

# Physiotherapy Management for Acute Lumbar Radiculopathy: A case study

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## ABSTRACT

**Background:** Low Back Pain (LBP) with radiation to lower limb is one of the common Conditions seen in the physical therapy clinics. It affects to overall 80% of people in their lifespan, affects their work, daily activity, decrease quality of life.

**Case Description:** The case of 20 year male was presented with the severe pain in the lumbar region radiating to the right leg. He describes the pain severity at as 10/10 on the NPRS and even complained that he is unable to walk and needs to take rest in between while covering longer distances.

**Outcomes:** Pain levels decreased from 10/10 average to 2/10 on Numeric Pain Rating Scale. The patient was able to complete full range of motion of hip, and had strength of the lower extremity 5/5 bilaterally after the treatment.

**Conclusion:** After using this protocol on patients it was found that it reduces the pain and improves overall activities, ROM, strength and general health of the patient as well as there was marked and visible changes found in the posture of this case.

**Key Words:** Acute lumbar Radiculopathy, Low Back Pain, Physiotherapy Management.

## BACKGROUND

Back pain is one of the most widely recognized issues seen in individuals and around 80 per cent of the populace once in the course of their life experience back pain. LBP is caused by numerous causes among which Prolapsed intervertebral disk prolapsed is one of the most common disorder that can lead to pain in the back with radiculating to the lower limb.

It is considered to be a pathological condition with numerous reasons that often affects the spine particularly in adults and medium age. The maximum incidence of disc prolapse is found in the age limits of 30–50 years, with both gender ratio of 2:1. In adults approximately 95% of LDH occurs primarily at the level of 5<sup>th</sup>& 6<sup>th</sup> lumbar and L5–S1 spinal segmental level (Amin et al., 2017; Hart, 1979; Meucci et al., 2015) . So it is important to have an accurate understanding of the LDH, its causes, origin and treatment.

The intervertebral disc is part of vertebral column and it is composed of inner nucleus pulposes and outer annulus fibrosis. The central Nucleus pulposes is jelly based it contains water, collagen and proteoglycans which resist the axial pressure of spine (Kepler et al., 2013).

It has been found out that around 90% of the cases of lower limb Radiculopathy is associated with LDH (Kobayashi et al., 2010; Kobayashi & Takeno, 2010). The principal signals of LDH include radicular pain sensory abnormalities, and weakness in one or more lumbosacral nerve root. There can be focal paresis and restriction in the range of motion of trunk. There can be chances of increase in the pain by coughing and sneezing (Lanska, 2002).

The North American Spine Society provided guidelines with evidence in 2014 for LDH with Radiculopathy which recommend that the MMT, sensory examination and SLR particularly with its cross variant are considered as the gold standard diagnosis tool for Disc herniation but apart from that radiographs, MRI and CT scan can be used to rule out the cases of Herniation (Hoffman et al., 2017).

There are various treatment approaches for LDH. The most common choice of treatment for disc herniation is Non-operative management. One of the researcher recently demonstrated medium and long-term effects of conservative and surgical treatment related to LDH. Effect of Localized corticosteroid injections has also been evaluated for diagnosis and treatment as well. One of the study evaluated the effect of traction therapy. Operative management (Minimally Invasive Surgery, Open Discectomy, Interlaminar approach) has also proven to provide the short term effect from symptoms (Dewing et al., 2008; Gugliotta et al., 2016; Kim et al., 2016). Physiotherapy treatment particularly focused on rehabilitation part which includes strengthening exercises for core, and joint mobility are having known evidences to improve symptoms related to LDH. There are different number of exercise programs to treat the symptoms related to LDH, among which the most common are aerobic activity, directional preference, flexibility exercises, motor control and strengthening exercises.

Motor control exercises also known as stabilization exercises. MCEs are designed in a way that they re-educate the muscles particularly abdominals, paraspinal, gluteus, pelvic floor musculature and diaphragm, co-activation pattern. The motor control exercises are based on the principle of motor learning theory. The primarily motive is to provide the stability and control of the spine altered in patients with LDH and motor control exercises help to regain it (Macedo et al., 2016).

