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Comparison of Muscle Energy Techniques with and Without Routine Physical Therapy in Mechanical Neck Pain

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Author`s Contribution

[1]Conception and design, Collection and assembly of data, [2]Analysis and interpretation of the data, [3]Critical revision of the article for important intellectual content, 1Statistical expertise [1-3]Final approval and guarantor of the article

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A B S T R A C T

Background: Mechanical neck pain is common musculoskeletal condition, which needs medical care and is 4th leading cause of functional limitation among the world, which increases 30% every year. Most of the people may recover from the acute condition of neck pain without medical care due to bad posture. Further examination is required to diagnose that the pain is mechanical or neurogenic and out of the all types of neck, mechanical neck pain is the commonest of the all.

Objective: To compare the effects of MET when combined with routine physical therapy in contrast to routine physical therapy alone in reducing mechanical neck pain.

Methodology: It was a quasi-experimental study done in six months after PT/2018/REC/IRB/060. A sample of 46 Individuals both male and females of aged 30-50 with mechanical neck pain were selected through convenience sampling and was divided into two groups. Group A was treated with routine physical therapy (RPT) including hot pack and Transcutaneous Electrical Nerve Stimulation (TENS) whereas group B was treated with Muscle energy technique (METs) combined with routine physical therapy. Data was collected before and after treatment. Total treatment duration was 2 weeks on alternate days (three days a week). Outcome measures were Visual Analogue Scale (VAS) and Neck Disability Index (NDI) and data was analyzed using SPSS and Mann-Whitney test was used to compare the between group effectiveness.

Results: Mean values of VAS for group A (RPT) pre and post treatment were 8.53 and 5.04 whereas pre and post-treatment values for group B (METs) were 8.01 and 1.40 respectively. The mean score of NDI of group A (RPT) before and after treatment was 22.07 and 18.15 respectively whereas pre and post-treatment values for group B (METs) were 24.93 and 12.85 respectively ($p<0.05$)

Conclusion: The study concluded that Muscle energy Technique combined with routine physical therapy is more effective than routine physical therapy alone in terms of decreasing pain, and improving functional status.

Keywords: Muscle energy techniques, neck pain, visual analogue scale and social functioning of the patients.

Introduction

Neck pain is common musculoskeletal condition, which needs medical care.[1, 2] It is the 4th most leading cause of functional limitation among the world, which increases 30% every year.[3] Most of the people may recover from the acute condition of neck pain without medical care. Further examination is required to diagnose that the pain is mechanical or neurogenic.[4, 5] Neck pain has high impact on individuals and their terms and societies, health departments and organizations. It might be gradual in nature having various factors i.e. bad working posture or habits, poor ergonomics and muscle spasm or weakness around the neck.([6]) All these factors lead to abnormality in muscles action and normal neck range of motion. Occupations related to neck pain which have high association in workers with long time computer users like in offices and receptions. [7]

Neck pain is also associated with primary headache issues. It is rare in individuals already having migraine and tension type headache.[8] There are three types or classifications of neck pain: Axial neck pain it is pure musculoskeletal pain especially of muscles and soft tissue around the neck example is muscle strain and spasm due to unusual activities other type of pain is cervical radiculopathy which is associated with compression of nerves around cervical spine which radiated to shoulder and other type of neck is due to myelopathy which is associated with compression on spinal cord which can cause pain and weakness of arms and numbness. All these types of pain can be Acute or Chronic.[9] For the diagnosis X-rays and MRIs are helpful in the diagnosis followed by conservative therapy. Conservative therapy can include anti-inflammatory drugs, physical therapy. Pain which is longer than three months is chronic pain or people not get recovered from acute pain for long by conservative intervention so they can get relieve from surgical procedure.

