

# Case report of a trochanter minor fracture management of a young patient after a scooter incident

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## ABSTRACT

Trochanter minor fractures are generally seen in individuals aged 12 to 16 years, commonly associated with sports such as martial arts or self-defense techniques, while the growth plate is still open. The management of trochanter minor fractures in adolescents typically involves conservative methods including early quadriceps and hip exercises; surgery is reserved for a small number of cases. This case report discusses the management of a young patient who sustained a trochanter minor fracture following a scooter accident. The fracture was successfully treated using conservative measures during follow-up.

**Keywords:** Avulsion fracture, ischiofemoral impingement syndrome, ludhoffs sign, trochanter minor.

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## INTRODUCTION

Trochanter minor fractures usually occur between the ages of 12 and 16 years. Elderly patients are not very common. Isolated fractures can be related to tumor metastasis and trauma in elderly patients.<sup>[1]</sup> In adolescents, the apophysis of the iliopsoas tendon attachment has not completely fused with the body of the femur. The avulsion fracture is then caused by traction of the iliopsoas tendon. In most cases, the fracture is displaced cranially. This type of injury typically occurs in patients engaged in self-defense sports when they attempt to kick their opponents. The fracture doesn't usually result from direct trauma in young patients.<sup>[2]</sup>

Trochanter minor fractures are generally treated conservatively. Surgery is performed rarely, especially in young patients. The main criteria for surgery are fractures with displacement between 2 to 3 cm and fractures involving more than 75% of the medial Wall.<sup>[3]</sup> Proximal femoral nailing, plate-screw fixation, or fixation with cannulated screws can be preferred. However, in younger patients, better functional results are shown with conservative treatment.<sup>[4]</sup>

In this case report, our aim is to demonstrate a patient's trochanter minor fracture managed with conservative treatment.

## CASE REPORT

A 13-year-old male patient was admitted to our emergency department with hip pain and tenderness in the groin. The patient's family reported that he had fallen from a scooter the previous day. The patient had no comorbidities, was not using any medical drugs, and had not undergone any surgeries. Patient consent was obtained before any medical interventions were made. During the physical examination, the patient reported pain in his right hip, medially near the inguinal region. He also had difficulties flexing the hip and experienced tenderness in the groin region. A positive Ludhoff sign was observed—a special test in which the patient sits on a chair, extends his knees, and attempts to lift the leg (Fig. 1). The patient experienced pain while trying to lift the leg, indicating that the iliopsoas muscle's tendinous insertion on the trochanter minor was affected. There was no neurovascular injury, and the patient had no other complaints. The patient had a full range of motion in both hip joints; however, pain was reported on the right side. While lying down, the patient experienced difficulty fully elevating the lower extremity. The patient's Harris Hip Score was calculated upon admission as 81.

Radiological imaging detected an isolated trochanter minor fracture with a 2 cm displacement superiorly. There was no comminution of the fragment. Additionally, the patient's physal lines were open. The patient's fracture was classified as a Salter-Harris type 1 fracture (Fig. 2).

After the initial assessments, conservative treatment was initiated despite the patient's fracture being displaced more than 2 cm. The patient was advised not to bear weight for 2 weeks and to attend check-ups at 2-week intervals.

At the first follow-up, the patient was instructed to move with partial weight-bearing using a crutch. After an additional 2 weeks, he was asked to walk with full weight-bearing, still using a crutch. Subsequently, quadriceps exercises were initiated. Radiological evaluation in the first month confirmed that the displacement of the fractured fragment had not increased (Fig. 3).



Figure 1: A positive Ludhoff sign can be observed at the patient.

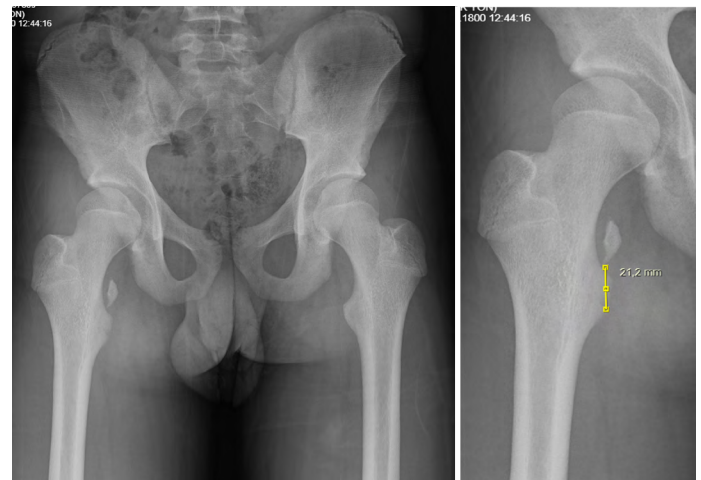


Figure 2: The patient's pelvic X-ray examination at admission.

