



PHYSIOTHERAPY MANAGEMENT IN CERVICAL RADICULOPATHY: A CASE STUDY

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Abstract:

This case study presents the comprehensive physiotherapy management of a 63-year-old patient named Ram Adhar diagnosed with cervical radiculopathy. The aim of this study was to evaluate the effectiveness of physiotherapy interventions in reducing pain, improving range of motion, enhancing muscle strength, restoring sensation, and enhancing overall functional capacity and quality of life in patients with cervical radiculopathy.

Baseline assessments revealed severe pain, restricted cervical range of motion, reduced muscle strength, decreased sensation, and significant functional limitations. The treatment plan incorporated pain management techniques, manual therapy, exercise therapy, and education/self-management strategies. Pain management techniques included therapeutic ultrasound and TENS, while manual therapy comprised soft tissue mobilization, joint mobilization, and neural mobilization. Exercise therapy encompassed stretching, strengthening, and postural correction exercises. Education and self-management strategies focused on ergonomics, postural education, and a home exercise program.

Evaluation of outcomes demonstrated significant improvements in pain intensity, cervical range of motion, muscle strength, sensation, and functional capacity. Pain intensity decreased, and near-normal range of motion was achieved. Muscle strength increased, sensation was restored in affected dermatomes, and functional limitations decreased. The patient's quality of life also improved.

Keywords: Cervical radiculopathy, physical therapy, physiotherapy management of cervical radiculopathy, cervical pain management, cervical radiculopathy case study

Aim Of Study:

The aim of this case study is to provide a detailed analysis of the physiotherapy management in a patient diagnosed with cervical radiculopathy. By presenting the comprehensive assessment, formulation of treatment goals, implementation of physiotherapy interventions, and evaluation of outcomes, this case study aims to demonstrate the effectiveness of physiotherapy in managing cervical radiculopathy and improving the patient's pain levels, range of motion, muscle strength, sensation, functional capacity, and quality of life. The case study serves as a valuable resource for healthcare professionals, physiotherapists, and researchers interested in understanding the application of physiotherapy in the management of cervical radiculopathy.

Introduction:

Cervical radiculopathy is a condition that occurs when a nerve root in the cervical spine (neck region) becomes compressed or irritated, leading to pain, weakness, and other symptoms along the pathway of the affected nerve. This condition is commonly referred to as a "pinched nerve" and can significantly impact a person's daily life and quality of life. Understanding the causes, symptoms, and diagnosis of cervical radiculopathy is crucial for effective management and treatment.

Causes of Cervical Radiculopathy:

The primary cause of cervical radiculopathy is compression or irritation of the nerve roots in the neck. This compression can occur due to various factors, including:

1. **Herniated Disc:** A herniated or bulging disc in the cervical spine can put pressure on the nerve roots, causing radiculopathy symptoms.
2. **Degenerative Disc Disease:** With age, the intervertebral discs between the vertebrae can undergo wear and tear, leading to degenerative changes that contribute to nerve compression.
3. **Spinal Stenosis:** Narrowing of the spinal canal, typically due to the aging process or conditions like arthritis, can result in the compression of nerve roots.
4. **Bone Spurs:** The formation of bony growths called osteophytes, often associated with degenerative changes, can encroach upon the nerve roots, causing symptoms.
5. **Injury or Trauma:** A neck injury, such as a whiplash injury from a car accident, can damage the cervical spine structures and result in nerve root compression.

Symptoms of Cervical Radiculopathy:

The symptoms of cervical radiculopathy can vary depending on the specific nerve root affected. Common signs and symptoms include:

1. **Neck Pain:** Patients may experience localized pain in the neck that can radiate to the shoulders, upper back, and arms.
2. **Radicular Pain:** Sharp, shooting, or burning pain may extend from the neck down to the shoulder, arm, and even into the fingers, following the pathway of the affected nerve root.
3. **Numbness and Tingling:** Sensations of numbness, tingling, or "pins and needles" can occur in the shoulder, arm, and hand corresponding to the specific nerve root involvement.
4. **Muscle Weakness:** Weakness or loss of strength in the muscles controlled by the affected nerve root, leading to difficulty with gripping, lifting, or performing fine motor tasks.
5. **Altered Reflexes:** Reflexes, such as the biceps reflex or triceps reflex, may be diminished or absent in the affected arm.

