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EFFICACY OF MUSCLE ENERGY TECHNIQUE IN MECHANICAL LOW BACK PAIN

KOTTEESWARAN K AND KUMAR C*

Saveetha College of Physiotherapy, Saveetha University, Thandalam, Chennai, India

***Corresponding Author: E Mail: kumarorthophysio1987@gmail.com; Mob.: +91 9944341783**

ABSTRACT

Low back pain (LBP) is a major health problem. Effective treatment of acute LBP is important because it prevents from developing chronic LBP, the stage of LBP that requires expensive and more complex treatment. Aim of this study is to investigate the effect of Muscle Energy Technique in Mechanical LBP. Thirty subjects with mechanical LBP were selected based on the selection criteria and randomly divided in to two groups. Group-A subjects received conventional physiotherapy with Supervised Neuromuscular Reeducation Exercises and Resistance Training. Group-B subjects received Muscle Energy Technique and conventional physiotherapy. Both groups were treated for 4 days a week for one month.

All the values were tabulated and statistically analyzed by using paired and unpaired t-test. Data analysis revealed significant difference between the two groups in the parameter functional disability. Muscle Energy Technique with neuromuscular re-education and resistance training is effective than neuromuscular re-education and resistance training alone in the management of Subjects with Mechanical Low Back Pain in reducing Pain and Disability, thereby improving the functional activities.

Keywords: Mechanical Low Back Pain, Muscle Energy Technique, Modified Oswestry Disability Questionnaire

INTRODUCTION

Low back pain is a major public health problem all over the world. Most people suffer incapacitating back pain at some stages in their lives. Low back pain is a leading cause of disability, which interfere with qualities of life and work performance.

Epidemiological studies indicate that about 80% of the population will suffer from back pain during their active lives **[1]**. In India, occurrence of low back pain is also alarming; nearly sixty per cent of the people in India have significant back pain at some time or the other in lives.

The lumbar spine structures involved in the development of low back pain are intervertebral disk cartilages, intervertebral joints, tendons, and muscles. When the sensory receptors in these structures receive nociceptive stimuli, they trigger a pain reaction in the pain sensation system, including both at the peripheral and the central levels. Inappropriate posture, irregular movement of the lumbar vertebrae, and reduced or imbalanced muscle strength enhance the nociceptive stimuli. Motion restriction due to pain leads to the contracture of intervertebral joints and the atrophy of the other lumbar spine structures, resulting in a vicious circle of pain **[2]**.

Muscle energy is used to lengthen a short or spastic muscle, to strengthen a physiologically weak muscle or group of muscles, to reduce localized oedema and relieve passive congestion and to mobilize an articulation with restricted mobility **[3]**. Reciprocal Inhibition (RI) method of Muscle Energy Technique refers to the inhibition of the antagonist muscle when isometric contraction occurs in the agonist due to stretch receptors within the agonist muscle fibres - muscle spindles. Muscle spindles work to maintain constant muscle length by giving feedback on the changes in contraction, in this way muscle spindles play a part in proprioception. In response to being stretched, muscle spindles discharge nerve impulses, which increase contraction, thus preventing over-stretching **[4]**.

The spindles discharge impulses which excite the afferent nerve fibres or the agonist muscle; they meet with the excitatory motor neuron of the agonist muscle (in the spinal cord) and at the same time inhibit the motor neuron of the antagonist muscle which prevents it from contracting. This result in the relaxation of the antagonist therefore is called reciprocal inhibition. When the agonist stops contracting against force, the muscle spindles stop discharging and the muscle relaxes **[5]**.

METHODOLOGY

The study was conducted in a teaching hospital and was cleared by institutional ethical committee. Thirty subjects with LBP attending outpatient department were selected conveniently and randomly assigned into two groups. Subjects with Mechanical LBP with lumbar flexion and side flexion restriction, Initial Oswestry Disability Index (ODI) score of twenty to sixty percentage and age between 30-40

years were included and the subjects with the Neurological symptoms, Spondylolis thesis, Chronic Low Back Pain of more than twelve weeks and Previous Back surgeries are excluded. They were explained about the procedure and informed consent was obtained from all the participants. Participants were randomized into two groups.

