Original Article

Physiotherapy and Occupational Therapy Journal
Volume 17 Number 1, January - March 2024
DOI: http://dx.doi.org/10.21088/potj.0974.5777.17124.4

To assess the Impact of Particular Spine Stabilization Exercises and Mckenzie Approaches on Low Back Pain

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How to cite this article:

Manivannan S. To assess the Impact of Particular Spine Stabilization Exercises and Mckenzie Approaches on Low Back Pain. Physio Ther Occup Ther J 2024;17(1): 29-38.

ABSTRACT

Background: Various exercises have been proposed to mitigate low back pain. However, no one particular exercise has been shown to be superior. Hence, the purpose of this study was to assess the effects of McKenzie method and specific spine stabilization exercise on patients with LBP.

Objective: Objective of this study is to find out the effect of McKenzie exercises and specific spine stabilization exercises in patients with non-specific LBP.

Methodology: A total of 30 subjects aged 25 to 50 years were taken based on the inclusion criteria. And the subjects were randomly assigned to two groups; group A (n=15) received McKenzie exercises and group B (n=15) received specific spine stabilization exercises. Subjects were evaluated before treatment and 4 weeks after treatment. Each patient completed a self administered Roland Morris disability Questionnaire (RMDQ) to assess subjective disability as well as Visual analogue scale for evaluation of pain.

Outcome Measures: RMDQ, VAS

Results: The results showed significant improvement in both the groups. When McKenzie exercise and lumbar stabilization exercises were compared post-treatment, there was statistically significant difference in the outcome measures VAS and RMDQ score, in which lumbar stabilization group demonstrated more improvement.

Conclusion: The present study concluded that lumbar stabilization exercise and McKenzie exercise yielded significant improvement in patients with LBP. There is significant difference in lumbar stabilization and McKenzie exercise in the treatment of subjects with LBP. And lumbar stabilization exercise is slightly more beneficial than the McKenzie exercises.

Keywords: McKenzie exercises; Spine stabilization exercise; Mechanical low back pain; Chronic pain; Visual analogue scale; Roland-Morris disability questionnaire.

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Recieved on 24.01.2024 **Accepted on** 22.02.2024

INTRODUCTION

Low back pain is one of the most common musculoskeletal disorders, with an estimated point prevalence of 9.4% and a worldwide life time prevalence of up to 84%. The occurrence of LBP in India is also alarming with nearly 60% of people in

India.[1]

Low back pain is defined as pain and discomfort, localized below the costal margin and above the inferior gluteal folds with or without referred leg pain.[2] LBP is generally classified by its cause, location, severity and duration.

Typically LBP is classified as; Specific pain caused by unique orunusual pathophysiologic mechanisms (discherniation, tumor, osteoporosis, arthritis, trauma, mechanical disorders or spinal pathology), Non-specific pain not caused by a specific disease or spinal pathology, Acute pain lasting less than 6 weeks, Sub acute pain lasting 6-12 weeks and chronic pain lasting longer than 12 weeks.[3]

About 90% of low back pain is considered as non specific. In 10% of cases a specific cause is identified.[4] Chronic non specific low back pain (i.e., low back pain persisting for at least 12 weeks and without a specific cause) may be related to mechanical strain or dysfunction although it often develops spontaneously.[2,4] LBP can contribute to recurring pain and increased severity, lost work time, decreased health related quality of life, decreased neuromuscular function, and decreased physical fitness. LBP is generally diagnosed or ruled in when red flags, magnetic resonance imaging, and x-ray results are found to be negative for spine or nerve pathology.[3]

A substantial proportion of individual with chronic low back pain has been found to have chronic wide spread pain. Evidence suggest that the burden of LBP compelling health providers to utilize the treatments that are effective and also promote independent management to reduce the burden. Treatment targets are reduction of pain and better activities including prevention of disability.

