

A Comparative Study of the Effectiveness of Two Manual Therapy Techniques on Pain and Lumbar Range of Motion in Individuals with Mechanical Low Back Ache

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Abstract

Objectives: To study the efficacy of muscle energy technique and positional release therapy to relieve pain and improve lumbar range of motion in patients with mechanical low back pain and to find which is superior.

Methods: 30 participants with mechanical low back pain were selected and divided into 2 groups, Group A received MET and Group B received PRT. The outcome measures used were VAS to measure pain and lumbar ROM measurement by Modified schober's method. Intervention values of outcome measures were noted on first and eighth day of intervention.

Results: The result of the study showed that there was significant decrease in pain and improvement in ROM in both the groups but there was no statistical significant difference when compared between two groups.

Conclusion: Both the techniques, MET and PRT were significantly useful in reducing pain and improving lumbar ROM in mechanical low back pain patients but there was no statistical difference between both the groups. Both MET and PRT provide good results in management of mechanical low back pain.

Keywords: Mechanical low back pain; Muscle energy technique; Positional release therapy; Modified schober's method; Visual analogue scale

Introduction

Low back pain is the commonest problem human body suffers with second to common cold. Back pain leads to loss of time from work, loss of productivity, health care costs, financial compensation and various psycho social problems. Low back pain occurs with wide variety of professions including those involving heavy labour, repetitive work activities and extended sedentary postures. Simple perspectives of mechanical back pain are prolonged sitting, poor posture, weak abdominal muscles, weak low back muscles, poor flexibility and incorrect use or lifting technique.

People with low back pain have reduced spinal motion. When motion is limited, spinal extension is limited more than spinal flexion. Reduced spinal extension results in pain and stiffness. The function and co-ordination of muscles that stabilize the lumbar spine are impaired in patients with low back pain. Spinal extensors are the main muscle groups in positional holding and in eccentric control of trunk flexion Pauley [1].

Muscle energy technique is a comprehensive manual therapy system for evaluating and treating joint restrictions of the spine (segmental and intervertebral dysfunctions), rib cage (restricted respiratory motions, dislocations, intraosseous deformities of the ribs), pelvis (sacroiliac, inter-in nominate restrictions and dislocations), and extremities (joint restrictions and impairments of muscle length and strength. Muscle energy technique is a system of manual therapy for treatment of movement impairment that combines the precision of passive mobilization with the effectiveness, safety and specificity of reeducation therapist and therapeutic exercises. The therapist localizes and controls the procedure while the patient provides corrective forces and energies for treatment as instructed by therapist. It is an

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active technique. Kuchera and Kuchera [2] - hypothesized that the effect may result from inhibitory golgi tendon reflex activated during isometric contraction that leads to reflex relaxation of muscle as a result of post isometric relaxation. Alternative reflex effect has been suggested in which isometric contraction of antagonistic of affected muscle induce relaxation via reciprocal inhibition.

Positional release began in the 1950's, discovered by accident that when he placed the body into a specific comfortable position pain and dysfunction would heal quickly and completely Lawrence Jones [3]. He initially called this approach to pain "Spontaneous Release by Positioning" and later Strain and Counter Strain. Eventually variations of this work became known collectively as "positional release." Positional release technique is a form of manual therapy that is used as effort to reduce pain and improve range of motion. It is a powerful therapy for back pain. Passive technique that places body part in a position of ease or greatest comfort, relieving pain. Positional release technique is a method of total body valuation and treatment using tender point and a position of comfort to relieve the associated dysfunction the tender point is used as a guide and position of comfort is maintained. This position of minimal discomfort is usually position in which muscle is at its shortest length. This position is held for 90 seconds and joint is slowly and passively returned to its neutral position. This prolonged shortening causes shortening of both intrafusal and extrafusal fibers, which in turn results in significant increase in range of motion and decrease in pain.

Aim and need of the study

The aim of the study is to compare the efficacy of muscle energy technique versus positional release technique to relieve pain and improve lumbar range of motion in patients with mechanical low back pain. To popularize muscle energy technique and positional release technique for mechanical low back pain among physiotherapists.

Materials and Methods

Study Design: Experimental design, comparative in nature.

Study Setting: Study was carried out in A.R.S. Hospitals, Thennampalayam, Tirupur.