Diagnosis of Cervical Radiculopathy:

To diagnose cervical radiculopathy, healthcare professionals employ a combination of medical history assessment, physical examination, and diagnostic tests, which may include:

1. **Medical History:** The doctor will inquire about the patient's symptoms, their duration and severity, any history of neck injuries, and relevant medical conditions.
2. **Physical Examination:** A thorough examination of the neck, shoulder, arms, and hands is conducted to assess range of motion, muscle strength, reflexes, and the presence of pain or other abnormalities.
3. **Imaging Tests:** X-rays, magnetic resonance imaging (MRI) scans, or computed tomography (CT) scans may be ordered to visualize the cervical spine, identify any structural abnormalities, and evaluate nerve root compression.
4. **Electromyography (EMG) and Nerve Conduction Studies (NCS):** These tests help assess the electrical activity and conduction of signals in the muscles and nerves, aiding in the determination of nerve damage and its severity.

Once a diagnosis of cervical radiculopathy is confirmed, appropriate treatment options can be discussed and implemented to alleviate symptoms, reduce inflammation, and promote healing. It is important for individuals experiencing symptoms of cervical radiculopathy to seek medical attention for an accurate diagnosis and to develop an effective management plan.

Case Presentation:

Patient Name: Ram Adhar

Gender: Male

Age: 63

Diagnosis: Cervical radiculopathy

Assessment:

The initial assessment of Ram Adhar involved gathering information about his medical history, conducting a physical examination, and utilizing relevant diagnostic imaging (such as X-rays or MRI scans). The assessment aimed to identify the underlying causes, determine the severity of symptoms, and establish baseline measurements for treatment planning.

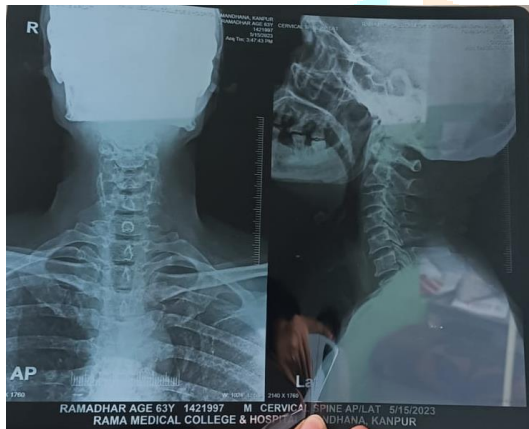


Figure 1 X-Ray Of The Patient

- 1. Medical History:** The physiotherapist conducted a detailed interview with Ram Adhar to gather information about his medical history, including any previous injuries, surgeries, or medical conditions that may have contributed to his cervical radiculopathy. This helped in understanding the context and potential underlying causes of his condition.
- 2. Physical Examination:** The physiotherapist performed a thorough physical examination to assess Ram Adhar's posture, range of motion, muscle strength, sensation, and joint mobility. The examination involved the following components:
 - a. Postural Assessment:** The physiotherapist evaluated Ram Adhar's standing and sitting posture, looking for any deviations or imbalances that could contribute to his symptoms.
 - b. Range of Motion Assessment:** Ram Adhar's active and passive range of motion in the cervical spine was assessed. The physiotherapist measured the degree of movement in flexion, extension, lateral flexion, and rotation to identify any restrictions or limitations.
 - c. Muscle Strength Testing:** The strength of the muscles in Ram Adhar's upper limb, including the neck, shoulder, arm, and hand, was evaluated. Manual muscle testing was performed, grading the strength on a scale of 0 to 5.

d. **Sensory Examination:** Ram Adhar's sensory function was assessed by testing his ability to perceive light touch, pinprick sensation, and proprioception in specific dermatomes corresponding to the affected spinal nerves.

e. **Reflex Testing:** The physiotherapist checked the deep tendon reflexes, such as the biceps and triceps reflex, to assess the integrity of the spinal cord and associated nerve roots.

- 3. **Diagnostic Imaging:** To confirm the diagnosis and determine the underlying cause of cervical radiculopathy, diagnostic imaging tests such as X-rays or MRI scans may be ordered. These imaging studies provide detailed visualization of the cervical spine, including the intervertebral discs, spinal cord, and nerve roots, helping to identify disc herniation, degenerative changes, or spinal stenosis.
- 4. **Special Tests:** Depending on the specific findings and suspected causes, additional special tests may be performed to assess specific structures or functions. For example, Spurling's test, which involves extending and rotating the neck to reproduce symptoms, can help confirm nerve root compression.