## CASE DESCRIPTION

A 20 year old male Patient visited physiotherapy OPD with complains of low back pain radiating to right leg. He had tingling & numbness sensation all over the posterior compartment of the leg. He also complains severe pain while walking and prolonged standing. He reported with 2 weeks history of low back pain. His symptoms appeared suddenly after lifting cylinder from car, he felt sudden sharp pain in the centre & at right side of lower back area. His pain worsens during static posture like in sitting & standing erect for a longer time & sometimes on lying flat. He had a past history of trauma 3 months ago. No other relevant past medical history. He had no medication history & neither has he had taken any physiotherapy treatment previously. In personal history, he is non-vegetarian with healthy active lifestyle. In family history, he is the only one who has back problem among his entire family. Patient belongs to middle upper class family. In pain history, he's having sharp shooting pain at right side of piriformis muscle & in central part of lumbar region L5-S1. His pain duration was continuous with gradual onset & aggravates in standing prolonged & walking & relieves at rest only. On Observation, patient was mesomorphic. He had forward head neck posture & inequality level of shoulder. His gait pattern was antalgic with independent ambulation. The lumbar curve has been observed was flat back, with normal arched foot. There was absence of swelling, muscle wasting & any skin problems. On Palpation, there is an absence of pitting & non-pitting edema. Tenderness (Grade 2) is there over the right side central part of lumbar area [L5-S1] with mild spasm around Para spinal muscles of right side & had normal body temperature.

In initial visit, a musculoskeletal review was performed by PT, which shows impairments including decreased ROM of hip, pain and tenderness in lumbar region. Motor control Exercises, Stretching and Tens were given to the patient for one week and patient responded well during and after the treatment with reduction in pain and increase in range of motion.

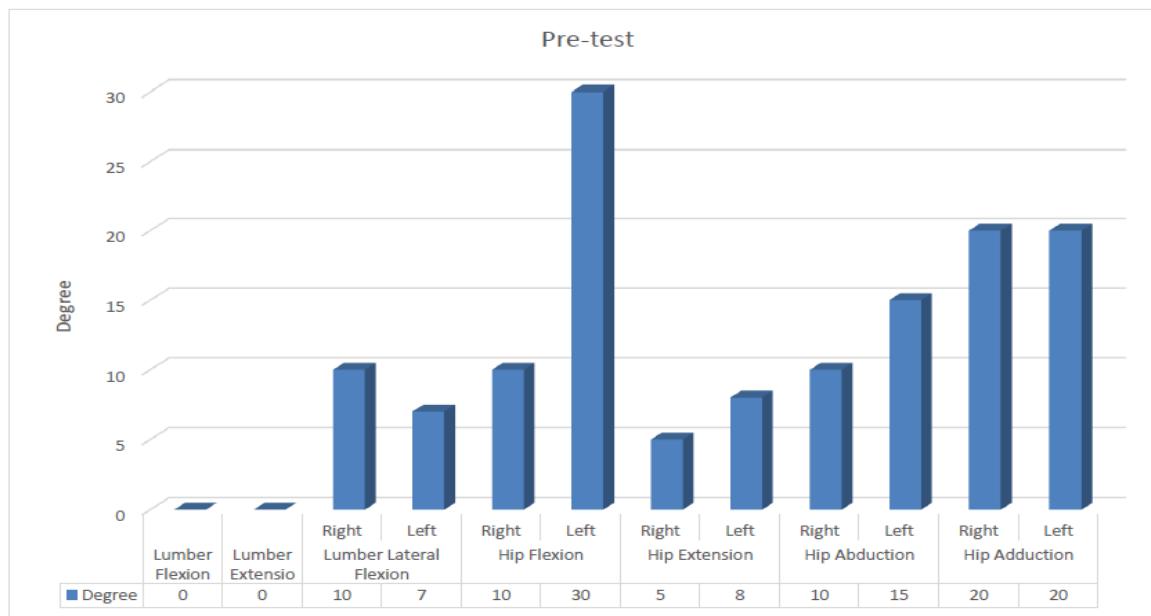
**Examination test and Measures:** - The examination part is based on Numeric Pain Rating Scale [NPRS] that is reliable to measure LBP. The patient describes his severe pain on NPRS=10/10. The ROM was taken for hip joint & lumbar spine with help of goniometer & measuring tape. Special Tests were done SLR Test was positive above 10 degrees with severe radiating pain to Right leg. The MRI report of the patient shows the **Postero-central disc protrusion at L5-S1 level which compresses the thecal sac enclosing nerve root (Right more than Left) and mildly encroaching upon neural foramina and indentation of thecal sac at S1-S2 level.**