Exercise has been shown to have beneficial effects for the management of chronic LBP when compared with other treatments.[4,5]

There is a great variety of interventions for treatment of LBP. The McKenzie method of mechanical diagnosis and therapy is an internationally acclaimed method of assessment and treatment for spinal and extremity pain developed by Robin McKenzie; it is an active therapy that involves repeated movements or sustained positions and has an educational component with the purpose of minimizing pain and disability. Recent studies in McKenzie method showed better results in short term pain relief and improvement of disability compared with active interventions such as physical exercises.[6,7]

The goal of McKenzie exercise is to centralize the pain or move the pain from the leg into the low back. McKenzie believes and states "that treatment is the best way to achieve a lasting movement of back pain ''A basic philosophy of McKenzie therapy is that the reverse force can probably abolish the pain and restore the function.[7]

A meta-analysis for effectiveness of the McKenzie method for treating low back pain by Olivier and David M Strenger showed that MDT is not superior to other rehabilitation interventions for reducing pain and disability in patients with acute LBP. But in patients with chronic LBP, MDT is superior to other rehabilitation for reducing pain and disability.[8]

Reduced spinal extension can be the result of pain or stiffness and can be classified as being either general (i.e., total spine) or segmental (one vertebral level). Spinal mobilization techniques and range-of-motion exercises often are prescribed by physical therapists in an attempt to improve lumbar extension and ultimately reduce low back pain.[11,12]

Lumbar stabilization exercise is aimed at improving the neuromuscularcontrol, strength and endurance of the muscles that are central to maintaining the dynamic spinal and trunk stability. Several groups of muscles particularly targeted the transverse abdominis and lumbar multifidi but also other paraspinal, abdominal, diaphragmatic and pelvic muscles.[9] The lumbar stabilization exercise can be recommended for patients with LBP.[10]

1.1 NEED OF THE STUDY

For many years, low back pain has been both the leading cause of days lost from work and the leading indication for medical rehabilitation. Evidence suggest that the burden of LBP compelling health providers to utilize the treatments that are effective and also promote independent management to reduce the burden. Among the different approaches for the treatment of low back pain, exercise therapy is the most important aspect of treatment. In this study the treatment interventions does not include electro modalities to avoid placebo effect.

So the purpose of this study was to assess the effects of McKenzie methodand specific spine stabilization exercise on patients with LBP (as quantified by Roland Morris Disability Questionnaire) and pain intensity (as quantified by visual analogue scale) in people with low back pain

1.2 OBJECTIVES OF THE STUDY

- Find out the effect of McKenzie exercise in patients with non-specific LBP.

- Find out the effect of specific spine stabilization exercise in patients with non-specific LBP.
- Comparing the effect of McKenzie exercises and specific spine stabilization exercises in patients with non-specific LBP.

1.3 HYPOTHESIS

- **Null Hypothesis**

There will be no significant difference in effects and outcomes when compared between McKenzie exercises and spine stabilization exercises in patients with LBP.

- **Alternate Hypothesis**

There will be a significant difference in effects and outcomes when compared between McKenzie exercises and spine stabilization exercises in patients with LBP.

REVIEW OF LITERATURE

Hye jin Moon et al (2013): A randomized controlled trial on effect of lumbar stabilization and dynamic lumbar strengthening exercise in patient with chronic low back pain. A total of 21 patients were enrolled and randomly assigned to one of the two groups, a lumbar stabilization exercise group (11) and a conventional lumbar dynamic exercise group (10). The VAS and the Oswestry low back pain disability Questionnaire were used to measure the severity of LBP. Concluding with the lumbar stabilization exercise was more effective in lumbar extensor strengthening and functional improvement in patient with NSCLBP.[9]

Mohammad Hosseinifar et al (2013): This study compared the effectiveness of stabilization and McKenzie exercises on transverse abdominis and multifidus muscle thickness, pain, and disability in patient with NSCLBP.[30] patients were randomly assigned into 2 groups; The first group (n=15) performed stabilization exercise and the second group (n=15) performed McKenzie exercise. The VAS was used for pain assessment. TrA and MF muscle thickness assessed by ultrasound imaging and functional disability by functional Rating scale. The results of this study showed that stabilization exercises are more effective than McKenzie exercises in improving the intensity of pain and function score and increasing thickness of transverse abdominis muscle.[13]

