

# Comparison between Neural Mobilization and Mckenzie Approach in Reducing Pain, Improving Mobility and Functional Ability in Peoples with Lumbar Radiculopathy

Monisha K<sup>1</sup>, Ramana K<sup>2</sup>, Kamalakannan M<sup>3</sup>, Anitha A<sup>4</sup>

<sup>1</sup>Undergraduate Student, <sup>2</sup>Assistant Professor, <sup>3</sup>Associate Professor, <sup>4</sup>Associate Professor, Saveetha college of physiotherapy, Saveetha Institute of Medical and Technical science, Chennai, Tamil Nadu, India

**How to cite this article:** Monisha K, Ramana K, Kamalakannan M et. al. Comparison between Neural Mobilization and Mckenzie Approach in Reducing Pain, Improving Mobility and Functional Ability in Peoples with Lumbar Radiculopathy. Indian Journal of Physiotherapy and Occupational Therapy / Volume 18, Year 2024.

## Abstract

**Background:** Lumbar radiculopathy is the compression of lumbar nerve root. The most common causes of nerve root compression are intervertebral disc herniation and degenerative alterations. About 3% of cases, disc disease causes lumbar radiculopathy. Pain is the major symptom.

**Purpose:** The study is to compare the effectiveness of neural mobilisation and McKenzie approach in reducing pain, improving mobility and functional ability for peoples with lumbar radiculopathy.

**Materials and Methods:** A Experimental study which consists of 64 subjects who were selected based on inclusion and exclusion criteria from A.K.B physiotherapy during the period of November 2022 to April 2023. They were split into two groups , the Neural mobilisation group(n=32) and McKenzie group(n=32).The intervention was given for 5 days a week for 4 weeks . The pre and post test values were measured using (NPRS), Modified Schober's method and (MODI).

**Results:** With a p value of 0.0001, the mean of the Neural Mobilization 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 , improving mobility and functional ability for peoples with lumbar radiculopathy.

**Key Words:** Lumbar radiculopathy, NPRS, Modified schober's method and MODI

## Introduction

Lumbar radiculopathy is a 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, whereas less often occurring causes include

infection, inflammation, tumor, vascular disease, and congenital anomalies <sup>1, 2</sup>

The primary manifestation occurs as a result of degenerative changes (osteophyte formation) or a prolapsed disc, lumbar radiculopathy is the compression of peripheral nerves that exit the intervertebral foramina, causing pain either alone

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**Corresponding Author:** Ramana.K, Assistant Professor, Saveetha College of Physiotherapy, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu, India.

**E-Mail:** ramana.scpt@saveetha.com

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or with significant neurological symptoms<sup>3,4</sup> While osteoarthritic changes associated with ageing in the spine are the primary cause of radiculopathy in people over the age of fifty, prolapsed discs are the most common cause in patients under fifty<sup>5,6</sup>.

About 3% of cases, disc disease causes lumbar radiculopathy. With 11.10% occurrence among working people and 13% due to lumbar radiculopathy, they are more susceptible to low back ache<sup>7</sup>

Pain is frequently the main symptom of lumbar radiculopathy patients. The radiating pain may be described as being sharp, dull, penetrating, throbbing, or scorching<sup>8</sup>

Activities that place an excessively high level of repetitive stress on the spine are risk factors for radiculopathy. In comparison to people who lead more sedentary lifestyles, those who engage in hard labour or contact sports are at a higher risk of developing radiculopathy<sup>9</sup>.

Secondary risk factors for acute lumbar radiculopathy (peak 40-60 years) include smoking, mental stress, extended physical activity (frequent lifting), and driving (whole-body shaking)<sup>10</sup>.

Neurodynamic mobilisation is a manual treatment approach that could be used to treat patients with lumbar radiculopathy. Both slider and tensioner manoeuvres are a part of neural mobilisation. A nerve slider intervention aims to cause the nerve trunk to glide relative to its surrounding tissues. The nerve slider technique involves moving the joint proximally while releasing it distally, then combining the movements in reverse. The goal of a nerve tensioner intervention, on the other hand, is to create tension in a nerve trunk relative to its surrounding tissues. The targeted structure is moved proximally and distally at the same time and in the same direction with joint movements using the nerve tensioner technique to increase nerve tension<sup>11</sup>.

