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"A CASE OF ATYPICAL HAMSTRING PAIN IN A SPRINTER: DISTINGUISHING DOMS FROM MYOFASCIAL INJURY"

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ABSTRACT

INTRODUCTION

Delayed Onset Muscle Soreness (DOMS) is a transient, self-limiting muscular phenomenon commonly observed following unaccustomed, repetitive, or high-intensity eccentric loading. It typically manifests as diffuse muscle pain, stiffness, tenderness on palpation, and temporary strength reduction, with peak symptoms occurring between 24 and 72 hours after exertion. Although DOMS is generally benign and resolves naturally within five to seven days, its presentation may vary considerably among athletes engaged in high-demand sports. Activities such as sprinting, hurdling, and plyometric training impose substantial eccentric stress on the hamstring muscles, which can lead to symptom profiles that deviate from typical DOMS patterns. These atypical presentations may last longer, involve localized myofascial sensitivity, or negatively affect neuromuscular control, potentially complicating return-to-sport decisions.(1)

The hamstring muscle group—comprising the biceps femoris, semitendinosus, and semimembranosus—is particularly susceptible to overload due to its biarticular structure and its critical role during sprint acceleration, terminal swing deceleration, and ground contact phases. Distinguishing physiological DOMS from a low-grade strain or early myofascial dysfunction often poses a clinical challenge, as both conditions share overlapping symptoms

without overt structural disruption on imaging. Misdiagnosis may result in inappropriate management strategies, including excessive rest, insufficient neuromuscular reactivation, or premature progression to high-intensity training. In elite athletes, these errors may impair performance, prolong recovery, or increase the risk of recurrent hamstring injury.(2)

This case report describes an atypical, prolonged episode of hamstring muscle soreness in a competitive sprinter following an intensive eccentric training session. The report outlines a structured diagnostic approach, integrating clinical examination with outcome-based monitoring to differentiate DOMS from underlying myofascial dysfunction. Furthermore, it details a progressive physiotherapy management plan emphasizing eccentric reloading, proprioceptive retraining, and sport-specific functional restoration. The case reinforces the importance of early identification and targeted rehabilitation strategies in managing unusual DOMS presentations within high-performance sports contexts.

METHODOLOGY

This case investigation followed a structured clinical monitoring approach involving a 21-year-old male sprint athlete who developed posterior thigh discomfort two days after a high-intensity training block involving eccentric sprinting and plyometric loads. The athlete did not report acute injury markers such as a snapping sound, ecchymosis, or loss of strength. Consent was obtained prior to documentation and reporting.(2,3)

Assessment Procedures

A multistage evaluation protocol was conducted at presentation. Soft-tissue palpation and selective tissue tension tests were used to identify pain-generating structures. Joint mobility and hamstring extensibility were assessed through goniometric Active Knee Extension (AKE) measurement. Pain levels were captured using the Visual Analogue Scale (VAS). Functional competence was documented using the Lower Extremity Functional Scale (LEFS). Diagnostic ultrasound was incorporated to differentiate between myofascial irritation and structural fibre injury to ensure clinical accuracy.

Rehabilitation Framework

The intervention was designed as a progressive three-stage rehabilitation framework delivered across a 21-day period. The program emphasized symptom control, neuromuscular reactivation, and sport reintegration.(4)

Stage 1: Regulation of Symptoms and Foundational Mobility (Days 1–5)

- Cold application to control pain and reduce post-exertional sensitivity.
- Low-intensity mobility drills to maintain tissue glide.
- Light myofascial decompression techniques on the posterior thigh.
- Submaximal aerobic cycling to facilitate metabolic recovery.

Stage 2: Strength Rebuilding and Neuromuscular Control (Days 6–14)

- Eccentric loading exercises targeting the hamstrings (e.g., controlled Nordic variations, hip-hinge patterns).
- Neuromuscular electrical stimulation to facilitate motor recruitment.
- Progression of balance and kinesthetic retraining drills.
- Soft tissue mobilization to enhance muscle compliance and reduce fascial tightness.

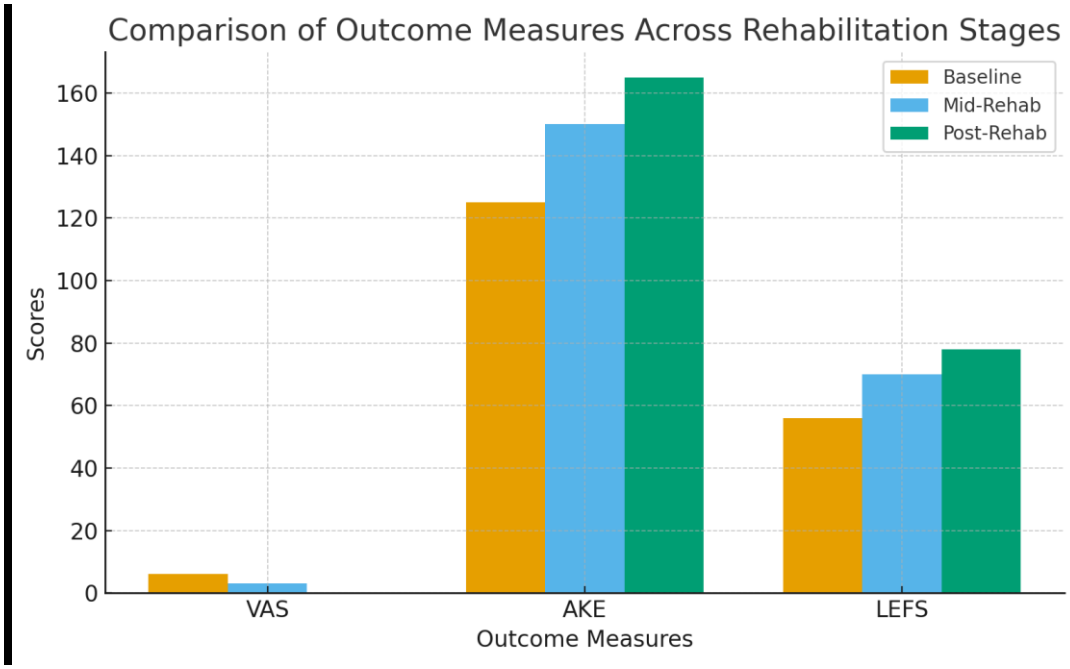
Stage 3: Performance Integration and Return-to-Sport Preparation (Days 15–21)

- Incremental sprint-pattern drills emphasizing stride mechanics.
- Plyometric progressions focusing on ground reaction force control.
- Dynamic stretching and end-range mobility enhancement.
- Functional benchmarks assessed before clearance for near-maximal sprinting.

Outcome Evaluation

Clinical measures were collected at three time intervals: initial presentation, midway through rehabilitation (Day 10), and at program completion (Day 21). VAS scores quantified pain, AKE was used to track changes in hamstring extensibility, and functional recovery was scored using LEFS. Changes across sessions were documented to determine the effectiveness of the intervention.

Two tables summarised the structured rehabilitation phases and the progression of outcome measures. A graphical trend line illustrated recovery patterns in pain levels, flexibility, and functional capacity across the three-week intervention period.(5,6)



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.(7)

Table 1. Progression of Outcome Measures Across the 21-Day Rehabilitation Period.

Outcome Measure	Baseline (Day 0)	Week 1	Week 2	Week 3
Pain (VAS /10)	6/10	3/10	1/10	0/10
Hamstring Flexibility (AKE°)	125°	135°	150°	165°
Functional Ability (LEFS /80)	56	62	70	78

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.

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