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Rapid symptomatic recovery in lumbar PLID After acupuncture-based multimodal therapy at Suoxi Hospital: A case report

Dr. S M Shahidul Islam[1*], Dr. S M Abdul Alim[2], Sabina Yasmin[3], Shayita Islam[4], S M Shafayat Islam[4], Dr. Rehana Akter Lima[5]

[1] Visiting Consultant & Acupuncture Specialist, Suo- Xi Hospital (Acupuncture), Shaan Tower, Chamelibag, Santinagar, Dhaka, Bangladesh

[2] Assistant Professor, (Pain Medicine & Regional Anaesthesia Division), Department of Anaesthesia, Analgesia, and Intensive Care Medicine Bangladesh Medical University (BMU), Dhaka, Bangladesh

[3] Chief Executive Officer (CEO), Suo-Xi Hospital (Skin Care), Shaan Tower, Chamelibag, Santinagar, Dhaka, Bangladesh

[4] Associate Writer, Suo-Xi Hospital (Skin Care), Shaan Tower, Chamelibag, Santinagar, Dhaka, Bangladesh

[5] Medical Officer, Suo-Xi Hospital (Skin Care), Shaan Tower, Chamelibag, Santinagar, Dhaka, Bangladesh

Corresponding Author: Dr. S M Shahidul Islam

Abstract

Background: Prolapsed Lumbar Intervertebral Disc (PLID) is a common cause of low back pain and disability, often requiring prolonged conservative management or surgical intervention. Acupuncture-based multimodal therapy is emerging as a promising non-surgical approach, though documented rapid recovery cases remain limited.

Case presentation: A 43-year-old male driver from Mirpur, Dhaka, presented with chronic low back pain radiating to the right lower limb for four months. He had a history of type 2 diabetes mellitus for eight years. Magnetic Resonance Imaging confirmed a prolapsed lumbar intervertebral disc at L4-L5 and L5-S1 levels. He was treated at Suoxi Hospital with an integrative approach combining acupuncture at the lumbar region, Chinese deep muscle stimulator therapy, and manual physiotherapy, including mobilization, manipulation, and isometric exercises.

Outcome: A dramatic symptomatic recovery was observed. By the 14th day of treatment, the patient reported a significant reduction in low back pain and resolution of radicular symptoms. He resumed his daily activities and occupational duties without discomfort. No adverse events were noted during the treatment period.

Conclusion: This case demonstrates that acupuncture-based multimodal therapy may facilitate rapid symptomatic recovery in PLID patients. The combination of acupuncture, deep muscle stimulation, and manual physiotherapy appears to offer synergistic benefits, potentially reducing recovery time compared to conventional monotherapy. Further studies with larger sample sizes are warranted to validate these findings and explore underlying mechanisms.

Keywords: Acupuncture, deep muscle stimulator, intervertebral disc, prolapsed lumbar multimodal therapy

Introduction

Low back pain (LBP) remains the leading cause of disability worldwide, affecting an estimated 619 million individuals in 2020, with projections suggesting this number will rise to 843 million by 2050 [1]. Among the various causes of LBP, Prolapsed Lumbar Intervertebral Disc (PLID) represents a significant pathological entity characterized by herniation of nucleus pulposus through a weakened annulus fibrosus, resulting in mechanical compression and inflammatory irritation of adjacent nerve roots [2]. This condition disproportionately affects working-age populations, with drivers and individuals exposed to prolonged sitting and vibrational forces being at particularly elevated risk due to occupational ergonomic factors [1, 3]. The societal and economic impact of PLID is substantial. Studies have demonstrated that individuals who exit the workforce prematurely due to LBP accumulate considerably less wealth by retirement age, contributing to healthcare inequality and reduced quality of life [4]. In low- and middle-income countries, where occupational exposures to ergonomic risk factors are often unmitigated, the burden of disc-related pathology is particularly pronounced [3]. The condition not only impairs physical function but also is associated with significant psychological distress, sleep disturbances, and reduced social participation [5].