Muhammad Waseem Akhtar *et al* (2017): A Randomized controlled clinical trial on Effectiveness of core stabilization exercises and routine exercise therapy in management of pain in chronic NSLBP.[120] subjects with NSCLBP were participated, they randomly assigned to 2 treatment groups A &B which were treated with core stabilization exercise and routine physical therapy exercise respectively. Intensity of pain was evaluated with visual analogue scale. Result showed that core stabilization exercise is more effective than routine physical therapy exercise in patient with NSLBP.[14]

Cho Rong Bae et al (2018): A Randomized controlled trial on effects of assisted sit up exercise compared to core stabilization exercise on patients with non specific low back pain. Subjects with NSLBP were randomly divided into 2 groups SUE (n=18) and CSE (n=18).Thickness and activity of core muscles were measured using ultra sonogram and surface EMG. Pain and disability were assessed using VAS and ODI respectively. Assisted SUE using new training device can be an effective therapeutic exercise to improve core muscle activation in NSLBP patients.[15]

Mohammad hosseinifar et al(2009): A double blind randomized clinical trial which compared the effects of McKenzie exercises with lumbar stabilization training on chronic low back pain and functional improvement. 32 participants were randomly assigned to either a stabilization exercise group (n=16) or McKenzie group (n=16). The outcome measures used were McGill pain questionnaire for pain, ODI for disabilityand range of lumbar flexion using Schober test. Concluded with one treatment method was not more effective than other.[16]

Saira Waqqar et al (2016): This study compared the effects of McKenzie extension exercises versus Mulligan sustained natural apophyseal glide for chronic low back pain. A randomized controlled trial was conducted on 37 patients. They randomized into 2 groups; group 1 (n=20) performed mulligan technique and group 2 (n=17) performed McKenzie exercises. Outcomes assessed in this intervention were pain intensity using Numeric pain rating scale and functional disability using ODI. Study concluded that McKenzie program is clinically slightly more effective in the management of pain and disability as compared with Mulligan SNAGs.[17]

Jee Hyun Suh et al (2019): A randomized controlled trial on effect of lumbar stabilization and walking exercises on chronic low back pain. Study conducted in 48 participants with CLBP; the participants were randomized to 1 to 4 groups:

flexibility exercise, WE, stabilization exercise, and stabilization with WE. The outcome measures used were VAS for pain intensity, ODI for functional disability and strength of lumbar extensor was measured with manual muscle tester. This study concluded that lumbar SE and WE can be recommended for patients with chronic LBP.[10]

R chithra (2014): A Randomized clinical trial on effect of lumbar stabilization exercise and lumbar extension exercise in the treatment of chronic low back pain. 40 participants with CLBP were selected and randomized into 2 groups; of them 20 were given lumbar stabilization exercise and 20 were given lumbar extension exercise. The outcome measures used were Numerical pain rating scale for pain and ODI for disability. In this study lumbar stabilization exercise showed more improvement.[18]

F.Y Aliyu et al (2018): A randomized clinical trial on effects of combined lumbar stabilization exercise and cognitive behavioral therapy on selected variables of individuals with non specific low back pain. 46 individuals with NSCLBP participated and they were randomly assigned into 2 groups; CBT+LSE (n=23) and LSE only (n=23). Outcomes assessed in pre and post interventions were pain intensity using VAS, functional disability using ODQ and fear avoidance beliefs using FAB questionnaire. Combined intervention of CBT plus LSE was not more effective than LSE alone in the management of NSCLBP.[19]

Saravanan Kuppusamy et al (2013): A comparative study on effectiveness of McKenzie exercises and mat based Pilates exercises in subject with chronic non specific low back pain.[30] subjects were randomly assigned to 1of the 2 groups; McKenzie exercise group (n=15) and mat based Pilates exercisegroup (n=15).The outcome measures of pain were measured by numeric pain rating scale and functional disability measured by RMDQ. There was no significant difference between these two techniques.[20]

