

## Atypical Stress Fractures in a Soldier

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## Article Information

Received date: Apr 19, 2017

Accepted date: May 10, 2017

Published date: May 12, 2017

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**Keywords** Muscle; Function;  
Osteoarthritis; Pathogenesis; Stress  
fractures

## Abstract

A significant increase in physical activity or a recent change in the routine activity level may result with stress fractures, which are seen more frequently in soldiers and athletes due to repetitive activities such as running and marching. Clinical assessment and x-rays are not always enough to diagnose stress fracture, thus further radiological assessment is often needed. Here we aimed to present a case of an atypical stress fractures in a soldier seen after a prolonged repetitive activity.

## Introduction

Stress fractures of the lower extremity are common fatigue injuries among individuals who participate in high load-bearing activities such as running in athletes and military exercises in soldiers, therefore require practitioner expertise in diagnosis and treatment [1-4]. The most common stress fractures occur in lower extremities; about 50% are localized in tibia, but also tarsal navicular, metatarsals, femur and pelvis, respectively [2]. However calcaneus and proximal tibial metaphysis are the uncommon locations. Conventional radiography alone may not be enough for the diagnosis, bone scintigraphy and Magnetic Resonance Imaging (MRI) should be added to facilitate the diagnosis.

In this report, we aimed to present a rare case of bilateral medial tibial plateau and left calcaneus stress fractures of a retired soldier following training as an unusual repetitive activity unlike usual daily activities.

## Case

A 43-year-old man presented to Orthopedics and Traumatology department in a wheelchair, complaining of severe pain on bilateral knees and left heel for 5 days. In the anamnesis it is stated that six weeks prior to the onset of symptoms, he had commenced his daily training, having increased to ten kilometers walking per day. On physical examination there was tenderness, minimal edema and eritema around the knees and on his left heel. Both knees and ankle range of motion was assessed fully. The function and strength of the muscles and soft tissues around the knee were normal. An initial Antero-Posterior (AP), Lateral (L) knee and heel radiographs were taken. Also medial oblique foot x-ray was taken to examine whether there was any fracture line at the tarsals and metatarsals. (Figure 1).



Figure 1: Medial oblique graphy of left foot.



Figure 2: Knee AP graphy shows fracture line of both medial tibial plateaus.



Figure 3: Bone scintigraphy of whole body. Radioactive material uptake is shown on both medial proximal tibiae and left calcaneus.

X-rays revealed transverse sclerotic lines on the medial sides of the both proximal tibiae (Figure 2), whereas there was no bone pathology at calcaneus. Further radiographic assessments including Computed Tomography (CT) and three-phase bone scintigraphy confirmed incomplete fracture lines on the medial plateaus of the tibiae and revealed posteroinferior fracture line on left calcaneus (Figure 3).



Figure 4: PTB cast immobilization for 3 weeks.

Initial treatment was began with Patellar Tendon Bearing (PTB) cast immobilization for left cruris and foot (Figure 4) with the diagnosis of the left calcaneus and bilateral tibial stress fractures. Additional activity restriction for 3 weeks with the use of crutches and lateral wedge insole for right foot for shifting the load to the lateral compartment of the right knee during walking showed decline in symptoms in the 3<sup>rd</sup> week follow-up. Furthermore paracetamol had been added to initial treatment. The cast was removed after 4 weeks. Physiotherapy continued with partial weight-bearing with crutches for two more weeks. He was allowed full weight-bearing and jogging at the end of 6 weeks. Bone healing without any pain was observed at the end of 6<sup>th</sup> week, whereas sclerotic line on x-rays was disappeared at the end of 8<sup>th</sup> week.

### Discussion

Stress fracture mechanism in young patients is usually related to excessive and prolonged repetitive activity. This is the fact that why it is mostly seen in soldiers or athletes. Since Breithaupt first described the symptoms of stress fractures in military recruits in 1855, there have been several reports of these injuries in this group of individuals [5]. However two or three of the ten soldiers (%20-30) are complaining of severe posteromedial cruris pain in our department in an ordinary outpatient clinic day. Due to facing with military patient population in an ordinary day, we are aware of the possibility of stress fractures in such situations, thus diagnosing stress fractures or shin splints more easy.

In addition to exhausting activity resulted with bone pain; female gender, increased Body Mass Index (BMI) and the previous history of stress fracture are the other risk factors which Phil et al. reported in a review and meta-analysis [6].

Tibial medial plateau stress fracture has a higher incidence, while calcaneal is rare, thus very little has been published about calcaneal stress fractures. There are few reports of anterior process stress fracture of the calcaneus which can be seen with talonavicular coalition up to now [7].

Physician should be aware of several pathologies in the way of diagnosis as Robin reported in a review. Calcaneal stress fractures could be confused with plantar fasciitis or Achilles tendonitis [8].

Also sclerotic lines may appear 3 weeks after the onset of symptoms. So clinicians should be suspicious and take precautions against malpractice whether there is no fracture line on initial x-rays and a persistent pain not responding to pain killers. On the other hand degenerative knee arthritis, lumbosacral pathologies, obturator and saphenous neuropathies, inflammation, vascular and connective tissue disorders can mimic medial knee pain [9].

In the literature bilateral tibial plateau stress fractures are seen rarely. Some authors consider that activity restriction is enough, while others suggest casting on both sides with activity restriction. Kurklu et al. reported the case of bilateral tibial plateau stress fractures following training for the ceremonial march. They had applied long leg cast immobilization and recommended 6 weeks activity restriction which had resulted bone healing [10].

The clinical finding of a stress fracture is usually pain after increased repetitive activity. Conventional radiographs are usually inadequate to demonstrate the stress fractures. MRI is the by far most sensitive diagnostic method. Low signal intensity at T1 and high signal intensity at T2-weighted sequences demonstrate the edema at the fracture line. Further investigation can be achieved with intravenous gadolinium if needed [11]. Moreover, CT and bone scintigraphy can be performed in differential diagnosis. In our case, bone scintigraphy helped us to understand the nature of the fracture pattern, thus confirming the diagnosis [1,9,12-14].

Finally physicians should be aware of treatment modalities which are conservative or surgical. Fracture site status (non-displaced, displaced, stable, and unstable) should determine the treatment strategy. In the literature nearly all of authors suggest that for none or minimally displaced stress fractures, treatment should include three to six weeks of protected weight bearing in a cast or brace, whereas displaced fractures require internal fixation. On the other hand Schatzker et al. observed that patients who had stress fractures treated conservatively can have instability and degenerative arthritis secondary to misaligned joint lines [15].

In the literature, few reports have been published about the use of anticoagulants which may be added according to patient's comorbidities, however we did not use.

In summary, clinicians should have a high suspicion of a stress fracture or fractures when a patient presents with bone pain after intense physical training or following the commencement of unusual activities. Anamnesis and physical examination should take

precedence on the way of diagnosis. Diagnostic imaging studies can only help about staging and treatment method, whether it may be conservative or surgical. MRI and nuclear bone scans are often required to confirm diagnosis.

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