

Efficacy of McKenzie, Maitland Mobilisation and Myofascial Release in Chronic Low Back Pain

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Abstract

Objective: To compare the effectiveness of Myofascial Release, Mc Kenzie and Maitland Mobilisation in Chronic Low back Pain and find out the effects of Myofascial Release, Mc Kenzie and Maitland Mobilisation in Chronic Low back Pain.

Background: Low back pain is defined as the pain that occurs in an area with boundaries between the lowest rib and the crease of the buttocks. It is one of the most common complain of working-age population. Low back pain is associated with deconditioning of spine and trunk due to lack of core strength and stability in which 60-80% of general population suffer with high recurrence rates of 60 - 85% within following three years. The global prevalence of LBP as 7.3%. Activities that are required for daily living are affected because of LBP. The significance of disability is created because of LBP. The lumbosacral, sacroiliac and lumbar regions are the main regions of LBP. Pain in the back region that lasts for more than three months is called chronic lower back pain (CLBP). Lower-back pain (LBP) is seen in all age groups. Half of the people encounter back pain in a year and nearly three-fourths of the population account for LBP in their lifetimes. It is one of the most disabling factors often preventing sports person for participation in sporting activities. In United States, the workers compensation claims account for about one fourth of all claims and one third of total compensation costs. It results in about 40% of absences from work. In total spinal pain cases low back pain accounts for 60-70%. Chronic Low back pain is the pain that persists longer than the expected time period for healing, with a duration of more than three months. The natural course of most low back pain is of self-limiting in nature, with vast majority of individuals improving within six weeks or less.

Study design: Experimental study

Methods: 51 subjects were selected through convenient sampling. All the subjects who were diagnosed with chronic low back pain from Orthopaedics OPD was referred to physiotherapy department and was screened and assessed according to inclusion and exclusion criteria. The eligible subjects were approached with proposal of the study. Aim and procedure of the study was explained to the subject and a written informed consent was taken from them in their preferred language. At first the demographic data (age, sex, duration) was collected for every subject. Then the baseline data (pre intervention) of CLP intensity, functional disability was taken before commencement of the study. Then the subjects were randomly allocated each 17 subjects. A final data of pain intensity, functional disability was recorded.

Results: For all the outcome measures, no significant difference results were found for all three techniques. Whereas, Mc Kenzie techniques is the most effective and the least effective is Maitland Mobilisation. Mean Improvement calculated as Pre- post values of VAS and RMQ scores at follow-up on 7th and 14th day was compared between the 3 techniques. Its significance was tested by testing whether the 95% CI of the mean improvement included 0 or not. McKenzie techniques showed maximum improvement 4.68 (2.29, 7.07) on Day 7th and Maitland mobilisation the least improvement, 1.56(0.95, 2.93). Improvement by all techniques was significant at 95% CI using paired t test. However, on day 14th McKenzie showed maximum improvement 5.56(2.72, 7.07)) Maitland mobilization remaining the least effective.

Conclusion: LBP is a common condition and all age groups are facing it. Pain can be due to various causes and the line of treatment depends upon the cause of pain. In this review, we found out that LBP is a condition everyone is facing. Mc Kenzie is a better treatment approach over other two techniques to reduce chronic LBP. Pain and disability were the points considered while concluding. LBP affects the quality of life and to maintain or improve the quality of life strengthening the muscles plays an important role. This review gives a brief about the treatment methods available for treating CLBP clinically. Hence physiotherapy treating subjects with chronic low back pain may choose any one technique but Mc Kenzie Technique is the most effective technique for pain and for functional disability in CLBP is the most effective. However sufficient experience and expertise is necessary.

Key words: Chronic Low Back Pain, Mc Kenzie, Maitland Mobilisation, Myofascial Release, VAS, RMQ.