Mark H Halliday et al (2016): A randomized controlled trial comparing McKenzie therapy and motor control exercises on trunk muscle recruitment in people with chronic low back pain. 70 participants were randomized into two groups; the first group (n=35) performed McKenzie exercises and second group (n=35) performed motor control exercises. Transversus abdominus thickness measured from ultrasound images. They found no significant effect of treatment group for trunk muscle thickness. The participants reported a slightly greater sense of perceived recovery with McKenzie method than with the motor control.[21]

Alexandra Henrique Nowotny et al (2018): A Randomized controlled trial on lumbar stabilization exercise versus back endurance resistance exercise training in athletes with chronic low back pain.[32] eligible participants were blinded and randomized into two groups: group-1 (n=16) LMSE and group-2 (n=16) BERE. Outcomes assessed pre and post interventions were pain intensity using VAS, pain quality using McGill pain questionnaire, functional disability using ODI and fear avoidance beliefs using FAB questionnaire in evidence based practice, they concluded that use of these two modalities of therapeutic exercises in the management of athletes with LBP.[22]

Minseock Kim et al (2018): An experimental study on effectiveness of Hollowing and bracing strategies with lumbar stabilization exercise in older adult women with non specific low back pain. A total of 38 subjects with NSLBP were allocated to either HLSE (n=17) or the BLSE (n=21) group. The baseline and post test values of trunk strength, disability (Korean Oswestry disability index) and Korean RMDQ and static balance test were compared by using per-protocol analysis. Study showed that both HLSE and BLSE could be recommended to improve trunk strength and disability in LBP patients.[23]

Alessandra Narciso Garcia et al (2015): Efficacy of the McKenzie method in patients with chronic non specific low back pain: a protocol of randomized placebo controlled trial. 148 participants were randomly allocated 1 of 2 treatment groups: McKenzie method or placebo therapy. The pain intensity measured with the Pain Numerical Rating Scale and disability measured with Roland Morris disability questionnaire. The study was the first trial to compare the McKenzie method with placebo therapy in CNSLBP patients.[24]

Ali Hasanpour Dehkordi et al (2017): A Randomized trail which compared the effects of Pilates and McKenzie training on pain and general health in men with chronic low back pain.[36] patients with chronic low back pain were assigned to three groups of 12 each; McKenzie group, Pilates group and control group. The McGill pain questionnaire and General health questionnaire were used to evaluate the pain and general health respectively. Result showed that Pilates training was more effective to improve general health.[25]

MATERIALS AND METHODS

30 Low back pain for more than 3 months duration under the age groupof 25-50 years of both males and females with or without radiating

pain, without traumatic origin were included in this study. An experimental study was conducted at the outpatient department of Physiotherapy, Aparampar swami college of Physiotherapy, Nanded, Maharashtra for 4 weeks 15 members in each group were divided under a convenient sampling method.Exclusion Criteria: Metastatic cancer, Previous spinal fusion, Artificial disc, Motor signs of nerve root compression, Alcohol abuse, Osseous stenosis, Unstable spine, Infection or inflammatory disease, Pregnancy, Severe medical problems, Major psychiatric illness. Outcome measures: Roland Morris Disability Questionnaire (RMDQ), Visual Analogue scale Study Materials: Couch, Pillow, Visual analogue scale, RMDQ

3.9 STUDY PROCEDURE

A convenient sample of 30 LBP patients from both sexes was selected. The study has pre-test and post-test experimental control group designs. All subjects were informed about the treatment protocol and written consent was taken prior to participation.

Before conducting the treatment, the patient was evaluated by assessment format including age, sex, occupation, duration of symptoms, chief complaints, medication etc. Subject who filled inclusion criteria were randomly divided into two groups: group A and group B, each group consists of 15 members.

