

Case Report: Multimodal Rehabilitation in a Young Olympic Weightlifter with Chronic Lumbosacral Pain and Lower Limb Neurological Deficits

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Keywords

Weightlifting, lumbar disc pathology, adolescent athlete, conservative rehabilitation, McKenzie method, neuromuscular control, CARE guideline

Abstract

Introduction: This case report describes the comprehensive rehabilitation of a 17-year-old elite Olympic weightlifter experiencing chronic lower back and left leg pain, with diagnosed lumbar disc pathology. **Case Presentation:** After one year of persistent symptoms and unsuccessful conservative and interventional treatments, a structured six-week physiotherapy program targeting flexibility, neuromuscular control, and strength led to full recovery. **Conclusion:** Conservative multimodal rehabilitation incorporating directional preference therapy, neurodynamics, and functional reconditioning can successfully restore high-level athletic performance without surgery.

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Introduction

Low back pain (LBP) is increasingly reported among adolescent athletes, particularly those participating in weightlifting, where repetitive spinal loading and excessive axial compression predispose to early disc degeneration and neural sensitization (Bono et al., 2004; Sato et al., 2011). Lumbar disc pathology in youth can manifest as referred leg pain, muscular inhibition, and significant functional decline. The growing spine is particularly vulnerable to overuse syndromes, and mismanagement can result in long-term impairment or withdrawal from sport (Taimela et al., 1997).

Despite the high physical demand of Olympic lifting, early conservative rehabilitation focusing on segmental mobility, core stability, and movement retraining remains underutilized. The McKenzie method, combined with neurodynamic and proprioceptive training, offers a tailored approach to address directional dysfunction and neural tension (Halliday et al., 2016). This case report illustrates the clinical reasoning and recovery trajectory of an adolescent Olympic champion who avoided surgery despite persistent symptoms and multiple failed interventions.

Patient Information

A 17-year-old elite weightlifter (165 cm, 57 kg, Snatch 105 kg, Clean & Jerk 135 kg) presented with a one-year history of cumulative lower back pain (6/10) and left posterior thigh (9/10) and calf pain (6/10), aggravated during lumbar flexion and end-range extension. Pain worsened during prolonged sitting, bending, and static postures. He reported a notable drop in performance and inability to return to sport.

Clinical Findings

- Pain aggravated at end ROM in all directions
- Left SLR and SLUMP tests positive
- Weakness: left hamstring 3/5, quadriceps 4/5, hip extension and abduction 3/5
- Poor static balance (single-leg test)
- Limited flexibility: left hamstring and calf
- Impaired lumbopelvic control and core stability

Timeline

- 12 months of persistent pain with multiple specialist consultations
- Imaging: MRI revealed L4-L5 posterior disc bulge and L5-S1 central protrusion without significant stenosis
- Failed interventions: Dry needling, shockwave, ultrasound, electrical stimulation, lumbar brace, PRP injection, and corticosteroids
- Surgical consultation refused by patient
- Senior physiotherapy evaluation began one year after symptom onset

Diagnostic Assessment

MRI findings confirmed structural disc changes without severe stenosis. Clinical signs of neural tension (positive SLR/SLUMP), motor weakness, and poor movement control suggested a mechanical neurogenic dysfunction. Static and dynamic stability testing indicated impaired neuromuscular control.

Therapeutic Intervention

A structured 6-week physiotherapy program was initiated, including:

- Flexibility Training: Static and dynamic stretching for left hamstring, calf, and lumbar extensors
- Motor Control Exercises: Deep squats, step-ups (4 sets of 15 reps)
- Balance Training: Single-leg balance on varying surfaces
- Core Stability: Plank, side plank, bridge in all directions
- Neurodynamic techniques: SLUMP and nerve gliding techniques
- McKenzie Extension Exercises for directional preference
- Low-impact Conditioning: Cycling (10–20 mins), pool therapy (15 mins)

At week 4, flexibility improved significantly and pain reduced to 2/10 (hamstring only).

Strength training was introduced:

- Leg press, hamstring curl, deadlift isometrics (20–30 sec x 5 reps)

Follow-up and Outcomes

- Week 6: No pain, full lumbar ROM, normal hamstring flexibility, better single-leg balance, and restored core control
- 3-month progression: With coach guidance, athlete resumed advanced Olympic lifts
- 9-month review: Full return to training and competition at national level (body weight: 65 kg; Snatch: 130 kg; Clean & Jerk: 165 kg), symptom-free with optimal performance

Discussion

Adolescents engaged in high-intensity sports like Olympic lifting are at elevated risk for cumulative spinal microtrauma, particularly at L4–S1, often presenting with neural tension, performance decline, and asymmetrical control (Standaert et al., 2008). Conservative rehabilitation remains the first-line intervention in absence of red flags. In this case, the failure of passive modalities underscores the importance of movement-based, criteria-driven programs.

The McKenzie approach emphasizes directional preference and loading strategies that restore disc hydration and relieve pressure on sensitized neural structures (Halliday et al., 2016). Neurodynamic techniques target peripheral nerve mobility, reducing neural mechanosensitivity (Shacklock, 2005). Functional reconditioning, including progressive resistance training, proprioception work, and aerobic activity, was essential for restoring sport-specific performance.

This case exemplifies how integrated rehabilitation, anchored in evidence-based frameworks, can lead to full athletic recovery even after prolonged impairment and failed interventions.

Patient Perspective

The athlete expressed immense relief and gratitude upon regaining strength and returning to elite performance. He reported renewed confidence and motivation to compete.

Informed Consent

Written informed consent was obtained from both the patient and their legal guardian for publication of this case report.

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