SHAREme.

Scientific Hub of Applied Research in Emerging Medical science & technology

Received: 11.10..2025 Revised: 12.11.2025 Accepted: 29.08.2025

153-159Article

DOMS or Damage? A Novel Case study of Hamstring Myofascial Dysfunction in a Sprinter

K. Manikandan[1], Subash M[2], Alagappan Thiyagarajan[3], Kiran Velukuri[4]

[1]*Department of Sports & Exercise Science, School of Allied Health Sciences, REVA University, Bangalore, Karnataka*
[2]*Padukone School of Badminton, Bangalore, Karnataka*
[3]*School of Physiotherapy, Faculty of Health Sciences, Nursing and Education, MAHSA University, Malaysia*
[4]*Apollo College of Physiotherapy, Chittoor, Andhra Pradesh*

Abstract: Introduction: Delayed Onset Muscle Soreness (DOMS) is a common physiological response to eccentric exercise, but atypical or prolonged presentations in competitive athletes may mimic muscle strain. This report presents a novel case of prolonged hamstring DOMS in a track and field athlete, highlighting the clinical reasoning and outcome-based physiotherapy approach leading to full recovery. Methods: A 21-year-old male sprinter developed posterior thigh pain and stiffness 48 hours after an eccentric sprint and plyometric session. Clinical examination revealed diffuse tenderness over the biceps femoris without structural damage on ultrasound. Outcome measures included the Visual Analogue Scale (VAS) for pain, Active Knee Extension (AKE) for hamstring flexibility, and the Lower Extremity Functional Scale (LEFS) for functional ability. A 21-day progressive physiotherapy plan was followed. Phase 1 included cryotherapy, gentle stretching, and soft tissue release. Phase 2 emphasized eccentric reactivation, neuromuscular electrical stimulation, and proprioceptive training. Phase 3 focused on sport-specific sprint drills and functional reconditioning. Results: Initially, the athlete recorded a VAS score of 6/10, AKE of 125°, and LEFS of 56/80, indicating moderate pain and reduced flexibility and function. After one week, pain reduced to 3/10 with improved mobility. By the end of the second week, flexibility increased to 150°, and LEFS improved to 70/80. After three weeks, the athlete achieved full pain relief (VAS 0/10), complete flexibility (AKE 165°), and near-normal function (LEFS 78/80). He successfully returned to sprint training without recurrence at a four-week follow-up. Discussion: The prolonged DOMS presentation

resembled a mild strain but was primarily neuromuscular and myofascial in origin. The use of functional and patient-specific outcome tools enabled precise monitoring of recovery and guided timely progression of exercises. Early eccentric reactivation and proprioceptive retraining were critical in preventing chronic dysfunction and facilitating an efficient return to sport. Conclusion: This case illustrates that atypical hamstring DOMS can mimic strain in high-performance athletes. Integrating pain, flexibility, and functional outcome measures with a structured, evidence-based rehabilitation approach ensures accurate diagnosis, optimal recovery, and safe return to sport

Keywords *Delayed Onset Muscle Soreness; Hamstring; Track and Field Athlete; Physiotherapy Rehabilitation*

1. Introduction

Delayed Onset Muscle Soreness (DOMS) is a self-limiting muscular condition that occurs following unaccustomed or high-intensity eccentric activity. It is typically characterized by muscle pain, stiffness, tenderness, and transient loss of strength, peaking between 24 and 72 hours after exercise. In most athletes, DOMS resolves spontaneously within five to seven days. However, in high-performance or repetitive loading sports such as sprinting, jumping, and hurdling, the presentation may become atypical lasting longer, mimicking mild muscle strain, or interfering with neuromuscular coordination and performance. These tools provide objective data for assessing progress, setting goals, and modifying treatment strategies.

