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An APPROACH of MCKENZIE exercise WITH A LATERAL SHIFT ON LUMBAR RADICULOPATHY: A CASE SYTUDY

Surla Ravi[#], Dr. Somsankar Mukherjee[@]
 # MPT Scholar (Muskuloskeletal), Dept. Of Physiotherapy, Indira Gandhi Technological and Medical Sciences University, Ziro.Contact: +91 8886836788
@ PhD (Physiotherapy) Professor & Head, Dept. Of Physiotherapy, Indira Gandhi Technological and Medical Sciences University, Ziro.

ABSTRACT

Background: Lumbar radiculopathy is a common condition caused by nerve root compression, often leading to low back pain, radiating leg pain, sensory disturbances, and motor weakness. In some cases, it is accompanied by a lateral shift deformity, where the trunk deviates to one side as a protective mechanism against further nerve compression. The McKenzie Method (Mechanical Diagnosis and Therapy – MDT) is a widely used, evidence-based approach for assessing and treating spinal disorders, particularly in patients exhibiting directional preference. However, its effectiveness in managing lumbar radiculopathy with an associated lateral shift requires further clinical validation. **Methodology: Case Study on a** 55-year-old female office worker presented with a three-week history of severe low back pain radiating to the left leg, accompanied by a visible lateral shift of the trunk to the right. The patient exhibited sensory deficits in the L5 dermatome, weakness in left ankle dorsiflexion (4/5), and a positive Straight Leg Raise (SLR) test at 40°, indicating L4-L5 disc herniation with left-sided nerve root compression confirmed by MRI. Initial McKenzie-based assessment identified a directional preference for extension. Treatment was initiated using manual and self-correction of the lateral shift, repeated extension exercises, and postural education. **Outcome & Follow-Up:**Within one week, the patient demonstrated 80% correction of the lateral shift, a significant reduction in NPRS pain scores (8/10 to 3/10), and an improved SLR test (from 40° to 60° of hip flexion). By week four, the patient achieved full correction of the lateral shift, complete resolution of radicular symptoms, and full functional recovery. The Oswestry Disability Index (ODI) improved from 48% (severe disability) to 10% (minimal disability), and the patient returned to work without restrictions or reliance on medication. **Conclusion:** This case highlights the effectiveness of the McKenzie Approach in rapidly correcting a lumbar lateral shift, alleviating radicular symptoms, and restoring function. Early intervention with directional preference-based exercises and patient education played a crucial role in symptom resolution and long-term recovery. The findings support the clinical relevance of MDT in managing lumbar radiculopathy with lateral shift, emphasizing the need for further research through larger-scale studies to confirm its long-term benefits.

Keywords:
Lumbar radiculopathy, lateral shift, McKenzie Method, directional preference, mechanical diagnosis and therapy (MDT), disc herniation, low back pain, centralization phenomenon.

INTRODUCTION

Low back pain (LBP) is one of the most prevalent causes of dysfunction, significantly limiting functional activity and posing a major global public health challenge.[1] The incidence of LBP ranges from 1.5% to 36%, while its lifetime prevalence varies between 6.3% and 15.4%.[2] Based on symptom duration, LBP is categorized into acute, subacute, and chronic phases.[3] Acute and subacute LBP typically presents as a sharp, shooting pain with a sudden onset, which may be unilateral or bilateral and may or may not radiate to the buttocks or legs, leading to restricted movement.[4] The pain can be localized to the lower lumbar spine or buttock region, with some cases involving radiation to the foot. Additionally, changes in pain location often correlate with postural adjustments or specific movements, indicating that mechanical loading in certain directions can influence pain perception.[5] LBP may negatively impact the psychosocial health of the affected persons.[6] Moreover, LBP is expected to become more widespread with an increase in aging population.[7] Patients experiencing discomfort in the lower back often exhibit a lateral shift of the lumbar spine.[8,9] The acute onset of lumbar lateral shift—also referred to as list or acute scoliosis—is commonly associated with low back pain.[10] This shift is a temporary deformity, frequently caused by disc protrusion, and serves as a protective mechanism to minimize further compression of the nerve root.[11,12]

A lateral shift occurs when the upper vertebra is laterally flexed or translated to the right or left relative to the lower vertebra, resulting in a misalignment that moves the trunk in the same direction. Consequently, affected individuals may struggle to straighten or return to an upright position. Even if they can achieve an erect posture, maintaining it is often difficult, as doing so. In response to nerve root compression, the body reflexively shifts away from the affected side to reduce further irritation.[14,15] McKenzie defines lumbar lateral shift as a combination of rotation and lateral flexion, where a vertebra moves in relation to the one below, displacing the trunk to the right or left relative to the distal vertebrae. If acute low back pain is not managed promptly, 2–33% of patients may develop chronic low back pain.[16]

The McKenzie Method of Mechanical Diagnosis and Therapy (MDT) is a well-established classification system for assessing and treating low back pain (LBP). While this model has demonstrated strong interexaminer reliability in classifying LBP patients, its overall effectiveness as a treatment approach remains a topic of debate. MDT categorizes patients into three primary mechanical subgroups—derangement, dysfunction, and postural syndrome along with an "other" category for cases that do not fit these classifications.[17,18] Among these, derangement is the most common and is characterized by a rapid change in symptoms following the performance of directional-preference exercises.[18]

