



# Unusual Presentation for Stress Fracture of Femoral Neck in Non-Athlete



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## Abstract

**Background:** Stress fractures of femoral neck can be missed in up to 75% of the cases due to several atypical presentations. We report an atypical case who suffered from bilateral neck of femur stress fractures within a span of 2 years.

**Case report:** An overweight middle-age healthy man non-alcoholic presented with insidious onset of hip pain for one month after history of minor trauma. No fracture lines were detected on pelvis radiographs. Magnetic resonance imaging (MRI) of pelvis showed edema and subcortical lines suggested fracture. Case was treated surgically with 3-cannulated screws. Followed at the clinic for 2-years, full union without evidence of avascular necrosis of femoral head.

**Conclusion:** comprehensive approach in addition to high index of suspicion is required to diagnose neck of femur fractures in a healthy young adult non-athlete. Moreover, Surgical management can result in optimal outcomes.

**Keywords:** Case Report; Femoral Neck Fracture; MRI, Stress Fracture; Surgical Management

**Abbreviation:** MRI: Magnetic Resonance Imaging; BMI: Body Mass Index

## Introduction

Stress fractures are divided in two entities, insufficiency stress fractures usually seen in the elderly population with weak bone quality. The second is fatigue stress fracture which is frequently seen in military recruiters or marathon runners with prolonged repeated stress stimulation, resulting in imbalance between bone resorption and production [1-4] Stress fractures of the femoral neck can be missed in up to 75% of the cases [5].

Patients with stress fractures usually present with insidious onset of groin, thigh or knee pain which increases with activities and decreases with rest [6,7]. Moreover, physical examination of those patients is often inconclusive, with barely elicited hip pain during extreme range of motion [8]. At the time of symptoms, a plain pelvis X-Ray might not be helpful to detect early fractures [9]. In fact, Magnetic resonance imaging (MRI) has 100% sensitivity in detecting femoral neck stress fractures, with findings of bone marrow edema with or without fracture lines [9]. In this report, we present a case of a healthy young adult non athlete who suffered from bilateral neck of femur stress fractures within a

span of 2 years. Also, we describe a treatment plan that might be a reference for other orthopedic surgeons.

## Case presentation:

This is a 29-year-old male patient smoker, who presented to the orthopedic clinic with history of inability to bear weight on left lower limb. One month prior to the onset of symptoms patient recalled a blunt trauma to left knee. Initially he was able to bear weight and walk after the trauma. He seeks medical advice in multiple health-care professionals and treated conservatively with analgesia. However, the pain was continuous and get progressed. Systematic review, past medical, past surgical, family history and social history were reviewed and unremarkable. His body mass index (BMI) was 28kg/m<sup>2</sup>.

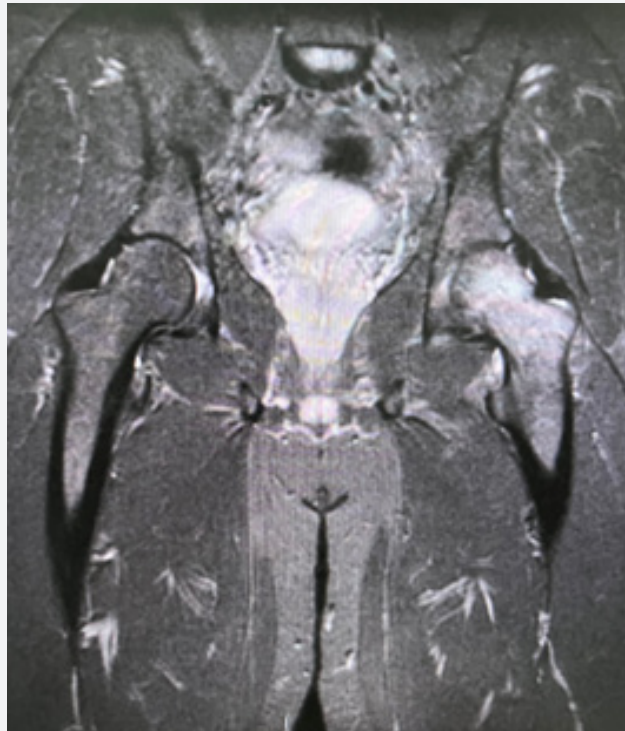
Antalgic gait was observed with Inability to bear weight on the left lower limb, No obvious limb deformity. The ranges of motion of both hip and knee were within normal. Distal neurovascular was intact. Initial radiographs for spine, pelvis (figure 1) and left

knee were normal. MRI pelvis (figure 2) was ordered upon a high suspicion of fracture and showed diffuse bone marrow edema involving the left femoral head and neck, subcortical horizontal

low signal intensity below the weight bearing aspect of the femoral head cortex. Indicating a small trabecular fracture with associated mild joint effusion.



