

# Effectiveness of Mckenzie Exercises Versus Neural Flossing Technique in Patients with Lumbar Radiculopathy

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## Abstract

**Background:** Lumbar radiculopathy is a term used to describe a range of symptoms that includes pain, tingling, numbness, and weakness that spreads along the pathway of the sciatic nerve. This condition can arise when any of the five sciatic spinal nerve roots become compressed or irritated, affecting one or both lower limbs.

**Purpose:** The study is to compare the effectiveness of McKenzie exercises and the neural flossing technique in managing lumbar radiculopathy in patients.

**Methodology:** The study recruited 40 participants with lumbar radiculopathy, randomly allocating them to Group A (McKenzie exercises along with laser therapy) and Group B (neural flossing with low-level laser therapy). The modified Oswestry Disability Index and Numeric Pain Rating Scale were used to assess outcomes.

**Results:** The results showed that the neural flossing technique (Group B) demonstrated statistically significant improvements in reducing pain and improving function compared to the McKenzie exercises (Group A) post-treatment. Group B had significantly lower NPRS scores ( $p < 0.0001$ ) and a higher improvement in MODI scores compared to Group A.

**Conclusion:** In this study, the neural flossing technique (Group B) showed superior outcomes in managing lumbar radiculopathy compared to McKenzie exercises (Group A). Group B exhibited significantly lower pain levels and greater improvement in functional disability. These findings suggest that the neural flossing technique may be a more effective treatment option for patients with lumbar radiculopathy.

**Keywords:** McKenzie technique, Nerve flossing technique, Laser therapy, radiculopathy, low back pain.

## Introduction

Lumbar radiculopathy, a condition characterized by radiating pain, numbness, and weakness in the lower back and legs, affects a significant proportion of the population and poses a considerable burden on individuals' quality of life. It is a prevalent and

debilitating condition that affects a substantial portion of the global population. More than 70% of individuals in developed countries have reported experiencing low back pain at least once in their life<sup>1,2</sup>.

Lumbar radiculopathy may cause irritation in one or both legs because of an issue with any

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(or all) of the five sciatic spinal nerve roots. Nerve root entrapment is another way of saying lumbar radiculopathy along with other similar terms like sciatica and nerve root pain. The most typical condition affecting both sexes and most age groups is lower back discomfort. Approximately 85% of the population is affected by this. An extensive treatment program for lumbar radiculopathy may also include spinal extension exercise, mainly McKenzie exercise, Neural flossing exercises, chiropractic care, pain management methods, and anti-inflammatory drugs. To relieve the compression on the afflicted nerves in extreme situations where conservative therapies are ineffective, surgical surgery may be considered<sup>3,4</sup>.

The McKenzie Method focuses on self-assessment and self-treatment, empowering patients to take an active role in their recovery. The key principle behind McKenzie exercises is centralization, which refers to the process of moving the pain from the legs back to the lower back. This is considered a positive sign as it indicates that the pressure on the irritated nerve is reducing. By centralizing the pain, the exercises aim to promote the body's natural healing process and alleviate discomfort caused by nerve impingement<sup>5,6</sup>. During the assessment phase, the therapist identifies specific movements that either centralized or peripheralized the pain. Peripheralization is when the pain spreads further down the leg, which is usually an indicator that a particular movement is aggravating the condition. Once the centralizing movements are identified, the patient is prescribed exercises tailored to their specific condition<sup>7,8</sup>.

These exercises may include repeated movements, such as standing or lying extensions, and sustained positions, like lying on the stomach or back. The goal is to encourage proper disc alignment and reduce irritation on the affected nerve root. Patients are encouraged to perform the prescribed exercises regularly at home. Over time, the exercises are adjusted and progressed based on the individual's response to treatment. McKenzie exercises are often incorporated into a comprehensive treatment plan for lumbar radiculopathy<sup>9,10</sup>.