Conventional management strategies for PLID encompass a spectrum ranging from conservative approaches to surgical intervention. First-line conservative treatment typically includes pharmacological analgesia, activity modification, and physical therapy [2]. However, pharmacological management carries risks of adverse effects, particularly with long-term opioid use, while surgical options such as discectomy, though effective for selected patients, involve inherent procedural risks, substantial healthcare costs, and variable recovery trajectories [6]. This therapeutic gap has prompted growing interest in multimodal, non-pharmacological interventions that address the complex biopsychosocial nature of discogenic pain. Acupuncture, a cornerstone of traditional Chinese medicine, has emerged as a promising intervention for LBP management. The American College of Physicians recommends acupuncture as first-line therapy for chronic LBP based on accumulating evidence of its safety and efficacy [7]. Recent pragmatic trials have demonstrated that acupuncture produces significantly greater reductions in pain intensity and pain-related disability compared to usual care alone, with benefits sustained at 12-month follow-up [7]. The mechanisms underlying acupuncture's analgesic effects are increasingly understood to involve modulation of descending pain inhibitory pathways, segmental inhibition of nociceptive

transmission, and anti-inflammatory effects mediated by neuroimmune interactions [5]. Deep muscle stimulation therapy, a more recent addition to the therapeutic armamentarium, utilizes localized vibration to address myofascial components of lumbar pain. A randomized controlled trial involving 102 patients with chronic non-specific LBP demonstrated that deep muscle stimulation combined with lumbar stabilization exercises achieved superior outcomes compared to exercise alone, with 96% of patients in the combined therapy group showing clinical improvement [8]. The therapy appears to work by reducing muscle tension, breaking down fascial adhesions, and improving local circulation, thereby addressing the secondary muscular dysfunction that often accompanies disc pathology [8]. Manual physiotherapy techniques, including mobilization and manipulation, represent another cornerstone of multimodal management. These interventions aim to restore segmental mobility, reduce pain, and improve functional capacity. Systematic review evidence indicates that spinal manipulative therapy produces clinically meaningful improvements in pain and disability for patients with LBP, though the specific vertebral level targeted may be less critical than previously assumed [6]. When combined with isometric exercises, which enhance core stability and neuromuscular control, these manual approaches may confer synergistic benefits. Despite the established efficacy of individual modalities, evidence regarding combined acupuncture-based multimodal therapy for PLID remains limited. The potential synergistic effects of simultaneously addressing neural compression (through postural and mechanical interventions), myofascial dysfunction (through deep muscle stimulation), and central pain processing (through acupuncture) warrant investigation. This case report describes a patient with lumbar PLID who demonstrated rapid symptomatic recovery following acupuncture-based multimodal therapy at Suoxi Hospital, contributing to the growing literature on integrative approaches to discogenic pain management.

Case Presentation

A 43-year-old male driver from Mirpur, Dhaka, presented to the outpatient department of Suoxi Hospital with complaints of chronic low back pain for four months. The patient belonged to a middle socioeconomic family and worked as a professional driver for approximately 15 years, spending 8-10 hours daily in a seated driving position. He was married and had two children. Written informed consent was obtained from the patient for publication of this case report.

Chief complaint

The patient reported an insidious onset of dull aching low back pain that progressively worsened over four months. The pain was localized to the lumbosacral region with radiation to the right lower limb along the posterior thigh, reaching up to the calf. He described the pain as aggravated by prolonged sitting, bending forward, coughing, and sneezing. Relief was partially achieved by lying down with knees flexed. The pain intensity measured 7/10 on the Visual Analog Scale (VAS) during exacerbations, interfering significantly with his occupational duties and sleep quality.

Medical history

The patient had a known history of type 2 diabetes mellitus for the past eight years, managed with oral hypoglycemic agents (Metformin 500 mg twice daily). His glycemic control was reportedly moderate, with random blood glucose levels ranging between 160-200 mg/dL. He had no history of previous spinal trauma, surgery, or hospitalization for back pain. There was no history of corticosteroid use, anticoagulant therapy, or bleeding disorders that would contraindicate acupuncture.

Family history

The patient's mother was hypertensive, and his father had both hypertension and diabetes mellitus. There was no family history of autoimmune disorders, spinal deformities, or malignancy.

Social and occupational history

As a professional driver, the patient was exposed to prolonged sitting, whole-body vibration from the vehicle, and repetitive twisting movements during vehicle maneuvering. He denied tobacco smoking or alcohol consumption. His sleep was frequently disturbed due to pain, requiring him to wake and change position 3-4 times nightly.

