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# Physiotherapy Management of Lumbar Disc Herniation with Radiculopathy: A Case Report

## A Pre-Operative and Post-Operative Rehabilitation Perspective

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**Abstract:** ***Background: Lumbar disc herniation (LDH) with radiculopathy can cause low-back pain, sensory impairment, muscle weakness, and substantial functional limitation. Physiotherapy plays an important role in conservative and post-operative rehabilitation through exercise, education, mobility training, strengthening, and graded functional activity. Methodology: This single-case report describes the assessment and rehabilitation of an adult male office clerk with work-related onset of low-back pain and left lower-limb radicular symptoms. The recorded diagnosis was left posterolateral L4–L5 intervertebral disc prolapse with nerve-root compression. Pre-operative and early post-operative findings were assessed using Visual Analogue Scale (VAS), Oswestry Disability Index (ODI), lumbar range of motion (ROM), manual muscle testing, sensory and reflex examination, straight-leg raise, gait assessment, and Berg Balance Scale (BBS). Results: Pre-operatively, the patient reported severe pain (VAS 7/10), moderate disability (ODI 48%), restricted lumbar flexion (30°) and extension (10%), diminished L5 sensation, reduced left ankle reflex, and left ankle dorsiflexor weakness (3/5). SLR, cross-SLR, and slump tests were positive. The patient had an antalgic gait and difficulty sitting for more than 20 minutes and walking beyond 100 m. Conservative physiotherapy included pain-relieving modalities, lumbar traction, manual therapy, mobility exercises, McKenzie/extension-biased exercises, core stabilization, strengthening, stretching, and postural education. Following surgery and early post-operative rehabilitation, radicular pain resolved and VAS decreased to 3/10. Lumbar flexion improved to 55° and extension to 30°, while left ankle dorsiflexion improved to 4/5. However, balance and functional mobility remained limited, with a BBS score of 31/56 and ambulation of approximately 20 m using a walker. Conclusion: Structured physiotherapy contributed to early improvements in pain, neurological symptoms, lumbar mobility, strength, and functional mobility following lumbar disc herniation surgery. Individualized, progressive rehabilitation incorporating education, therapeutic exercise, gait training, strengthening, and functional retraining is important for recovery. Passive modalities and traction should be considered adjuncts rather than substitutes for active rehabilitation.***

**Keywords:** Lumbar disc herniation, Physiotherapy rehabilitation, Radiculopathy, Post-operative rehabilitation, Functional mobility

## 1. Introduction

Lumbar disc herniation (LDH) with radiculopathy is characterized by lumbar pain associated with dermatomal leg pain, sensory disturbance and/or myotomal weakness. It commonly produces functional limitations and may require conservative or surgical management depending on symptom severity, neurological findings and response to treatment. The North American Spine Society guideline emphasizes individualized assessment and management rather than a fixed treatment protocol. Physiotherapy is an important component of multidisciplinary care, with exercise, education, graded activity and selected manual or adjunctive interventions used according to clinical presentation. Recent evidence supports exercise-based rehabilitation for pain and disability, although the optimal exercise prescription remains heterogeneous.

## 2. Methodology

This article presents a single-case report based on the clinical assessment and rehabilitation record contained in the supplied case document. The record describes an adult male office clerk with work-related onset of lumbar pain and left lower-limb radicular symptoms, diagnosed with left posterolateral L4–L5 intervertebral disc prolapse with nerve-root compression. Pre-operative findings, physiotherapy management, subsequent surgery and early post-operative rehabilitation were extracted and compressed into a clinically focused report. Outcomes included Visual Analogue Scale (VAS), Oswestry Disability Index (ODI), lumbar range of motion (ROM), manual muscle testing (MMT), sensory/reflex examination, straight-leg raise (SLR), gait and Berg Balance Scale (BBS).

The source record reports different ages at the pre-operative and post-operative assessments; therefore, age is intentionally not stated in this compressed manuscript. No new patient data were added. Evidence from current clinical literature was used only to contextualize the case and was not treated as additional case data.