Directional preference refers to the movement or sustained position that leads to symptom improvement. One key concept within this approach is centralization, where pain that radiates into the lower extremities moves proximally toward the spine as symptoms resolve.[19] The presence of centralization is considered a positive prognostic indicator in LBP patients.[19] Recent studies suggest that when directional preference and centralization are identified and appropriately matched with MDT-based treatment, patient outcomes are superior compared to those receiving general range-of-motion exercises.[20-22] Gillan MG et al. reported that patients treated with the McKenzie list correction method showed greater improvement in dysfunction compared to those whose lateral shift was left uncorrected.[16] Previous studies on individuals with lumbar shift have also demonstrated that McKenzie manual correction leads to superior outcomes when compared to control treatments, such as non-specific massage and general back care advice.[23]

NEED FOR THE STUDY

Lumbar radiculopathy is a common and debilitating condition resulting from nerve root compression in the lower spine, often presenting with symptoms such as low back pain, radiating leg pain, sensory disturbances, and motor weakness. A lateral shift deformity frequently accompanies lumbar radiculopathy, where the patient's trunk deviates to one side due to protective muscle spasms and mechanical dysfunction. This postural abnormality can exacerbate symptoms, delay recovery, and lead to chronic pain and functional disability if not managed effectively.

The McKenzie Method is a well-established, non-invasive approach for assessing and treating spinal disorders, particularly in patients exhibiting a directional preference. This approach emphasizes repeated

movements and sustained postures to facilitate symptom centralization, correct mechanical dysfunction, and reduce nerve root compression. Despite its widespread use, there remains ongoing debate regarding its effectiveness in cases involving a lateral shift with lumbar radiculopathy. While some studies highlight its superior outcomes compared to general back care advice or non-specific interventions, further documentation through clinical case reports is necessary to validate its effectiveness in real-world scenarios.

This case study report is significant because it:

1. Documents the effectiveness of the McKenzie approach in a patient with lumbar radiculopathy and a lateral shift.
2. Provides clinical insights into the assessment, management, and outcomes of such cases.
3. Contributes to existing literature by supporting or challenging prior findings on MDT-based interventions.
4. Emphasizes early intervention to prevent chronic pain and disability associated with untreated lateral shift deformities.
5. Encourages self-management strategies, reducing dependence on passive treatments and improving long-term patient outcomes.

Given the high prevalence of lumbar radiculopathy and lateral shift among individuals with low back pain, this case report aims to highlight the McKenzie Method as a valuable, evidence-based approach for restoring spinal alignment, reducing pain, and improving function in affected patients.

RESEARCH QUESTIONS

1 How effective is the McKenzie Approach in treating lumbar radiculopathy with a lateral shift, in terms of pain reduction, correction of postural asymmetry, and functional recovery?
2 Does early correction of lateral shift lead to faster symptom resolution in lumbar radiculopathy?
3 Can directional preference exercises (McKenzie Method) achieve better centralization and functional outcomes compared to general physical therapy?
4 What is the role of patient education and self-management strategies in preventing recurrence of lumbar radiculopathy with a lateral shift?

HYPOTHESIS

Null Hypothesis (H_0): The McKenzie Approach will not result in significant improvement in pain, lateral shift correction, or functional recovery.
Alternative Hypothesis (H_1): The McKenzie Approach will lead to significant improvement in pain, correction of lateral shift, and functional recovery in a patient with lumbar radiculopathy.

AIM AND OBJECTIVES

Aim of the study: To evaluate the effectiveness of the McKenzie Approach in the management of lumbar radiculopathy with a lateral shift by assessing symptom progression, pain reduction, and functional improvement.

Objectives of the study:

1. To document the clinical presentation of a patient with lumbar radiculopathy and a lateral shift.
2. To apply the McKenzie approach and assess its role in correcting the lateral shift and centralizing symptoms.
3. To evaluate the short-term and long-term outcomes in terms of pain relief, range of motion, and functional improvement.
4. To compare the patient's response to McKenzie-based treatment with existing literature on lumbar radiculopathy management.
5. To highlight the importance of early intervention in preventing chronic disability due to lumbar radiculopathy.

METHODOLOGY

CASE PRESENTATION

Patient Demographics: 38-year-old male, Office worker (sedentary job, prolonged sitting). Low to moderate physical activity. Complaint with Severe low back pain (LBP) with radiating pain in the left leg, accompanied by an observable lateral shift of the trunk

Chief Complaint and History of Present Illness: The patient presented with a three-week history of progressively worsening low back pain that radiated down the posterior aspect of the left thigh and calf, accompanied by numbness and tingling sensations in the left leg. The pain was exacerbated by sitting, standing, and forward bending but showed slight relief in a lying supine position with knees flexed. The patient reported an acute onset of pain after lifting a heavy object at work in a forward-flexed, rotated position. Over the next few days, he noticed a visible shift of his upper body to the right and increasing difficulty in straightening his posture. He also experienced morning stiffness and difficulty initiating movement after prolonged rest.