Nerve flossing, a technique (NFT) pioneered by Michael Shacklock, is an active procedure that provides mechanical and physiological advantages as a conservative treatment option. For many

compressive neuropathic diseases, the flossing technique is a safe, feasible, and conventional therapy option. Neural flossing, also known as neural gliding or neurodynamic mobilization, is a method that can both reduce pain and improve range of motion. The neural flossing method gently mobilizes the damaged nerves by gently stretching them through a series of controlled movements. Variations of the specialized neural flossing exercises for lumbar radiculopathy may include the slump floss, slump with a lateral glide, and straight leg lift floss<sup>11,12</sup>.

MODI Modified Oswestry Disability Index (MODI) is a validated questionnaire used to assess functional disability in patients with lower back pain or lumbar radiculopathy. <sup>(13)</sup>

The Numerical Pain Rating Scale (NPRS) is a simple and widely used tool to assess pain severity. It uses a 10-centimeter line, with "0" representing no pain and "10" the worst possible pain. Individuals mark their pain level on the line and measure the distance to assign a numerical value to pain severity<sup>14</sup>.

## Aim

The aim of the study is to evaluate the effectiveness of McKenzie exercises versus neural flossing technique in patients with Lumbar radiculopathy.

## Materials and Methodology

It was an Experimental study conducted at Saveetha medical college and hospital, Chennai. The duration of the entire study was around 5 months i.e., from June to October 2022 including the sample collections procedures and treatment period. 40 participants with lumbar radiculopathy were chosen based on specific inclusion and exclusion criteria. Subsequently, they were allocated randomly to either of the two groups. Group A underwent McKenzie exercises (ME) along with low level laser therapy, while Group B received the neural flossing technique (NFT) in combination with low-level laser therapy, and this treatment regimen lasted for a duration of 6 weeks. To evaluate the results, the researchers used a modified Oswestry disability index (MODI) and the Numeric Pain Rating Scale (NPRS).

**Inclusion criteria:**

- Both male and female
- Above 30 years old
- Subject diagnosed with IVDP confirmed by MRI.
- Sharp, shooting, and radiating leg pain
- Positive passive straight leg raise test [30 – 70 degrees]

**Exclusion criteria:**

- Infection of the spine
- Recent surgery
- History of vertebral fracture
- Spinal deformity
- Osteoporosis
- Sacroiliac joint pain
- Spondylolisthesis
- Vascular disorders
- cauda equina syndrome
- spinal deformity

**Outcome Measures**

The study used MODI, and NPRS as outcome measures. MODI assesses pain, stiffness, and function in the spine. NPRS measures pain severity. These measures guide treatment regimens for lumbar radiculopathy.

**Procedure**

This study is a comparative intervention trial involving 40 subjects with lumbar radiculopathy, divided into two groups: Group A and Group B. Eligible participants were selected based on inclusion and exclusion criteria. After explaining the study and intervention, subjects were separated into the McKenzie group and neural flossing group, with their consent obtained. Baseline demographic data, along with MODI and NPRS scores, were recorded before treatment and after the 6-week intervention. Both Group A and Group B received low-level laser therapy treatment for 3 sessions per week for 4 weeks, followed by continuing exercises at home for the remaining 2 weeks. The study aims to compare the effectiveness of the two interventions in managing lumbar radiculopathy.

The participants in Group A received McKenzie exercises followed by low level laser therapy for 3 sessions a week continuously for 4 weeks. After 4 weeks of treatment, instructions were given to the participants to do exercises alone for two weeks. Subjects were reassessed by a physiotherapist after 2 weeks of follow up. The MODI and NPRS were used to measure function and pain respectively.

The participants in Group B receive neural flossing technique followed by low level laser therapy for 3 sessions per week continuously for 4 weeks. After 4 weeks of treatment, instructions were given to the participants to do exercises alone for two weeks. Subjects were reassessed by a physiotherapist after 2 weeks of follow up. The MODI and NPRS were used to measure function and pain respectively.

**Group A: McKenzie exercise:**

1. LYING IN PRONE: This simple exercise can prove highly effective for individuals who are in pain-sensitive or acute condition. Patients turn their head to one side while lying on their stomach. The lumbar spine's natural inward curve, or lordosis, is induced by this position. For at least three minutes, the patient holds this position while attentively evaluating how their symptoms change. In more severe circumstances, adopting this position might be enough to lessen symptoms, allowing the patient to advance to prolonged or repetitive motions with less pain or discomfort. This activity is an important first step in evaluating the patient's condition and choosing the best course of treatment for them.

