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Early Physiotherapeutic Interventions in Acute Transverse Myelitis: A Case Report

Divya Kashyap [1], Abhishek Kumar Sandilya [2], Deepak Nainwal [3], Dr Parul R Agrawal [4*]

[1,2] Assistant Professor, College of Physiotherapy, Heritage Institute of Medical Sciences, Varanasi, Uttar Pradesh, India
[3] Associate Professor, College of Physiotherapy, Heritage Institute of Medical Sciences, Varanasi, Uttar Pradesh, India
[4] Professor & Head, College of Physiotherapy, Heritage Institute of Medical Sciences, Varanasi, Uttar Pradesh, India

Abstract

Background: Transverse myelitis (TM) is a rare inflammatory disorder of the spinal cord that can cause motor, sensory, and autonomic dysfunction. Rehabilitation strategies are essential for optimising recovery, yet standardised physiotherapy protocols remain limited.

Case Presentation: A 23-year-old male with acute TM following a viral illness presented with lower back pain, bilateral leg weakness, sensory impairment, and bladder dysfunction. MRI revealed a longitudinally extensive inflammatory demyelinating lesion of the spinal cord.

Intervention: A tailored physiotherapy program was initiated, integrating functional mobility training, flexibility restoration interventions targeting musculotendinous structures, progressive resistance, and lumbopelvic stabilisation training. Medical management included antibiotics, antihypertensives, antithrombotics, and anticonvulsants.

Outcome: In the 10 days of the rehabilitation program, the patient showed marked improvement in muscle strength, where the power in the lower limbs on both sides improved from 3/5 to 5/5, along with improved functional mobility, pain, and bladder control. The patient's functional disability improved, and the Oswestry Disability Index decreased from 68% (severe disability) to 32% (moderate disability).

Conclusion: Early, structured physiotherapy combining exercise therapy and flexibility-oriented intervention can enhance functional recovery in Acute TM patients. This case underscores the importance of individualized rehabilitation programs in neurorehabilitation.

Keywords: Acute Transverse Myelitis, Exercise Therapy, Functional Mobility Training, Early Rehabilitation, Flexibility Restoration

Introduction

Transverse myelitis (TM) is an uncommon and severe inflammatory disorder of the spinal cord, defined by motor, sensory, and autonomic dysfunction. [1] The inflammation destroys myelin and axons, resulting in neurological deficits that can range from mild weakness to complete paralysis. [2] The TM usually occurs under the age of 50 and above 50, with an incidence calculated between 1–8 cases per million years. [3] The etiology of POTS is multifactorial, and the condition is often linked to autoimmune mechanisms, postinfectious states, or idiopathic causes. [4] TM is clinically characterized by acute or subacute development of back pain, weakness, sensory changes, and bladder/bowel dysfunction. [5] Symptoms may advance quickly, leading to hospitalization and multidisciplinary care. MRI imaging is critical for diagnosis, allowing for distinction of TM from alternative causes including spinal cord compression or degenerative disc disease. [6] Despite advances in medical management, rehabilitation is the cornerstone of recovery. Apt physiotherapy procedures such as exercise, stretching, and strength training play a foundational role in enhancing physical mobility, minimising pain and dysfunction, and regaining muscle range of motion to avoid further complications like contractures or deconditioning. [7] Standardized rehabilitation protocols for TM are still lacking, and case report evidence may shed light on effective strategies. The case report demonstrates an integrated approach to rehabilitation through both exercise and passive muscle stretching for a young adult with acute transverse myelitis. This case report describes the progression and outcomes of this patient as evidence of the importance of providing formalized physiotherapy as early as possible to improve recovery from spinal cord injury. This adds evidence in the literature supporting neurorehabilitation and providing formalized physiotherapy as soon as possible after injury.

Patient Information

- Age/Sex: 23-year-old male
- Medical History: Hypertension (controlled), fatty liver grade II
- Presenting Symptoms: Sudden onset of lower back pain, bilateral leg weakness, tingling/numbness, impaired sensation from the waist to the knees, bladder dysfunction
- Trigger: Viral illness two weeks prior to onset

Clinical Findings

- Endomorphic body build with slouched posture; shoulder symmetry maintained
- Bilateral lower limb weakness involving proximal and distal muscle groups (muscle strength: 3/5 on MRC scale)
- Sensory impairment below the waist, with complaints of numbness and tingling in both lower limbs
- Functional limitations:
- Difficulty in standing and maintaining balance
- Impaired gait requiring assistance
- Difficulty in sit-to-stand transitions
- Reduced independence in activities of daily living (ADLs)
- Bladder dysfunction:
- Reduced bladder control
- Urgency and possible features of neurogenic bladder
- Muscle tightness:
- Tightness in bilateral hamstrings and calf muscles

- Associated restriction in range of motion contributing to limited mobility

Medications

- Antibiotics, antihypertensives, antithrombotics, anticonvulsants

Diagnostic Assessment

- **MRI Findings**

Magnetic resonance imaging revealed a longitudinally extensive inflammatory demyelinating lesion of the spinal cord, which is compatible with acute transverse myelitis, and degenerative changes at the levels of L4-L5 and L5-S1.