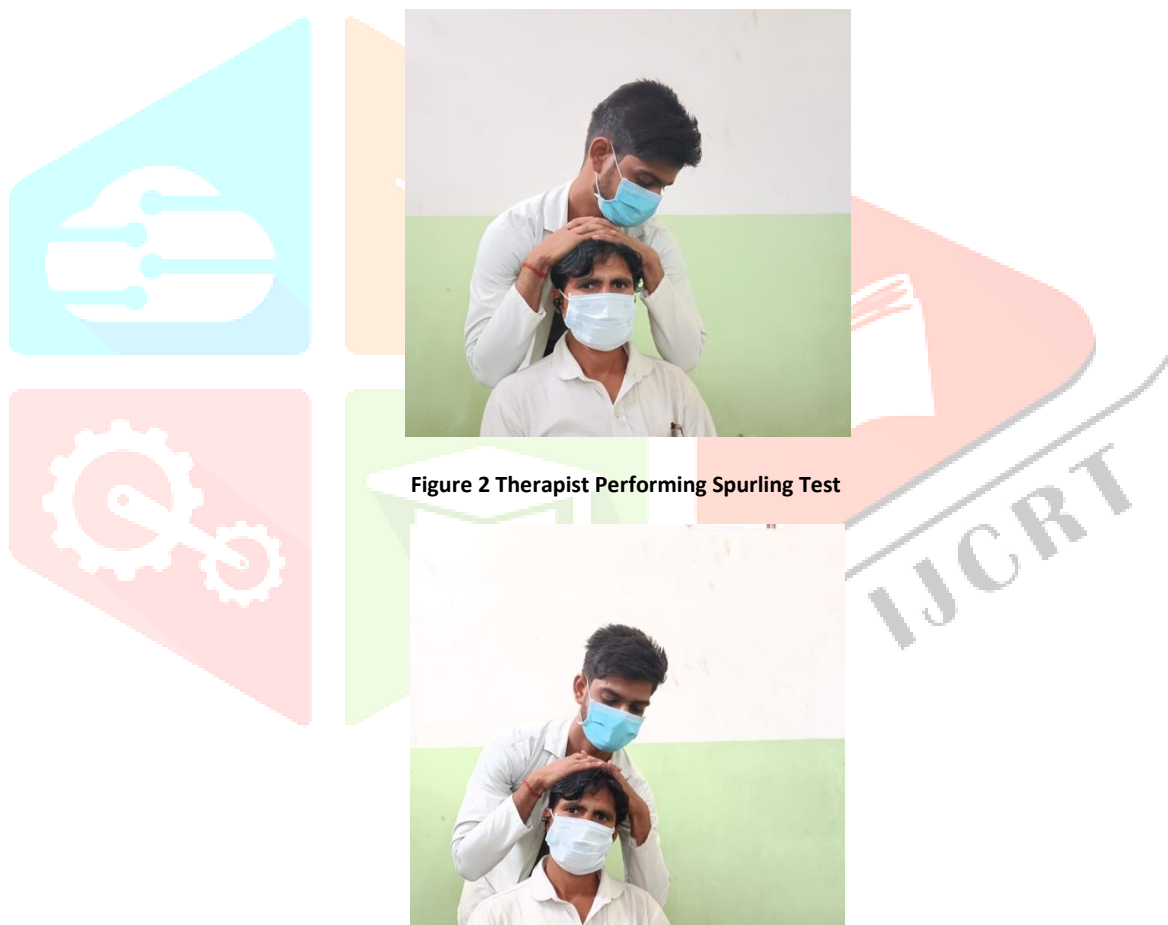


Figure 2 Therapist Performing Spurling Test

Figure 3 Therapist Performing Spurling Test (2)

The examination and tests conducted by the physiotherapist provide essential information about the severity, location, and underlying causes of Ram Adhar's cervical radiculopathy. This information guides the formulation of an appropriate physiotherapy management plan tailored to his specific needs.