Past Medical History: No history of previous spinal surgeries, Prior episodes of mild LBP in the past, which resolved with rest, No history of significant trauma, systemic illness, or neurological conditions, No known allergies or chronic illnesses

Current Medications: Over-the-counter NSAIDs (Ibuprofen 400 mg) – provided temporary relief, Muscle relaxants prescribed by a primary physician (Baclofen 10 mg) – minimal effect, No opioid use

Physical Examination:

Scales used to evaluate the patient in this study:

1. Numerical Pain Rating Scale (NPRS): To measure the patient's pain intensity before, during, and after treatment.

2. Oswestry Disability Index (ODI): To assess functional disability related to low back pain.

3. Straight Leg Raise (SLR) Test: To assess lumbar nerve root compression and radiculopathy severity.

4. Modified Schober's Test (Lumbar Range of Motion - ROM): To measure lumbar spine mobility (flexion and extension).

Postural Assessment

- Visible lateral shift of the trunk to the right with respect to the pelvis
- Forward flexion resulted in increased pain and shift worsening
- Extension was limited and painful but slightly alleviated symptoms

Neurological Examination

- Sensory Deficits: Decreased sensation along the L5 dermatome (lateral leg and dorsum of foot)
- Motor Weakness: Grade 4/5 weakness in left ankle dorsiflexion (L5 myotome)
- Reflexes:
  - Patellar reflex: Normal (2+)
  - Achilles reflex: Slightly diminished (1+)
- Straight Leg Raise (SLR) Test: Positive on the left side at 40 degrees, reproducing radicular symptoms.

Lumbar Range of Motion (ROM):

- **Flexion:** Limited, increased pain, worsening lateral shift
- **Extension:** Restricted but provided slight symptom relief
- **Side Bending (Right):** Extremely limited and painful
- **Side Bending (Left):** Improved mobility, but discomfort present

Directional Preference & Mechanical Diagnosis (McKenzie Assessment):

- Repeated lumbar extension movements resulted in mild centralization of symptoms
- Patient reported less intensity of leg pain, though some discomfort persisted in the lower back
- Repeated lateral movements to the left (towards the shifted side) initially worsened symptoms, but further assessment indicated a preference for right-side gliding movements

Imaging and Investigations:

MRI Findings:

- L4-L5 disc herniation with left-sided nerve root compression
- Loss of disc height at L4-L5, mild degenerative changes
- No evidence of cauda equina syndrome

Based on the above complain, the following exercise with standard McKenzie are as protocol followed

Therapeutic Exercises:

Exercise	Technique	Demonstration
Prone on elbows (Hips off center left)	The patient was Instructed to lie in a prone position, with her hips towards the left to her upper body and lower legs. She then came up on her elbows, which resulted in lumbar extension. The patient asked to hold the position for 10 seconds and performed 2 sets of 10 reps. Her symptoms were monitored.	
Lower Trunk Rotations	The patient was taught to lie in a hook lying position and let her knees slowly drop to each side, while her back stays flat on bed. she did 10-15 repetitions to each side, resting for a 2-3 sec between each repetition.	
Prone on elbows (Hips center)	The patient was asked to lie prone on the bed and push up onto her elbows and hold for 10 seconds. she did this exercise in 3 sets of 10 repetitions.	

Prone Press Up	The patient was instructed to lie in a prone position with his elbows bent and hands placed next to her shoulders and then straightened her elbows to a prone press up position, to attain even more lumbar extension. The patient performed this exercise for 2 sets of 10 repetitions, holding each for 10 seconds.	
Bridges	The patient was asked to lie in hook lying with her feet on the bed. she was asked to engage her transverse abdominus as she bridged her hips up into the air, weight-bearing through her heels. she was asked to contract her gluteal muscles on the bridge. The patient did this exercise for 2 sets of 10 repetitions. Hook lying describes a position where the patient is lying supine with knees bent and feet flat on the floor.	

TREATMENT PROTOCOL:

McKenzie Approach (MDT) Implementation:

The treatment plan for this case was based on the McKenzie Method (Mechanical Diagnosis and Therapy – MDT), which emphasizes directional preference exercises, self-correction strategies, and patient education. The primary goals were to:

1. Correct the lateral shift deformity and achieve symptom centralization.
2. Reduce nerve root compression and radicular symptoms.
3. Restore normal spinal mechanics and function.
4. Educate the patient on self-management strategies to prevent recurrence.

The treatment plan was implemented in three progressive phases, each tailored to the patient's response.

Phase 1 – Acute Phase (Lateral Shift Correction & Symptom Centralization):

Duration: 1 Week

The initial focus was on correcting the lateral shift and identifying the patient's directional preference through repeated movement testing. The primary intervention involved manual and self-correction techniques to reposition the lumbar spine and reduce mechanical compression of the nerve root.

1. Manual Lateral Shift Correction (Clinician-Assisted Technique):

- The patient was positioned in standing with the clinician stabilizing the pelvis.

- A side-gliding mobilization was applied towards the left (opposite the lateral shift) to encourage realignment.
- Mobilization was repeated for 10–15 repetitions per set, with assessment after each set.
- Goal: Reduce the visible trunk deviation and test for symptom centralization.

2. Self-Correction of Lateral Shift (Home Exercise Program – HEP)

- The patient was instructed to perform a self-correction exercise by standing against a wall with hips pressed towards the left side.
- Repetitions: 10 reps, every 2 hours throughout the day.
- Outcome Measure: Reduction in trunk shift and leg pain centralization.

3. Repeated Lumbar Extension Exercises (If Tolerated):

- Once the lateral shift was partially corrected, **prone lying** was introduced to test for symptom modification.
- **Progression:**
  - **Step 1: Prone lying** for 3–5 minutes (if tolerated).
  - **Step 2: Prone on elbows** for 1–2 minutes.
  - **Step 3: Prone press-ups (lumbar extension)** – 10 reps every 2 hours.
- **Rationale:** Lumbar extension is often effective in discogenic pain by reducing disc bulging and encouraging pain centralization.