Theoretically, irritation of the lumbar nerve root may result in neural edema, ischemia, and fibrosis, which would worsen the system's damage, result in discomfort, and reduce function<sup>12,13</sup>.

The McKenzie method is divided into three stages: assessment, treatment, and Prevention. Postural, dysfunctional, and derangement syndromes

are the three mechanical syndromes that McKenzie lists. When a derangement is reduced, centralization takes place. When derangement has completely subsided, pain has been eliminated, and full range, pain-free movement has been returned.

### Aim

The purpose of the study is to compare the effectiveness of neural mobilisation and McKenzie approach in reducing pain, improving mobility and functional ability for peoples with lumbar radiculopathy.

### Material and Method

It was an experimental study conducted on 64 subjects with lumbar radiculopathy, age between 30-45 yrs was taken from A.K.B Physiotherapy . Convenient sampling with a random allocation method was used in the study. Study period : November 2022 to April 2023.

#### Inclusion Criteria

- Subjects who have diagnosed with lumbar radiculopathy
- Age between 30 – 45 years
- Both males and female
- Patients with SLR positive

#### Exclusion Criteria

- Patients with a history of vertebral fracture.
- History of spinal surgery.
- Cardiovascular disorder
- Neurological deficits
- Uncooperative patient

#### Outcome Measures

- Numerical pain rating scale (NPRS)<sup>17</sup>
- Modified oswestry disability index (MODI)<sup>19,20</sup>
- Modified schober's method<sup>21</sup>

#### Procedure

A Total 64 Participants were recruited on the basis of inclusion and exclusion criteria. Information sheet was provided regarding the procedure and Informed consent was obtained from participants. Assessment

was done before the treatment. Participants were assigned into two groups. Neural mobilization group and Mckenzie group. All subjects underwent pre test measurement using NPRS, MODI and modified schober's method and same repeated for post test after the treatment session

### Neural Mobilization Group

- Neural Mobilisation was performed 3 sessions a day and five days per week.
- Duration per session: 20 minutes

### Passive Exercise:

#### Straight Leg Raise:

- Ask the patient to lie in supine
- Stand next to the patients affected side
- Place one hand at the ankle joint and the other at the knee joint.
- Raise the affected side leg perpendicular to the bed until back discomfort is felt.
- Then lower the limb few degrees from symptomatic point
- Dorsiflex the ankle
- Ankle plantar flexion, inversion, Hip adduction and medial rotation to tense the sciatic nerve more.

### Active Exercise:

#### Straight Leg Raise:

- Lay flat on back with legs extended.
- Flex one knee and place both hands behind it.
- Next, extend the knee. Flex and extend ankle once your knee is straight.
- A small stretch below the knee and calf should be felt
- Slowly lower your leg back down to the bent knee position.
- Repeat 5 to 10 times.

### Slump Technique

- Sit upright on a couch.
- Slump the back and head.
- Extend the affected knee
- Slowly dorsiflex your ankle

### Mckenzie Group

- There are 4 levels in this exercise program .
- Mckenzie exercise was performed 3 sessions a day and five days per week.
- Duration per session: 20 minutes

### Lying Face Down:

- Lie face down with arms at side
- Turn head to one side
- Breathe deeply and relax.

### Lying Face Down In Extension

- From this position, place the elbow under shoulder to lean on forearm
- Take a deep breath and relax.

### Extension In Lying:

- Slowly straighten the elbow while pushing the upper body upward as far as discomfort will permit.
- Maintain this position for 2-3 seconds
- Come back to the starting position
- Breath in at bottom and come up then breath out
- If a patient feels uncomfortable, place the pillow to maintain the extension.

