PHYSIOTHERAPY MANAGEMENT OF LEFT ILIOPSOAS MUSCLE STRAIN IN A STATE-LEVEL SPRINTER: A CASE REPORT

Dr: R. Arputha Roja[1] Dr. I Manimozhi [2]

[1]*Department of Physiotherapy, Government Cuddalore Medical College and Hospital, Chidambaram, Tamil Nadu, India*

[2]*Lecturer in Physiotherapy, Department of Physiotherapy, Government Cuddalore Medical College and Hospital, Chidambaram, Tamil Nadu, India*

ABSTRACT

Background: The iliopsoas muscle is the primary hip flexor and plays a crucial role in sprinting. Athletes are more prone to muscle strain when they expose the hip flexor group to excessive loading, poor movement mechanics, or sudden high-intensity activities such as Olympic lifting, rapid acceleration, and deceleration activity. Iliopsoas muscle strain commonly presents with groin pain, reduced range of motion, and impaired athletic performance. The goals of the patient and the physical therapist are the same: to create a pain-free environment for the patient and allow him to return to their previous activity level pain-free. **Methods:** A single case study was conducted on a 20-year-old male state-level sprinter diagnosed with left iliopsoas strain (Grade I). Baseline assessment included pain (NPRS), range of motion, palpation findings, and functional limitations. Physiotherapy interventions included RICE protocol, ultrasound therapy, trigger point release therapy, progressive strengthening, and sport-specific rehabilitation over 1–2 weeks. **Data Analysis:** Descriptive analysis was used to compare pre- and post-intervention outcomes, including pain intensity, movement, functional ability, and performance. **Results:** Pain reduced from NPRS 6/10 to 1/10, hip range of motion improved, and the athlete regained functional abilities, including running acceleration and ADLs, without discomfort. **Conclusion:** Physiotherapy plays a pivotal role in the management of hip flexor strains by reducing pain, restoring mobility, improving neuromuscular control, and progressively reintroducing functional and sport-specific activities. Early intervention and progressive rehabilitation are essential for optimal recovery in athletes.

Keywords: *Olympic lifting, hip flexor injury, sprinting injury, sports-specific rehabilitation, NPRS*

INTRODUCTION

In high-performance sports such as sprinting, hip flexor–related injuries are common due to the significant biomechanical demands placed on the musculotendinous unit during rapid limb acceleration, where repetitive high-velocity hip flexion and eccentric control during terminal swing contribute to increased strain on the muscle fibers. The iliopsoas muscle complex is the primary contributor to hip flexion and plays a critical role in sprinting biomechanics.[2][4]

Muscle strain injuries are defined as a disruption of muscle fibers caused by excessive tensile stress, commonly occurring during eccentric contractions or rapid lengthening under load[5]. Muscle strains refer to the mechanical disruption of muscle fibers caused by excessive tensile stress, commonly associated with eccentric loading or rapid muscle lengthening beyond physiological limits. Grade I muscle strains involve partial tearing of muscle fibers, presenting with moderate pain, localized tenderness, reduced strength, and functional limitation. Iliopsoas strain commonly occurs in athletes during high-intensity activities such as sprinting and resistance training, especially during rapid acceleration–deceleration phases that subject the hip flexors to increased mechanical load[6]. Clinically, athletes with iliopsoas present with anterior hip or groin pain, difficulty in hip flexion, pain during acceleration or push-off, and reduced range of motion, which significantly affects athletic performance [7].

Early intervention and structured rehabilitation have been shown to facilitate optimal tissue healing and safe return to sport in athletes with muscle strain injuries [9]. Physiotherapy is essential in managing hip flexor strains by reducing pain, restoring mobility, and improving neuromuscular control, while enabling a graded return to functional and sport-specific activities. Early, structured rehabilitation promotes optimal healing and facilitates a safe return to sport

Therefore, this case aims to outline the physiotherapy management and clinical outcomes of a state-level sprinter diagnosed with Grade-I iliopsoas and muscle strain.

METHODOLOGY

Study Design: Single case clinical report.

