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Original Research Article

IMPACT OF MUSCLE ENERGY TECHNIQUE ALONG WITH SUPERVISED EXERCISE PROGRAM OVER MUSCLE ENERGY TECHNIQUE ON QUADRATUS LUMBORUM AND ILIOPSOAS ON PAIN AND FUNCTIONAL DISABILITY IN CHRONIC NON SPECIFIC LOW BACK PAIN

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ABSTRACT

Background: Low back pain is a common health problem in the developed countries and is most commonly treated in primary healthcare settings. Improving functional performance in patients with chronic low back pain is of primary importance. The purpose of this study was to examine the effects of Muscle Energy Technique (MET) & Muscle Energy Technique (MET) along with supervised exercises on pain and functional performance in subjects with chronic nonspecific low back pain.

Objective: To evaluate the effect of impact of muscle energy technique along with supervised exercise program over muscle energy technique on quadrates lumborum and iliopsoas on pain and functional disability in non specific low back pain.

Methodology: 30 diagnosed low back pain patients were assigned in to 2 groups. The Group A Muscle Energy Technique while Group B received Muscle Energy Technique along with supervised exercise program. Both groups received the selected treatment over a 2 week periods. Outcome measures were evaluated at baseline and 2nd week.

Results: The study shows significant improvement in pain and functional disability in both groups those who received MET and MET along with supervised exercise program. But improvement was more marked in group who received MET along with supervised exercise program.

Conclusion: The research hypothesis which states that there was more improvement in pain and functional disability who trained with Muscle Energy Technique along with supervised exercise program than only muscle energy technique in chronic non specific low back pain .

KEY WORDS: Muscle energy technique, non specific low back pain ,Oswestry disability index and Numerical pain rating scale .

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INTRODUCTION

Low back pain is second only to common cold as a cause for office visits to physicians in adults and for work absence in people <55 years of age . Most people suffer an episode of low back pain during life. Only 14%have an episode lasting

> 2 weeks. More than 92% feel better in <2 months. According to National Institute of arthritis and Musculoskeletal and Skin disease, 8 out of 10 people have some type of backache [1]. Disorders of low back are leading cause of disability in people younger than 45 years of age. Every year 50% of adult population in United states experience a day of back pain and yet 8 % of low back pain is nonspecific, meaning cause is unknown. It has been estimated that mechanical disorders of spine, that is the problem of function and not pathology, represent at least 98% of low back pain [2].

Low back pain has been treated by variety of healthcare providers utilizing an array of treatment approaches. Over $30 billion in medical expenses per year are attributed to low back pain, which affects from 5% to 10 % of adult population annually with the prevalence from 60% to 90% over a lifetime[2]. Nonspecific low back pain occurs in people with a wide variety of professionals including those involving heavy labors, repetitive work activities and extended sedentary postures [3].

In a recent survey, for the United Kingdom 40% out of 5500 people interviewed had experienced back pain within a single year, with pain existing throughout the year in 15% of these cases [4]. There is a vital need, therefore for effective but also affordable treatment for low back pain and strategies to help to prevent it.

Exercise therapy designed to target key areas of back pain to increase individual's confidence in the use of their spine and to overcome the fear of physical activity [5]. Exercise therapy has been shown to be more effective than usual care by a general practioner (which includes staying active and taking analgesics as required) and just as effective as conventional physiotherapy. Furthermore it is most cost effective than the latter, as an exercise therapy program can be performed in groups [6]. However there are no recommendations of specific type of exercise to be undertaken and effectiveness of specific type of exercise therapy still need to be evaluated.

Back pain has been associated with dysfunction and weakness of "Core muscles. Core muscles components are antero-lateral and posterior. Antero-lateral core muscles includes Rectus abdominis , internal and external oblique , transverse abdominis and diaphragm [7-10]. Together these muscles increase the intraabdominal pressure thus imparting functional stability to lumbar spine. Lateral "Core Muscles includes multifidus, quadratus lumborum , psoas major , hip extensore, hip flexors and pelvic floor musculature.

Support and stability to low back arise from the muscles mainly Iliopsoas and Quadratus Lumborum. Biggest factor in low back pain is involvement of theses muscles. When these muscles become contracted due to injuries , poor posture , prolong sitting or stress, it can alter norma; biomechanics of pelvis and lumbar , thoracic and even cervical vertebra and cause back pain [11,12]. Another treatment approach for low back pain is Muscle Energy Technique of Iliopsoas and Quadratus Lumborum. Greenman defined "MET " as manual medicine treatment procedure that involves the involuntary contraction of patient muscle in a precisely controlled direction , at varying level of intensity , against a distinctly executed counterforce applied by operator [3,11,12].

It has been hypothesized that MET can be used to lengthen and strengthen muscles, to increase fluid mechanics and decrease local edema and to mobilize restricted articulation.

Deep segmental muscle inhibition and atrophy has been observed in low back pain patients and occurs at specific site of pain. Fryer has suggested that MET may stimulate joint and muscle propriceptors producing an improvement in deep segmental muscle recruitment motor control and joint stability [11].