### Range of motion before Treatment (Table: 1)

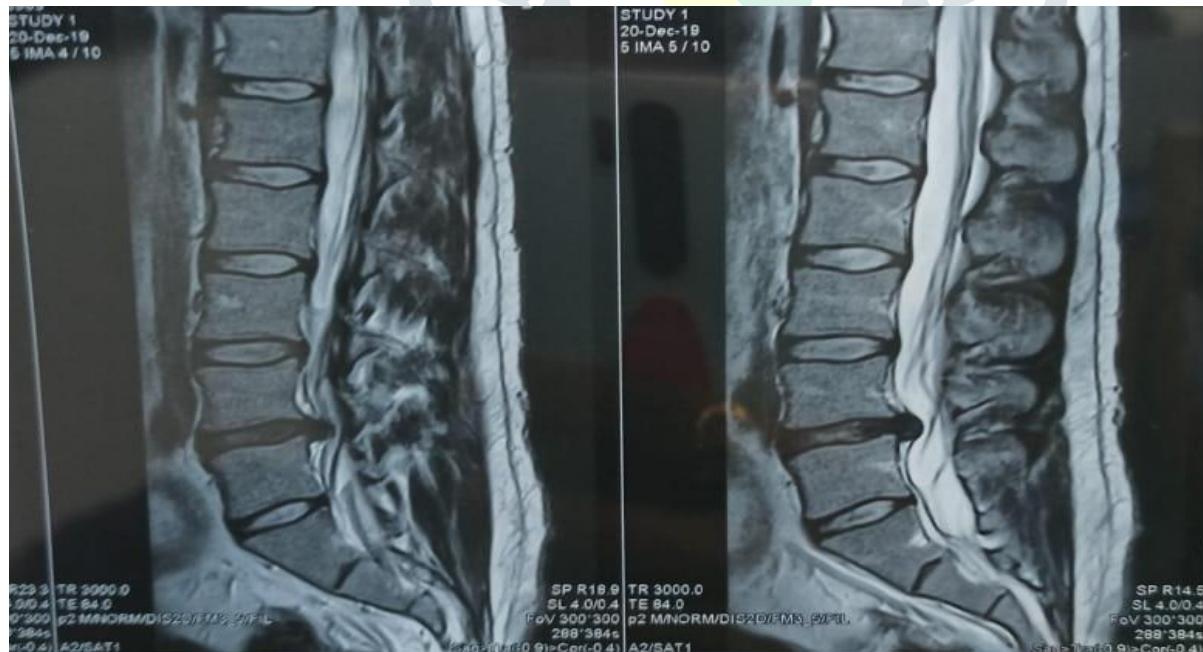
S.NO	ROM	RT	LT
1	Lumbar Flexion	Unable to perform	
2	Lumbar Extension	Unable to perform	

3	Lumbar Lateral Flexion	10 degree	7 degree
4	Hip Flex.	10 degree	30 degree
5	Hip Ext.	5 degree	8 degree
6	Hip Abduction	10 degree	15 degree
7	Hip Adduction	20 degree	30 degree

### Graphical representation of Range of Motion before treatment (Graph: 1)



### Magnetic resonance imaging (Fig: 1)



## Magnetic Resonance imaging report (fig: 2)

**MRI LUMBO-SACRAL SPINE**

MR Imaging of the lumbo-sacral spine was done using a spine coil. Sequential SE T1 & T2 weighted images were obtained in sagittal and transverse planes.

**REPORT**

Lumbar spinal curvature is reduced. Lumbar vertebrae are normal in signal intensity. No lytic/destructive lesion seen, **lumbarization of S1 vertebra is seen.**

Posterocentral disc protrusion is seen at L5/S1 level, compressing thecal sac, contained nerve roots (right more than left) and mildly encroaching upon right neural foramina. Posterocentral disc bulge is seen at S1/S2 level, indenting thecal sac.

There is evidence of disc dessication at L5/S1 level, as loss of signal of nucleus pulposus seen in T2 weighted images.

No significant ligamenta flava hypertrophy seen. Facet joints are normal in alignment. Posterior longitudinal ligament is intact.

Thecal sac is indented at L5/S1 and S1/S2 levels, CSF is normal in signal intensity. Pre & Paravertebral soft tissues are normal. No abscess/collection seen. Distal cord is normal.

**OPINION:**

**Findings s/o**

- POSTEROCENTRAL DISC PROTRUSION AT L5/S1 LEVEL, COMPRESSING THECAL SAC, CONTAINED NERVE ROOTS (RIGHT MORE THAN LEFT) AND MILDLY ENDCROACHING UPON RIGHT NEURAL FORAMINA.
- POSTEROCENTRAL DISC BULGE AT S1/S2 LEVEL, INDENTING THECAL SAC.

To correlate clinically.