Inclusion Criteria

- a. Clinically diagnosed mechanical low back pain patients
- b. Symptoms less than 3 weeks
- c. Low back pain without radiating to buttocks, thighs and legs
- d. Age group- 25-30 years
- e. Both male and female
- f. Occupational E.g. prolonged sitting

Exclusion Criteria

- a. History of spinal surgery
- b. Discal lesions
- c. Skeletal abnormalities
- d. Systemic diseases
- e. Subjects receiving muscle relaxants
- f. History of trauma
- g. Obesity
- h. Osteoporotic

Sample Population: 30 samples, both male and female diagnosed as mechanical low back pain.

Variables used in the study

Independent Variable:

- a. Muscle energy technique
- b. Positional release technique

Dependent Variable:

- a. Pain
- b. Lumbar Range of motion

Method

30 participants with mechanical low back pain were randomly assigned into two groups Group A receiving muscle energy technique and Group B receiving Positional release technique. Both the group were treated in 8 treatment sessions for 8 days

For muscle energy technique each session consists of each contraction held for 10 seconds and 20 seconds of relaxation for 9 times i.e a total of 270 seconds.

For positional release technique each position is held for 90 seconds with 3 repetitions i.e. a total of 270 seconds.

Measuring Tools

Outcome measures used are

- a. Visual analogue scale
- b. Modified schobers method -Lumbar range of motion

Procedure: Muscle energy technique for erector spinae

Patient position- Patient's sits with back to therapist on treatment couch legs hanging over side, hands clasped behind the neck.

Therapist Position-Therapist places knees on couch close to the patient at side towards which side banding and rotation are to be introduced.

Technique-Therapist places a hand in front of patients axilla on side to which patient is to be rotated across the front of patient's neck to rest on the opposite shoulder.

Patient is drawn into flexion, side bending and rotation over the therapist knees.

Therapist's hand monitors the area of tightness and ensures that various forces localize at point of maximum contraction/tension. When patient has been taken to comfortable limit of flexion, patient is asked to look towards the direction from which rotation has been made while holding the breathe for 7-10 seconds and also introducing very slight degree of effort towards rotating back to upright position against firm resistance from therapist. Patient is then asked to release breathe and completely relax and to look towards the direction in which side bending/rotation is being introduced (i.e. towards resistance barrier). The mechanism by which the effect occurs is due to post isometric relaxation. Patient fully exhales and therapist takes patient further into direction of resistance towards new barrier.

Volume of the treatment: Each contraction is held for 10 seconds for 20 seconds relaxation for 9 times i.e. 270 seconds. Total treatment duration being 8 treatment sessions for 8 days.

Positional release technique for erector spinae

Patient position: Patient is in prone position with trunk laterally flexed towards the tender side.

Therapist Position: Therapist stands on the side of tender area. Therapist places knee over the table and rests the patients affected leg on therapist leg.

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Technique: Patients hip is extended and adducted i.e position of ease and slight rotation is used to tune. This position is carefully and slowly positioned until the level of pain reduces, held for 90 seconds and slowly returned to neutral position.

Volume of treatment: Each position is held for 90 seconds with 3 repetitions i.e. 270 seconds. Duration of 8 sessions for 8 days, total treatment

Results

The pre test and post test values of both the groups were analyzed using paired t test and independent 't' test. In Group A, the mean VAS pre test value was 5.8 and post test value was 2.4, for 14 degrees of freedom at 0.05 level of significance, The 't' table value is 2.145 and t calculated value is 17.72 which is greater than t value. In Group B, the mean VAS pre test value was 5.9 and post test value was 2.3, for 14 degrees of freedom at 0.05 level of significance the 't' table value is 2.145 and t calculated value is 21.16 which is greater than t value. The independent t test values were 0.292 and 0.457 respectively for 28 degrees of freedom at, 0.05 level of significance and the critical value was 2.048, therefore there is no significant difference between two groups.

In Group A the mean lumbar extension range pre test value was 3.7 cm and mean lumbar flexion range was 4.4 cm post test extension value was 4.8 cm, and flexion value was 5.4cm. For 14 degrees of freedom at 0.05 level of significance, the 't' table value is 2.145 and 't' calculated value for extension is 4.93 and for flexion is 23.08 which is greater than t value. In Group B, the mean lumbar extension range pre test value was 3.8 cm flexion range was 4.5 cm and post test value for extension was 4.7 cm and for flexion was 5.5cm, for 14 degrees of freedom at 0.05 level of significance the 't' table value f is 2.145 and the t calculated value for extension is 4.06 and for flexion is 9.73, which is greater than t value.