## 3. Case Presentation and Initial Assessment

The patient developed acute low-back pain after lifting a heavy file at work, followed by burning/shooting pain radiating to the left leg and foot, numbness over the lateral leg/foot and intermittent left-leg weakness. Symptoms were aggravated by prolonged sitting, standing and forward bending and relieved in supine lying. Initial pain intensity was 7/10 on VAS and ODI was 48%, indicating moderate disability. He had difficulty sitting for more than 20 minutes, walking beyond 100 m and lifting objects.

Examination showed mild lumbar scoliosis with left lean and posterior pelvic tilt, antalgic left gait, L4–L5 tenderness and left erector-spinae spasm. Left ankle reflex was reduced, L5 sensation was diminished and the L5 myotome was weak. Lumbar flexion was limited to 30° and extension to 10°. Left ankle dorsiflexion was 3/5. SLR was positive at 40°, cross-

SLR and slump test were positive, Valsalva was positive and Schober testing demonstrated restricted lumbar mobility. Imaging investigations included X-ray, CT and MRI; the recorded diagnosis was left posterolateral L4–L5 disc protrusion with nerve-root compression.

## 4. Results

The physiotherapy plan was initially directed toward symptom reduction, restoration of lumbar mobility, correction of movement and posture, improvement of core and lower-limb strength, functional independence and prevention of recurrence. The recorded conservative program included electrotherapy (TENS/IFT), cryotherapy or heat according to presentation, lumbar traction, spinal mobilization/manipulation, selected complementary techniques, lumbosacral support and progressive therapeutic exercise. Exercise components included extension-biased/McKenzie exercises, pelvic tilting, bridging, bird-dog, dead bug, planks, spinal stretching and progressive stabilization.

Despite approximately four months of previous physiotherapy without significant pain relief, the patient subsequently underwent lumbar surgery. Early post-operative assessment documented resolution of the radiating left-leg pain and reduction of lumbar pain. Surgical-site pain was 3/10 on VAS, described as dull and non-radiating, with mild restriction of forward flexion. The wound was clean and dry with mild local swelling and grade-1 tenderness.

Neurologically, there was partial improvement in the L5 dermatome. Left ankle dorsiflexors improved to 4/5. Lumbar flexion was 55° and extension 30°, representing greater movement than the pre-operative values. Lumbar side flexion was 30° bilaterally. Left hip flexors were 3/5, extensors 4/5, abductors 4/5 and adductors 3/5; lumbar flexors were 3/5 and extensors 4/5. The patient remained cautious because of fear of reinjury and required a cane/walker for safe ambulation. Functional assessment showed independent bed mobility and transfers, but ambulation was limited to approximately 20 m with a walker and sitting tolerance was about 20 minutes. BBS was 31/56, indicating a medium fall risk. Post-operative goals therefore emphasized pain control, wound and complication prevention, safe mobility, restoration of trunk and lower-limb strength, postural retraining, core stabilization, patient education and graded return to activity.

In-hospital treatment consisted of breathing exercises, secretion-clearance techniques when indicated, ankle pumps, lower-limb isometrics, gentle lumbar mobility, pelvic tilts and gait training. The discharge program included supervised physiotherapy for 4–8 weeks, home exercise, lifting and postural education, progressive lumbar mobility, lower-limb strengthening, stretching, extension-biased exercises and spinal stabilization. The record also lists TENS/IFT, cryotherapy, shortwave diathermy, ultrasound, laser and moist heat as possible pain-relieving modalities.