2. LYING - PRONE EXTENSION (prone on elbow) To perform the McKenzie prone on elbow exercise, lie face down, support your upper body on your elbows, and keep your forearms flat on the ground. Raise your upper body by slightly arching your back. Maintain this position for a brief period, and then gently lower yourself back down. This exercise helps improve spine extension and can be beneficial for some lower back conditions.

3. EXTENSION IN LYING (prone on hand): In prone position, assume a press-up stance with hands under shoulders. Push upper body up, straightening elbows, and relax hips, pelvis, and legs while maintaining regular breathing. Hold for 10 seconds, then return to the initial position. Perform 2 sets of 10 reps, ten times each session, spread across six to eight sessions. Focus on smooth, rhythmic movements.

4. EXTENSION IN STANDING: To perform this exercise, stand with feet shoulder-width apart, hands on the lower back, and gently arch the lower back backward. Hold for 5-10 seconds, then return to an upright position. Repeat 8-10 times.

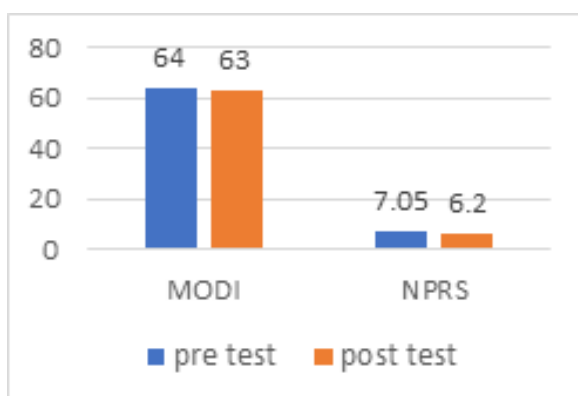
**Group B Neural flossing technique:**

The neural flossing technique was actively carried out while seated on a chair or couch. The participant lowered their head while simultaneously bending their knee backward under the chair, holding the position for five seconds. The subject then stretched his neck while straightening the leg on the side of his body that was experiencing sciatica. Until he felt discomfort, the participant lifted his leg forward and out in front and stopped there. He sustained the position for five seconds while extending his foot higher towards his shin to boost the stretching effect as the nerve’s sensitivity decreased. The nerve-flossing technique was performed 15 times. After each set of 15 repetitions, the patient underwent an additional evaluation. The above were administered in five sets, with a two-hour break between each set while the investigator was present.

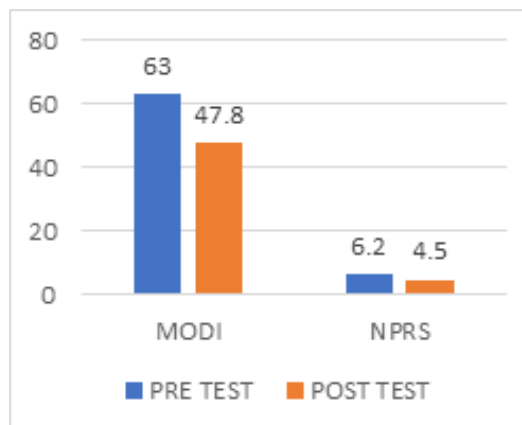
**LOW LEVEL LASER THERAPY**

Once, the participants completed an exercise using a McKenzie and neural flossing approach. Then Participants from both the groups were given LLLT with 830 nm laser with a power density of 0.67 W/cm<sup>2</sup> or 300 mW/cm<sup>2</sup>. The stationary laser probe was positioned with the utmost attention to skin hygiene by placing it near either L4, L5, or S1 spinal process associated nerves targeted to treat a single distal level segment. A period of 30 to 60 sec was used to apply the laser at each point. The procedure was performed 3 days every week for 4 weeks.