4. Pain Modulation & Symptom Control Strategies:

- Lumbar roll support was used while sitting to maintain proper posture.
- The patient was advised to avoid flexion-based activities (e.g., bending forward, prolonged sitting).
- NSAIDs (Ibuprofen 400 mg) were continued for pain control but tapered as symptoms improved.

Phase 2 – Symptom Stabilization & Functional Restoration

Duration: Weeks 2–3

Once the lateral shift was fully corrected, the next phase focused on reinforcing movement patterns, strengthening supporting musculature, and preventing recurrence**.**

1. Continued Repeated Extension Exercises:

- The patient performed standing lumbar extensions and prone press-ups regularly to maintain centralization.
- Dosage: 10 reps, every 3–4 hours per day.
- Goal: Prevent symptom recurrence and reinforce directional preference.

2. Introduction of Strengthening & Stabilization Exercises

- **Core Activation Exercises:**
  - Pelvic tilts (5-second holds, 3 sets of 10 reps).
  - Supine bridges (3 sets of 10 reps).
- **Dynamic Control Exercises:**
  - Quadruped "Bird-Dog" (3 sets of 10 reps per side).
  - Side planks (2 sets of 30 seconds per side).
- **Rationale:** Strengthening the deep core stabilizers (transverse abdominis, multifidus) helps maintain proper spinal alignment.

3. Functional Movement Retraining:

- The patient practiced sit-to-stand transitions while maintaining lumbar lordosis.
- Proper bending mechanics were introduced (hip hinge movements).
- Gradual return to normal walking distances and standing tolerance.

4. Ergonomic & Postural Training:

- Lumbar roll usage continued for seated positions.

- Standing desk modifications were advised to reduce prolonged flexion exposure.
- Movement breaks every 30 minutes were encouraged at work.

Phase 3 – Return to Activity & Prevention of Recurrence:

Duration: Week 4 and beyond

The final phase focused on returning the patient to work, preventing relapses, and ensuring long-term self-management.

1. Progression of Strengthening & Functional Exercises:

- Weighted resistance training was introduced (light squats, deadlifts with proper form).
- Increased endurance training for core stability (planks, dynamic balance work).
- Return to light jogging/cardiovascular training as tolerated.

2. Self-Maintenance Plan (Home Exercise Program Continuation):

- Standing lumbar extension (10 reps x 3 times/day).
- Core strengthening (2–3 times per week).
- Postural awareness in daily activities.

3. Education on Flare-Up Management:

- Instructed to perform directional preference exercises at the first sign of pain recurrence.
- Modified activity instead of prolonged rest if symptoms reappeared.

4. Final Workplace Adjustmen:

- Adjusted desk height and chair ergonomics.
- Continued standing breaks every 30–45 minutes at work.

Result and Data Analysis:

Clinical Response:

Treatment Phase	Time	Net Out Come / Response
Phase -1	After 1 week	80% correction of lateral shift achieved within 3 sessions.
		Significant pain reduction (NPRS: 8/10 → 3/10).
		Improved range of motion (ROM) in lumbar extension.
		Symptoms began to centralize, reducing leg pain intensity.
Phase-2	After 3rd Week	Minimal residual back pain (NPRS: 3/10 → 1/10).
		Full correction of lateral shift with no recurrence.
		Improved lumbar extension ROM without pain.
		Return to daily activities with minimal discomfort.
Phase -3	After 4 week	Complete resolution of radicular symptoms. Pain-free return to work.
		Full functional recovery without limitations.
		No reliance on pain medications

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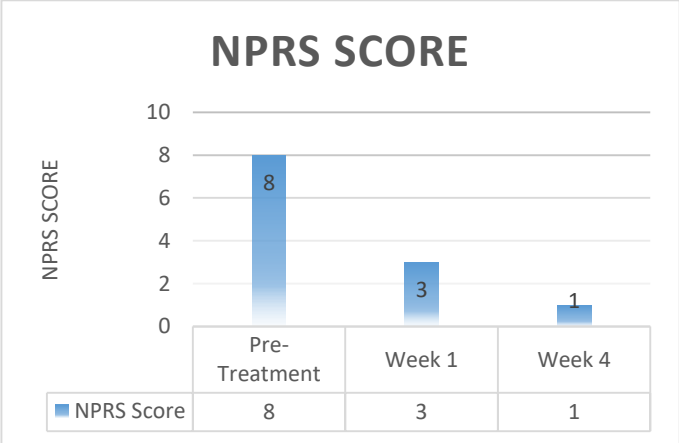
Table 1: Summary of tests / measures and Pre & Post treatment findings