Visser et al said there are several mechanism responsible for tissue damage in Mechanical Neck Pain. Cinderella hypothesis suggested low intensity task contribute selectively and sustained motor unit activation of Type 1 fiber. Ca+2 start accumulating in these fibers. At that time a larger number of motor unit activation occurs due to slow blood supply. Mechanism responsible for Mechanical Neck Pain is Intra-muscular shear forces.[12]

In a cross sectional study Cagnie B et al found that females have more risk than the males. He said adults with the age of 30 years or less have 2.61 times less risk of having mechanical neck pain than other people. Long sitting with neck in forward bent position, physical and mental tiredness in the evening after work have strong relation in having neck pain.[13, 14]

“Movement disorders” and “Loading disorders” are two main classifications of mechanical neck pain and this can be used as a strong indicator of prognosis.[15] Borghouts JA in a Systematic review said bad prognosis of mechanical neck pain is indicated by pain intensity and recurrence.[16]

MET (Muscle Energy technique is a type of soft tissue technique that accompanies with isotonic and isometric contractions to reduce pain and to increase muscle function and to increase range of motion.[17] MET approach is now explained by variety of terms. Muscle energy techniques were classified as active muscular relaxation techniques by chiropractor Craig Liebenson (1989, 1990) some years before. Liebenson now uses the more generalized descriptor, manual resistance techniques.[17] Kumari’s research in 2016 said that hypoalgesic effect generated by MET can reduce pain. He added that this effect may be elaborated by GTO reflex which is activated during isometric muscular contraction that mimics reflex relaxation of muscles and stimulation of the musculararand joint mechanoreceptors, leading to sympathetic excitation induced by somatic efferent and localized activation of periaqueductal gray matter, and periaqueductal grey matter is responsible for pain modulation. Inhibition of nociceptors then occurs at the dorsal column of spinal cord, because simultaneous opening of nociceptors occurs at the dorsal horn due to the stimulation of mechano-receptors.[18, 19]

In addition to this another theory describing the pain relief generated by the MET explains it to be the inhibitory effect of golgi tendon organs, (which inhibits the motor neuronal discharge and hence produces the relaxation of MTU (musculotendinous unit) and pacinian corpuscle modification. These reflexes generate relaxation response in MTU and hence a decline in feeling of pain.[20, 21]

Rationale of this study was to reduce pain, improve life style and save time of patients. This study will yield a more appropriate method for treating the neck pain and thereby paving the way for coming practitioners and providing help to upcoming researchers. The objective of study was to compare the effects of muscles Energy Techniques (METs) with and without routine physical therapy in terms of decreasing mechanical neck pain and improving functional status.

Methodology

Quasi experimental study was conducted on 46 patients presented with mechanical neck pain at Kanaan physiotherapy and spine clinic. Study was completed in six months (June 2018- Nov 2018) after the approval of synopsis and data was collected by convenient sampling technique. After taking the consent, 46 patients were divided into two groups A (RPT) and B (METs) by convenient sampling. In group A the researcher applied hot packs for 15 minutes (temperature of 50 to 60 degrees) and TENS (transcutaneous electrical nerve stimulation) for 10mins. In group B the researcher applied Muscle Energy technique along with routine physical therapy (hot packs and TENS).METs was applied on tight muscles. METs are applied with patient in sitting position moving neck up to available range and at point of barrier giving 5 sec hold for isometric contractions of agonists. Total treatment duration was 2 weeks on alternate days (three days a week). Data was collected before and after treatment. Outcome measures were calculated using Visual Analogue Scale (VAS[22] and Neck Disability Index (NDI), both of them have high validity and reliability.[23] The data was analyzed by using the SPSS software version 23. Quantitative characteristics were described by means and standard deviations (SD). Data was not normally distributed that’s why used non parametric test (Mann-Whitney

test) for comparison of improvement (pain, functional disability) between both groups.