Introduction

Low back pain is defined as the pain that occurs in an area with boundaries between the lowest rib and the crease of the buttocks¹. It is one of the most common complain of working-age population.² Low back pain is associated with deconditioning of spine and trunk due to lack of core strength and stability in which 60-80% of general population suffer with high recurrence rates of 60 - 85% within following three years.³ The global prevalence of LBP as 7.3%. Activities that are required for daily living are affected because of LBP. The significance of disability is created because of LBP. The lumbosacral, sacroiliac and lumbar regions are the main regions of LBP.⁴ Pain in the back region that lasts for more than three months is called chronic lower back pain (CLBP). Lower-back pain (LBP) is seen in all age groups. Half of the people encounter back pain in a year and nearly three-fourths of the population account for LBP in their lifetimes.⁵ It is one of the most disabling factors often preventing sports person for participation in sporting activities.⁴ In United States, the workers

compensation claims account for about one fourth of all claims and one third of total compensation costs. It results in about 40% of absences from work.⁵ In total spinal pain cases low back pain accounts for 60-70%.⁶ Chronic Low back pain is the pain that persists longer than the expected time period for healing, with a duration of more than three months.⁷ The natural course of most low back pain is of self-limiting in nature, with vast majority of individuals improving within six weeks or less.⁸

Most low back pain is may be due to repetitive strain injuries, not the result of a single exposure to a high magnitude load, but instead due to cumulative trauma from sub-failure-magnitude loads like repeated small loads (e.g., bending) or a sustained load (e.g., sitting). Low back injury results from repetitive motion at end range as a result of a history of excessive loading which gradually, but progressively, reduces the tissue failure tolerance.⁹

Chronic poor posture coupled with sedentary habits that put the back under severe mechanical stress. It is aching in nature and typically worse toward the end of the day and better with rest.¹⁰ A link has been established between dysfunction in the local muscle system and back pain, which leads to a concept of therapeutic exercise to enhance lumbar, based on the specific rehabilitation of both the global, and the local muscle system.¹¹

A recent focus in the physiotherapy management of patients with CLBP has been the specific training of muscles surrounding the lumbar spine whose primary role is considered to be the provision of dynamic stability and segmental control to the spine.^{12, 13}

A wide range of conservative interventions has been advocated for the treatment of low back pain when it is chronically symptomatic presenting with localised pain. These interventions include McKenzie, Maitland Mobilisation and Myofascial Release.

The McKenzie back exercises belong to an exercise protocol pioneered by physiotherapist Robin Anthony McKenzie in the 1950s and popularized around 1985.¹⁴ The McKenzie method, also known as Mechanical Diagnosis and Therapy (MDT), is widely used as a classification system for the diagnosis and treatment of a variety of musculoskeletal conditions, including lower back, neck, and extremity pain. Over time the McKenzie exercises have become synonymous with spinal extension exercises.¹⁵

McKenzie classification- The **postural syndrome** is pain which is caused by mechanical deformation of soft tissue or vasculature arising from prolonged postural stresses. These may affect the joint surfaces, muscles, or tendons, and can occur in sitting, standing or lying. The relief of pain typically occurs immediately following the correction of abnormal posture.

The **dysfunction syndrome** is pain which is caused by the mechanical deformation of structurally impaired soft tissue; this may be due to traumatic, inflammatory, or degenerative

processes, causing tissue contraction, scarring, adhesion, or adaptive shortening. The hallmark is a loss of movement and pain at the end range of motion. Myofascial trigger points which are focal areas of tenderness caused by hyper contracted muscle tissue. Fascia is located between the skin and the underlying structure of muscle and bone, it is a seamless web of connective tissue that covers and connects the muscles, organs, and skeletal structures in our body. Muscle and fascia are united forming the myofascial system. The purpose of deep myofascial release is to release restrictions (barriers) within the deeper layers of fascia. This is accomplished by a stretching of the muscular elastic components of the fascia, along with the crosslinks, and changing the viscosity of the ground substance of fascia.²³

AIMS AND OBJECTIVES

Aim; This study aims the efficacy of, McKenzie, Maitland Mobilisation and Myofascial release in Chronic Low Back Pain.

Objectives;

To compare the effectiveness of Myofascial Release, McKenzie and Maitland Mobilisation in Chronic Low back Pain and find out the effects of Myofascial Release, McKenzie and Maitland Mobilisation in Chronic Low back Pain.

Hypothesis

Null Hypothesis

H0; There is no significance difference between McKenzie, Maitland Mobilisation and Myofascial Release

Alternate Hypothesis

H1; McKenzie technique is more effective than the other two technique i.e., Maitland Mobilisation and Myofascial Release.

H2; Maitland Mobilisation is more effective than the other two technique i.e., McKenzie and Myofascial Release

H3; Myofascial Release is more effective than the other two technique i.e ., McKenzie and Maitland Mobilisation.