- ❖ Group A: McKenzie exercise
- ❖ Group B: Lumbar stabilization exercise

In each group, before starting the treatment VAS and RMDQ was used to assess pain and disability of patient. The exercise program was performed in 3 sets with 5 repetitions and repetitions was gradually increased until they reached 20. The treatment was given 6 days a week. All participants tolerated and completed the treatment protocol.

The treatment period was 4 weeks. Measurement was taken at pre treatment on the 1st day and post treatment on the 4th week.

TECHNIQUE

Group A (McKenzie exercises)

1. Prone lying

- Patient position: Patient adopts prone lying with the arms alongside the trunk. Head turned to one side.
- Technique: This position is maintained for 5 minutes.

2 Prone lying on elbows

- Patient position: Prone lying
- Technique: Places the elbows under the shoulders and raises the top half of his body so that he comes to lean on elbows and forearms while pelvis and thighs remain on the couch. Remain in this position for 5 minutes.

3 **Prone press ups/extension in lying**

- Patient position: Prone lying, place the hand near shoulder.
- Technique: Slowly push the shoulders up, while the bottom halffrom the pelvis down is allowed to sag with gravity. The top half of the body is then lowered. The exercise is repeated.

4 Sustained extension

- Patient position: Prone lying
- Technique: The patient lies prone with a pillow placed under the chest. After several minutes, add a second pillow, if it doesn't hurt add a third pillow. Remove pillows one at a time over several minutes.

5 Standing extension

- Patient position: Standing.
- Technique: The patient stand with the feet well apart and places the hands in small of the back across the belt line. He leans backwards and then returns to neutral standing. Hold for 20 seconds and repeat.

Group B (Lumbar stabilization exercises)

1 TrA activation

- Patient position: Supine lying
- Technique: Patient in supine and places his/her fingers 2 cm in and down from the ASIS. Ask the patient to draw in their pelvic floor. Also draw the belly button in and hold muscle contraction for 10 seconds.

2 Pelvic tilt

- Patient position: Supine lying
- Technique: patient in supine lying. Ask the patient to slowly tilt the pelvis into anterior and posterior.

3 Segmental bridge

- Patient position: Supine lying

- Technique: patient in supine lying with both feet at hip distance apart. Ask the patient to tilt the pelvis and slowly lift the pelvis off the mat.

4 Single leg bridging

- Patient position: Supine lying
- Technique: Patient in supine lying with both feet at hip distance apart. Ask the patient to tilt the pelvis and slowly lift the pelvis off the mat. Then raise one leg straight.

5 Lumbar side bends push up

- Patient position: Side lying
- Technique: Lie on floor on your side, fore arm supporting upper body, knees should be bent to 45 degrees, place free hand on hip, keep knee and lower leg on floor and raise hip off floor, lower and repeat, repeat exercise on other side, perform 2 sets of 5 repetitions.

6 Lumbar flexion supine arms crossed

- Patient position: Supine lying
- Technique: Lie on back, knees bent, arms crossed over chest, lift up head and continue to lift up shoulder off floor, toward knees, keep low back in contact with floor, Return to start position and repeat, perform 2 sets of 5 repetitions. Rest 1 minute between sets; perform 1 repetition over 4 seconds.

7 Curl on

- Patient position: Supine lying
- Technique: Bend the knees and lie down. In lying position keep both the hands on the side and try to lift the head and shoulders, tighten the stomach muscles and touch the knees with straight hand.

DATA ANALYSIS

30 patients with NSCLBP were participated in this study. The subjects were chosen from AKG hospital Kannur and the samples were undersigned based on inclusion and exclusion criteria. Patients were fully informed about the treatment procedure and written consent was taken. Theywere divided into 2 groups in randomized manner and each group contains 15 members. Group A received McKenzie exercise and group B received lumbar stabilization exercises for duration of 4 weeks. Data about demographic characteristics were obtained. Each patient completed a self administered Roland Morris disability Questionnaire (RMDQ) to assess subjective disability as well as Visual analogue scale for evaluation of pain. Improvements were observed pre and post treatment for both groups by using VAS and RMDQ score. Differences in the mean VAS and RMDQ scores between the 2 groups were analyzed and the baseline mean values were compared with the mean values after the treatment within the groups.