The independent t test values were 0.361, 0.307 and 1.265 respectively for 28 degrees of freedom at 0.05 level of significance and critical t value was 2.048, therefore there is no significant difference between two groups. This shows that there was significant decrease in pain and increase in lumbar range in both the groups but there was no significant difference between both the groups.

Data Analysis and Interpretation

Variable	Pre Test Mean	Post Test Mean	Mean Difference	Standard Deviation	Paired t Value
Pain	5.8	2.4	3.4	0.743	17.72
Range of motion(ext)	3.7	4.8	1.1	0.285	4.93
Range of motion(flz)	4.4	5.4	1	0.151	23.08

Table 1: Pre test, post test, Mean, Mean difference values of group A - Pain, Lumbar flexion and extension ROM.

Variable	Pre Test Mean	Post Test Mean	Mean Difference	Standard Deviation	Paired t Value
Pain	5.9	2.3	3.5	0.640	21.16
Range of motion(ext)	3.8	4.7	1.1	1.048	4.06
Range of motion(flz)	4.5	5.5	1	0.397	9.74

Table 2: Pre test, post test, Mean, Mean difference values of group B - Pain, Lumbar flexion and extension ROM.

Variable	Group A mean Difference	Group B mean Difference	Unpaired t Value
Pain	3.4	3.5	0.467
Range of motion(ext)	1.1	1.1	0.307
Range of motion(flz)	1	1	1.265

Table 3: Mean difference and unpaired t value of Group A & Group B - Pain, Lumbar flexion and extension ROM.

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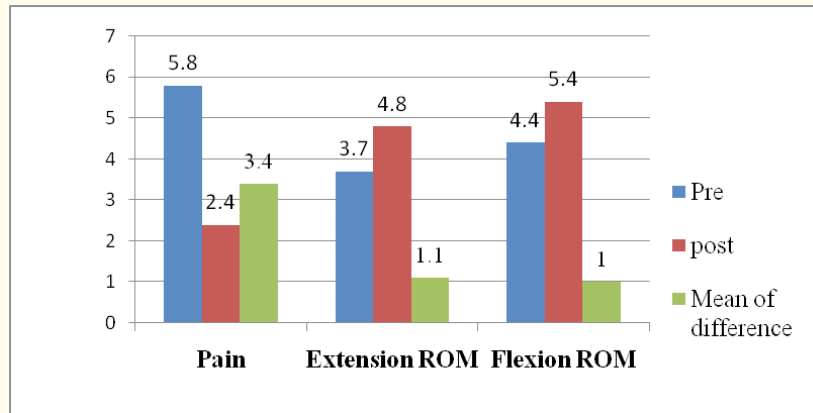


Figure 1: Pre test, post test, Mean, Mean difference values of group A – Pain, Lumbar extension and flexion ROM.

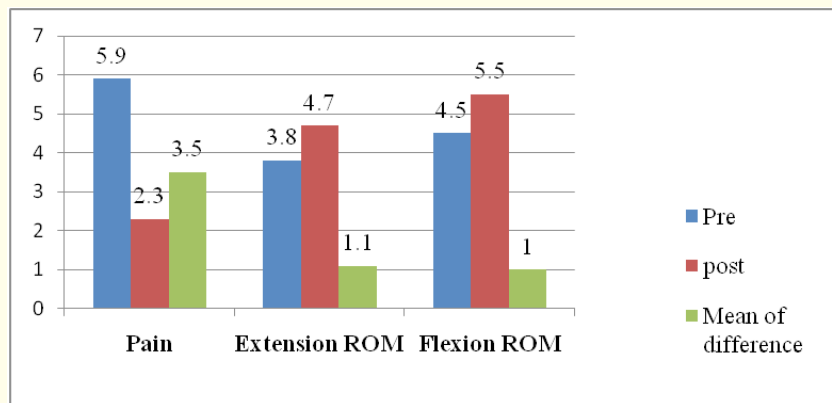


Figure 2: Pre test, post test, Mean, Mean difference values of group B – Pain, Lumbar extension and flexion ROM.