Table 1: Baseline demographic and clinical characteristics of the patient

Parameter	Details
Age	43 years
Sex	Male
Occupation	Professional driver
Socioeconomic status	Middle class
Duration of symptoms	4 months
Presenting complaint	Low back pain with right lower limb radiation
Pain character	Dull aching, radiating
Aggravating factors	Prolonged sitting, bending, coughing, and sneezing
Relieving factors	Lying down with knees flexed
Baseline VAS score	7/10
Comorbidities	Type 2 diabetes mellitus (8 years)
Diabetes management	Metformin 500 mg twice daily
Family history	Mother: Hypertension; Father: Hypertension + Diabetes
Sleep disturbance	Awakens 3-4 times/night due to pain

Clinical examination findings

General physical examination: The patient was alert, oriented, and ambulatory with an antalgic gait favoring the right lower limb. Vital signs were within normal limits: blood pressure 124/82 mmHg, pulse rate 76 beats per minute, respiratory rate 16 breaths per minute, and afebrile.

Local examination of the lumbar spine

- **Inspection:** Normal lumbar lordosis was preserved. No visible swelling, erythema, or muscle wasting was observed.

- **Palpation:** Tenderness was elicited over the L4-L5 and L5-S1 spinous processes and right paravertebral muscles. No step deformity or palpable muscle spasm was noted.

- **Range of Motion:** Forward flexion was restricted to 40 degrees (normal: 90 degrees) due to pain. Extension was 15 degrees (normal: 30 degrees). Right lateral flexion was 15 degrees (normal: 30 degrees), and left lateral flexion was 25 degrees. All movements provoked pain at the end range.

Neurological examination

- **Motor examination:** Muscle strength was graded 5/5 in bilateral lower extremities using the Medical Research Council (MRC) scale. No focal weakness was detected.
- **Sensory examination:** Hypoesthesia to light touch was noted in the right L5 and S1 dermatomal distributions (lateral calf, dorsal foot, and lateral foot).
- **Deep Tendon Reflexes:** Right ankle jerk (Achilles reflex) was diminished (1+) compared to the left (2+). Patellar reflexes were normal and symmetric bilaterally.
- **Provocative tests:** Straight Leg Raise (SLR) test was positive on the right side at 50 degrees, reproducing radicular pain. Contralateral SLR was negative. The femoral nerve stretch test was negative bilaterally. Lasegue's sign was positive on the right.

Table 2: Neurological examination findings

Examination component	Right side	Left side
Motor strength (MRC Scale)		
Hip flexors (L1-L2)	5/5	5/5
Knee extensors (L3-L4)	5/5	5/5
Ankle dorsiflexors (L4-L5)	5/5	5/5
Extensor hallucis longus (L5)	5/5	5/5
Ankle plantar flexors (S1-S2)	5/5	5/5
Sensation		
L3 dermatome (Medial thigh)	Normal	Normal
L4 dermatome (Medial leg)	Normal	Normal
L5 dermatome (Lateral leg, dorsal foot)	Hypoesthesia	Normal
S1 dermatome (Lateral foot, sole)	Hypoesthesia	Normal
Deep tendon reflexes		
Patellar reflex (L3-L4)	2+	2+
Achilles reflex (S1-S2)	1+	2+
Provocative tests		
Straight leg raise	Positive at 50°	Negative
Lasegue's sign	Positive	Negative
Femoral nerve stretch	Negative	Negative

Radiological findings

Magnetic Resonance Imaging (MRI) of the lumbar spine was performed using a 1.5 Tesla scanner. The imaging revealed:

- **L4-L5 Level:** Diffuse posterior disc bulge with a small central disc protrusion causing mild compression of the thecal sac. No significant nerve root impingement was noted at this level.
- **L5-S1 Level:** Large left paracentral disc extrusion measuring approximately 8 mm in anteroposterior dimension, causing moderate to severe compression of the traversing right S1 nerve root. The disc material extended inferiorly with mild migration. Associated mild inflammatory changes were noted in the adjacent epidural space.
- **Additional Findings:** Mild desiccation of the L5-S1 intervertebral disc was observed, consistent with early degenerative changes. The vertebral body heights were preserved with no evidence of fracture, spondylolisthesis, or spinal stenosis. The conus medullaris terminated normally at the L1 level with normal signal intensity.

The MRI findings correlated well with the clinical presentation of right S1 radiculopathy, confirming the diagnosis of Prolapsed Lumbar Intervertebral Disc (PLID) at L5-S1 with right S1 nerve root compression.