METHODOLOGY

Sample Size;

51 subjects of chronic low back pain were included in the study

Study Area;

Department of physiotherapy (OPD),ELMCH, Lucknow

Study Population:

Diagnosed case of CLBP referred from Orthopaedics, ELMCH

MATERIALS:

Table

Sheet

Chair

Pillow

Towel

Assessment chart & scales

STUDY DURATION:

Total duration of 12 months was adopted for this study

STUDY DESIGN: An experimental study in which the subjects were randomly allocated into 3 techniques (Technique 1 technique 2 and technique 3) by Computer generated random numbers and pre test values of three techniques were compared with post test values in selected parameters over a period of time for within group analysis and three techniques were analyzed for between three techniques.

Inclusion criteria:

-Presenting with localised low back pain with tenderness in midline (L4- L5)

- Age: 18 to 50 years.

-Diagnosed case of Chronic Low back pain with localised pain presenting at L4-L5 region.

-Able to understand& sign the consent form of the treatment technique.

-Duration of pain for atleast 3 months

-Pain intensity (VAS) 3-7cm

-Both male and female subjects

-Patients not responding to previous treatment and at present not on any analgesics.

Exclusion Criteria:

- Tumours,

-Fracture

-Infection

-Spondylolisthesis

-Osteoporosis

-Cardio respiratory illness

-Pregnancy

-Psychological illness

-Spinal canal stenosis

- previous spinal surgeries, extrusion, sequestration & prolapse Diagnosed referred visceral pain.

Technique 1: 17 patients received McKenzie method with IFT (for 5 days).

Technique 2: 17 patients received Maitland Mobilisation with IFT (for 5 days).

Technique 3: 17 patients received Myofascial Release with IFT (For 5 days)

SAMPLING: Computer generated random sampling

Study variables;

Dependent variable-

VAS (Visual Analogue Scale) for measuring pain

Roland Morris Questionnaire for measuring functional disability.

Independent variable-

Mc Kenzie, Maitland Mobilisation, Myofascial Release.

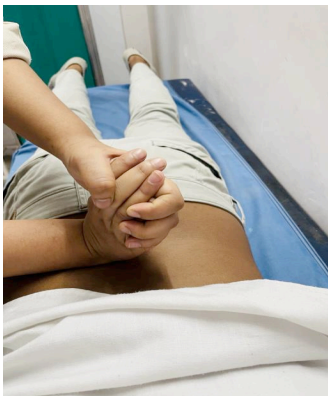
PROCEDURE

All the subjects who were diagnosed with chronic low back pain from Orthopaedics OPD was referred to physiotherapy department and was screened and assessed according to inclusion and exclusion criteria. The eligible subjects were approached with proposal of the study. Aim and procedure of the study was explained to the subject and a written informed consent was taken from them in their preferred language.

At first the demographic data (age, sex, duration) was collected for every subject. Then the baseline data (pre intervention) of CLP intensity, functional disability was taken before commencement of the study. Then the subjects were randomly allocated each 17 subjects.

A final data of pain intensity, functional disability was recorded

Day1 – Day7



RESULTS

Demographic Data: A total of 51 patients, aged between 18-50 years, out of which 24 were males 27 were females, with chronic back pain, duration 3-6 months, were randomized with the 3 techniques (17 in each group). Inclusion and exclusion criteria were fulfilled.

Treatment given for 2 weeks. Before and after 2 weeks of treatment intervention, pain and

Day1 – Day 14

Subject was blinded about the treatment throughout the intervention period.

TECHNIQUES OF DATA COLLECTION:

Initial assessment was taken on the first day of intervention by using outcome measures. After obtaining the informed consent form. On 7th Day again assessment was taken by using outcome measures. Final assessment was taken on 14th day using same outcome measures. Comparison of pretest and posttest values within the group and between the groups was done finally.