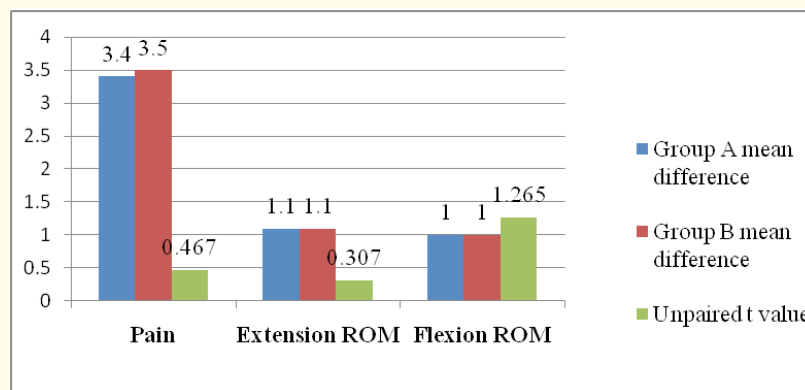


Figure 3: Mean difference and unpaired t value of Group A & Group B – Pain, Lumbar extension and flexion ROM.

Discussion

Mechanical low back pain is pain resulting from inherent susceptibility of spine to static load due to muscles, gravitational force and to kinetic deviations from normal function. The study conducted consists of eight sessions of treatment for eight days following which both the groups (Muscle energy technique and positional release technique) showed that there was no statistically significant difference between each other and was equally effective in relieving pain and increase in lumbar range of motion. Reduction in pain intensity was significant in both the groups.

MET induces relaxation of hypertonic muscle and thereby reduces disability and improves function among patients Greenman [4]. Muscle energy technique is an active technique which is very effective in mechanical, subacute and acute low back pain patients Prllay, Keshnee [5]. Based on the above study the present study also shows MET is an effective technique in terms of reduction of pain and improving lumbar range among mechanical low back pain patients.

Positional release therapy in terms of reducing pain and improving muscle power and range among mechanical low back pain patients Wang, Schaner Alvarce [6] (Positional Release Therapy involves positioning an area or the whole body in such a way as to invoke a physiological response, which helps to resolve musculoskeletal dysfunction Chaitow [7]. The beneficial results seem to be due to a combination of neurological and circulatory changes, which occur when a distressed area is placed in its most comfortable, its most easy, most pain free position, hence it can be used as an effective treatment technique in mechanical low back pain patients. Atienza Meseguer, *et al.* [8] Positional release technique is thought to achieve its benefits by means of an automatic resetting of muscle spindles which would help to dictate the length and tone into the affected tissues thereby reducing pain and improving range.

The erector spinae strain is one of the causes for back pain. The application of muscle energy technique and positional release technique must have facilitated in the reduction of inflammation and spasm of erector spinae muscle due to its effect similar to soft tissues such as stretching of the soft tissues in affected area, moving of fluid out of inflamed area and reflexively relaxing or tonifying muscle. The form of muscle energy technique used was post isometric relaxation which refers to the effect of subsequent reduction in tone experienced by the muscle after brief period during which an isometric contraction has been performed. The main objective of muscle energy technique which was used was inducing relaxation of hypertonic muscle and subsequent stretching of muscle. The reduction of pain and improvement in range when using positional release technique could have occurred because when position of ease is held for 90 seconds, the body begins to reduce spasm, restore normal muscle tone, increase circulation, remove pressure on nerves and allow bones and joints to move freely

The study showed that there was statistically significant improvement in active lumbar range of motion on last day of treatment but there was no statistically significant difference existing when compared between two groups

Conclusion

The study was conducted with the aim to compare the effectiveness of muscle energy technique and positional release technique on patients with mechanical low back pain. Participants between age group of 25-30 were selected and divided into two groups, one group receiving muscle energy technique and other group receiving positional release technique. It was found that both the techniques are useful in alleviating mechanical low back pain and increase in active and passive lumbar range of motion.

Thus it was found that there was significant decrease in pain and increase in lumbar range in both the groups patients treated with muscle energy technique and patients treated with positional release technique but there was no significant difference between the groups.

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