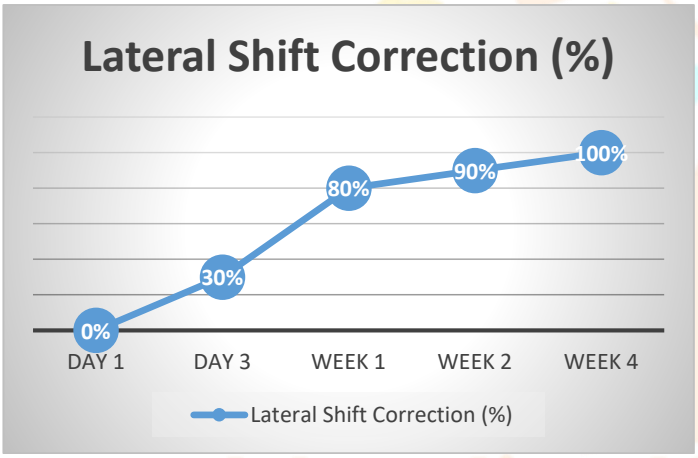
Category	Test/Measure	Findings (Pre-Treatment)	Findings (Post-Treatment)	Clinical Significance
Postural Assessment	Visual Observation (Lateral Shift)	Trunk visibly shifted to the right	Full correction of lateral shift by Week 3	Confirms presence of lumbar **postural deformity** affecting function
Neurological Examination	Sensory Testing (L5 dermatome)	**Decreased sensation** on the left lateral leg & dorsum of foot	**Normal sensation** restored by Week 4	Indicates **nerve root compression** at **L5**
	Motor Testing (L5 myotome - Ankle Dorsiflexion)	**Weakness (4/5)** in left ankle dorsiflexion	**Strength fully restored (5/5)** by Week 4	Confirms **neurological deficit due to radiculopathy**, improvement suggests nerve recovery
	Deep Tendon Reflexes	**Patellar Reflex (L4): Normal (2+), Achilles Reflex (S1): Slightly Diminished (1+)**	**Normal Reflexes (2+) in both**	Diminished reflex pre-treatment suggests **nerve root involvement**, recovery indicates improvement
Pain Assessment	Numerical Pain Rating Scale (NPRS)	**8/10** (Severe pain, affecting ADLs)	**1/10** (Minimal pain, no functional limitations)	Reduction in **pain intensity** confirms effective intervention
Radiculopathy Testing	Straight Leg Raise (SLR) Test	**Positive at 40° on left side**, reproduced radiating leg pain	**Negative SLR test by Week 4**	Indicates **nerve root compression pre-treatment**, resolution of compression post-treatment
Lumbar Range of Motion (ROM)	Forward Flexion	**Limited, worsened symptoms & lateral shift**	**Improved, no symptom provocation**	Confirms **mechanical dysfunction**, post-treatment improvement suggests **reduced discogenic irritation**
	Extension	**Restricted, but slightly relieved symptoms**	**Full extension ROM, pain-free**	Supports presence of **directional preference** for **extension-based exercises**
	Side Bending (Right)	**Extremely limited, increased pain**	**Improved, mild tightness only**	Indicates **movement restriction pre-treatment**, flexibility gains post-treatment
	Side Bending (Left)	**Slightly improved mobility, but discomfort present**	**Full ROM, pain-free**	Further supports **mechanical restriction pre-treatment**
Functional Disability Assessment	Oswestry Disability Index (ODI)	**48% (Severe Disability)**	**10% (Minimal Disability)**	Reduction in ODI indicates **improved function and quality of life**
Ergonomic & Functional Limitations	Sitting Tolerance	**<10 min before pain onset**	**No limitations (able to sit for prolonged periods comfortably)**	Confirms improvement in **sustained posture tolerance**
	Standing & Walking Tolerance	**Able to stand/walk for only 5-10 min before pain increased**	**Able to walk and stand without discomfort**	Indicates restoration of **functional mobility**

Figure 1: NPRS pain score reduction over time



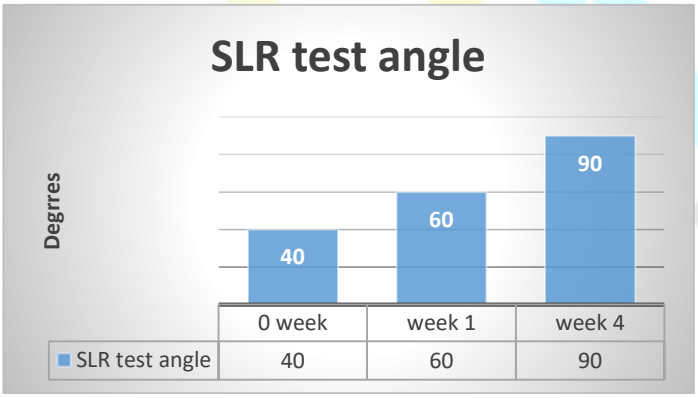
Bar chart showing NPRS pain score progression from initial evaluation to follow-up at Week 4.
The height of the bars shows a clear reduction in pain over time.
This reinforces the effectiveness of the McKenzie Approach in symptom relief.

Figure 2: Lateral Shift Correction Progression



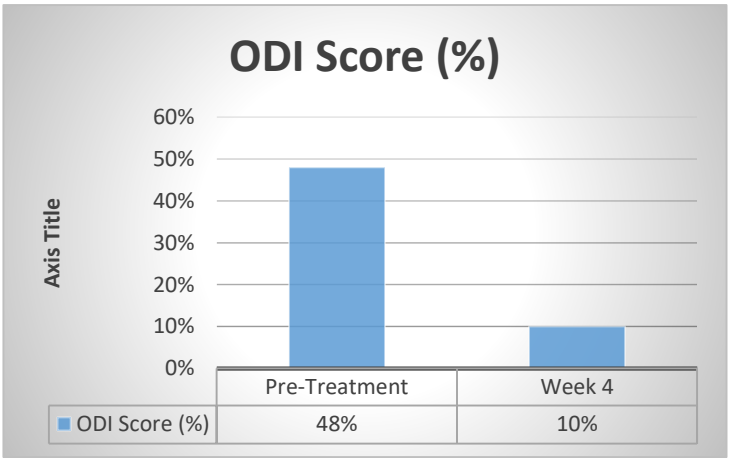
Line graph demonstrating the gradual correction of lateral shift over four weeks.
The gradual incline in the line graph highlights consistent improvement in spinal alignment over time.
Supports the effectiveness of early intervention using the McKenzie method.