The hamstring muscle complex, composed of the biceps femoris, semitendinosus, and semimembranosus, is especially vulnerable due to its dual-joint action and heavy eccentric demand during sprinting and deceleration phases. The differentiation between physiological DOMS and low-grade strain remains a clinical challenge because both share similar symptom patterns without clear structural disruption. Misinterpretation of prolonged DOMS as a strain may result in unnecessary rest, delayed reactivation, and performance decline, while ignoring early dysfunction could predispose the athlete to recurrent hamstring injuries.(1)

Correspondence should be addressed to
D. Samuel Prem Kumar; Email: alagappanphd@gmail.com

This case report presents an unusual and extended presentation of DOMS in the hamstring muscle of a competitive track and field athlete. The case highlights diagnostic reasoning, phase-wise physiotherapy management, and the use of objective and patient-reported outcome measures to monitor recovery. The report also emphasizes the importance of early eccentric reactivation, proprioceptive control, and progressive functional restoration in managing atypical muscle soreness in elite sports settings.

Methodology

Study Design and Participant

A single-case clinical observation was conducted involving a 21-year-old male competitive track and field sprinter who presented with posterior thigh pain and stiffness 48 hours after an intensive eccentric sprint and plyometric training session. No acute popping sensation, swelling, or bruising was reported. Ethical consent for case documentation and publication was obtained from the athlete.(2,3)

Clinical Examination

Initial assessment included palpation, range of motion testing, and flexibility evaluation. The pain was assessed using the Visual Analogue Scale (VAS), flexibility using the Active Knee Extension (AKE) Test, and lower limb function using the Lower Extremity Functional Scale (LEFS). Ultrasound imaging was performed to rule out structural damage such as muscle fibre disruption or hematoma formation.(4)

Rehabilitation Protocol

A structured three-phase physiotherapy program was implemented over 21 days, focusing on pain control, eccentric reactivation, and sport-specific reconditioning.

Phase 1 (Days 1–5): Pain Relief and Mobility

- Cryotherapy for 10 minutes, twice daily.
- Active-assisted stretching within pain-free range.
- Myofascial release over the biceps femoris long head.
- Gentle mobility and cycling to promote circulation.

Phase 2 (Days 6–14): Eccentric Strengthening and Neuromuscular Activation

- Eccentric hamstring strengthening (Nordic curls, Romanian deadlifts).
- Neuromuscular Electrical Stimulation (NMES) for motor unit recruitment.
- Proprioceptive balance training (single-leg stance, dynamic control drills).
- Soft tissue and fascial mobilization to improve elasticity.

Phase 3 (Days 15–21): Functional Reconditioning

- Sprint-specific progressive drills and resisted running.
- Plyometric reactivation with ladder and cone drills.
- Dynamic stretching and recovery sessions.
- Return-to-sport readiness assessed through pain-free sprint trials and functional scale reassessment.

Outcome Measures

Outcome measures were recorded at baseline, mid-rehabilitation (Day 10), and post-rehabilitation (Day 21). Tools included:

- Visual Analogue Scale (VAS) for pain (0 = no pain; 10 = worst pain).
- Active Knee Extension (AKE) for hamstring flexibility measured in degrees.
- Lower Extremity Functional Scale (LEFS) for functional recovery (0–80).

Table 1: Rehabilitation Phases and Key Interventions

Phase	Duration (Days)	Focus Area	Interventions
Phase 1	1–5	Pain modulation & early mobility	Cryotherapy, gentle stretching, myofascial release
Phase 2	6–14	Eccentric activation & proprioceptive control	Nordic curls, NMES, balance training
Phase 3	15–21	Functional and sport-specific reconditioning	Sprint drills, plyometric progression, dynamic stretching

Table 2: Outcome Measure Progression Across Phases

Outcome Measure	Baseline (Day 1)	Mid-Rehab (Day 10)	Post-Rehab (Day 21)
Visual Analogue Scale (VAS)	6/10	3/10	0/10
Active Knee Extension (AKE)	125°	150°	165°
Lower Extremity Functional Scale (LEFS)	56/80	70/80	78/80

