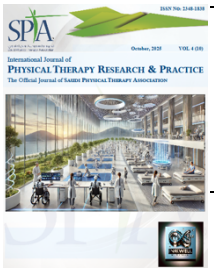

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Case Report

Missed Greater Trochanteric Fracture in a Young Adult Following Equestrian Trauma: A Case Report Emphasizing the Role of Physiotherapy in Diagnostic Reevaluation

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Abstract

Background: Diagnostic errors in musculoskeletal trauma remain a significant clinical challenge, especially when initial imaging fails to reveal fractures. Greater trochanteric (GT) fractures are rare in young adults and often overlooked, leading to delayed treatment and increased risk of complications. **Objective:** This case report aims to highlight the diagnostic challenges associated with GT fractures in young adults and emphasize the critical role of physiotherapists in early detection and interdisciplinary referral. **Case Presentation:** A 26-year-old Bahraini male presented with persistent left hip pain following a fall from a horse. Initial emergency and primary care assessments, including plain radiographs, failed to detect a fracture. The patient was referred to physiotherapy with a nonspecific diagnosis of "hip pain." During physiotherapy evaluation, several red flags were identified, including traumatic mechanism, persistent pain, and antalgic gait. Further imaging confirmed an isolated GT fracture. **Discussion:** This case underscores the importance of independent clinical evaluation by physiotherapists, who are uniquely positioned to identify red flags that may be missed in initial assessments. Their ability to integrate clinical findings with patient history and refer for appropriate imaging plays a vital role in preventing misdiagnosis. Moreover, physiotherapists contribute significantly to post-diagnosis rehabilitation, ensuring safe recovery and functional restoration. **Conclusion:** Integrating physiotherapy into the early stages of musculoskeletal assessment enhances diagnostic accuracy and patient safety. Independent screening and effective interdisciplinary communication are essential to avoid diagnostic delays and optimize outcomes in trauma cases.

Keywords: Greater Trochanter Fracture, Equestrian, Unilateral TKA, Rehabilitation, Functional outcomes, Range of motion.

Introduction

Musculoskeletal injuries are among the most frequent presentations in emergency and primary care settings. While hip fractures are commonly associated with elderly populations, particularly those with osteoporosis, isolated greater trochanteric (GT) fractures in young adults are exceptionally rare and often underdiagnosed. According to Mayne et al. (2020), the majority of trochanteric fractures occur in older adults, with isolated GT fractures accounting for a small fraction of total hip injuries. In younger individuals, these fractures typically result from high-impact trauma, such as falls from height or sports-related accidents, and may be radiographically occult in the early stages.

The diagnostic challenge lies in the subtle presentation

and the limitations of plain radiographs, which frequently fail to detect isolated GT fractures. This can lead to mislabeling of symptoms as nonspecific joint or soft-tissue pain, resulting in inappropriate referrals and delayed management. MRI has been shown to be significantly more sensitive in detecting occult hip fractures, including GT involvement, and is considered the gold standard when clinical suspicion remains high despite negative initial imaging (Lubovsky et al., 2005; Ren et al., 2019).

This case report presents a rare instance of an isolated GT fracture in a young adult that was initially missed across multiple clinical encounters. It highlights the critical diagnostic oversight and underscores the essential role of physiotherapists in identifying red flags, conducting independent clinical assessments, and initiating appropriate referrals. By documenting this case, we aim to raise awareness of the diagnostic pitfalls associated with GT fractures in younger populations and advocate for a more vigilant, interdisciplinary approach to musculoskeletal trauma evaluation.

Methodology

Study design and setting

This study follows a descriptive case report design, which is appropriate for highlighting rare clinical presentations and diagnostic challenges. The subject is a single patient—a 26-year-old Bahraini male—who sustained a traumatic hip injury following a fall from a horse. The case was selected due to its atypical presentation and the diagnostic oversight that occurred across multiple clinical encounters.

Data collection

Data for this case report were collected through a combination of direct clinical assessment, patient interviews, and review of medical documentation from multiple healthcare encounters.

Tools for assessment

The physiotherapy evaluation was conducted using standardized and validated tools to ensure consistency and clinical relevance.

Visual Analog Scale (VAS)

VAS was used to quantify the patient's subjective pain intensity, recorded as 5/10 during initial physiotherapy assessment.

Manual Muscle Testing (MMT)

It was applied to assess strength in hip flexors and abductors, revealing grade 4/5 performance limited by pain.

Range of Motion (ROM)

ROM was measured using standard goniometric techniques, showing reduced flexion, abduction, and rotation due to pain.

Gait Analysis

Observational assessment identified a mild antalgic gait, indicating compensatory movement patterns.

Systemic screening was also performed to rule out constitutional symptoms and systemic pathology. The presence of red flags—including traumatic mechanism, persistent pain, and lack of improvement—guided the decision to refer for advanced imaging or repeating the x-ray. All findings were documented in alignment with clinical standards and institutional protocols.

