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# Comparison Between Mckenzie Approach and Lumbar Core Stabilization Exercise in Improving Functional Activity and Reducing Pain for Lumbar Radiculopathy by Using Pain Rating Scale and Functional Scale as an Outcome Tool

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## Abstract

**Background:** Lumbar radiculopathy, is a symptom of radiating pain in the lumbar nerve root distribution that may also include sensory and motor dysfunction. The most common causes of nerve root compression are intervertebral disc herniation and degenerative alterations

**Purpose:** To compare the effectiveness of McKenzie approach and core stabilization exercise in Lumbar radiculopathy by reducing pain and improving the functional activity

**Materials and Methods:** Total of 64 subjects will be selected by a convenient sampling method based on inclusion and exclusion criteria. The study was fully described to the participants, and their signed agreement was acquired. Numerical pain rating scale (NPRS), Roland-Morris Disability Questionnaire (RMDQ) was used to analyse the pain, and related disability.

**Results:** With a p value of 0.0001, the mean of the core stabilization at the post test was shown to be greater than the mean of McKenzie Exercise.

**Conclusion:** This study concluded that Neural mobilisation was found to be more effective than McKenzie in decreasing pain and functional ability for peoples with lumbar radiculopathy

**Key Words:** Lumbar radiculopathy, NPRS, RMDQ Scale

## Introduction

Radiculopathy is also known as nerve root pain which arises from disc herniation with nerve root compression. Nerve irritation caused by damage to the disc between the vertebrae damage to the disc occurs because of degeneration [wear and tear] of the

outer ring of the disc traumatic injury or both a result the central softer portion of the disc can rupture (herniation) through the outer ring of the disc and about the spinal cords or its nerves as they exit the bony spinal Column. This rupture is what causes the commonly recognized pain of sciatica" that shoots down the leg. Lumbar radiculopathy is one of the most

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prevalent problems that a spine surgeon evaluates. It affects both men and women and is believed to impact 3%-5% of the population. Age is a major risk factor since it happens as a result of the degenerative process within the spinal column. Symptoms often appear in midlife, with males typically impacted in their 40s and women in their 50s and 60s. Females are at a higher risk in specific populations, such as those with physically demanding jobs such as military duty. Lumbar radiculopathy is caused mostly by degenerative spondyloarthropathies. Patients frequently present with back discomfort as a result of their radiculopathy.<sup>1-2</sup> The transverse abdominis, multifidus, pelvic floor muscles, and obliques are among the key core muscles that support and stabilize the spine. The lumbar spine may be subjected to excessive stress and strain when these muscles are weak or unbalanced, which can exacerbate the symptoms of lumbar radiculopathy.<sup>3</sup>

Strengthening and coordinating these muscles through core stabilisation exercises is intended to improve the spine's support and reduce pain. The strain on the damaged nerve roots can be relieved by strengthening the core muscles, which would lessen the lumbar radiculopathy-related pain and discomfort.<sup>4-5</sup>

The McKenzie technique, developed by physical therapist Robin McKenzie in 1981, is a categorization-based treatment for individuals with back pain. The McKenzie technique's purpose is to move the pain away from the spine or to integrate it. The McKenzie method is divided into three stages: assessment, treatment, and prevention. The McKenzie method has been widely used by physiotherapists as a treatment for back pain.

Numerical pain rating scale (NPRS) is an 11 point scale in which '0' indicates no pain and '10' indicates maximum pain.<sup>6</sup>

### Aim

To compare the effectiveness of McKenzie approach and core stabilization exercise in Lumbar radiculopathy by reducing pain and improving the functional activity for peoples with lumbar radiculopathy.

## Material and Method

It was an experimental study conducted on 64 subjects with lumbar radiculopathy aged between 30-45 years was taken from RTG Hospital. Convenient sampling with a random allocation method was used in the study.

### Inclusion criteria

1. Both men and women
2. Age between 18-45 years
3. NPRS score between 5 to 10
4. Patients with lumbar radiculopathy

### Exclusion criteria

1. Subjects with recent injury
2. Subjects with NPRS score less the 5
3. Subjects without cooperation
4. Recent surgery

### Outcome measures

1. Numerical Pain Rating Scale<sup>7</sup>
2. Roland Morris Disability Questionnaire<sup>8</sup>

## Procedure

Total of 64 subjects will be selected by a convenient sampling method based on inclusion and exclusion criteria. The subjects were divided into two groups. McKenzie group (n:32) and core stabilization group(n:32). The study was fully described to the participants, and their signed agreement was acquired. Numerical pain rating scale (NPRS), and Roland-Morris Disability Questionnaire was used to analyse the pain and related disability before the treatment session. After Pre test analyses Mckenzie group received Mckenzie exercise and core stabilization received core stabilization exercise for 5 days per week for 4 days. After 4 weeks the post test values were collected and tabulated. *Study period : November 2022 to april 2023*

### McKenzie Group

#### Lying face down:

Subjects were asked to lie face down with arms at their side, then asked to turn their head to one side and instruct them to take deep breath and relax.