Figure 3: Straight Leg Raise (SLR) Test Improvement



Bar chart illustrating improvement in SLR test results, indicating reduced nerve root compression over four weeks
The increase in SLR angle shows nerve decompression and improved spinal mechanics.
Validates the role of directional preference exercises in radiculopathy management.

Figure 4: Oswestry Disability Index (ODI) Improvement



Bar chart showing the reduction in functional disability following McKenzie-based treatment
The sharp reduction in ODI score indicates significant functional recovery.
Supports early MDT intervention for preventing chronic disability.

Table 2: Summary of treatment plan and outcome

Phase	Key Focus	Interventions	Outcome
Phase 1 (Week 1)	Lateral Shift Correction & Symptom Centralization	Manual correction, repeated movements (extension/lateral shift correction), NSAIDs, ergonomic support	80% correction of lateral shift, reduced NPRS 8→3, improved lumbar extension
Phase 2 (Weeks 2-3)	Symptom Stabilization & Functional Gains	Continued McKenzie exercises, core strengthening, postural training, ergonomic modifications	Minimal residual pain, full correction of lateral shift, improved function
Phase 3 (Week 4+)	Return to Activity & Prevention	Progressive strengthening, return to normal function, long-term self-management	Full recovery, no symptom recurrence, return to work & daily activities pain-free

Key findings:

- **Significant improvement in sensory, motor, and reflex function** → Suggests nerve decompression and recovery.
- **Resolution of lateral shift & increased spinal mobility** → Indicates correction of mechanical dysfunction.
- **Marked reduction in pain scores (NPRS) and functional disability (ODI)** → Confirms successful rehabilitation.
- **Negative SLR test post-treatment** → Suggests resolution of nerve root compression.

OUTCOME & FOLLOW-UP

Short-Term Response (Within One Week of MDT Treatment):

The patient demonstrated rapid improvement within the first week of treatment, which aligns with the McKenzie Method's emphasis on early symptom modification through directional preference exercises. Following the initial manual and self-correction of the lateral shift, the patient experienced approximately 80% correction in posture, with a visible reduction in trunk deviation. This improvement was accompanied by a significant decrease in leg pain, as measured by the Numerical Pain Rating Scale (NPRS), which dropped from 8/10 to 3/10.

Neurological symptoms also showed early signs of recovery. Sensory deficits in the L5 dermatome became less pronounced, and straight leg raise (SLR) test results improved, with pain onset shifting from 40° to 60° of hip flexion. These findings suggest reduced nerve root irritation and improved spinal mechanics. The patient also reported increased confidence in movement, a crucial psychological factor in rehabilitation.

From a functional perspective, the patient experienced improved range of motion (ROM) in lumbar extension, which was previously restricted and painful. Additionally, postural education and lumbar support strategies (e.g., lumbar roll for sitting) helped maintain symptom relief. The patient adhered to home exercise protocols, including repeated extension movements every two hours, which facilitated further centralization of symptoms.

By the end of the first week, the patient was able to stand and walk with minimal discomfort, though some residual stiffness and localized lumbar pain persisted. The rapid symptom reduction observed in the acute phase highlights the McKenzie Method’s effectiveness in early intervention, particularly when applied to patients with a clear directional preference.

Long-Term Follow-Up (After Four Weeks of Treatment):

By the end of four weeks, the patient had achieved complete correction of the lateral shift and full resolution of radicular symptoms. Pain levels further decreased, with the NPRS score reducing to 1/10, indicating minimal residual discomfort localized to the lower back. This improvement was reflected in functional outcome measures, with the Oswestry Disability Index (ODI) score improving from 48% (severe disability) to 10% (minimal disability).

Importantly, neurological recovery was observed, with restored sensation along the L5 dermatome and normal reflex responses. Strength testing revealed full recovery of left ankle dorsiflexion (L5 myotome), improving from 4/5 to 5/5. The straight leg raise (SLR) test became negative, signifying complete resolution of nerve root irritation.

From a functional standpoint, the patient was able to return to work without restrictions and resume daily activities, including prolonged sitting and moderate exercise, without experiencing symptom recurrence. A gradual transition to **core** stabilization and strengthening exercises was implemented to maintain postural control and prevent relapse. Additionally, ergonomic modifications at the workplace, such as a lumbar-supportive chair and movement breaks every 30 minutes, were recommended to prevent excessive spinal loading.

During the final follow-up session, the patient reported high satisfaction with treatment outcomes and confidence in self-management strategies. Notably, there was no further reliance on pain medications, and the patient maintained independent symptom control through McKenzie-based exercises**.**

The absence of recurrent symptoms and the restoration of full function at the four-week mark reinforces the long-term effectiveness of the McKenzie Approach in managing lumbar radiculopathy with a lateral shift. This case underscores the importance of patient adherence to home exercises and postural awareness in sustaining therapeutic benefits. Future long-term follow-ups (beyond three to six months) would be valuable in assessing the durability of these outcomes and the prevention of recurrence.