RESULT

ANALYSIS OF DESCRIPTIVE DATA

Table 5.1: Basic characteristics of the subjects studied.

Basic characteristics		Group A		Group B	
Total no. of subjects studied (n)		15		15	
Age in years (mean)		37.13		36.8	
Gender	Female	n=13	86.6%	n=12	80%
	Male	n=2	13.3%	n=3	20%

ANALYSIS OF SCALES

Table 5.2: Mean of pre test and post test VAS score.

		VAS Score		
		Minimum	**Maximum**	**Mean**
Group A	Pre Test	6	9	7
	Post Test	3	5	3.93
Group B	Pre Test	6	8	6.93
	Post Test	2	4	3.13

Table 5.3: Mean of pre test and post test RMDQ score.

		VAS Score		
		Minimum	**Maximum**	**Mean**
Group A	Pre Test	14	18	16.26
	Post Test	5	8	6.66
Group B	Pre Test	14	18	16.13
	Post Test	4	7	5.73

Table 5.4: Intra group analysis of VAS and RMDQ score: Group A

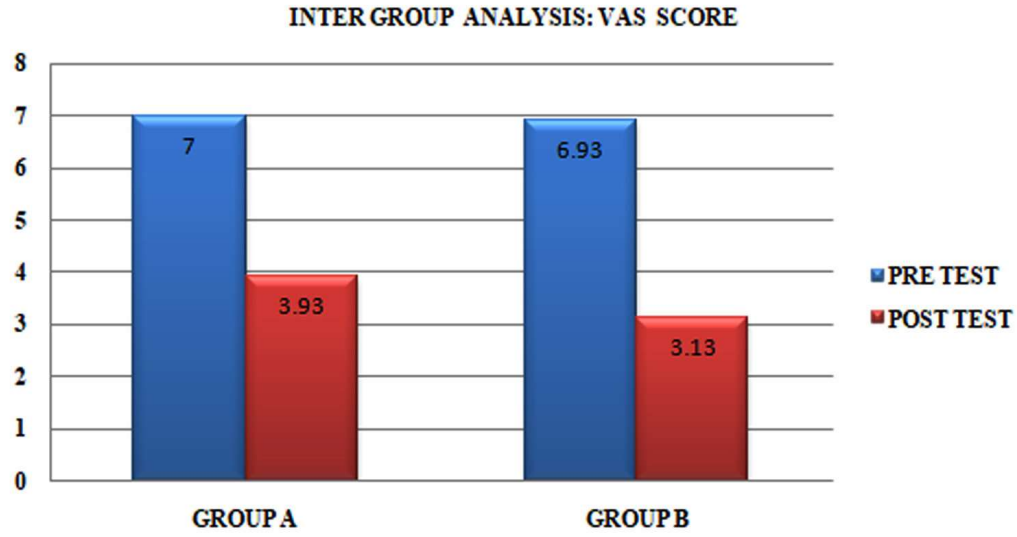
	Pre Test	Post Test
VAS	7	3.93
RMDQ	16.26	6.66

The Table 5.4 shows; (1) the evaluation of VAS score in group A by comparing the mean of pre and post-test values, mean of pre-test was 7 and post-test was 3.93, which indicate there was an improvement in the vas score after treatment. (2) Evaluation of RMDQ score by comparing the pre and post-test values, Mean of pre-test was 16.26 and post-test was 6.66, indicates an improvement in the RMDQ score after the completion of treatment.

