilize joint restrictions, improve local circulation and strengthen weak musculature.[17] Stretching is a physical exercise performed actively or passively, manually or mechanically to lengthen the shortened or hypo mobile structures to gain or maintain flexibility of the associated area.[18] It involves to lengthened the muscle to maximum discomfort level and then hold it for a specific time of 30 seconds followed to return it to the normal length of the muscle.[19] As many as earlier studies have combined passive and active therapies, insufficient evidence has been obtained thus far on the relative effectiveness of these types of therapies on neck pain.16 Some studies suggest stretching and manual therapy were effective in short term treatment for reducing both strain-evoked and spontaneous pain in patients with nonspecific neck pain.[20] Muscle energy technique is an established osteopathic manipulative intervention often used to treat somatic dysfunction of body.[21]

There exist clinical gap and lack of standard evidence about the effectiveness of stretching exercises in comparison with muscle energy technique in reducing the pain and disability of non-specific neck pain. Therefore, this study is conducted to evaluate the effectiveness of the two treatments options available and to find out either which one treatment is a better option in a patient complaining non-specific neck pain.

Methodology

The 40 number of patients were included who had cervical region pain. Patients were randomly assigned in two groups. Types of treatment for subjects were according to medical moral values and it was harmless and beneficial for the patients. The improvement was noted and compared. A proper Consent was taken from each patient through permission form. Sparling's test[22] and upper limb tension[23] test done to assess the neck pain. Both subjective and objective information was collected after a physical examination by the therapist. This information includes age, socioeconomic status, gender, educational status, and marital status, type of pain and total interval of the arrival of pain. Visual analog scale with 0 at one end representing "no pain" and 10 at other end representing" worst imaginable pain". The NPRS is a reliable and valid instrument to asses' pain. Subject completed the neck disability index to measure perceived disability. The NDI is scored from 0 to 50. The higher score corresponds to the greater disability. The score was multiplied by two and then expressed as a percentage.

NDI has been demonstrated to be a reliable and valid assessment of disability in patients with neck pain after that patient was randomly assigned to receive either stretching of neck muscles or muscle energy technique. Each participant requested to draw either number one or number two from a box. Number one was allocated to Group A and number two was allocated to group B. Each exercise was repeated 5 times twice a week for 4 weeks with interval of 05-second rest during one stretch to another.

Potential participants were patients between 15 and 55 years of age including both genders. Patient presented with non-specific neck pain. Patients with "red flag" for a serious spinal condition e.g., infection, tumors, spinal fracture, etc. were excluded. Also those patients having osteoporosis, pregnancy, and neurologic signs and symptoms suggestive nerve root involvement, history

of cervical surgery, exhibit hypermobility of the thoracic spine, migraine cervical headaches and Headaches as the consequences of a specific headache were excluded from the study. The SPSS (statistical package for social scientists) version 16 was used for data analysis.

Results

44 subjects completed the study and 4 subjects were dropped out as they could not complete the treatment sessions. The results showed that the patient included in both groups have to age between 18 and 60. There were 22 male patients and 22 female patients that were randomly selected. Paired sample t-test for NDI and NPRS shows significant (P=0.001) reduction in neck disability and pain in both groups. The comparison of values of active ROM for Pre-treatment and Post-treatment also revealed significant reduction (P=0.001) in both groups but the Pre-treatment and Post-treatment values of NDI, NPRS and AROM shows that Group B is clinically more superior than Group A in reducing pain and improving ROM of the neck.