## 5. Outcome Summary

| Outcome | Pre-operative | Early post-operative |
|---|---|---|
| VAS pain | 7/10 | 3/10 |
| ODI | 48% | Not recorded |
| Lumbar flexion | 30° | 55° |
| Lumbar extension | 10° | 30° |
| Left ankle dorsiflexion | 3/5 | 4/5 |
| L5 radicular pain | Present | Resolved |
| BBS | Not recorded | 31/56 |
| Ambulation | Antalgic; stick | 20 m with walker |

## 6. Discussion

This case illustrates the clinical course of LDH with radiculopathy from significant pre-operative pain and neurological impairment to early post-operative improvement. The initial presentation- radiating leg pain, L5 sensory loss, dorsiflexor weakness and positive SLR/cross-SLR/slump tests- was consistent with nerve-root involvement and supported the recorded diagnosis. The NASS guideline identifies dermatomal pain, numbness or weakness as typical features of lumbar disc herniation with radiculopathy and recommends individualized clinical decision-making. The patient demonstrated substantial early change after surgery: VAS decreased from 7/10 to 3/10, radicular pain resolved, lumbar flexion increased from 30° to 55°, extension from 10° to 30°, and ankle dorsiflexion improved from 3/5 to 4/5. These findings suggest improvement in pain, neural symptoms and functional movement; however, because this is a single case without a controlled design, causality cannot be attributed to physiotherapy alone or to surgery alone.

The pre-operative physiotherapy program was broad and included traction, electrotherapy, manual therapy and exercise. Current evidence indicates that exercise-based rehabilitation can improve pain and function in LDH, particularly through programs addressing motor control, trunk stability, strength and general physical activity. A 2025 systematic review found evidence for core stabilization, motor-control and other exercise approaches, while emphasizing variation in protocols and evidence quality.

Traction requires particular clinical judgment. Earlier systematic evidence has been conflicting, whereas more recent meta-analytic evidence suggests that some forms of mechanical traction may provide short-term improvements when added to physiotherapist treatment, but benefits are not consistently demonstrated in higher-quality studies or over the long term. Therefore, traction should not replace active rehabilitation and should be selected according to the patient's response and clinical presentation.

The post-operative program in the case emphasized early mobility, breathing exercises, ankle pumps, isometrics, gait retraining, lumbar mobility and progressive strengthening. This is consistent with recent evidence synthesis showing that physical therapy after lumbar disc surgery can improve pain, function and quality of life, with exercise targeting endurance, flexibility and back-muscle strength generally producing beneficial outcomes. Education and graded activity are particularly important because the patient demonstrated fear of reinjury and hesitant movement. Progressive exposure to safe functional activities, ergonomic instruction and lifting education may support confidence and reduce maladaptive movement behaviors.

## 7. Clinical Implications

For physiotherapists, this case highlights the importance of repeated neurological and functional assessment rather than relying only on pain scores. Sensory changes, reflexes, myotomal strength, neural tension tests, gait, ROM and validated disability/balance measures can help monitor progression. Treatment should be staged: symptom modulation and protection initially, followed by mobility, motor control, strengthening, gait retraining, functional conditioning and return-to-work education.

The case also demonstrates the need to screen for serious neurological deterioration. New bladder or bowel dysfunction, saddle anesthesia or rapidly progressive motor deficit would require urgent medical reassessment rather than routine physiotherapy. In this case, normal bowel and bladder habits were documented pre-operatively.

## 8. Limitations

The report is limited by its single-case design, absence of a standardized post-discharge follow-up, lack of post-operative ODI, and incomplete documentation of treatment dosage, frequency and adherence. The supplied record also contains an age discrepancy between pre-operative and post-operative sections. No attempt was made to reconcile this discrepancy. These limitations restrict generalization and prevent estimation of treatment effect.

## 9. Conclusion

This case demonstrates the role of physiotherapy across conservative and post-operative phases of management for lumbar disc herniation with radiculopathy. The patient initially presented with severe pain, functional limitation, L5 sensory impairment, dorsiflexor weakness and positive neural tension tests. Following surgical management and structured post-operative rehabilitation, early improvements were documented in pain, radicular symptoms, lumbar mobility and ankle dorsiflexor strength, although balance, gait and trunk/lower-limb strength remained impaired. A progressive, individualized program combining education, safe mobility, therapeutic exercise, strengthening, gait training and functional rehabilitation is appropriate for recovery. Passive modalities and traction should be regarded as adjuncts rather than substitutes for active rehabilitation, with treatment decisions guided by clinical response and current evidence.

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