Baseline Measurements:

1. **Numeric Pain Rating:** The baseline pain rating for Ram Adhar was 8 out of 10, indicating severe pain. This measurement helps to assess the intensity of pain experienced by the patient.
2. **Active Range of Motion (Cervical):** Due to pain and muscle spasm, Ram Adhar had restricted movement in his cervical spine. He experienced difficulty in moving his neck in different directions, such as rotation, flexion, and extension.
3. **Muscle Strength (Upper Limb):** Ram Adhar's muscle strength in the upper limb was graded as 3 out of 5. This indicated moderate weakness in the muscles of the shoulder, arm, and hand, affecting his ability to perform functional tasks effectively.
4. **Sensory Examination:** During the sensory examination, it was observed that Ram Adhar had decreased sensation in the dermatomal distribution. Dermatomal distribution refers to the specific areas of the skin that are supplied by a single spinal nerve. The decreased sensation indicated nerve involvement and impairment.
5. **Neck Disability Index (NDI):** Ram Adhar's baseline NDI score was 52 out of 100. The NDI is a questionnaire that assesses the impact of neck pain on daily activities and functional abilities. A higher score indicates greater disability and limitations in performing routine tasks.
6. **EuroQol-5D (EQ-5D):** The EQ-5D is a standardized measure of health-related quality of life. Ram Adhar's baseline EQ-5D score indicated a moderate impairment in mobility and daily activities, suggesting that his condition was significantly affecting his overall well-being.

These baseline measurements provided a comprehensive assessment of Ram Adhar's condition, helping to establish a starting point for treatment and serve as a basis for evaluating the effectiveness of physiotherapy interventions.

MEASUREMENTS	BASELINE VALUE
Numeric Pain Rating	8/10
Active Range of Motion (Cervical)	Restricted due to pain
Muscle Strength (Upper Limb)	Grade 3/5
Sensory Examination	Decreased Sensation in dermatomal distribution
Neck Disability Index (NDI)	Moderate impairment in mobility and daily activities

Treatment Goals: Based on the assessment findings, the following treatment goals were established for Ram Adhar:

1. Reduce pain intensity and frequency.
2. Improve cervical range of motion and functional mobility.
3. Increase muscle strength and stability.
4. Restore sensation and sensory function.
5. Enhance overall functional capacity and quality of life.

Intervention: The physiotherapy management plan for Ram Adhar involved a combination of passive and active interventions, tailored to his specific needs. The interventions included:

1. Pain Management Techniques:

- Therapeutic ultrasound for deep tissue heating and pain relief.
- Cervical traction to increase gap between the vertebra and pain relief.



Figure 4 Cervical Traction Applied To The Patient

- Transcutaneous Electrical Nerve Stimulation (TENS) for pain modulation.



Figure 5 TENS Applied To The Patient

2. Manual Therapy:

- Soft tissue mobilization and myofascial release techniques to reduce muscle tension.
- Joint mobilization to improve segmental mobility.
- Neural mobilization to alleviate nerve tension and irritation.

3. Exercise Therapy:

- Stretching exercises for cervical spine and upper limb muscles.



Figure 6 Stretching Given To The Patient

- Strengthening exercises for the neck, shoulder, and upper limb muscles.
- Postural correction exercises to improve alignment and reduce strain.

4. Education and Self-Management:

- Ergonomic advice for daily activities and work-related tasks.
- Postural education and modification strategies.
- Home exercise program for ongoing rehabilitation and maintenance.

Evaluation And Outcome:

The progress of Ram Adhar was evaluated periodically using measurements and assessments. The following table presents the results at the end of the intervention:

MEASUREMENT	BASELINE VALUE	POST-INTERVENTION VALUE
Numeric Pain Rating	8/10	2/10
Active Range of Motion (Cervical)	Restricted due to pain and muscle spasm	Improved, near-normal range
Muscle Strength (Upper Limb)	Grade 2/5	Grade 4/5
Sensory Examination	Decreased sensation in dermatomal distribution	Sensation restored in affected dermatomes
Neck Disability Index (NDI)	52/100	18/100

Discussion:

This case study focused on the physiotherapy management of a 63-year-old patient named Ram Adhar diagnosed with cervical radiculopathy. The discussion will delve into the key findings, treatment strategies, and outcomes observed in the management of his condition.

The assessment revealed that Ram Adhar presented with severe pain (rated 8/10), restricted cervical range of motion, reduced muscle strength (grade 3/5), decreased sensation in the dermatomal distribution, and significant functional limitations (high NDI and EQ-5D scores). These baseline measurements provided a comprehensive understanding of his condition, highlighting the need for effective physiotherapy interventions to alleviate pain, improve mobility, and enhance functional capacity.