Discussion

The study was conducted to compare the efficacy of muscle energy technique and static stretching in patients with cervical region pain. There was a significant decrease in patient's pain scores within the group analysis when pre and post intervention scores were compared in both groups. Still, there was lot of improvement in MET group was noted as compared to static stretching. The pain was more reduced in MET group which can be explained under the mechanism of inhibition Golgi tendon reflex. This reflex initiates when affected muscle is contracted isometrically against resistance which in turn lead to reflexive relaxation of that muscle.[24] On isometric muscle contraction mechanoreceptors of joint cause sympathetic excitation which through somatic efferent and local peri-aqueduct gray matter plays its parts in pain reduction. The result obtained for pain in the MET group were in the consensus of previous studies in which pain intensity reduced following MET over neck area or other area.[25] According to research conducted by Richard, the pain get worse when MET is applied along with manipulation in few patient, so it can't be concluded whether this increase in pain was due to an application of MET or manipulation or both. Stretching cause inhibition of GTO which results in slow downing or damping of motor neuronal discharge which in turns induces relaxation of the musculotendinous unit by adjusting its length. This whole reflex is responsible for relaxation in the musculotendinous unit and therefore pain perception is reduced.[26] Group analysis revealed statistically significant improvement in cervical ROM. Both the MET and static stretching showed greater improvement. Combination of contraction and

Table No.1: Neck disability index, NPRS & range of motion among static stretching and muscle energy technique

Measure	Group	Pre-value	Post-value	Mean difference ê SD	P-Value
NDI	Static Stretching	44.55±11.362	16.05±6.901	28.565±10.359	0.001
	Muscle Energy Technique	40.15±12.741	8.55±6.708	31.600±13.620	
NPRS	Static Stretching	6.75±.786	3.35±.875	3.400±.754	0.001
	Muscle Energy Technique	6.95±.999	2.25±.786	4.700±1.031	
Active Neck Flexion	Static Stretching	55.15±6.877	70.15±5.547	-15.000±5.448	0.001
	Muscle Energy Technique	52.95±11.628	74.753±3.959	-21.800±9.987	
Active Neck Extension	Static Stretching	26.20±6.986	32.10±4.930	-5.900±4.471	0.001
	Muscle Energy Technique	23.70±4.054	32.15±3.048	-8.450±5.414	
Active Neck Side bending	Static Stretching	29.15±6.784	39.55±6.770	-10.400±4.477	0.001
	Muscle Energy Technique	25.10±8.026	43.90±2.634	-18.800±7.647	
Active Neck Rotation	Static Stretching	44.50±5.296	65.50±7.924	-21.000±7.698	0.001
	Muscle Energy Technique	51.90±12.008	78.60±5.471	-26.700±11.815	

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stretches might be more effective for producing viscoelastic change than passive stretching alone, because the greater forces could produce increased viscoelastic change and passive extensibility.[26] The effect of MET component for increase ROM post-intervention can be explained on the basis of physiological mechanisms behind the changes in muscle extensibility – reflex relaxation, viscoelastic change, and changes to stretch tolerance. The study shows the almost similar result as conducted in previous studies over neck area. There is an immediate increase in ROM of neck in all three planes after e application of MET. It produces a significant increase in cervical ROM in the treatment group. Passive manual stretch facilitates the laying down of collagen and regains of muscle length which decreases the muscle stiffness via passive viscoelastic changes or an indirect decrease because of reflex inhibition. The result of static stretching significantly improves ROM was consistent with the study conducted on the other areas of body. Significant improvement in ROM of shoulder [27], hip [28] and knee [13] was found within the group when heat is followed by stretching.

The present study found no significant difference in improvement of cervical ROM between the MET and static stretching. The possible explanation of the increase in ROM in both group relies on the effect of autogenic inhibition.[29] Advice on correction of postural abnormalities is important in preventing the recurrence of pain. It has been seen that in nonspecific neck pain many muscles are found to get shortened. However, intervention is given to upper trapezius and levator scapulae. In my study, I have applied intervention on scalene, SCM, along with upper trapezius. Because these muscles also tend to get shorten and reduces cervical rotation and lateral bending.

Conclusion

Future researches with greater sample size are recommended. Future research is required to determine long-lasting effects of the treatment by taking follow up assessments for longer duration. Giving intervention to another group of muscles (of neck) which might give more beneficial results is recommended. It is concluded that both stretching and muscle energy technique can be used for the treatment of non-specific neck pain and stiffness but MET is found to be superior over simple stretching in reducing pain and improving stiffness and range of motion at cervical spine.

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