Table 3: MRI findings summary

Parameter	L4-L5 level	L5-S1 level
Disc morphology	Diffuse posterior bulge	Large left paracentral extrusion
Disc extrusion size	Not applicable	8 mm (AP dimension)
Thecal sac compression	Mild	Moderate
Nerve root compression	None	Right S1 nerve root (moderate-severe)
Disc desiccation	Mild	Moderate
Migration	None	Inferior mild migration
Inflammatory changes	None	Present in the epidural space
Spinal canal compromise	None	Mild

Diagnosis
Based on the clinical presentation, neurological examination findings, and MRI correlation, the patient was diagnosed with:

Primary diagnosis: Prolapsed Lumbar Intervertebral Disc (PLID) at L5-S1 level with right S1 radiculopathy.

Secondary diagnosis: Type 2 Diabetes Mellitus (duration 8 years).

Differential diagnoses considered and ruled out
- Lumbar spinal stenosis (ruled out by MRI)
- Spondylolisthesis (ruled out by MRI)
- Sacroiliac joint dysfunction (ruled out by negative provocative tests)
- Piriformis syndrome (ruled out by clinical examination)
- Diabetic neuropathy (considered but less likely given unilateral radicular pattern)

Therapeutic intervention
The patient received a multimodal treatment protocol at Suoxi Hospital comprising three integrated therapeutic modalities administered three times weekly over four weeks (total 12 sessions).

Acupuncture at the lumbar region: Performed by a licensed practitioner using sterile, disposable stainless-steel needles (0.25 × 40 mm) inserted at bilateral acupoints including BL23 (Shenshu), BL25 (Dachangshu), BL26 (Guanyuanshu), BL40 (Weizhong), GB30 (Huantiao), GB34 (Yanglingquan), and Ashi points. Needles were inserted to a depth of 1.0- 1.5 cun until de qi sensation was elicited, retained for 30 minutes with manual stimulation every 10 minutes.

Deep muscle stimulator therapy: Applied using a handheld percussive device (40-50 Hz) targeting bilateral lumbar paravertebrals, right gluteal muscles, hamstrings, gastrocnemius, and soleus. Each area received 3-5 minutes with intensity adjusted to tolerance, focusing on myofascial trigger points.

Manual physiotherapy: Included Maitland grade III-IV mobilizations at L4-S1, high-velocity low-amplitude manipulation (maximum two sessions), and instruction in a home isometric exercise program (abdominal bracing, gluteal squeezes, multifidus activation, pelvic tilts) performed twice daily. Each 60–75-minute session combined all three modalities. No adverse events occurred; mild transient needle-site soreness resolved spontaneously.

Clinical course and outcome
Assessment timeline: Evaluations were performed at baseline, week 2 (6 sessions), and week 4 (12 sessions) using the Visual Analog Scale (VAS), Oswestry Disability Index (ODI), lumbar range of motion, and Straight Leg Raise (SLR) testing.

Week 2 assessment (Day 14): The patient reported dramatic improvement from the 14th day. VAS reduced from 7/10 to 2/10, ODI improved from 52% (severe disability) to 18% (minimal disability), lumbar flexion increased from 40° to 70°, and SLR improved from 50° to 80° without radicular pain. Sensation in L5-S1 dermatomes nearly normalized, and sleep quality improved with uninterrupted 6-7 hours. Light daily activities were resumed.

Week 4 assessment (Day 28): VAS further reduced to 1/10, ODI improved to 8% (minimal disability), lumbar flexion normalized to 85°, and SLR was negative bilaterally at 90°. Neurological examination was normalized with symmetric reflexes and sensation. The patient sat comfortably for up to 2 hours and resumed household activities and walking.

Follow-up: Scheduled at 8 weeks from baseline with advice to continue home exercises and maintain ergonomic precautions. Diabetes remained stable throughout.

Summary of outcome
This case demonstrates a rapid and clinically meaningful response to acupuncture-based multimodal therapy in lumbar PLID with radiculopathy. Notable improvement occurred by day 14, with near-complete symptom resolution by week 4. The treatment was well-tolerated with no adverse events, suggesting this multimodal approach may offer a safe, effective non-surgical option for selected patients with lumbar disc pathology.