TECHNIQUES OF DATA ANALYSIS & INTERPRETATION:

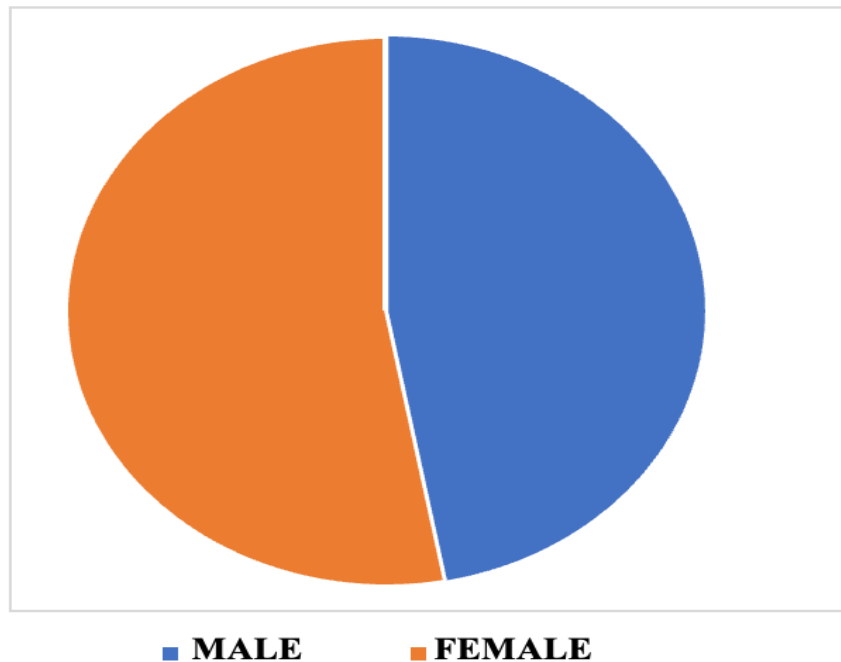
Data collected from subjects were analyzed using paired “t” test to measure changes between pretest and post test values of outcome measures within the technique. Independent, “t” test was used to measure changes between the techniques. The analysis was performed using *epi info*.

functional abilities was evaluated by VAS and Roland Morris Questionnaire (RMQ)

Mean Improvement calculated as Pre- post values of VAS and RMQ scores at follow-up on 7th and 14th day was compared between the 3 techniques. Its significance was tested by testing whether the 95% CI of the mean improvement included 0 or not.

Table 1: showing baseline characteristics of the study population

Head	Technique 1	Technique2	Technique3	P value
Age (18-50)yrs	32.11±9.79	31.82±9.78	34.52±9.2	0.66
Duration(3-6)mnths	3.88±0.99	4.35±0.78	3.94±0.82	0.24
ADL Pre RMQ	10.23±2.92	10.47±2.21	9.70±1.99	0.64
Severity Pre VAS	6.00±0.50	5.58±0.79	5.11±0.85	0.004

**Figure 1: Distribution of study population according to gender**

Gender ratio (M:F)1:2 MALE=24 (47%)
FEMALE=27(53%)

Female patients were more (53%) as compared to male(47%)

Improvement in VAS:

Mean Improvement calculated as Pre- post values for VAS and RMQ scores at follow-up on 7th and 14th day was compared between the 3 techniques. Its significance was tested by testing whether the

95% CI of the mean improvement included 0 or notMcKenzie showed maximum improvement on Day 7 4.68 (2.29,7.07) and Maitland Mobilisation showedthe least improvement, 1.56(0.76, 2.36). Improvement by all techniques was significant at 95% CI using paired t test. However, on Day 14 McKenzie showed maximum improvement 4.03(1.97, 6.09) Maitland mobilisation remaining the least effective 1.97(0.96,2.98)

Table 2: showing improvement in VAS levels measuring pain in low back pain by the 3techniques

	PreD-1	Post D1-D7	Post D1-D14
Tech.1	6.00± 0.50	3.52±2.06	1.82±1.1
Tech.2	5.58±0.79	2.64±1.22	2.64±1.22
Tech.3	5.11±0.85	3.17±0.80	2.17±1.01
Pvalue	p=0.004	p=0.0007	p=0.036