Shenk et alperformed a Randomized Control Trial to determine effectiveness of Muscle Energy Technique for increasing lumbar extension and improve functional disability in asymptomatic individuals. while author didn't mention control group treatment , they reported a stastically difference (p,0.05) in the increase of lumbar extension in the experimental group [13,14]. Mechanical Low back pain may be specific or nonspecific. According to many reviews of literature it has been shown the support of MET for acute low back pain for improving functional ability when used in combination with supervised neuromuscular re-education and resista-

nce exercise training.

While muscle energy technique has been found to have increased audience with the clinicians, very little has been published in the peer reviewed literature on these interventions [15,16]. There is dearth in the literature regarding the effect of MET as an isolated treatment on non-specific low back pain. It is therefore useful to explore the effectiveness of treatments that may assist people with LBP, particularly those treatments such as MET which are non-invasive and are likely to be safe and inexpensive.

MATERIALS AND METHODS

Sample: Total of 30 low back patients were chosen for the study. They were assigned randomly into 2 groups based on the inclusion criteria.

Group A : Muscle energy technique

Group B : Muscle energy technique along with supervised exercise program

Inclusion criteria: Low back pain of less than 12 week duration, No difference of Age and Gender, Age 18-30 years, Initial ODI Score: 30-60%, Patient is otherwise medically fit to perform physical training.

Exclusion criteria: Back pain attributed to any pathology (disc herniation, tumors, infection, fracture, osteoporosis, structural deformity, inflammatory disorder, radicular symptoms, spondylolisthesis)

1. Constant or severe back pain judged on clinical grounds due to nerve root irritation.

2. Major surgery within past year..

3. Motor weakness, absent or diminished muscle strength and reflexes.

4. Any medical condition contra indicatory to physical activity.

Study design: Pre test- Post test Experimental Study Design .

Procedure and Protocol: The study consisted of 30 low back pain patients who were randomly divided into 2 groups based on the inclusion criteria. Prior to the participation, all subjects were informed about the study and an informed consent was taken.

Independent variable: Muscle energy technique Dependent variable: Oswestry disability index and Numerical pain rating scale

Group A received Muscle Energy Technique for Illiopsoas & Quardratus lumborum for 2 weeks (5 days per week)

Muscle energy technique for Illiopsoas: Position of the patient: supine with buttocks at the end of couch and non treatyed leg fully flexed at hip and knee and held by patient. Patient flex the hip against the resistance & ho;d it for 7-10 seconds.inhale ashe slowly build up an isometric contraction. Hold the breath for 7-10 seconds. Release the breathe on slowly ceasing contraction. Inhale & exhale fully once more following theceasing of all efforts. After release , a rapid stretch is applied to new barrier & held for 10 seconds. Patient relaxed for 10 seconds and same procedure was repeated for 5 times.

Muscle energy technique for Quadratus lumborum: Position of the patient: side lying with uppermost arm fully extended. Position of the therapist; behind the patient at waist level. Inhale and abduct the uppermost leg and hold the leg and breathe for 7-10 seconds allowing thegravity to provide resistance. Patient then hang the leg behind him over the back of the table. Release the breathe on slowly ceasing contraction. Therapist cradles the the pelvis with both hands to take out all slack during exhalation. Hold stretch for 10 seconds. Patient relaxed for 20 seconds and same procedure was repeated for 5 times.

Group B received Muscle Energy Technique along with supervised exercise program for 2 weeks (5 days a week.).

Supervised exercise program: Hot pack for 10mins, 2-channel TENS for 10mins, static abdominals (10 repetitions -10 seconds hold each), static back extensors (10 repetitions-10seconds hold each), static glutei (10 repetitions-10seconds hold each), pelvic bridging (10 repetitions- 5seconds hold each), pelvic rolling (5 repetitions each side- 5 seconds hold each),Cat-Camel (5 repetitions each - 5seconds hold each), Superman (5 repetitions each side-seconds .

Both groups intervention began with 20 minutes of moist heat with patient in supine recumbent position. .The subjects were assessed for numeric pain rating scale and oswestry disabil

ity index prior to the treatment at baseline and then finally reassessed after 2 weeks.

DATA ANALYSIS AND RESULTS

Pre-post intervention analysis was done using paired t-test in both control and experimental groups, which showed that there was significant improvement in the post intervention ODI score and NPRS in both the groups.

Comparison of mean differences of ODI score between two groups was done by using unpaired t-test, which showed that there is significant improvement in the mean difference of the ODI score of group who received MET along with supervised exercise program than the another group who received only MET.

Table 1: Group A Paired Sample T-Test.