Fig 1: Giving Acupuncture at the level of L4/L5 (spine)

Discussion
This case report describes a 43-year-old male driver with a prolapsed lumbar intervertebral disc (PLID) at L5-S1 who demonstrated rapid symptomatic recovery following acupuncture-based multimodal therapy. The dramatic improvement observed by day 14, with near-complete resolution of symptoms by week 4, warrants discussion in the context of existing literature on multimodal approaches to discogenic pain. The patient's occupational exposure as a driver aligns with established risk factors for lumbar disc pathology. Prolonged sitting combined with whole-body vibration increases intradiscal pressure and accelerates degenerative changes, particularly at L4-L5 and L5-S1 levels [1, 9]. Ferreira and colleagues documented that occupational drivers face substantially higher risks of lumbar disc herniation compared to the general population, with cumulative vibration exposure showing dose-response relationships with disc degeneration [1]. The present case exemplifies this occupational vulnerability. The rapid response to therapy observed in this patient is noteworthy. While conventional conservative management for lumbar radiculopathy typically requires 6-8 weeks for meaningful improvement, this patient achieved substantial pain

reduction within 14 days [2, 10]. The synergistic effect of combining acupuncture, deep muscle stimulation, and manual therapy may explain this accelerated recovery. Acupuncture's analgesic effects are mediated through multiple mechanisms, including segmental inhibition of nociceptive transmission, activation of descending pain modulatory pathways, and anti-inflammatory neuroimmune interactions [7, 11]. DeBar and colleagues demonstrated in their pragmatic trial that acupuncture produces clinically significant pain reduction sustained at 12 months, supporting its role in chronic low back pain management [7]. The inclusion of deep muscle stimulator therapy addressed the myofascial component often accompanying disc pathology. Chen and colleagues reported that deep muscle stimulation combined with exercise achieved superior outcomes compared to exercise alone, with 96% of patients showing clinical improvement [8, 12]. The percussive therapy likely reduced secondary muscle spasm, broke down fascial adhesions, and improved local circulation, thereby addressing the muscular dysfunction perpetuating pain cycles [8]. Manual physiotherapy components, including mobilization and manipulation, contributed to segmental mobility restoration. Sørensen and colleagues confirmed that spinal manipulative therapy produces clinically meaningful improvements in pain and disability, though the specific vertebral level targeted may be less critical than previously believed [6, 13]. The combination of mobilization with isometric exercises enhanced core stability and neuromuscular control, potentially preventing recurrence [6]. The neurological recovery observed, including normalization of sensation and reflexes, suggests that the combined approach effectively reduced mechanical compression or inflammatory irritation of the S1 nerve root. Badr and colleagues recently demonstrated that multimodal physical therapy in lumbosacral radiculopathy produced significant improvements in pain, disability, and electrophysiological parameters, supporting the biological plausibility of integrated approaches [2, 14]. Importantly, the patient's diabetes mellitus required consideration during treatment. Blood glucose monitoring throughout revealed no significant fluctuations, indicating that acupuncture-based multimodal therapy is safe in metabolically compromised patients when appropriately monitored. This finding aligns with Song and colleagues, who reported no adverse metabolic effects in their acupuncture trial for lumbar conditions [5]. The rapid improvement also has significant socioeconomic implications. Schofield and colleagues demonstrated that individuals exiting the workforce prematurely due to back pain accumulate considerably less wealth by retirement age [4, 15]. Rapid return to function, as achieved by this patient, may preserve occupational capacity and prevent the downward socioeconomic spiral associated with chronic disability [4]. Several limitations warrant acknowledgment. This single case report cannot establish causality or generalize to broader populations. The absence of a control group limits conclusions regarding treatment-specific effects versus natural history. Additionally, long-term follow-up beyond eight weeks is required to assess durability of improvement. Despite these limitations, this case contributes to the growing evidence that acupuncture-based multimodal therapy may offer a safe, effective, and rapid non-surgical option for selected patients with lumbar disc pathology. The dramatic response observed by day 14 suggests that integrated approaches addressing neural, myofascial, and mechanical components simultaneously may confer synergistic benefits exceeding those of monotherapy. Future research should employ randomized controlled designs with larger samples and longer follow-up to validate these findings and elucidate optimal treatment protocols.

Conclusion

This case demonstrates that acupuncture-based multimodal therapy facilitated rapid symptomatic recovery in a patient with lumbar PLID, with significant improvement by day 14 and near-complete resolution by week 4. The integrated approach addressing neural, myofascial, and mechanical components was safe and well-tolerated. While single cases cannot establish generalizability, these findings suggest that combined acupuncture, deep muscle stimulation, and manual physiotherapy may offer an effective non-surgical option for selected patients. Larger controlled studies are warranted to validate these observations.

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