Physiotherapy Intervention Program:

Following Physiotherapy intervention were carried out focusing on mobility and maintaining properties of muscles

Functional Mobility Training

Passive and active-assisted joint mobility interventions were administered to the bilateral lower extremities, incorporating multiplanar articular movements including hip flexion–extension and abduction–adduction, knee flexion–extension, and ankle dorsiflexion–plantarflexion to facilitate neuromuscular activation and maintain joint integrity.

Performed in supine position, 10 repetitions per joint, ~15 minutes/session

Flexibility Restoration Interventions Targeting Musculotendinous Structures

Musculotendinous stretching with the assistance of a therapist was applied to the primary muscle groups (Hamstrings, Gastrocnemius/Soleus, and Hip adductors) in a supine position. The stretches were maintained for 15 to 20 seconds over 10 repetitions for each muscle group, which is essential for stretching the musculotendinous units and optimising viscoelastic properties.

Progressive Resistance and Lumbopelvic Stabilisation Training

A structured program of progressive resistance and lumbopelvic stabilisation training was implemented, including therapist-assisted and bodyweight-resisted exercises targeting key lower limb muscles such as the quadriceps, hamstrings, gluteals, and calves. Exercise intensity was kept at a moderate level (around 60–80% of estimated maximal voluntary contraction), with three sessions per week. The protocol also incorporated early-stage lumbopelvic stabilization exercises performed in supine and crook-lying positions, including abdominal bracing, pelvic tilting, and isometric trunk activations, which were progressively advanced to sitting balance and postural control tasks as capacity improved. The overall dosage was standardised to three sets of ten repetitions, with each session lasting approximately 15 minutes.

Fig 1: Depiction of the Therapeutic Exercise Regimen

Table 1: Summary of the intervention and clinical status

Clinical Event	Event / Intervention	Clinical Status & Outcome Measures
Day 1	Preceding viral illness	Patient reported febrile illness; no neurological deficits
Day 13	Onset of TM symptoms	Acute onset lower back pain, bilateral lower limb weakness, paresthesia, and bladder dysfunction
Day15-18 (Hospital Admission)	Medical management initiated; referred to physiotherapy	Lower limb muscle strength: MRC Scale 3/5 bilaterally; Severe functional limitation; ODI: 68% (Severe disability)
Day 19- 22	Initiation of physiotherapy: joint mobility exercises, assisted strengthening, and early core activation	Slight improvement in voluntary muscle activation; persistent sensory deficits; dependent ambulation
Day 23-26	Progression to structured strengthening + passive neuromuscular lengthening	Improved muscle recruitment and sitting balance; beginning assisted standing; reduction in perceived stiffness
Day 27-30	Continued progressive resistance training and postural control exercises	Improved functional mobility; independence in bed mobility and transfers
Day 31-35	Advanced strengthening and balance training	Noticeable improvement in gait; improved functional mobility.
Day 36 (Reassessment)	Outcome evaluation	Lower limb muscle strength: MRC Scale 5/5 bilaterally; Functional mobility significantly improved; ODI: 32% (Moderate disability); Partial restoration of bladder control

Discussion

Transverse myelitis is a rare inflammatory disorder that often results in motor, sensory, and autonomic dysfunction. [1] While medical management addresses the acute phase, rehabilitation is critical for functional recovery. [8] In this case, early integration of physical therapy led to rapid improvements in strength and mobility, with limb power progressing from 3/5 to 5/5 within 10 days.

Physiotherapy interventions such as functional mobility training, flexibility restoration interventions targeting musculoskeletal structures, progressive resistance, and lumbopelvic stabilisation training promote neuroplasticity and prevent complications like contractures. [9] Passive inhibition complements active exercises by maintaining flexibility and reducing stiffness. [10] The patient's partial recovery of bladder control also suggests that rehabilitation may influence autonomic functions, though further study is needed.

Interestingly, the early intervention of a structured physiotherapy program in the case study has been seen to produce positive outcomes in various domains, such as motor skills, functional independence, and disability status, as evidenced by the marked reduction in disability. The rehabilitation strategy employed in the case study focused on the preservation and development of neuromuscular and neurophysiological properties of skeletal muscles, thus ensuring the achievement of the best functional outcomes. The case study has demonstrated the potential for early intervention of physiotherapy, being a comprehensive intervention strategy for acute transverse myelitis, and its significance in addressing the multidimensional impairments. The findings may be used as a basis for the formulation of guidelines on the same, as there is a scarcity of evidence in the domain.

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