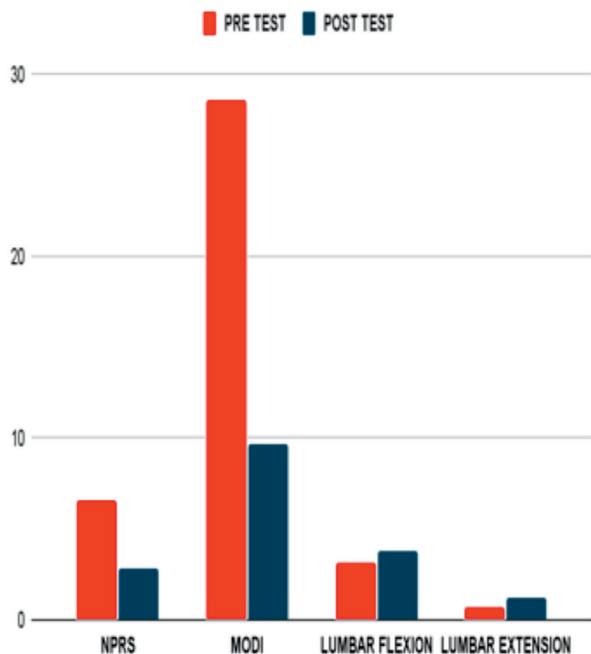
### Extension in standing:

- Put feet slightly apart while standing straight.
- Position the hands behind, fingers pointing backward using hands as a fulcrum with knees straight, bend the body backward at the waist as much as possible.
- For 2-3 seconds this position should be maintained.
- Then come back to the standing position.
- Try to bend backward a little further while doing this movement each time.

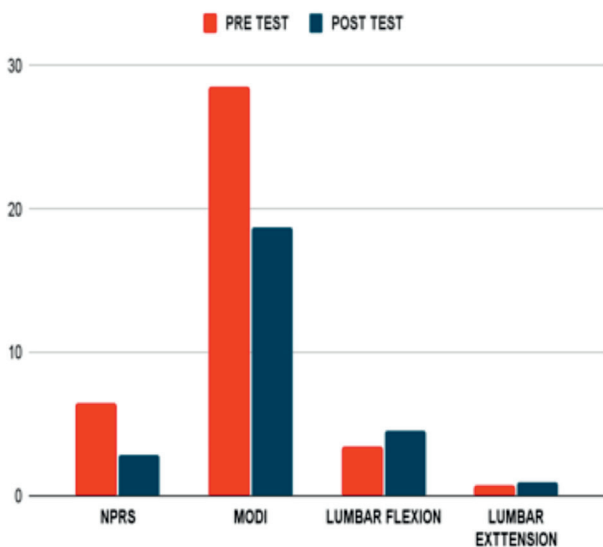
### Data Analysis

Using tabular and inferential statistics, the gathered data was evaluated. The mean and standard deviation were utilized for all parameters. 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

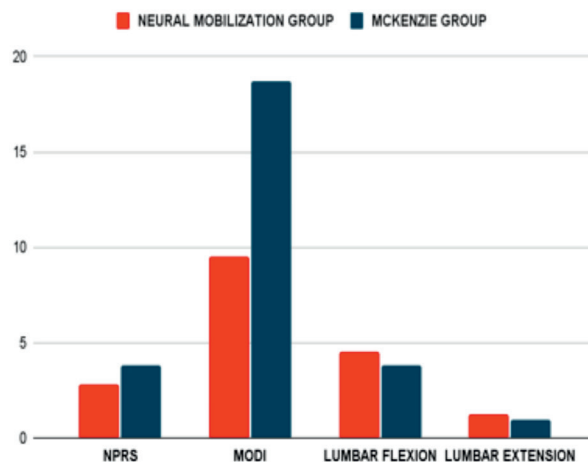
look at significant changes in the experimental group, the significance level of  $p < 0.0001$  was determined to be statistically significant.



**Graph - 1: Pre and Post test values of Neural mobilization group**



**Graph- 2: Pre and Post test values of Mckenzie group**



**Graph - 3: Post test values of Neural Mobilization group and Mckenzie group**

### Result

A statistical comparison of quantitative data between the McKenzie group and the Neural mobilisation group, as well as within the group showed a statistically significant difference.