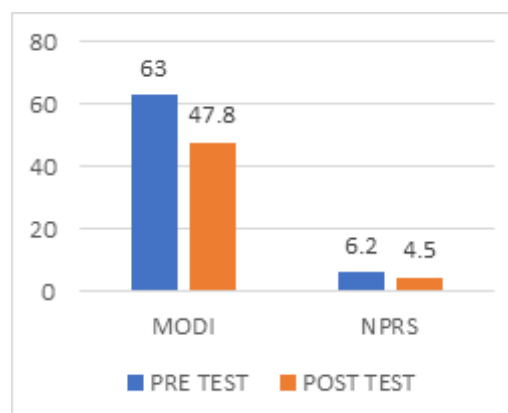
**DATA ANALYSIS**



**Graph 1: Group A paired t test**



**Graph 2: Group B paired t test**



**Graph 3: unpaired t test**

**Result**

The study compared Neural Flossing Group and McKenzie Group with MODI and NPRS values. In the Neural Flossing Group, post-test MODI was 47.8 (SD = 18.53), NPRS was 4.55 (SD = 1.10). McKenzie Group had MODI 63.30 (SD = 20.74) and NPRS 6.20 (SD = 1.36). MODI, NPRS showed highly significant differences ( $p < 0.0001$ ). the neural flossing technique (Group B) showed superior outcomes in managing lumbar radiculopathy compared to McKenzie exercises (Group A). Group B exhibited significantly lower pain levels and greater improvement in functional disability. These findings suggest that the neural flossing technique may be a more effective treatment option for patients with lumbar radiculopathy.

**Discussion**

According to the present study, individuals with lumbar radiculopathy have less pain and

disability while using the nerve flossing technique with low-level laser therapy (LLLT). In this study, we compare the outcome parameter of MODI and NPRS in improving the lumbar mobility and lumbar functional activity by giving neural flossing technique and McKenzie exercise.

McCracking et al. conducted a study on low back pain (LBP) with radiculopathy and reported similar results in Favor of neurodynamic treatment techniques. Neurodynamic treatments aim to address nerve-related issues and have shown promising outcomes for individuals with LBP and radiculopathy<sup>15</sup>.

Kranthi Pallipamula et al.'s 2012 case study explored the efficacy of nerve flossing for sciatica caused by an extruded disc. While limited by its single-case design, the study suggests the potential effectiveness of the technique in treating such cases<sup>16</sup>.

In 2022, Afzal et al. reported that neural flossing technique (NFT) shows promise in alleviating sciatica symptoms and improving patient outcomes. The approach, when combined with traditional physical therapy, demonstrated favourable effects, suggesting its potential as an effective treatment for sciatica<sup>17</sup>.

In Ishaq Ahmed et al.'s study (2022), the findings indicate that low-level laser therapy (LLLTT) is a successful supplementary treatment for discogenic lumbar radiculopathy when used in combination with traditional physical therapy. This suggests its potential as an effective approach in managing this condition<sup>18</sup>.

The study conducted by Anikwe EE et al. in 2015 examined the impact of the Nerve Flossing Technique on acute sciatica symptoms and hip range of motion. The results demonstrated that incorporating Nerve Flossing with conventional physical therapy significantly reduced acute sciatica symptoms and improved hip mobility. These findings suggest that Nerve Flossing could be a valuable treatment option for patients with acute sciatica<sup>19</sup>.

In chronic back pain, exercise is helpful in return to activities of daily living. Niraj Kumar's 2020 study compared McKenzie Techniques (MT) with isometric strengthening exercises (ISE) in patients with cervical radiculopathy. After four weeks of treatment,

the study found that the McKenzie protocol was more effective in managing cervical radiculopathy compared to isometric strengthening exercises<sup>19,20</sup>.

## Conclusion

The study compared the effectiveness of McKenzie exercises (Group A) and neural flossing technique (Group B) in lumbar radiculopathy patients. Group A showed higher post-test disability (MODI) and pain (NPRS) scores compared to Group B, which received neural flossing. Thus, the findings suggest that the neural flossing technique be more effective in managing lumbar radiculopathy than McKenzie exercises, as Group B demonstrated lower post-test disability and pain scores.

**Ethical Clearance:** The study was approved by the Committee of Institutional Scientific Review Board.

**Conflicts of interest:** All authors declare no conflict of interest.

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**Author's contribution:** All authors contributed equally to the manuscript and read and approved the final version of the manuscript.

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