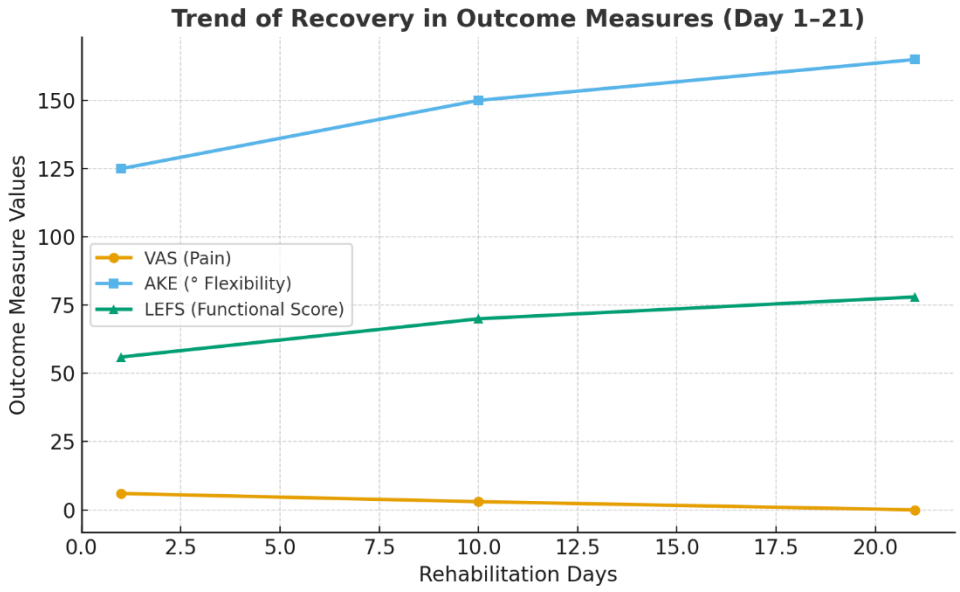

Figure 1: Trend of Recovery in Outcome Measures

A line graph illustrates progressive improvement in pain reduction, flexibility, and functional performance over the 21-day rehabilitation period. The x-axis represents the rehabilitation days (0–21), and the y-axis represents outcome scale scores. The VAS curve shows a sharp decline from 6 to 0 by Day 21, the AKE curve rises steadily from 125° to 165°, and the LEFS curve shows gradual improvement from 56 to 78, reflecting consistent gains in clinical and functional parameters.(7)

Results

The athlete demonstrated a distinct recovery trajectory characterized by steady pain reduction, flexibility restoration, and functional improvement over three rehabilitation phases. Initially, the athlete reported moderate posterior thigh pain (VAS 6/10), restricted flexibility with an AKE of 125°, and diminished lower limb

performance (LEFS 56/80). After the first phase of cryotherapy and myofascial release, pain subsided to 3/10, and movement tolerance improved. By the end of the second week, the inclusion of eccentric control exercises and NMES facilitated marked neuromuscular activation, increasing hamstring flexibility to 150° and functional capacity to 70/80. During the final week, dynamic sprint drills and proprioceptive reconditioning reinstated confidence and efficiency in stride mechanics. At the end of the 21-day protocol, the athlete reported complete pain resolution (VAS 0/10), full flexibility (AKE 165°), and near-normal function (LEFS 78/80). Follow-up at four weeks confirmed stable recovery without recurrence, indicating full return-to-sport readiness and sustained neuromuscular integrity.(8,9)

Discussion

This case underscores a rarely documented clinical phenomenon prolonged, function-limiting DOMS that mimicked a mild hamstring strain yet lacked structural injury evidence. The condition represented a neuromyofascial dysfunction rather than fibre disruption, reflecting altered proprioceptive feedback and transient inhibition of motor unit recruitment. The absence of focal tenderness or hematoma on ultrasound reinforced the diagnosis of pathological DOMS, triggered by excessive eccentric loading during sprint intervals. The management strategy adopted in this case departed from traditional rest-based recovery by introducing early controlled eccentric reactivation. This approach leveraged the principle of mechanical adaptation, facilitating faster realignment of sarcomeric structures and promoting neuromuscular recalibration. The integration of NMES provided sensory feedback enhancement, countering cortical inhibition often associated with post-exercise soreness.(10,11)

A key differentiator in this rehabilitation process was the use of patient-centered and functional outcome tools VAS, AKE, and LEFS. These scales collectively captured the athlete's pain perception, biomechanical recovery, and functional readiness, creating a multidimensional assessment framework. The progressive increase in flexibility and functional score mirrored the neurophysiological restoration of hamstring elasticity and motor coordination, validating the structured, evidence-based approach. This case also suggests that prolonged DOMS may serve as a precursor to recurrent strain if neuromuscular deficits remain unresolved. Therefore, physiotherapists should not dismiss persistent soreness as benign but rather interpret it as a warning sign of motor control impairment. The combined application of eccentric control training, myofascial mobility work, and proprioceptive recalibration ensured both structural and functional restoration, setting a replicable model for clinical sports rehabilitation.