The statically analysis of neural mobilization group pre test mean value of NPRS was 6.56 , while Post mean value was 2.78 .The MODI pre test mean value was 28.58 while Post test mean value was 9.63. Lumbar Flexion pre test mean value was 3.175 while Post mean value was 3.781. Pre test Mean value of lumbar extension was 0.691 and, while Post mean value was 1.244. This showed statistically significant in p-value of less than 0.0001

The statistical analysis of McKenzie group pre test mean value of NPRS was 6.47 while Post mean value was 2.81.The MODI pre test mean value was 28.56,While Post mean value was 18.72. Lumbar flexion pre test mean value was 3.469, while Post mean value was 4.503. Pre test Mean value of lumbar extension was 0.687 ,while Post mean value was 0.941.This showed statistically significant in p-value of less than 0.0001

The statistical analysis of NPRS Post test mean value of Neural mobilization group was 2.78,while Post test mean value of McKenzie group was 3.81.The MODI post test mean value of Neural mobilization group was 9.48 while post test mean value of McKenzie group was 18.72.The lumbar Flexion Post

test mean value of Neural mobilization group was 4.503, while Post mean value of McKenzie group was 3.781. The lumbar extension post test mean value of Neural mobilization group was 1.244, while post test mean value of McKenzie group was 0.941. This showed statistically significant in p value of less than 0.001

### Discussion

This study compares the efficacy of neural mobilization and McKenzie and also assesses the effectiveness in terms of reducing pain and improving Mobility and functional ability. This comparison is recorded with a duration of 4 weeks. The pre and post test values were measured by NPRS scale, Schobers method and MODI before and after treatment. The main finding of the study is that the group which received neural mobilization showed a higher rate of decreasing pain and improving functional ability for the patients with Lumbar Radiculopathy than the group that received McKenzie exercise.

The effects of the McKenzie method and Mulligan mobilization in Lumbar disc prolapse with unilateral Lumbar radiculopathy were examined in Trupti Warude's (2012) study, which concludes that the given data shows the effectiveness of both manual therapy modalities, namely the McKenzie approach and Mulligan's mobilization (SNAGS) approach, in treating PIVD patients with unilateral radiculopathy in reducing pain improving lumbar spine mobility and functional ability.

Therefore, this study's data imply that Mulligan's Mobilization SNAGS is efficient when combined with baseline therapy<sup>20</sup>.

It was believed that the neural mobilization therapies caused the nerve bed, or the tract made up of the components surrounding the nerve, to stretch, which resulted in nerve movement. Numerous studies support the hypothesis that extension of the nerve bed during neurodynamic tests is related to nerve gliding. Coppieters et al. (2009) claim that expanding of the nerve bed may also lead to the nerve elongating, resulting in an increase in tension and intraneural pressure.

According to the neural mobilization theory, changes in the nervous system's mechanics or physiology could lead to issues in other systems or with the musculoskeletal structures it innervates. By

using the neural mobilization approach, the flexibility and range of motion of the nervous system<sup>21</sup>.

While lumbar manipulation and neural mobilization both had an effect in reducing compression on the sciatic nerve root, whereas lumbar manipulation had superior outcomes. This may be the result of modification having a significant impact on disc bulge size, even if only slightly. It has been verified by (Bulbulian et al., 2002), who observed that despite substantial advancements in our understanding of the treatment of LBP, the precise mechanisms for LBP symptom reduction produced by spinal manipulation remain unknown. In a previous study where patient experienced significant pain relief and disc bulging was decreased to 14%, a series of clinical findings described additional potential pathways connected to successful treatment outcomes for LBP<sup>22</sup>.

Straight leg raise (SLR) combined with lumbar spine mobilization and exercise was helpful in lowering temporary impairment according to Sahar M. Adel's investigation into the impact of lumbar spine mobilization and neural mobilization technique on sciatic pain and the degree of nerve root compression for chronic low back dysfunction (LBD)<sup>23</sup>.

The result of the study, who performs neural mobilization shows reduction in pain, improving mobility and functional ability when it is compared to those who are all performing McKenzie approach.

### Conclusion

According to the findings of this study, neural mobilization was found to be more beneficial than McKenzie technique in decreasing pain, increasing lumbar spine mobility and functional ability for peoples with lumbar radiculopathy. As a result, neural mobilization is suggested for the people with Lumbar radiculopathy in reducing pain and improving functional ability.

**Ethical Clearance:** The ISRB committee of a private hospital and institution in Chennai has provided its clearance for the conduct of human research that complies with all applicable national laws, institutional regulations. (Application Number:

03/044/2022/ISRB/SR/SCPT).

**Funding:** This study is a self-funded study

**Conflict of Interest:** Nil

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