PATIENT ASSESSMENT

Demographic Details:

- Name: Mr. Ebinesar S
- Age: 20 years
- Gender: Male
- Occupation: Student (M.Sc Computer Science)
- Athlete: State-level 100m sprinter

Chief Complaints:

- Pain over the anterior left groin region for the past 1 week.
- Pain during hip movements and the acceleration phase of running
- Difficulty in bending the left hip [bike riding]

History of Present Illness:

The athlete presented with complaints of pain over the left anterior groin region for the past one week, along with the history of heavy weightlifting (clean – 75 kg) performed on 8th November 2025. The pain was aggravated during sprinting, particularly in the acceleration phase and hip extension movement. Due to persistent symptoms, the athlete reported to the outpatient department on 14th November 2025.

Pain Assessment:

- Site: Groin region
- Side: Left
- Nature: Aching pain
- Onset: Sudden
- Duration: Acute
- NPRS: 5/10
- Aggravating Factor: Running, left hip, lower extremity [Initial flexion movement]
- Relieving: Rest, icing

Observation:

- Built - Mesomorphic
- Posture: Normal
- Gait: Normal
- No swelling or deformity

Palpation:

- Tenderness: Grade II - Present over the left groin region.
- Trigger points: Present over the left Iliopsoas and Rectus Femoris muscles
- Warmth: Present over the Groin region

Examination:

JOINT	MOVEMENT	ROM	RIGHT	LEFT
HIP	FLEXION	ACTIVE PASSIVE	0-95 0-110	0-70 0-75
	EXTENSION	ACTIVE PASSIVE	0-30 0-35	0-25 0-30
	ABDUCTION	ACTIVE PASSIVE	0-45 0-50	0-45 0-50
	ADDUCTION	ACTIVE PASSIVE	0-40 0-45	0-40 0-45
	EXTERNAL ROTATION	ACTIVE PASSIVE	0-23 0-26	0-23 0-26
	INTERNAL ROTATION	ACTIVE PASSIVE	0-40 0-48	0-35 0-40

MUSCLE POWER:

HIP	RIGHT	LEFT
FLEXORS	5/5	4/5
EXTENSORS	5/5	5/5
ABDUCTORS	5/5	5/5
ADDUCTORS	5/5	5/5
INTERNAL ROTATORS	5/5	5/5
EXTERNAL ROTATORS	5/5	5/5

SPECIAL TESTS

	RIGHT	LEFT
Modified Thomas test	Negative	Positive
Ludloff Test	Negative	Positive
Stinchfield Test	Negative	Positive

Figure.1

Figure.2

Figure.3

PHYSICAL DIAGNOSIS:

- Left Iliopsoas Muscle Strain – Grade I

PROBLEM LIST

- Pain in the Groin region of the left hip
- Reduced left hip flexion
- Difficulty in sprinting (acceleration phase)

GOALS

Short-Term Goals:

- To reduce pain in the groin region of the left hip
- To improve the ROM of the left hip
- Reduce muscle stiffness over the left hip

Long-Term Goals:

- Restore the strength of the bilateral lower limbs
- Improve functional performance
- Return to sports

PHYSIOTHERAPY MANAGEMENT

Phase 1 (Acute Phase – First 3 Sessions)

- RICE Protocol
- Ultrasound Therapy –
    - Frequency - 2.5 to 3 MHz
    - Intensity 0.2-0.5 W/cm2
    - Mode/Duty Cycle – Pulsed mode 1:4
    - Duration- 7 min
- Trigger Point Release– To the left, Iliopsoas and abdominal muscles. Duration – 10 to 15minutes.
- **Hip flexor isometrics:**
  Push thigh upward against hand (10 sec x 3 Sets).

Phase 2 (4–6 Days)

- Range of motion exercise for left hip– Gentle heel slides
- **Hip flexor isometrics:**
  Push thigh upward against hand (10 sec x 3 Sets).
- Adductor isometrics: Pillow squeeze (10 sec x 3 sets).
- Core activation: Transverse abdominis Isometrics
- **Progressive Resistance Training:**
    - Side-leg Raise- 10 Reps X 3 Sets
    - Standing hip flexion with mild resistance band - 10 Reps X 3 Sets
    - Clamshells With mild resistance - 10 Reps X 3 Sets

Phase 3 (After 1 Week)

- **SHADOW TRAINING**
    - Clean work out with Long stick – 10 Reps x 3 sets
    - If no pain, proceed with minimal weights of Olympic Rod - Clean
    - 25 to 35 kgs wheels - clean workout.
- Closed-chain (early load tolerance):
    - Mini-squats – 10 s holding x 3 sets
    - Step-ups - 10 Reps X 3 Sets

RESULTS

Table 1: Pre- and Post-Intervention Outcomes

Outcome Measure	Pre – Intervention	Post-Intervention	Change
Pain (NPRS)	5	1	↓4
HAGOS Score	44	96	↑52

Table 2. ***Statistical Analysis of Outcome Measures***
Because this is a single-patient case report, descriptive statistical analysis and percentage improvement are typically reported rather than inferential statistics.