The patient was scheduled for regular monthly follow-ups; however, he did not attend these regularly. His second visit to the hospital occurred 6 months after the incident. At this time, the patient reported no pain symptoms and mentioned that he had returned to his regular activities, including running sports and jumping, after 2 months.

Comparative analysis of the pelvis anteroposterior images taken at the patient's first admission, and at the 6<sup>th</sup> and 12<sup>th</sup> months, showed that the fracture had healed and the fragment had ossified within the trochanter minor (Fig. 4). The patient's Harris Hip Score was calculated as 89 at the one-year follow-up.

## DISCUSSION

Trochanter minor fractures typically occur in adolescent patients who are involved in sports, with the mechanism of injury being traction of the iliopsoas muscle insertion on the trochanter minor. In most cases, the fracture fragment usually displaces superiorly. Our patient's fracture fragment was displaced 2.1 cm cranially in the initial examinations. Although some authors believe that over 2 cm displacement requires surgical fixation, others assert that displacements between 2–3 cm can be treated conservatively in younger patients.<sup>[4]</sup>



**Figure 3:** Pelvis anteroposterior radiogram of the patient 1 month after the incident.



**Figure 4:** The pelvis anteroposterior radiological imaging of the patient after 1 year.

We opted to treat the patient conservatively. After 6 months of follow-up, the patient was fully able to participate in sports activities and could run at a competitive level.

Conservative treatment for trochanter minor fractures typically involves a series of steps: restricting active lifting of the leg, using crutches with partial weight bearing for 2–4 weeks, followed by progressive weight bearing for another 2–4 weeks. Complete weight bearing is typically allowed after 4 to 6 weeks. Patients generally regain a symptom-free state within 3–4 months.<sup>[4]</sup> In our case, the patient exhibited remarkable progress, being able to walk with complete weight bearing after just 1 month of conservative treatment. Although some clinics may advocate waiting for 6 weeks before allowing full weight bearing, we decided to initiate this at 4 weeks because the patient was comfortable with their current mobilization and had experienced no pain during the first 2 weeks.

Hip pain is also very common when fracture healing is complete, often due to ischiofemoral impingement syndrome. There are reported cases indicating that chronic avulsion injuries of the hamstrings and iliopsoas muscles can cause ischiofemoral impingement in long-term follow-ups. The most common time of presentation for this condition is after 1 year. In our case, the patient exhibited no hip pain or limitations at the one-year mark.

Ischiofemoral impingement syndrome usually occurs after conservative treatment of trochanter minor fractures; therefore, it is important to keep this potential complication in mind during long-term follow-ups.<sup>[5,6]</sup>

Recent studies have indicated that a considerable proportion of trochanter minor fractures in young patients exhibit complete healing within approximately one year, without any detectable deformities upon clinical examination. Jason Mascoe and his colleagues indicated in their study that patients with non-displaced trochanter minor fractures are treated non-surgically with successful results.<sup>[7]</sup> In our case, the patient was 13 years old, and the bone healing process was almost fully completed within this timeframe, leaving no discernible traces of deformity. The Harris Hip Score increased in our patient from 81 to 89 in 1 year with conservative treatment, similarly to the study by Jason Mascoe and his colleagues.

## CONCLUSION

Fractures of the trochanter minor are frequently observed in younger patients and typically respond well to conservative treatment, unlike in older patients. Engaging in early mobilization and exercises during the healing process does not adversely affect bone recovery; however, it is essential to perform these activities with caution and under proper supervision.

## Statement

**Author Contributions:** Concept – AC, AŞ; Design – AC; Supervision – AŞ; Resource – AC; Materials – AC, FK; Data Collection and/or Processing – AC, ED, CE; Analysis and/or Interpretation – AŞ, ED; Literature Search – AC; Writing – AC; Critical Reviews – AŞ.

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