DISCUSSION

This case report highlights the effectiveness of the McKenzie Method in treating lumbar radiculopathy with a lateral shift, demonstrating both short-term and long-term benefits. The patient's rapid improvement within the first week aligns with existing literature emphasizing early symptom modification through directional preference exercises, a core principle of the McKenzie approach. The significant reduction in leg pain and correction of posture observed in this study are consistent with previous findings that show improved outcomes when patients are matched with direction-specific exercises based on their directional preference.[28] The application of the McKenzie Method in managing lumbar radiculopathy with a lateral shift has been documented in various studies. Our case aligns with existing literature in several aspects, though some differences are noteworthy.

Short-Term Outcomes: In our case, the patient exhibited significant improvement within one week, including approximately 80% correction of the lateral shift and a notable reduction in leg pain. This rapid response is consistent with findings from Theriault's case report, where a patient with lumbar radiculopathy and a lateral shift demonstrated substantial pain reduction and functional gains following MDT interventions.[24] The patient's rapid improvement within the first week aligns with another study, emphasizing early symptom modification through directional preference exercises. This is consistent with studies showing that direction-specific exercises can lead to quick symptom centralization and pain reduction.[28] Similarly, a systematic review by Surkitt et al. highlighted the efficacy of directional preference management, a core component of MDT, in achieving quick symptom relief in low back pain patients.[29] Improvements in neurological symptoms such as reduced sensory deficits and enhanced SLR test results suggest reduced nerve root irritation. This aligns with other research indicating positive effects of McKenzie therapy on spinal mechanics.[30] Psychological factors like increased confidence in movement also play a crucial role in rehabilitation, supporting broader literature on psychological influences on musculoskeletal recovery.[28]

Long-Term Outcomes: After four weeks, our patient achieved complete correction of the lateral shift, full return to daily activities, and minimal residual discomfort. These outcomes are in line with the systematic review by Hennemann et al., which found that MDT, when administered by credentialed therapists, was superior to other interventions in reducing pain and disability up to six months post-treatment.[31] The ODI score decreased from 48% to 10%, reflecting a transition from severe disability to minimal disability. These outcomes mirror those reported by studies where patients experienced substantial reductions in disability following McKenzie treatment combined with modalities like TENS for lumbar radiculopathy.[30,32] Neurological recovery was comprehensive, including restored sensation along the L5 dermatome and normal reflex responses. Full strength recovery (from 4/5 to 5/5) for left ankle dorsiflexion underscores the effectiveness of this approach. The ability for patients to return to work without restrictions highlights practical applications beyond clinical measures. Recommendations for ergonomic modifications at work emphasize prevention strategies post-treatment.

Directional Preference: Directional preference plays a crucial role in guiding exercise selection within the McKenzie approach. Studies have shown that matching exercises based on an individual's directional preference leads to superior outcomes compared to non-specific or unmatched protocols.[28] In cases involving lateral shifts, frontal plane motions may be particularly effective initially before transitioning into sagittal plane movements like extension if they prove more beneficial for centralizing symptoms.[24]

Symptom Centralization: Symptom centralization is often used as an indicator of successful intervention within MDT principles. Centralization refers not only to moving pain closer towards its origin but also reducing its intensity or eliminating it altogether if possible during repeated motion assessments.[28] This concept underpins much success seen when employing direction-specific techniques tailored around each patient’s unique mechanical diagnosis.[24]

Patient Education: Patient education is critical throughout any physical therapy regimen but especially so when utilizing methods requiring active participation such as home exercise programs (HEPs). Educating patients about proper posture maintenance strategies alongside regular self-exercise routines helps ensure continued progress outside clinical settings.[24] Moreover encouraging compliance enhances overall therapeutic efficacy while fostering independence necessary post-discharge.[24]

Contrasts and Considerations: While our case and several studies report positive outcomes with MDT, a meta-analysis by Machado et al. presented mixed results regarding the method's effectiveness, suggesting that while some patients benefit significantly, others may experience minimal improvement.[33] Another review provided evidence that McKenzie therapy resulted in a decrease in short-term (i.e. less than 3 months) pain and disability in low back pain patients compared to other treatments methods, like back care advice, back massage, NSAID, strength training, spinal mobilization and educational booklet. However, they found no statistical differences between McKenzie therapy and other treatments at follow-ups after 3 months.[34] Rapid symptom improvement through directional preference exercises is consistent across studies using the McKenzie Method. Centralization of symptoms during repeated extension movements has been documented as effective in reducing peripheral pain.[28] Additionally, a systematic review by Namnaqani et al. compared the McKenzie Method to manual therapy for chronic low back pain and found no significant difference in outcomes, indicating that the choice of intervention may depend on individual patient characteristics and therapist expertise.[35] While many studies focus on broader populations or combine treatments (e.g., TENS), this case emphasizes individualized treatment based on specific patient needs (lateral shift correction). Some research suggests mixed results regarding long-term efficacy without ongoing interventions; however, this case demonstrates sustained symptom control after four weeks. Systematic reviews have been unable to recommend one form of exercise over another due to conflicting results; however, this case supports direction-specific exercises as beneficial when matched correctly.[28]

CONCLUSION

This case illustrates the successful application of the McKenzie Approach in treating lumbar radiculopathy with a lateral shift. Early correction of postural asymmetry and targeted movement-based therapy significantly improved pain, function, and mobility. The McKenzie Method should be considered a first-line intervention for similar presentations, emphasizing patient engagement and self-management. While the McKenzie Method has demonstrated effectiveness in treating lumbar radiculopathy with a lateral shift, further high-quality research is needed to refine patient selection criteria, optimize treatment protocols, and evaluate long-term outcomes. This case also reinforces the potential benefits of tailored interventions using the McKenzie Method for managing complex presentations like lumbar radiculopathy with lateral shifts. It underscores both short-term symptom relief and long-term functional recovery when incorporating patient education and adherence strategies into treatment plans.