  
**DR. PRADEEP KUMAR**  
 MD, DMRE (RADIOODIAGNOSIS)

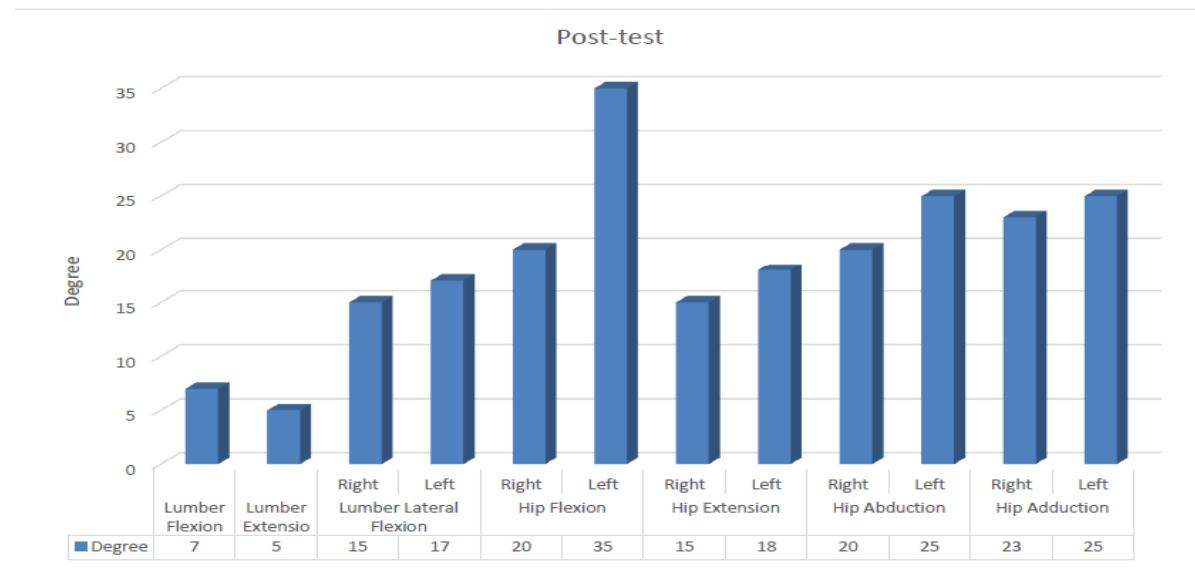
## INTERVENTION & RESULT

The plan of intervention was followed 5 times a week with a '45 minutes' session daily for 2 weeks. The treatment protocol includes therapeutic exercises like core stability exercises to improve core strength, Stretching exercises to improve the ROM and posture of the patient. The hip strengthening exercise along with MET was also given to the patient. Electrical Modalities like TENS (Transcutaneous Electrical Nerve Stimulation) was given along with home exercise plan.

### ROM After the Physiotherapy treatment (Table: 2)

S.NO	ROM	RT	LT
1	Lumbar Flexion	7 degree	
2	Lumbar Extension	5 degree	
3	Lumbar Lateral Flexion	15 degree	17 degree
4	Hip Flexion	20 degree	35 degree
5	Hip Extension	15 degree	18 degree
6	Hip Abduction	20 degree	25 degree
7	Hip Adduction	30 degree	30 degree

## Graphical representation of Range of Motion After treatment (Graph: 2)



## DISCUSSION

In this case the primary line of treatment was chosen as motor control exercises along with the stretching and transcutaneous electric nerve stimulator was used to relieve the pain. The treatment and recovery was assessed for total of two weeks and even the treatment continues after that also but the result of the study was only analyzed for 14 days. The patients conditions showed improvement with given treatment protocol. This study will determined that the supervised exercise training emphasizing motor control exercise (MCE) will be feasible and effective in reducing pain intensity and improving the functional disability among the youngster population.

This Study adds to the evidence that motor control exercise weather given alone or in combination with any other treatment methods has been proven to be effective in reducing pain and decreasing the disability in patients with LBP. We have not find convincing evidence that motor control exercise was superior to the manual therapy or any other forms of exercises and even surgery. This study provides us a base to conduct an experimental study for the motor control exercise.

## CONCLUSION

LDH is an etiology specific to low back pain. Important advances in our understanding regarding the LDH etiology have been made which includes microstructural improvements, molecular pathways, and microbial load. In fact, physiotherapy has demonstrated significantly promising effects in disc herniation cases during this same time span. Additionally, physiotherapy over this same time period has demonstrated increasingly positive outcomes in disc herniation cases. This case has showed overall success, as the condition of the patient was improved after the treatment. He showed increase ROM, increased strength, decreased pain and tenderness after

the end of PT session. There was decrease in pain severity with improved overall function. Both the outcome measures employed i.e. Numerical pain rating scale and range of motion of lumbar and hip segments have shown significant changes.

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