Group A - Control Group received standardized Physiotherapy treatment including Supervised Neuromuscular Reeducation (SNR) and Resistance Training. Drawing-In Maneuver was performed by the subject in supine with hips/knees slightly flexed (twenty degree) and instructed to draw the navel in towards the spine and head. Simple Supine Obliques was performed by the subject in supine with hips/knees slightly flexed (20°) and arms by the side. Subjects performs a drawing-in maneuver and holds it as he simultaneously reaches for the right ankle with the right hand and rotates the trunk to the right, bringing his/her left shoulder off the mat until the inferior angle of the left scapula clears the mat. Hold for a count of 1 and returns to starting position. Repeat on opposite side. Cervical spine may not flex and shoulders may not protract. Dumbbell Overhead was performed by the subject, supine with hips/knees slightly flexed (20°), grasps a dumbbell over the chest. Drawing-in maneuver and gluteus maximus squeeze were performed. With elbows extended, the subject flexes shoulders until the weight slightly touches the mat behind the head then returns the weight to the starting position. Modified Romanian Dead Lift was performed by the subject is standing and grasps a dumbbell and retracts the scapulae and bends forward at the hips, stopping when the weight is slightly superior to the patellae. The subject then performs an isometric gluteus maximus contraction and attempts to rise upright using the gluteus maximus instead of multifidus. All the exercises are performed until the muscle threshold was attained.

Group B - Experimental Group received METs, SNR, Resistance Training In Phase 1 by the subject lies supine with the feet crossed (the side to be treated crossed under the non-treated side leg) at the ankle. The subject is arranged in a light side bend, away from the side to be treated, so that the pelvis is towards that side, and the feet and head away from that side **[6]**. The subject's heels were placed just off the side of the table, anchoring the lower extremities and pelvis. The subject places the arm of the side to be treated behind neck as the practitioner, standing on the side opposite that to be treated, slides his cephalad hand under the subject's shoulders to grasp the treated side axilla. The subject grasps the

practitioner's cephalad arm at the elbow, with the treated side hand, making the contact more secure. The subject's treated side elbow should, at this stage, be pointing superiorly. The Physiotherapist caudad hand is placed firmly but carefully on the anterior superior iliac spine, on the side to be treated. The subject is instructed to very lightly side bend towards the treated side. This should produce an isometric contraction on the side to be treated. After 7 seconds the subject is asked to relax completely, and then to side bend towards the non-treated side, as the Physiotherapist simultaneously transfers his bodyweight from the cephalad leg to the caudad leg and leans backwards slightly, in order to side bend the subject. The stretch is held for 15-20 seconds for 4 times, allowing a lengthening of shortened musculature in the region. The dysfunctional joint is positioned at the end range of its limited motion and the subject is requested to lightly contract for approximately five seconds against the specific counterforce offered by the Physiotherapist. After relaxation, the restrictive barrier is often felt to yield, and the procedure is repeated several times. The procedure is repeated until the muscle flexibility was attained.

In the phase 2 the subject sits on the treatment table, back towards the practitioner, legs hanging over the side, and hands clasped behind the neck. The Physiotherapist places a knee on the table close to the subject, at the side towards which side bending and rotation were introduced. The Physiotherapist passes a hand in front of the subject's axilla on the side to which the subject is to be rotated, across the front of the subject's neck, to rest on the contra lateral shoulder. The subject is drawn into flexion, side bending and rotation over the Physiotherapist's knee. The Physiotherapist's free hand monitors the area of tightness and ensures that the various forces localise at the point of maximum contraction/tension.

When the subject has been taken to the comfortable limit of flexion, he is asked either to look towards the direction from which rotation has been made while holding the breath for 7-10 seconds, or to do this while also introducing a very slight degree of effort towards rotating back to the upright position, against firm resistance from the Physiotherapist. The procedure is repeated until the muscle flexibility was attained **[7]**. Both groups were treated for 4 times in a week for 4 weeks.

Modified Oswestry Disability Questionnaire **[8, 9]** was used to measure disability which consists of 10 questions. Each question is scored from 0 to 5, with the percentage of more than 60 out of 100.

DATA ANALYSIS

The collected data were analyzed using descriptive and inferential statistics. To all parameters mean and standard deviation (SD) were used. Paired t-test was used to analyze significant changes between pre-test & post-test measurements. Independent t-test was used to analyze significant changes between two groups at baseline and after intervention. From statistical analysis made with the quantitative data revealed statistically significant difference between the Group A and Group B, and also within the group. The Post Test mean value of MODQ percentage in Group A is 33.20 and in group B is 17.20 this shows that functional disability in Group B were comparatively less than Group A, P<0.001 **(Table 1 and 2)**.

Statistical analysis of post-test for functional disability revealed that there is high statically significant difference seen between group A and group B.