Table 5.5: Intra group analysis of VAS and RMDQ: Group B

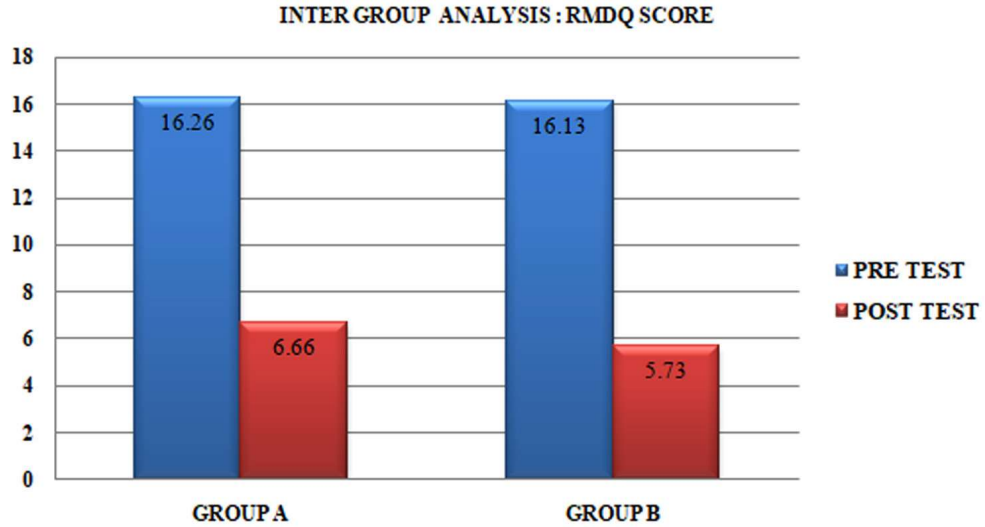
	Pre Test	Post Test
VAS	6.93	3.13
RMDQ	16.13	5.73

The Table 5.5 shows; (1) evaluation of VAS score in group B by comparing the mean of pre and post test values, mean of pre test was 6.93 and post-test was 3.13, which indicate there was an improvement in the VAS score after treatment. (2) Evaluation of RMDQ score by comparing the pre and post-test values, Mean of pre-test was 16.13 and post-test was 5.73, indicates an improvement in the RMDQ score after the completion of treatment.



Graph V. 1: Comparison of pre and post-test VAS score between two groups.

Graph V.1: The comparison of pre and post-test scores of VAS within 2 groups. It shows, in both the groups there was significant improvement between pre and post mean scores.

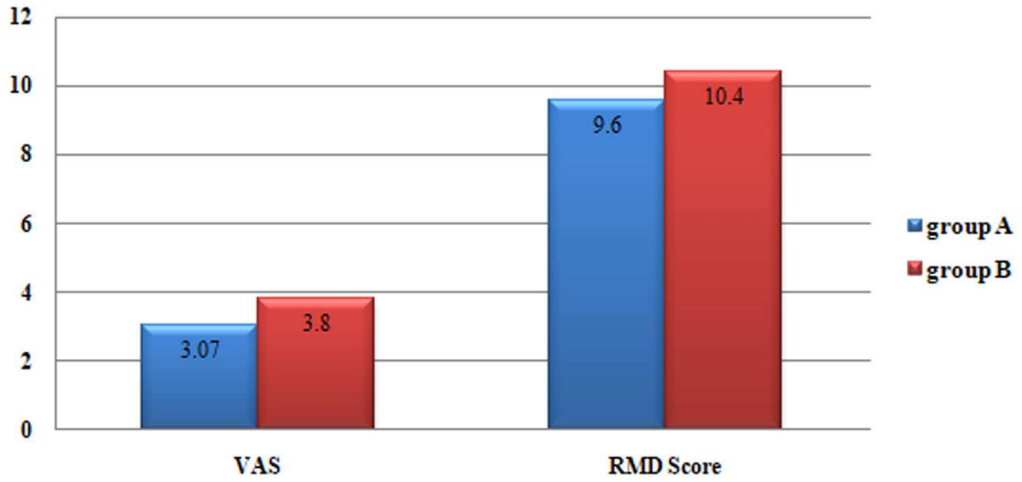


Graph V.2: Comparison of pre and post test RMDQ score between two groups.

Graph V.2: The comparison of pre and post test scores of RMDQ within 2 groups. It shows, in both the groups there was significant improvement between pre and post mean scores.

