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Physiotherapy rehabilitation in diabetic amyotrophy (*Lumbosacral Radiculoplexus Neuropathy*): A case study

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Abstract

Introduction: Diabetic amyotrophy, also known as diabetic *Lumbosacral Radiculoplexus Neuropathy*, is a rare and disabling neurological complication of diabetes mellitus characterized by acute onset pain, progressive proximal lower limb weakness, and functional decline. Although medical management is well described, literature highlighting the role of structured physiotherapy rehabilitation remains limited. This case report aims to describe the effectiveness of a phase-wise physiotherapy intervention in improving functional outcomes in a patient with diabetic amyotrophy.

Methodology: A 56-year-old male with a 12-year history of type 2 diabetes mellitus presented with severe unilateral thigh pain, muscle wasting, and difficulty in ambulation. Clinical examination, nerve conduction studies, and electromyography confirmed the diagnosis of diabetic amyotrophy. The patient underwent an 8-week individualized physiotherapy rehabilitation program focusing on pain management, muscle activation, progressive strengthening, balance training, gait retraining, and functional task-oriented exercises. Outcome measures included pain intensity (VAS), muscle strength (Medical Research Council scale), and functional performance assessed using the Lower Extremity Functional Scale (LEFS).

Results: Following the physiotherapy intervention, significant improvements were observed across all outcome measures. Pain intensity reduced from 8/10 to 2/10 on the VAS. Muscle strength of the affected hip flexors and knee extensors improved from grade 2/5 to 4/5 on the MRC scale. Functional ability showed marked improvement, with LEFS scores increasing from 18/80 at baseline to 62/80 post-intervention. The patient progressed from assisted ambulation with a walker to independent walking without support.

Discussion: The findings of this case highlight the critical role of early and structured physiotherapy rehabilitation in managing diabetic amyotrophy. Pain modulation facilitated early active participation, while progressive strengthening and functional training addressed neuromuscular deficits and mobility limitations. This case supports existing evidence that individualized physiotherapy intervention can significantly enhance recovery, reduce disability, and improve quality of life in patients with this rare diabetic neuropathy.

Conclusion: Structured, individualized physiotherapy rehabilitation can significantly reduce pain and improve muscle strength, gait, and functional independence in patients with diabetic amyotrophy, highlighting its essential role in comprehensive management.

Keywords: Diabetic amyotrophy, *Lumbosacral Radiculoplexus Neuropathy*, physiotherapy rehabilitation, gait training, case report

Introduction

Diabetic amyotrophy is an uncommon but severe manifestation of diabetic neuropathy, accounting for less than 1% of all diabetic neuropathies [1]. Unlike distal symmetric polyneuropathy, diabetic amyotrophy primarily affects the lumbosacral plexus, femoral nerve, and proximal muscles of the lower limb [2]. It is most commonly observed in middle-aged to elderly individuals with type 2 diabetes mellitus and may occur independently of long-standing glycemic control [3].

Clinically, the condition presents with sudden onset unilateral or bilateral thigh pain, followed by muscle weakness, atrophy, weight loss, and functional decline[4]. Pathophysiological mechanisms include ischemic nerve injury secondary to microvasculitis and inflammatory processes[5]. While pharmacological management focuses on pain control, glycemic regulation, and immunotherapy, physiotherapy plays a vital role in restoring mobility, preventing secondary complications, and improving quality of life [6].

Despite its functional impact, physiotherapy-specific literature on diabetic amyotrophy remains scarce. This elaborated case study aims to contribute to the existing evidence by detailing a structured rehabilitation approach and its clinical outcomes.

Case Description

Patient Information

- **Age:** 56 years
- **Gender:** Male
- **Occupation:** Shop owner
- **Dominant limb:** Right
- **Medical History:**
- Type 2 diabetes mellitus – 12 years
- Hypertension – 6 years
- **Presenting Complaints**
- Severe left thigh pain
- Progressive difficulty in walking
- Inability to rise from sitting

History of Present Illness

The patient experienced sudden onset severe burning pain over the left anterior thigh, radiating toward the knee. Over the following four weeks, pain was accompanied by progressive weakness of the left lower limb, resulting in

difficulty walking and frequent near-falls. There was no history of trauma, lumbar disc disease, or systemic illness.
Neurological evaluation and electrodiagnostic testing confirmed the diagnosis of diabetic amyotrophy. The patient was referred for physiotherapy six weeks after symptom onset.