**Lying face down in extension:**

From this position, the subjects were asked to place the elbow under their shoulder to lean on forearm and instruct them to take deep breath and relax

**Extension in lying:**

Ask the subjects to Slowly straighten the elbow while pushing the upper body upward as far as discomfort will permit. After holding this position for 2-3 seconds ,ask them to return to starting position .If a patient feels uncomfortable, place the pillow to maintain the extension

**Extension in standing:**

Subjects were asked to place the feet slightly apart while standing straight and hands are placed behind the back, fingers pointing backward using hands as a fulcrum with knees straight,ask the subjects to bend their body backward at the waist as much as they can. After holding this position for 2-3 seconds ,ask them to return to their starting position.

**Core Stabilization Group****Side plank on knees:**

- Begin by sitting on one hip, leaning on your side, and stacking your legs next to you. Your forearm should be on the surface of the floor next to you when you bend your elbow. Exhale to push your forearm into the floor and lift your hips into the air.
- Inhale to lower your hips halfway.
- Exhale to lift your hips up again.
- Repeat 8-10 times, then inhale as you lower your hips all the way down with control.

**Bird dog:**

- Begin on all fours with your hands beneath your shoulders and your knees precisely beneath your hips.
- Aim for a neutral position in your spine.
- Exhale to draw the abdominals in and up. Without shifting your weight or arching your back, lift one leg behind you and lift your opposite arm in front.
- Breathe and hold the position for 3 slow counts.

- Inhale with control to return your leg and hand to the mat.
- Complete 6-8 reps and then repeat on the other side.

**Curl up:**

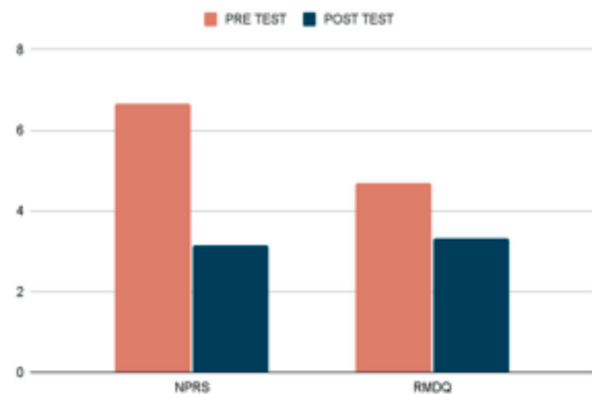
- In a relaxed arm-crossing
- While keeping their head in line with their shoulder, instruct the subject to contract their abdominal muscles and curl halfway up.
- 5 seconds of holding
- Roll out to lie down.
- Repetition of 3 sets of 5

**Glute bridge:**

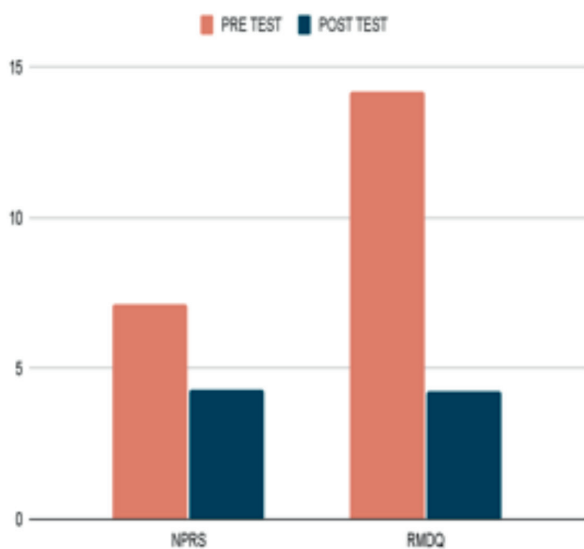
- Get the subject to lie on their back on a stable chair with their legs straight and their hands by their sides.
- Make the patient lift their hips off the surface while keeping their back straight, then pause for one second.
- Make them go back to the beginning position.
- Until the set is finished, repeat the movement.
- Repeat 3 sets of 4 holding per set