Individuals both male and females of aged 30-50 with mechanical neck pain were included in the study whereas patients presenting with age above 50 years, with cervicogenic headache, serious neck trauma or with history of systemic disease were excluded from the study.[24]

Results

Mean age + Standard Deviation of the participants were 37.69 + 5.48. Both males and females were included in the study, males consisted of 63% of total population whereas females comprised of 37% of the population. When participants were asked whether they are involved in any activity which involves them to sit stationary for long durations 65% of the population mentioned the answer in affirmation whereas 34% of the population stated that they are not involved in any such activity which requires them to sit stationary for long duration. Participants were also inquired about the category of the activity they are mostly involved in and as a response 32% of the population mentioned that they spend their time in reading, 28% mentioned that they are involved in working on computer most of the time, 6% population mentioned that they are involved in washing either pots or clothes which keeps their neck flexed for most of the time and remaining 21% mentioned that they spend their time in watching TV which again is an activity involving static neck posture for most of the time. (Table I)

Table I: Frequency, mean and standard deviation of participants age, gender, posture and type of activity

Variables	N(%)		Means
Age	42		37.69 ± 5.48
Gender	Male	29(63)	-
	Female	17(37)	-
Static posture	Yes	30(65.2)	
	No	16(34.8)	-
Type of activity	Reading	15(32.6)	-
	Computer work	13(28.3)	
	Cooking	3(6.5)	
	Washing	5(10.9)	
	Watching TV	10(21.7)	-

The calculated mean value of neck disability for group A (RPT) and B (METs) pretreatment was 22.07, 24.93 and after treatment was 18.15, 12.85 respectively. The calculated p value was 0.000 which was less than 0.05 indicating significant results in terms of neck disability on NDI. (Table II)

The calculated mean value of pain for group A (RPT) and B (METs) pretreatment was 8.53, 8.01 and after treatment was 5.04, 1.4 respectively. The calculated p value was 0.000 which was less than 0.05 indicating significant results in terms of pain VAS. (Table III)

Discussion

The current study was conducted to evaluate the effect of routine physical therapy and MET to relieve

Table II: Pre and post treatment NDI results of RPT and MET groups

	Group	N	Mean Rank	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Pre-treatment	Group A (RPT)	23	22.07				
	Group B(METs)	23	24.93				
	Total	46					
				231.500	507.500	-.727	.467
Post-treatment	Group A (RPT)	23	18.15				
	Group B(METs)	23	12.85				
	Total	46					
				19.500	295.500	-5.421	.000

Table III: Pre and post treatment VAS results of RPT and MET groups

	Groups	N	Mean Rank	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Pretreatment	Group A (RPT)	23	8.53				
	Group B (METs)	23	8.01				
	Total	46					
				227.000	503.000	-.871	.384
Post treatment	Group A (RPT)	23	5.04				
	Group B (METs)	23	1.4				
	Total	46					
				68.500	344.500	4.466	.000

mechanical neck pain among patients with mechanical neck pain. Both groups indicated a significant decrease in pain after having their respective treatments however group receiving MET experienced greater relief, various reasons may govern the cause behind greater relieve of pain by MET then by TENS one of them might being increased stretch tolerance among participants as stretching and isometric contractions when they occur together they trigger muscular contraction and stimulate mechanoreceptors and proprioceptors in joints thereby decreasing pain sensation and hence making further stretch easier (which is mandatory for any movement occurring in any joint.[19]

The results achieved regarding pain relief in the Muscle energy group could be similar to previously conducted studies in which pain intensity decreased by using MET on neck.[25-27] and even on the other areas of the body. [28, 29]

Along with the pain functional level was also improved in both of the groups however group treated with muscle energy technique again stood superior to the group treated with routine physical therapy. Significance value of less than 0.05 indicated that there is significant difference between both groups. Group B showed greater fall in mean NDI value when compared before and after treatment however decline in score of NDI for group A was not even negligible and dropped but obviously was less than group B. Patients treated with group B showed greater improvement in performance of functional activities and experienced a more free and liberal life than the other group.

Conclusion

It was concluded that muscle energy technique when with routine physical therapy is more effective than routine physical therapy alone in terms of pain and functional status.

Recommendation: It is suggested that in future research should be carried out on larger size of population for more positive impact.

Limitation: The only limitation to the study was insufficient time duration to conduct the study, and the less availability of the patients and the data was collected only from one setup.

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