Although the sample size is limited to one, the case offers valuable insights into the limitations of conventional imaging, the importance of red flag screening in physiotherapy, and the need for interdisciplinary vigilance in musculoskeletal trauma management.

Detailed Participant Case Description

Patient History

A.H., a 26-year-old Bahraini male, presented with acute left hip pain after a fall from a horse on 12 April 2023.

Mechanism of Injury

The patient sustained the injury during an equestrian activity, where he was thrown off a horse in a high-impact incident. The dynamic nature of the fall, as evidenced by the chaotic scene involving the horse jumping over a barrier and the patient being airborne, suggests a significant traumatic force applied to the hip region. Such mechanisms are consistent with direct lateral impact or torsional stress on the proximal femur, increasing the risk of greater trochanteric fractures even in young adults.

He was initially evaluated in the emergency department, where radiographs of the chest, back, hip, and pelvis were reported as unremarkable. He was discharged with intramuscular paracetamol and diclofenac sodium.

Persistent pain led him to consult his family physician on April 23, where he was prescribed rest and NSAIDs. On May 4, a second physician referred him to physiotherapy with the nonspecific label of 'joint pain.

Physiotherapy Assessment (May 8)

On May 8, physiotherapy assessment was conducted. Clinical examination revealed localized left hip pain, a mild antalgic gait, pain-limited hip motion, and reduced muscle strength. A Visual Analogue Scale (VAS) score of 5/10 was recorded (Table1).

Systemic screening showed no constitutional symptoms. Based on the traumatic mechanism of injury, persistent pain, and inconclusive radiographs, red flags were identified, and the patient was referred for further imaging. Subsequent x-rays confirmed a greater trochanteric fracture (Table2).

These findings prompted further referral and interdisciplinary consultation. A fracture of the greater trochanter was subsequently confirmed via imaging, leading to orthopedic management. The full summary of clinical visits is highlighted in Table 3.

Table 1. PT Clinical Examination Findings

Parameter	Findings	Clinical Significance
Gait	Mild antalgic gait	Suggests compensatory mechanism due to pain
Range of Motion (ROM)	Reduced flexion, abduction, internal & external rotation (pain-limited)	Indicative of joint dysfunction and pain-related restriction
Manual Muscle Testing (MMT)	Grade 4/5 in hip flexors and abductors (pain-limited)	Weakness likely secondary to pain rather than true muscle deficit

Table 2. Red Flags Identified at Physiotherapy Assessment.

Red Flag	Clinical Relevance
Traumatic mechanism of injury	High suspicion for fracture despite negative X-ray
Persistent pain	Suggests missed pathology beyond soft-tissue injury
Limping gait (antalgic)	Indicates biomechanical compensation due to pain
Lack of improvement with prior care	Excludes benign/self-limiting musculoskeletal strain
Suspicious radiographic findings	Necessitated advanced imaging (MRI) or follow up x-ray

Table 3. Timeline of Clinical Encounters

Date	Clinical Encounter	Key Findings	Management / Outcome
12 Apr	Emergency Department	Radiographs negative (as mentioned by physician); acute hip pain	Analgesics (paracetamol, diclofenac); discharged
23 Apr	Family Physician	Persistent pain	Rest and NSAIDs
4 May	Second Physician	Pain unchanged	Referral to physiotherapy ('hip pain')
8 May	Physiotherapy Assessment	Antalgic gait, reduced ROM, MMT 4/5, VAS 5/10	Red flags identified → referral for GP and imaging
Post-referral	Further x-ray	Greater trochanteric fracture	Orthopedic management

Radiograph study

Discussion

Greater trochanteric (GT) fractures are relatively uncommon, particularly in young adults, and their detection on plain radiographs is notoriously difficult (Learch & Pathria, 2000). In this case, the initial negative radiographs contributed to repeated misdiagnosis and inappropriate referral, emphasizing the clinical risks associated with diagnostic oversight.

Diagnostic Challenges and Imaging

The literature consistently reports the limitations of plain radiographs and even CT scans in identifying isolated GT fractures. MRI remains the gold standard when post-traumatic hip pain persists despite

inconclusive imaging (Lubovsky et al., 2005; Ren et al., 2019). In addition to confirming the diagnosis, MRI delineates the extent of the injury, particularly the presence of occult intertrochanteric extension, which carries a risk of fracture displacement if missed (Feldman & Staron, 2004; Suzuki et al., 2011). Recent evidence further supports MRI as the most reliable imaging modality for occult hip fractures, both for diagnostic confirmation and for guiding management decisions (Kim et al., 2021).