Parameter	Pre Value	Post Value	Absolute Change	Percentage Improvement
Pain (NPRS)	5	1	-4	80% improvement
HAGOS Score	44	96	+52	118.18% improvement

Figure 1: Improvement in NPRS following physiotherapy management, indicating a reduction in pain level.

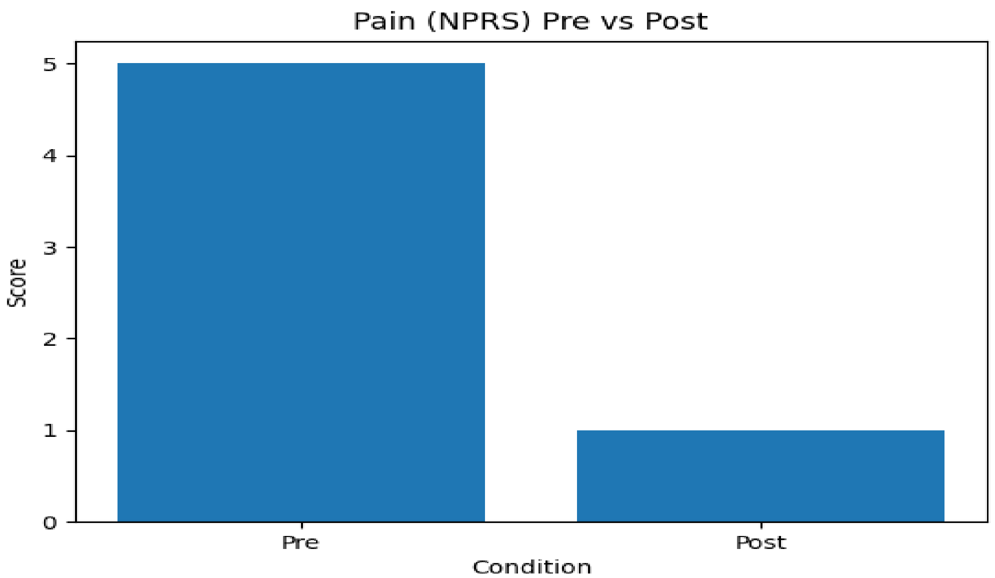


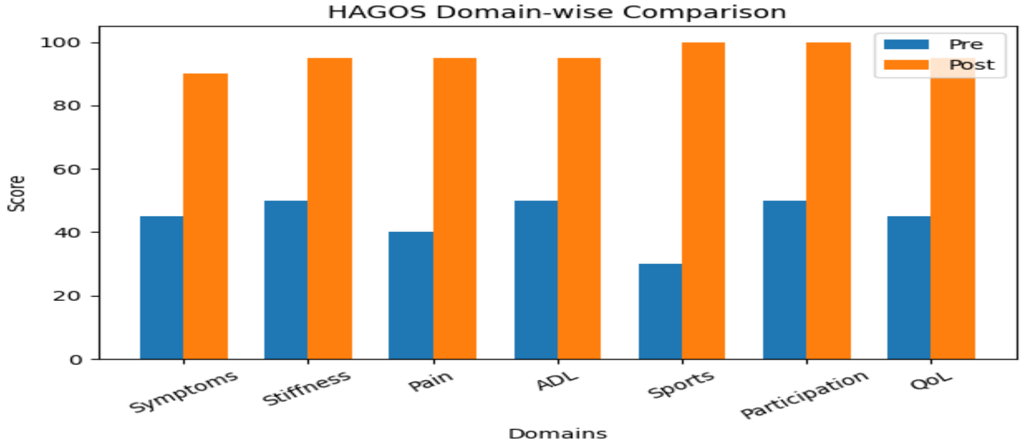
Table 3. ***Statistical Analysis of Outcome Measures***
Because this is a single-patient case report, descriptive statistical analysis and percentage improvement are typically reported rather than inferential statistics.