**Data Analysis**

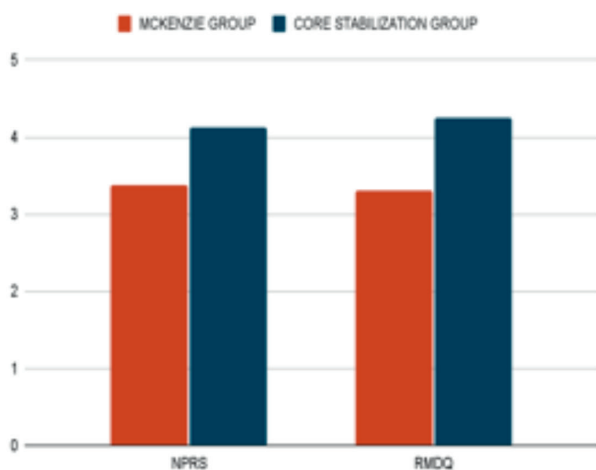
Using tabular and inferential statistics, the gathered data was evaluated. The statistically significant differences between pre-test and post-test measures were examined using a paired t-test. When utilizing the unpaired t-test to look at significant changes in the experimental group, the significance level of  $p < 0.0001$  was determined to be statistically significant.



**Graph No 1: Pre and Post Test Values of Mckenzie Group**



**Graph No 2: Pre and Post Test Values of Core Stabilization Group**



**Graph No 3: Post Test Values McKenzie and Core Stabilization Group**

**Result**

In Mckenzie Group, the pre test Mean value of NPRS is 6.66 and RMDQ is 14.69. The post test Mean value of NPRS is 3.14 and RMDQ is 3.31.

In Core Stabilization Group, the pre test Mean value of NPRS is 7.13 and RMDQ is 14.19. The post test Mean values of NPRS is 4.3 and RMDQ is 4.25. The statistical analysis of NPRS post test Mean value of Mckenzie group is 3.38 and Core stabilization group is 4.13. The RMDQ post test Mean value of Mckenzie group is 3.31 and Core stabilization group is 4.25.

**Discussion**

According to the findings of this study by Jay Indravadan Patel and Prem Kumar B N (2016a), both groups’ VAS scores for pain showed a substantial decrease and their SLR, lumbar spine range of motion using MMST, and disability scores using MODI all showed improvements. The experimental group showed earlier control of all outcome measures than the control group at the conclusion of the sixth week, according to the statistical analysis<sup>9</sup>. According to research by Faria Aqil, Muhammad Affan Iqbal, Suhail Karim, Muhammad Umar Iqbal, Muhammad Junaid Akram, Zona Mehreen, Raees Mufti 2021, Patients in both lumbar stabilisation and McKenzie groups showed significant improvement, however, the patients in lumbar stabilization group were superior than the patients in McKenzie group on the selected outcomes. In subjects with chronic low back pain (CLBP) with radiculopathy, who performed both the lumbar stabilisation and thoracic mobilisation exercise programmes in a coordinated manner, there was a statistically significant decrease in pain intensity values (VAS ls and leg), as well as the degree of functional disability (ODI), compared to initial values. According to Stefan Kostadinovic’a, Nenad Milovanovic’b, Jelena Jovanovic’b, and S Comparing respondents who performed a lumbar stabilisation programme in a closed and open kinetic chain, the patients who completed the lumbar stabilisation.

Thoracic mobilisation exercise programme in a closed kinetic chain had better functional recovery and a significantly greater reduction in pain intensity. Patients with a positive neuropathic pain component (Douleur Neuropathique en 4 Questions, DN4) were found to have higher initial and final values of pain intensity (VAS ls and leg) and functional disability (ODI) parameters than patients without the neuropathic pain component in both groups under study. Thoracic mobilisation exercises may enhance lumbar stabilisation and lead to a more potent decline in pain intensity and functional impairment<sup>10</sup>.

**Conclusion**

The collected data was statistically analyzed using an unpaired t-test. When Comparing the McKenzie group to the Core stabilization group,

the Mckenzie group indicates significant effects ( $p < 0.0001$ ) in Improving the strength of the back and improving the functional activity. Mckenzie exercises are more effective in reducing pain and improving strength of back muscles.

**Ethical Clearance:** Taken from the institutional ethical committee. ISRB number- 03/037/2022/ ISRB/SR/SCPT

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**Conflict of Interest:** NIL

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