Table 1: With in Group Analysis OF Pre Test & Post Test Measurements

MODQ		Mean (%)	SD (%)	t value	p value
Group A	Pre test	45.73	6.63	13.8595	<0.001
	Post test	33.20	8.71		
Group B	Pre test	46.40	6.01	21.416	<0.001
	Post test	17.20	4.13		

Table 2: Post Test Measurements of Control and Experimental Group

POST TEST		Mean (%)	SD (%)	't' value	p value
MODQ (%)	Group A	33.20	8.71	6.4287	<0.001
	Group B	17.20	4.13		

DISCUSSION

This study suggest that MET coupled with supervised neuromuscular re-education and resistance training exercises may be superior to supervised neuromuscular re-education and resistance training exercises alone for treating subjects with mechanical low back pain who are believed to have a mechanical low back pain because of flexion side flexion and trunk rotation restriction.

This study is the only identified clinical trial that has investigated the outcomes of interventions using the MET in symptomatic populations. The results of this study add support to the hypothesized effects of MET in subjects with mechanical low back pain. In this study, the mean post treatment Oswestry score was 17.20% for subjects in the experimental group compared to 33.20% in the control group **(Table 1)**. It should be noted that the control group's neuromuscular re-education and resistance training intervention produced good outcomes, but the addition of the MET improved the outcomes substantially.

When particular posture maintained for a prolonged period of time, there is abnormal

movement pattern were created. When the abnormal movement patterns are introduced in back that leads to micro injury and inflammation in the back region, which leads to altered force couple in the pelvic girdle, over using agonists and underactive antagonists the imbalance was created. Reciprocal inhibition is method of muscle energy technique is found useful to correct the abnormal force pattern in the back. The research shows that the MET work in the muscle spindle mechanism. Physiologically MET may be useful to reduce back pain.

In this study, most of the subjects with the mechanical low back pain and functional disability got relief in the first two weeks of the treatment. But, the other subjects with chronic low back pain got relief at the end of four weeks. Majorly, the subjects in the Experimental Group received Muscle Energy Technique, Supervised Neuromuscular Re-education and Resistance Training got better relief of Mechanical Low Back Pain and Functional Disability when compared with the control group who received Supervised Neuromuscular Reeducation and Resistance Training. The modified OSW demonstrated superior measurement properties compared with the QUE **[8]**.

Limitations of this study include smaller sample size exclusion of elderly patients. Follow-up for a longer period may be investigated which is not analyzed in this study. Subjects with different age and gender group may be investigated separately.

CONCLUSION

The present study concludes that muscle energy technique with neuromuscular re-education and resistance training is effective than neuromuscular re-education and resistance training alone in the management of subjects with mechanical low back pain in reducing Pain and Disability, thereby improving the functional activities.

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REFERENCES

[1] Niketa GP, Cheraladhan ES, Jagatheesan A and Premkumar M,

Effectiveness of Core Stability Exercises with Swiss Ball and Without Swiss Ball on Chronic Low Back Ache, Int. J. Pharmaceutical Sci. and Health Care, 2 (4), 2012, 94-99.

[2] Delitto A, Cibulka MT, Erhard RE, Bowling RW and Tenhula JA, Evidence for use of an extension-mobilization category in acute low back syndrome: A prescriptive validation pilot study, Phys. Ther., 73, 1993, 216-228.

[3] Cheraladhan ES, Jagatheesan A and Shilpi S, Immediate Effect of Muscle Energy Technique and Eccentric Training on Hamstring Tightness of Healthy Female Volunteers - A Comparative Study, Int. J. Current Res. and Rev., 3 (9), 2011, 122-126.

[4] Goodridge JP, Muscle energy technique: definition, explanation, methods of procedure, J Am. Osteopath. Assoc., 81, 1981, 249-254.

[5] Flynn T, Fritz J, Whittman J, *et al*., A clinical prediction rule to identify patients with low back pain who demonstrate short term improvement with spinal manipulation, Spine, 27, 2002, 2835-2843.

[6] Lenehan L, Fryer G and Mc Laughlin P, The effect of Muscle Energy Technique on gross trunk ROM, J. Osteopath. Med., 6, 2003, 13-18.

[7] Leon C. Muscle Energy Technique, 2 Ed., Churchill Livingstone, Edinburgh, 2001.

[8] Little DG and MacDonald D, The use of the percentage change in Oswestry Disability Index score a s an outcome measure in lumbar spinal surgery, Spine, 19, 1994, 2139-2143.

[9] Julie M, Fritz James J and Irrgang A, Comparison of a Modified Oswestry Low Back Pain Disability Questionnaire and the Quebec Back Pain Disability Scale, Phys. Ther. 81, 2001, 776-788.