HAGOS SCORE (PRE vs POST)

Domain	Pre Score	Post Score
Symptoms	45	90
Stiffness	50	95
Pain	40	95
ADL Function	50	95
Sports Function	30	100

Participation	50	100
Quality of Life	45	95
Interpretation	**44/100**	**96/100**

Figure 2: ***Improvement in HAGOS domains following physiotherapy management indicating significant improvement among pain, stiffness, sport function and quality of life.***



Interpretation

The HAGOS score improved from 44/100 pre-intervention to 96/100 post-intervention, with the improvement of 118.18% indicating a substantial reduction in pain and symptoms, along with complete restoration of functional and specific performance.

DISCUSSION

In the present case, a Grade I iliopsoas muscle strain in a state-level sprinter was successfully managed with physiotherapy, resulting in significant improvements in pain and functional outcomes. The athlete demonstrated a marked reduction in pain (NPRS - 80% improvement) and a substantial increase in HAGOS score (118.18% improvement), indicating effective restoration of hip function and return to sport-specific activity. Previous studies have reported that iliopsoas-related groin pain accounts for a considerable proportion of athletic groin injuries, with prevalence ranging from 12% to 36% based on clinical examination[4][8]. The clinical findings, including pain on resisted hip flexion, positive Stinchfield test, and localized tenderness, are consistent with muscle-strain–related pathology [12,13,15]. Biomechanically, the iliopsoas plays a critical role during sprinting, particularly in the transition from terminal stance to initial swing phase, where rapid concentric activation facilitates limb advancement while eccentric control stabilizes the limb prior to foot contact[2]. Repetitive high-speed contractions during sprinting impose substantial mechanical stress on the musculotendinous unit, leading to strain injury. Heavy resistance training combined with sprinting results in excessive tensile stress on the iliopsoas, leading to a Grade II muscle strain[10]. The significant reduction in NPRS (5 to 1) and HAGOS domains, including symptoms, stiffness, and pain, indicates effective pain modulation through physiotherapy interventions due to decreased inflammation and nociceptive input and restoration of muscle extensibility. This recovery likely improved the viscoelastic properties of the muscle–tendon unit and enhanced neuromuscular control, thereby increasing the ability of the hip flexors to tolerate mechanical loading during functional and sport-specific activities. Functional gains in ADL, sports function, and participation domains indicate recovery of dynamic hip stability, intermuscular coordination, and force-generating capacity, which are essential for sprinting performance.

Physiotherapy intervention played a pivotal role in achieving these outcomes. Early-phase management focusing on RICE, ultrasound therapy, and load modification likely contributed to pain reduction and controlled inflammation. Soft tissue techniques such as trigger point release may have further reduced muscle tightness and improved local circulation, facilitating recovery. Progressive rehabilitation, comprising a range of motion exercises, isometric strengthening, shadow training, and sport-specific training, facilitated graded loading for the healing tissue[14]. Controlled mechanical loading promotes muscle regeneration, optimizes collagen alignment, and improves functional recovery following strain injuries. The marked improvement in sports function highlights the effectiveness of sport-specific rehabilitation, including graded return to Sprinting drills, which are essential for restoring sprint mechanics and minimizing reinjury risk [9]. Similarly, improvements in participation and quality of life domains indicate successful reintegration into athletic activity and enhanced confidence [15].

As this is a single case report, we used only descriptive statistical analysis, and we interpret the findings with caution. However, the marked improvements in NPRS and HAGOS scores suggest that early, structured, and progressive physiotherapy effectively reduces pain and restores function in iliopsoas muscle strain.

CONCLUSION

This case demonstrates that physiotherapy management of an iliopsoas strain in a sprinter is most effective when structured into progressive phases. Initial pain modulation and load modification are followed by eccentric-based iliopsoas strengthening, comprehensive training, and a gradual, pain-monitored return to sprinting. The successful outcome highlights the importance of avoiding sudden spikes in sprint volume, addressing biomechanical faults in the lumbopelvic-hip region, and integrating patient education on long-term load management. This model supports a safe return to full-speed sprinting and may serve as a practical framework for the rehabilitation of iliopsoas-related injuries in track athletes.

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