CLINICAL IMPLICATIONS

This case report highlights several important clinical implications regarding the use of the McKenzie Method (MDT) in treating lumbar radiculopathy with a lateral shift. The findings emphasize early intervention, patient-centered management, and long-term prevention strategies, which can significantly improve patient outcomes in clinical practice.

1. Importance of Early Mechanical Assessment & Directional Preference Identification: Early identification of a lateral shift and directional preference is critical for effective treatment. Delayed or mismanaged cases may lead to chronic pain, persistent postural abnormalities, and increased disability. Clinicians should incorporate repeated movement testing during assessment to determine symptom centralization, which predicts better recovery.

2. Effectiveness of the McKenzie Approach in Symptom Centralization & Functional Recovery: The study reinforces the McKenzie principle of symptom centralization, where pain moves from the leg to the spine, leading to improved prognosis**.** The rapid correction of the lateral shift and resolution of radicular symptoms within four weeks suggest that MDT may be superior to generalized physical therapy exercises in such cases. The reduction in NPRS pain scores (8/10 → 1/10) and improvement in Oswestry Disability Index (ODI) (48% → 10%) highlight the functional benefits of MDT.

3. Reducing Dependence on Medications & Invasive Procedures: The patient achieved full recovery without requiring pain medications or invasive treatments (e.g., injections, surgery). The McKenzie approach empowers self-management, reducing the risk of opioid dependence and unnecessary spinal procedure

4. Role of Patient Education & Self-Management in Preventing Recurrence: The long-term success of treatment was attributed to the patient's adherence to self-correction techniques and postural awareness**.** Educating patients on self-maintenance strategies (e.g., lumbar extension exercises, ergonomic modifications) is key to reducing recurrence rates**.**

5. Workplace Ergonomics & Lifestyle Modifications for Sustained Recovery: The case highlights the role of workplace modifications (e.g., lumbar support, movement breaks) in preventing symptom relapse. Addressing sedentary lifestyle factors (e.g., prolonged sitting, poor posture) can further enhance long-term outcomes**.** The McKenzie Method is an effective, non-invasive approach for managing lumbar radiculopathy with a lateral shift. Early intervention leads to faster recovery, reduced disability, and avoidance of chronic pain syndromes**.** MDT should be integrated into clinical guidelines for treating patients with acute lumbar derangements, particularly those presenting with a lateral shift**.**

SUGGESTIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

1. Large-Scale Randomized Controlled Trials (RCTs): While the McKenzie Method (MDT) has demonstrated effectiveness in managing lumbar radiculopathy with a lateral shift, high-quality RCT**s** comparing MDT to other treatment modalities (e.g., manual therapy, neural mobilization, core stabilization programs) are necessary to establish its superiority or limitations in different patient populations. Future studies should include larger sample sizes for better generalizability. Compare MDT outcomes with other evidence-based approaches. Assess long-term effects beyond 6 months to evaluate recurrence rates.

2. Identifying Patient Subgroups That Respond Best to MDT: Although some patients respond well to MDT, others may not experience significant improvements. Future research should develop predictive models to identify which patient characteristics (e.g., chronicity, severity of disc pathology, presence of centralization) influence treatment success. Explore biomechanical and neurophysiological factors affecting treatment response.

3. Role of MDT in Combination Therapy: Studies should investigate whether combining MDT with other interventions (e.g., neural mobilization, manual therapy, motor control exercises) results in superior outcomes compared to MDT alone. Potential areas of research include MDT + Neural Mobilization**,** evaluating whether integrating nerve gliding techniques enhances recovery. MDT + Core Stabilization, examining whether core strengthening improves postural control and reduces recurrence.

5. **Long-Term Effectiveness and Prevention of Recurrence:** Studies should assess whether patients who undergo MDT experience lower recurrence rates compared to those receiving other treatments. Investigate the role of patient adherence to self-management exercises in preventing symptom relapse.

STUDY LIMITATIONS:

While this case report provides valuable insights into the effectiveness of the McKenzie Approach (MDT) in treating lumbar radiculopathy with a lateral shift, it has certain limitations that should be considered:

1. Single-Case Study Design (Limited Generalizability): This study is based on a single patient, which limits the ability to generalize findings to a broader population. Individual responses to MDT may vary depending on age, severity of disc pathology, chronicity of symptoms, and previous treatments.

2. Short-Term Follow-Up (Lack of Long-Term Data): The study followed the patient for four weeks, which is sufficient for acute symptom relief but does not provide insights into long-term recurrence rates. There is no data on whether the patient maintained symptom-free status after 6-12 months.

3. Subjective Outcome Measures (Patient-Reported Bias): Pain levels (NPRS) and disability (ODI) were self-reported, which introduces potential bias. Psychological factors (e.g., patient motivation, placebo effect) could influence symptom perception.

4. Variability in Therapist Skill & Patient Compliance: The effectiveness of MDT depends on the therapist's expertise in diagnosing and applying the correct directional preference exercises. Patient adherence to home exercises and postural modifications significantly affects outcomes.

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