Table 5.6: Comparison of difference in improvement of VAS and RMDQ Score between groups

Study parameter	Group A	Group B
VAS	3.07	3.8
RMDQ Score	9.6	10.4



Graph V.3: Comparison of difference in improvement of VAS and RMD score between groups

Graph V.3 demonstrated that there was significant difference between the groups. And group B showed more improvement in VAS and RMDQ score as compared to group A. That means, lumbar stabilization exercise is more effective than McKenzie exercise to reduce pain and disability in patients with LBP.

DISCUSSION

The purpose of this study conducted was to compare the effectiveness of McKenzie exercises and lumbar stabilization exercises in patients with NSCLBP. Visual analogue scale and RMDQ was used to find out whether there was significant difference between these two techniques on pain and disability respectively. The results showed significant improvement in both the groups. However, theStabilization techniques prove to be slightly more beneficial than McKenzie exercises.

Although stabilization exercises are most important methods in rehabilitation of LBP disorders and prophylaxis, the exact biological basis for the efficacy of stabilization exercises in LBP patients is not clear yet. Several mechanisms have been proposed to describe the effects of stabilization exercises on pain. These mechanisms include reduction of load and improvement in the quality of movements following improvement in coordination of trunk muscles.[13]

McKenzie suggests that all spinal pain can be attributed to alteration of the position of the disc's nucleus pulposus, in relationship to the annulus;mechanical deformation of the soft tissue about the spine which has undergone adaptive shortening; or mechanical deformation of the soft tissue caused by postural stress. As treatment McKenzie recommends exercises and postural instructions which restore lumbar lordosis.[26]

Mohammad hosseinifar et al (2013) compared the effect of stabilization and McKenzie exercises on pain, disability and thickness of the transverse abdominis and multifidus in patients with NSCLBP. And found that stabilization exercises were superior in improving pain and increasing thickness of muscle.[14]

The finding of this study is consistent with result of a randomized trial which investigating the efficiency of musculoskeletal physiotherapy on chronic low back disorders. Found that as a component of musculoskeletal physiotherapy, the spinal stabilization program is more effective than manually applied therapy in treating chronic low back disorder.[27]

Mark H Halliday compared the effect of McKenzie method to motor control exercise in patient with chronic LBP,and found a slightly greater recovery with McKenzie method.[21]

In this research, before and after the experiment

the data were collect to know the effect of McKenzie and lumbar stabilization exercises on patients with NSCLB. The VAS and RMDQ score were recorded on the first day prior to treatment (recorded as pre test value) and at the end of the treatment (recorded as post-test value).

Mean VAS score calculated for group A in pre-test was 7and in post-test was 3.93. Mean VAS score for group B in pre-test was 6.93 and post-test was 3.13. In group A there was 43% improvement in the vas score and in group B there was 54% improvement in the vas score.

Mean RMDQ score calculated for group A in pre test was 16.26 and the score reduced to 6.66 after treatment. Mean RMDQ score for group B in pre and post-test was 16.13 and 5.73 respectively. In group A there was 59% improvement in RMDQ score and in group B there was 64% improvement in the RMDQ score.

When McKenzie exercise and lumbar stabilization exercises were compared post-treatment, there was statistically significant difference in the outcome measures VAS and RMDQ score, in which lumbar stabilization group demonstrated more improvement. Both the groups, group A and group B demonstrated significant improvement in VAS score and RMDQ score after treatment.

Therefore, both types of exercises reduced pain and disability in patients with NSCLBP. But the lumbar stabilization exercise is slightly more beneficial as compared to McKenzie exercises.

CONCLUSION

The present study concluded that lumbar stabilization exercise and McKenzie exercise yielded significant improvement in patients with LBP. There is a significant difference in lumbar stabilization and McKenzie exercise in the treatment of subjects with LBP. And lumbar stabilization exercise isslightly more beneficial than the McKenzie exercises.

Limitations: Small sample size, Short term follow up. **Recommendations:** Increase sample size, Follow up period may be extended.

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