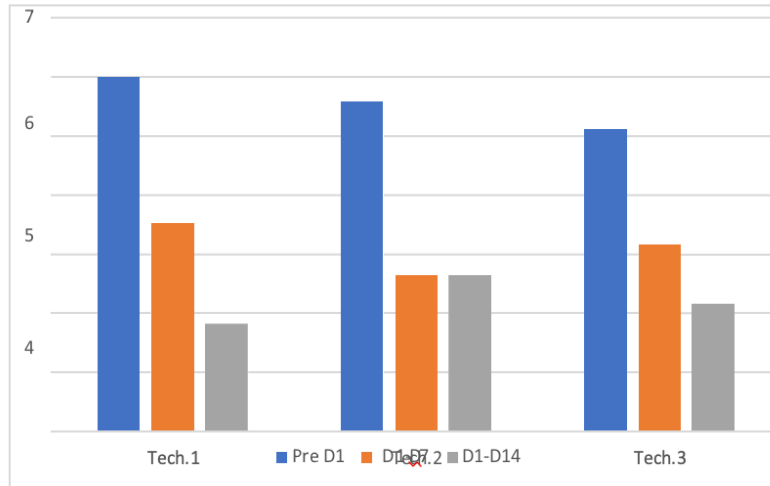


Figure 2:

Improvement in RMQ:

Mean Improvement calculated as Pre- post values RMQ scores at follow-up on 7th and 14th day was compared between the 3 techniques. Its significance was tested by testing whether the 95% CI of the mean improvement included 0 or not. McKenzie technique showed maximum

improvement on Day 7(5.11,1.45) and Myofascial Release technique the least improvement (8.11,2.84). Improvement by all techniques was significant at 95% CI using paired t test. However, on day 14 McKenzie showed maximum improvement (3.00,1.17) and Myofascial Release technique remaining the least effective(5.11,2.39).

Table 3: showing improvement in RMQ in measuring functional ability in low back pain by the 3 technique.

	PreD-1	Post D1-D7	Post D1-D14
Tech.1	9.70±1.99	5.11±1.45	3.00±1.17
Tech.2	10.47±2.21	5.58±1.41	3.11±0.99
Tech.3	10.23±2.92	8.11±2.84	5.11±2.39
P value	p=0.64	p=0.0005	p=0.0013

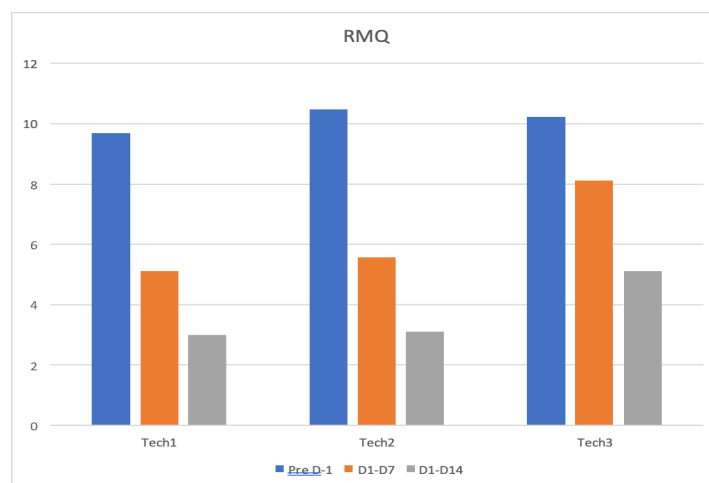


Figure 3:

The experimental study results showed that McKenzie significantly improved pain and functional ability in patients with CLBP.

DISCUSSION

The aim was to investigate the effectiveness of McKenzie, Maitland Mobilisation and Myofascial Release. Moreover, we found that although all the 3 techniques improved pain and disability post-intervention, amongst all the 3 techniques the most effective McKenzie, Myofascial Release and the least effective is Maitland Mobilisation.

Basically, the aim of this therapy is to eliminate pain and normalize function of the affected spinal segment. Many studies confirmed the positive effects of McKenzie method.⁴³⁻⁴⁸

One research found that spinal mobilization (PA in L3, 3 times for 1 minute) is related to the immediate increase in the threshold of the local pressure pain in asymptomatic subjects.

Pain reduction promoted by joint mobilization may be involved with mechanisms plants, which activate the inhibitory pathways of the spinal cord or brain stem descending inhibitory.⁴⁹

Chronic poor posture coupled with sedentary habits that put the back under severe mechanical stress. It is aching in nature and typically worse toward the end of the day and better with rest.¹⁰

Selection criteria of this study were based on inclusion of subjects with symptoms for at least 3 months of duration. Intervention focused on pain and functional disability.