**Figure 1:** Anteroposterior radiograph of pelvis showed no fracture or osseous abnormality.



**Figure 2:** Frontal view of magnetic resonance imaging of the pelvis showed diffuse bone marrow edema involving the left femoral head and neck, subcortical horizontal low signal intensity below the weight bearing aspect of the femoral head cortex.

The condition was discussed with the patient either to go with protective non-weightbearing and follow up regularly in the clinic or to do prophylactic cannulated screw fixation. Patient was agreed to do the surgery. All the advantages, disadvantages, and complications were explained to the patient regarding the surgery including wound infection, bleeding, deep vein thrombosis, pulmonary embolism, implant failure, necrosis of the femoral head and general anesthesia complications. Patient underwent

open reduction internal fixation using three partially threaded cannulated screws in triangular fashion (figure 3). bone density appears good during drilling. Postoperatively, the patient started partial weight bearing using walker frame. He was discharged home on day 3 with follow up appointment. He was followed at the clinic in 3 weeks, 6 weeks, 3 months, 6 months to complete two years follow up, no signs of Avascular necrosis of the hip were noted.



**Figure 3:** Anteroposterior radiograph of pelvis after osteosynthesis of left hip.

However, two years later he presented with history of right hip pain for one month with inability to bear weight. He reported history of falling at that time from two steps stairs. The pain was continuous, increased with walking, and interfering with his daily activities. Patient was tried conservative treatments with no improvement. On physical examination, BMI 31 kg/m<sup>2</sup> with normal vital signs. There was no obvious deformity. Tenderness on the right groin area with restricted range of motion mainly in the internal and external rotation. Distal neurovascular was intact. Radiographs were unremarkable.

MRI pelvis (figure 4) was done for the patient, which showed right hip linear low signal intensity in the superior lateral aspect of femoral head associated with mild edema, which suggested a trabecular fracture at anterosuperior lateral femoral head. The patient underwent surgery the following day, with internal fixation via cannulated screws (figure 5). The immediate postoperative management continued to be the same with 6 weeks of partial weight bearing on the right leg. He was followed at the clinic for two years; no signs of Avascular necrosis were noted.

### Discussion:

Femoral neck stress fractures remain challenging for most orthopedic surgeons. Patients usually report vague symptoms with non-specific physical examination and normal radiographs [9]. Delayed diagnosis of stress fractures of the femoral neck leads to devastating complications such as nonunion, malunion, re-fracture or osteonecrosis of femoral head, which is associated with fracture displacement [10-13].

Three types of femoral neck stress fractures were classified by Fullerton and Snowdy: tension, compression and displaced [14]. Tension type which occurs at superolateral aspect of femoral neck is usually treated with prophylactic surgical fixation due to the high risk of fracture displacement [15]. While compression type, which occurs at the inferomedial side of the femoral neck has a lower risk of fracture displacements and can be treated with conservative management [15]. Multiple non operative measures were described in the literature, including bed rest, pain control and non-weight bearing with prolonged follow up radiographs to

ensure no displacement of the fracture.[8] Other authors relate the role of shock waves therapy as a non-invasive measure with low complications in treating nondisplaced stress fractures by promoting bone healing [16,17].



**Figure 4:** Frontal view of magnetic resonance imaging of the pelvis showed right hip linear low signal intensity in the superior lateral aspect of femoral head associated with mild edema. In addition to left side hip screws from the previous surgery.



**Figure 5:** Anteroposterior radiograph of pelvis with bilateral partially threaded cannulated hip screws.



On the other hand, KalacAf et al. reported the importance of prophylactic in situ fixation for stress fractures of the femoral neck in young active patients [15]. Moreover, Oliviria et al. [8] emphasized the importance of early diagnosis and surgical management of young patients presenting with stress fractures of femoral neck regardless their level of activity [9] In agreement with Carlo et al. surgical management is indicated in young patients with persistent pain after 4 weeks of conservative management to allow early ambulation [18]. Multiple options were described for the surgical management of femoral neck stress fractures including partially threaded cannulated screws or screw-plate systems or combination of both [19,20]. In our case, partially threaded cannulated screws were used in a triangular fashion to stabilize the fracture and to allow early weight bearing.

Up to our knowledge, most reports of bilateral neck of femur stress fractures in the young population were related to transient osteoporosis or limited to specific high-risk individuals, for example, military recruiters or marathon runners. Therefore, we believe the present case is truly rare as it occurred in healthy young adult non athlete within a span of two years.

### Conclusion:

In conclusion, high index of suspicion is needed to diagnose femoral neck fracture in a healthy young adult with inconclusive clinical evaluation and normal radiographs. Furthermore, optimal outcomes could be achieved with surgical fixation utilized by cannulated screws. Thus, leading to prevention of the devastating consequences of displaced femoral neck fractures including osteonecrosis of the femoral head and nonunion.

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