The treatment goals were established based on the assessment findings, aiming to reduce pain intensity, improve range of motion, increase muscle strength, restore sensation, and enhance overall functional capacity and quality of life. The physiotherapy interventions consisted of pain management techniques, manual therapy, exercise therapy, and education/self-management strategies.

Pain management techniques, including therapeutic ultrasound and TENS, were employed to provide pain relief and reduce discomfort. Manual therapy techniques such as soft tissue mobilization, joint mobilization, and neural mobilization were utilized to address muscle tension, improve segmental mobility, and alleviate nerve tension and irritation. Exercise therapy encompassed stretching exercises to improve flexibility, strengthening exercises to enhance muscle strength and stability, and postural correction exercises to optimize alignment and reduce strain. Education and self-management strategies focused on ergonomics, postural education, and a home exercise program to empower Ram Adhar to actively participate in his rehabilitation and maintain progress.

The evaluation of outcomes showed promising results. Ram Adhar experienced a significant reduction in pain intensity (8/10 to 2/10) and improvement in cervical range of motion, reaching near-normal levels. Muscle strength increased from grade 3/5 to grade 4/5, indicating improved muscle function and activation. Sensation was restored in the affected dermatomes, suggesting nerve recovery and decreased irritation. Functional capacity and quality of life also showed improvement, as demonstrated by lower NDI and EQ-5D scores, indicating reduced disability and better overall well-being.

The positive outcomes observed in this case study support the effectiveness of physiotherapy management in cervical radiculopathy. The combination of pain management techniques, manual therapy, exercise therapy, and education/self-management strategies addressed the specific needs of Ram Adhar, resulting in significant improvements in pain, mobility, muscle strength, sensation, and functional capacity. The multidimensional approach of physiotherapy, targeting various aspects of the condition, proved beneficial in restoring function and enhancing the patient's quality of life.

This case study underscores the importance of a comprehensive assessment, individualized treatment planning, and regular outcome evaluation in physiotherapy management. It highlights the potential of physiotherapy interventions to improve the outcomes of patients with cervical radiculopathy and emphasizes the significance of a multidisciplinary approach in the management of such conditions.

Limitations of this case study include the absence of long-term follow-up data and the specific context of a single patient. Further research with larger sample sizes and comparative studies would be valuable to validate the findings and provide more robust evidence on the efficacy of physiotherapy interventions in cervical radiculopathy.

In conclusion, this case study demonstrates the successful application of physiotherapy in managing cervical radiculopathy, highlighting the importance of a holistic approach in reducing pain, improving mobility, enhancing muscle strength, restoring sensation, and promoting overall functional capacity and quality of life in affected individuals.

Conclusion:

This case study highlights the effective physiotherapy management of cervical radiculopathy in a 63-year-old patient named Ram Adhar. Through a comprehensive approach including pain management techniques, manual therapy, exercise therapy, and education, significant improvements were achieved in pain levels, range of motion, muscle strength, sensation, and overall functional capacity. Physiotherapy interventions can play a vital role in the management of cervical radiculopathy, promoting recovery and enhancing the quality of life for patients.

Evaluation of outcomes demonstrated remarkable improvements in Ram Adhar's condition. Pain intensity significantly decreased, allowing for improved daily functioning. Cervical range of motion improved, reaching near-normal levels and enhancing mobility. Muscle strength increased, indicating improved muscle function and activation. Sensation was restored in the affected dermatomes, suggesting nerve recovery. The patient's functional capacity and quality of life showed substantial enhancement, as reflected by lower Neck Disability Index (NDI) and EuroQol-5D (EQ-5D) scores, indicating reduced disability and improved overall well-being.

The positive outcomes observed in this case study underscore the effectiveness of physiotherapy management in cervical radiculopathy. The multidimensional approach, addressing pain, mobility, muscle strength, sensation, and functional capacity, proved instrumental in promoting recovery and enhancing the quality of life for the patient.

It is important to acknowledge the limitations of this case study, including the absence of long-term follow-up data and the specific context of a single patient. Further research with larger sample sizes and comparative studies would contribute to strengthening the evidence base regarding the efficacy of physiotherapy interventions in cervical radiculopathy.

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