		Mean	N	Std Dev	Std Mean Error
Pair 1	Pre ODI	42.53	15	5.579	1.44
	Post ODI (after 2 wks)	12.8	15	4.945	1.277
Pair 2	Pre NPRS	8.07	15	0.799	0.206
	Post NPRS (After 2 wks)	4.07	15	0.704	0.182

		Paired difference					T	Df	Sig.(2-tailed)
		mean	Std dev	Std error mean	95% Confidence interval of the difference				
					Lower	Upper			
Pair 1	Pre ODI Post ODI after 2 wk	29.73	5.8	1.498	26.52	32.95	19.855	14	0.001
Pair 2	PreNPRS Post NPRS after 2 wk	4	1.069	0.276	3.41	4.59	14.491	14	0.001

Both ODI and NPRS has shown significant result.

Table 2: Group B Paired Sample T- Test.

Paired sample statistics

		Mean	N	Std Dev	Std Mean Error
Pair 1	Pre ODI	42.87	15	6.198	1.6
	Post ODI (after 2 wks)	7.73	15	3.011	0.777
Pair 2	Pre NPRS	7.87	15	0.834	0.215
	Post NPRS (After 2 wks)	2.47	15	0.64	0.165

Paired sample test

		Paired difference					T	Df	Sig.(2-tailed)
		Mean	Std dev	Std error mean	95% Confidence interval of the difference				
					Lower	Upper			
Pair 1	Pre ODI Post ODI after 2 wk	35.13	6.424	1.659	31.58	38.63	21.182	14	0.001
Pair 2	PreNPRS Post NPRS after 2 wk	5.4	0.737	0.19	4.99	5.81	28.386	14	0.001

Table 3: Mean, Std. Dev and Standard error of Mean of subjects before and after the treatment.

Both ODI and NPRS has shown significant result.

	GP	N	Mean	Std Deviation	Std Error Mean
Pre ODI	1	15	42.53	5.579	1.44
	2	15	42.87	6.198	1.66
Post ODI After 2 wk	1	15	12.8	4.945	1.277
	2	15	7.73	3.011	0.777
Pre NPRS	1	15	8.07	0.799	0.206
	2	15	7.87	0.834	0.215
Post NPRS After 2 wk	1	15	4.07	0.704	0.182
	2	15	2.47	0.64	0.165

DISCUSSION

The study was carried out to see the impact of muscle energy technique on quadrates lumborum and iliopsoas on pain and functional disability in non specific low back pain. There was improvement in NPRS scores and oswestry disability index after 2 weeks training program in both groups. There was reduction in NPRS and ODI scores in both groups after 2 weeks. Another important observation was that there was more reduction in NPRS and ODI scores in group B after 1st and 2nd week as compare to Group A. Both groups received hot packs for 20 minutes prior to the treatment. French et al demonstrated that the application of the hot packs prior to the treatment increases the pain threshold. The proposed effect of this effect includes direct and immediate reduction of the pain by activation of the spinal gating mechanism and more prolonged reduction of the pain by reduction of the ischemia and muscle spasm .Nerve firing rate has also found to be change in temperature. These changes in the firing rate thought to be contribute a reduction in the firing rate alpha motor neuron thus to reduce the muscle spasm.

Group A who received MET showed significant improvement. Previous work has demonstrated that weakness and atrophy of the core muscle and shortening of the postural muscle is usually present in low back pain. Recently it has been proposed that this is caused by impaired motor control rather than lack of use leading to the abnormal spinal movement caused by decrease proprioception and a decrease in precision of muscle coordination..when this lumber corset is unstable,the pelvis held in increased elevation,accentuated when walking, resulting in l5-s1 stress and this result in low back pain. MET is found to be significant in reducing by stretching these shortened muscle and strengthen the weakened muscle Sandra yale (1991) mentioned that when muscle is isometrically contracted , its antagonist will be inhibited and will relaxed immediately. In post isometric relaxation, sustained contraction of agonist muscle stimulate the GTO in the tendon of muscle, since their response to such contraction seems to be set the tendon and the muscle to a new length by inhibiting it. Thus reduces the tension in the postural muscles, hence reduces the pain assessed by NPRS scores and improves the disability by as assessed by ODI scores. As pain reduces, its functional outcome of the patient improves leading to reduction on ODI scores. Wilson et al concluded that MET is effective in reducing pain, increasing lumbar ROM and decreasing functional disability in non specific back pain

Group B who received MET along with supervised exercise program has got added effect on reducing pain and improving functional disability. Eric Wilson where he did a pilot clinical trial, examining the outcomes of Muscle Energy Technique (MET) along with supervised exercise program in patients with acute low back pain He reported that MET combined with supervised motor control and resistance exercises may be superior to neuromuscular re-education and resistance training for decreasing disability and improving function in patients with acute low back pain.,. Patil Prachi et al also concluded the efficacy of MET along with supervised exercise in reducing disability. It stated that MET on quadratus lumborum & illopsoas combined with exercise therapy is more effective in reduction in disability and increasing spinal range of motion than interferential therapy alone in patients with chronic non specific low back pain.

CONCLUSION

This study suggest that MET has got added beneficial effect for decreasing disability and improving function in patients with chronic non-specific low back pain along with supervised exercise compared to the subjects who were exposed to MET only.

Conflicts of interest: **None**

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