As in previous studies most trials found no improvement in the disability level, except in the trial by Petersen *et al.*, who reported differences in disability improvement for those receiving the McKenzie intervention ($p=0.022$). These results support the findings of previous studies. At the six-month follow-up, two trials] reported that the McKenzie method was a successful treatment to improve disability level ($p<0.05$, $p<0.028$, respectively), but Schenk *et al.* reported significant differences in LBP for the McKenzie group

($p=0.037$). At the 12-month point/mark, there were no significant differences between groups in LBP, but most studies] reported that the McKenzie

method group had a better disability level than the MT group ($p=0.05$, $p=0.028$, $p=0.030$, respectively).

The study by Schenk *et al.* reported the results were limited as disability ratings were perceived to be high, especially for those subjects within the mobilisation groups of the Oswestry Index (at the baseline). This high baseline score has the potential to result in intervention bias. In addition, the study was performed in a single outpatient clinic, with subjects from a small population, and a single therapist, potentially affecting its reliability as evidence. Finally, there was also a lack of sufficient information regarding the treatment procedures in both groups, again, potentially resulting in intervention bias. A couple of studies reported a large withdrawal rate, which was often due to patients' disappointment at the lack of discernible benefit from the treatment, sometimes, they were practitioner-determined withdrawals.

This section deals with the discussion of the results obtained from this study. Mean Improvement calculated as Pre- post values for VAS and RMQ scores at follow-up on 7th and 14th day was compared between the 3 techniques.

Mean Improvement calculated as Pre- post values for VAS at follow-up on 7th and 14th day was compared between the 3 techniques. Its significance was tested by testing whether the 95% CI of the mean improvement included 0 or not. For VAS McKenzie showed maximum improvement

on Day 7, 3.52 ± 2.06 4.68 (2.29, 7.07) and Maitland Mobilisation showed the least improvement, 1.56 (0.76, 2.36). Improvement by all techniques was significant at 95% CI using paired t test. However, on Day 14 McKenzie showed maximum improvement 4.03 (1.97, 6.09) Maitland mobilisation remaining the least effective 1.97 (0.96, 2.98)

Mean Improvement calculated as Pre- post values RMQ scores at follow-up on 7th and 14th day was compared between the 3 techniques. Its significance was tested by testing whether the 95% CI of the mean improvement included 0 or not. McKenzie technique showed maximum improvement on Day 7(5.11,1.45) and Myofascial Release technique the least improvement (8.11,2.84). Improvement by all techniques was significant at 95% CI using paired t test. However, on day 14 McKenzie showed maximum improvement (3.00,1.17) and Myofascial Release technique remaining the least effective(5.11,2.39).

Pain can be due to various causes and the line of treatment depends upon the cause of pain. General strengthening exercises have proved to be effective in reducing LBP. Pain and disability were the points considered while concluding. LBP affects the quality of life and to maintain or improve the quality of life strengthening the muscles plays an important role. This review gives a brief about the treatment methods available for treating CLBP clinically.

Chronic Low back pain is the pain that persists longer than the expected time period for healing, with a duration of more than three months. Based on the concept that specific muscles are able to stabilize the lumbar spine segmental stabilization exercise regimen was developed. The role of specific deep muscles such as transverse abdominis and multifidus in stabilizing the lumbar spine was highlighted.⁷ Various studies have provided high quality evidence that demonstrates the effectiveness of McKenzie in pain reduction.

CONCLUSION

LBP is a common condition and all age groups are facing it. Pain can be due to various causes and the

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line of treatment depends upon the cause of pain. In this review, we found out that LBP is a condition everyone is facing. Mc Kenzie is a better treatment approach over other two techniques to reduce chronic LBP. Pain and disability were the points considered while concluding. LBP affects the quality of life and to maintain or improve the quality of life strengthening the muscles plays an important role. This review gives a brief about the treatment methods available for treating CLBP clinically. Hence physiotherapy treating subjects with chronic low back pain may choose any one technique but Mc Kenzie Technique is the most effective technique for pain and for functional disability in CLBP is the most effective. However sufficient experience and expertise is necessary.

LIMITATIONS OF STUDY

1. The sample size in this study is small. The findings should be substantiated in a larger group of subjects.
2. The follow-up to see the long-term effects of training is not done.
3. The study has not taken into consideration of the patients other than the chronic low back pain patients who constitute a fewer percentage of total back pain patients.

FUTURE RESEARCH

1. It would be interesting to assess how long improvement would be maintained by adding a delayed posttest.
2. The study must be incorporated on a large population for more generalizations to be made.
3. Further areas of research may include examining duration of training.

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