Clinical Examination
General Examination
- Conscious and oriented
- Mild weight loss (6 kg over 3 months)
- Antalgic posture

Neurological Examination
- **Muscle strength (MRC scale):**
- **Hip flexors:** 2/5 (left), 4/5 (right)
- **Knee extensors:** 2/5 (left), 4/5 (right)
- **Ankle dorsiflexors:** 4/5 bilaterally

- **Deep tendon reflexes**
- **Left knee jerk:** Reduced
- **Sensory examination**
- Hypoesthesia over anterior thigh
- **Pain**
- **Visual Analog Scale (VAS):** 8/10

Musculoskeletal Assessment
- Visible wasting of left quadriceps
- Reduced active range of motion at hip and knee
- Pain-limited movement

Functional Assessment
- **Gait:** Antalgic with walker
- **Sit-to-stand:** Maximal assistance
- **Stair climbing:** Unable
- **Lower Extremity Functional Scale (LEFS):** 18/80

Investigations
- **HbA1c:** 9.2%
- **Nerve Conduction Study:**
- Reduced femoral nerve amplitude on the left
- **Electromyography:**
- Denervation changes in quadriceps
- **MRI Lumbar Spine:**
- No compressive pathology

Physiotherapy Intervention
Rehabilitation Goals
1. Pain reduction
2. Prevention of muscle atrophy
3. Improvement of muscle strength
4. Restoration of gait and balance
5. Functional independence

Phase 1: Pain Management and Muscle Activation (Weeks 1–2)
- Transcutaneous electrical nerve stimulation (TENS)
- Gentle active-assisted range of motion exercises
- Isometric exercises for quadriceps and gluteals
- Bed mobility and positional training
- Patient education regarding energy conservation

Phase 2: Strengthening and Postural Control (Weeks 3–5)
- Progressive resisted exercises using therabands
- Closed kinetic chain exercises
- Static and dynamic balance training
- Gait training with walker progressing to cane
- Core stabilization exercises

Phase 3: Functional and Endurance Training (Weeks 6–8)
- Sit-to-stand repetitions
- Stair climbing practice
- Endurance training with walking program
- Functional task-oriented training
- Home exercise program

Outcome Measures

Outcome	Baseline	8 Weeks
Pain (VAS)	8/10	2/10
Hip flexor strength (MRC)	2/5	4/5
Knee extensor strength (MRC)	2/5	4/5
LEFS	18/80	62/80
Gait aid	Walker	Independent

Discussion
Diabetic amyotrophy is a disabling neuropathy that significantly compromises functional mobility and independence [1, 2]. The hallmark features of severe pain followed by proximal muscle weakness often result in prolonged disability if rehabilitation is delayed [3]. The observed improvements in this case support earlier findings that functional recovery is possible with appropriate multidisciplinary management [7].
Pain modulation using TENS facilitated early participation in active exercises, which is consistent with recommendations for neuropathic pain management[8]. Progressive strengthening and closed kinetic chain exercises addressed muscle atrophy and neuromuscular re-education, aligning with principles of therapeutic exercise in neuropathic conditions [9]. Functional task training and gait re-education were essential in restoring independence and preventing falls [10].
This case reinforces the importance of early referral to physiotherapy and individualized rehabilitation planning in diabetic amyotrophy, an area still underrepresented in rehabilitation literature.

Conclusion
This elaborated case study demonstrates that structured, phase-wise physiotherapy rehabilitation significantly improves pain, muscle strength, gait, and functional independence in patients with diabetic amyotrophy. Physiotherapy should be considered a cornerstone of comprehensive management to optimize recovery and quality of life.

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