Management Approaches

Truly isolated GT fractures are usually managed conservatively with protected weight-bearing, analgesia, and physiotherapy, with favorable outcomes (Thurston et al., 2018; Siu et al., 2006). However, fractures extending into the intertrochanteric region may require surgical fixation using dynamic hip screws or cephalomedullary nails (Lalonde et al., 2010; Alvarez et al., 2025). This distinction highlights the crucial role of early and accurate imaging in guiding treatment.

Role of Physiotherapy

Physiotherapists play a dual role in such cases. Initially, they contribute to early detection through systematic screening for red flags, as demonstrated here by identifying the traumatic mechanism, persistent pain, and gait disturbance. After diagnosis, physiotherapists are essential in rehabilitation, focusing on restoring hip mobility, strengthening periarticular muscles, preventing deconditioning, and facilitating safe return to function. Early but guided mobilization is associated with reduced disability and improved recovery.

Professional and Patient Safety Implications

This case also raises broader professional considerations. Over-reliance on prior referrals without independent clinical evaluation increases the risk of delayed or missed diagnoses. Such delays may prolong patient suffering, escalate healthcare costs, and, in severe cases, expose clinicians to medico-legal implications. Upholding diagnostic vigilance and interdisciplinary communication is therefore both a clinical and ethical imperative (Goodman et al., 2018).

Interpretation of Findings

This case report effectively fulfills its objective by demonstrating how greater trochanteric fractures in young adults can be missed due to limitations in initial clinical evaluation and over-reliance on early imaging. The findings highlight the importance of maintaining diagnostic vigilance, especially when symptoms persist despite conservative management and initial radiographs appear normal.

The physiotherapy assessment played a pivotal role in identifying red flags—such as traumatic mechanism, persistent pain, and gait disturbance—that were previously overlooked. These clinical indicators prompted further imaging, which ultimately confirmed the fracture. This reinforces the value of physiotherapists in conducting independent evaluations and advocating for reassessment when clinical progress is lacking.

While the report is limited by its single-patient design, the detailed timeline and interdisciplinary interactions offer meaningful insights into diagnostic processes and the potential consequences of mislabeling musculoskeletal injuries. The case also illustrates how structured physiotherapy screening can contribute to safer and more accurate patient care.

Future research should explore the integration of physiotherapy-led triage protocols in emergency and outpatient settings, and investigate their impact on reducing diagnostic delays. Studies involving larger samples could further validate the role of physiotherapists in early detection and collaborative management of orthopedic injuries.

Literature Comparison

While greater trochanteric fractures are more commonly reported in elderly populations with osteoporosis, recent case reports have documented similar injuries in young adults following high-impact trauma. For example, Lubovsky et al. (2005) and Ren et al. (2019) describe cases where initial radiographs failed to detect fractures, leading to delayed diagnosis until MRI was performed. These cases, like the current report, emphasize the limitations of plain imaging and the importance of clinical vigilance. Furthermore, Suzuki et al. (2011) highlighted the risk of displacement with early physiotherapy in undiagnosed fractures, reinforcing the need for accurate early assessment. This case adds to the growing body of evidence that greater trochanteric fractures in young adults, though rare, require high clinical suspicion and appropriate imaging to avoid complications.

Conclusion

This case demonstrates that even young adults with traumatic hip injuries may sustain greater trochanteric fractures that are easily missed on initial radiographs. Persistent post-traumatic hip pain warrants careful re-evaluation, and MRI should be considered the imaging modality of choice when plain films are inconclusive. The case also highlights the vital role of physiotherapists in both early recognition of red flags and in subsequent rehabilitation once a definitive diagnosis is established. Ultimately, diagnostic vigilance, independent clinical assessment, and effective interdisciplinary collaboration are essential to prevent misdiagnosis, ensure timely treatment, and optimize patient outcomes.

Author Contributions

All authors significantly contributed to the work reported, including conception, study design, execution, data acquisition, analysis, and interpretation. They actively participated in drafting, revising, or critically reviewing the manuscript, provided final approval of the version to be published, agreed on the journal submission, and accepted accountability for all aspects of the work.

Ethical Approval and Patient Consent

This case report was conducted in compliance with institutional and international ethical standards (CARE guidelines).

Written informed consent for publication of anonymized clinical data and imaging was obtained from the patient. All identifying details have been removed to protect confidentiality. Ethical approval was not required for this single case report, as per institutional and journal policies.

Data Availability Statement

The authors will transparently provide the primary data underpinning the findings or conclusions of this article, without any unjustified reluctance. If need from editorial team.

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Conflicts of Interest

The authors declare no potential conflicts of interest related to the research, writing, or publication of this work.

Declaration of generative AI and AI-assisted technologies

The author utilized AI tools to enhance the language quality and address any grammatical issues while preparing the manuscript. Following the use of this tool, the author carefully reviewed and edited the content as necessary and assumes full responsibility for the

accuracy and integrity of the published work.

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