Conclusion

This novel case highlights that DOMS, though typically transient, can evolve into a complex neuromuscular dysfunction when prolonged or misinterpreted. Early clinical distinction from true muscle strain is critical for safe and efficient management. A structured, phase-wise rehabilitation program grounded in eccentric strengthening, NMES-assisted activation, and proprioceptive re-education proved effective in restoring full hamstring performance. The incorporation of multidimensional outcome measures (VAS, AKE, LEFS) allowed continuous monitoring and objective decision-making for return-to-sport readiness. This case reinforces the physiotherapist's role in bridging symptom interpretation, scientific reasoning, and individualized intervention. Recognizing and addressing atypical DOMS presentations can prevent

progression to chronic dysfunction and optimize athletic recovery in high-performance sports.

REFERENCES:

1. Cheung, K., Hume, P. A., & Maxwell, L. (2003). Delayed onset muscle soreness: Treatment strategies and performance factors. *Sports Medicine, 33*(2), 145–164. https://doi.org/10.2165/00007256-200333020-00005

2. Connolly, D. A., Sayers, S. P., & McHugh, M. P. (2003). Treatment and prevention of delayed onset muscle soreness. *Journal of Strength and Conditioning Research, 17*(1), 197–208. https://doi.org/10.1519/00124278-200302000-00031

3. Clarkson, P. M., & Hubal, M. J. (2002). Exercise-induced muscle damage in humans. *American Journal of Physical Medicine & Rehabilitation, 81*(11), S52–S69. https://doi.org/10.1097/00002060-200211001-00007

4. Proske, U., & Morgan, D. L. (2001). Muscle damage from eccentric exercise: Mechanism, mechanical signs, adaptation and clinical applications. *The Journal of Physiology, 537*(2), 333–345. https://doi.org/10.1111/j.1469-7793.2001.00333.x

5. Howatson, G., & van Someren, K. A. (2008). The prevention and treatment of exercise-induced muscle damage. *Sports Medicine, 38*(6), 483–503. https://doi.org/10.2165/00007256-200838060-00004

6. Byrne, C., Twist, C., & Eston, R. (2004). Neuromuscular function after exercise-induced muscle damage: Theoretical and applied implications. *Sports Medicine, 34*(1), 49–69. https://doi.org/10.2165/00007256-200434010-00005

7. Reiman, M. P., Bolgla, L. A., & Loudon, J. K. (2012). A literature review of studies evaluating gluteus maximus and gluteus medius activation during rehabilitation exercises. *Physiotherapy Theory and Practice, 28*(4), 257–268. https://doi.org/10.3109/09593985.2011.604981

8. Nosaka, K., & Newton, M. (2002). Difference in the magnitude of muscle damage between maximal and submaximal eccentric loading. *Journal of Strength and Conditioning Research, 16*(2), 202–208. https://doi.org/10.1519/00124278-200205000-00007

9. Foster, C., Rodriguez-Marroyo, J. A., & de Koning, J. J. (2017). Monitoring training loads: The past, the present, and the future. *International Journal of Sports Physiology and Performance, 12*(2), S2–S8. https://doi.org/10.1123/ijspp.2016-0388

10. Behm, D. G., & Chaouachi, A. (2011). A review of the acute effects of static and dynamic stretching on performance. *European Journal of Applied Physiology, 111*(11), 2633–2651. https://doi.org/10.1007/s00421-011-1879-2

11. *Thiyagarajan A.* Importance of Athlete Injury Management focusing on Evidence-based Approaches in Indian Physiotherapy Standards. ***Chettinad Health City Med J. 2022;11(2):78-80.*** *DOI: 10.24321/2278.2044.202220*.