

**CASE REPORT**

# Migration of a Broken Steinman Pin into the Posterior Compartment of the Leg 12 Years after Total Hip Arthroplasty

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**Abstract**

This report is on a migration of a Steinman pin into the posterior compartment of the calf. It was used to fix a greater trochanteric osteotomy in a total hip arthroplasty. The puzzling note is how this metal piece passed through the antero-lateral compartment of the thigh to the posterior compartment of the calf. According to our literature review, migration of fixation pins through the knee joint is an extremely rare occurrence and could be missed by an inattentive physician.

**Keywords:** Total hip arthroplasty, Pin migration, Trochanter osteotomy, Implant complication, Steinman pin

**Introduction**

Kirschner wires (K-wires) and pins are popular implants in orthopedics for the management of different conditions like provisional or permanent fracture fixation and so the breakage and migration of these devices has been well described.

Broken parts usually migrate through a retrograde path, protruding near the entry point. If the migration follows other directions, unexpected problems may occur (1).

Recently using threaded wires or pins have been recommended to minimize its migration possibility and these could improve the wire to bone holding power (2).

Here, the authors present a case of symptomatic migration of a broken Steinman pin used for the internal fixation of a greater trochanteric osteotomy in a THA.

**Case report**

A 34 year old woman, who had total hip arthroplasty (THA) surgery and greater trochanteric osteotomy fixation by Steinman pins and K-wires in 1998 at the age of 22

for a severe and painful left dysplastic hip, was referred to our hip clinic complaining of limping and limited ROM (Figure 1).

After surgery she had a low grade infection that was treated successfully by antibiotics and debridement and became free of discharge until now.

In 2007, she was diagnosed with prosthesis loosening and revision surgery was recommended for her, but she refused and discontinued her follow-up visits. (Figure 2)

In May 2011, 4 years after her last visit, she complained of mild pain in her left leg, a mass in the calf and limping.

On physical examination, a tender, firm, subcutaneous nodule in the posteromedial aspect of the leg was found. On X-ray evaluation of the leg, a broken Steinman pin about 5 cm in length was found under the skin nodule, which migrated from the left greater trochanter (Figure 3). However, in her synchronous hip radiography, a piece of broken pin was not found (Figure 4).

The patient was asymptomatic during the migration of the pin during the last 4 years. The pin was removed

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successfully with a small longitudinal incision. In her last follow-up visit, she was healthy with no calf pain.

### Discussion

Greater trochanter osteotomy is used in revision procedures and may be necessary if the anatomy of the hip

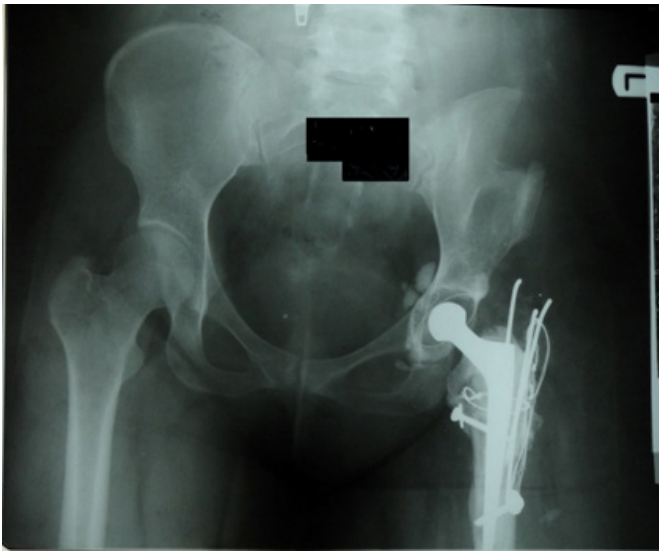


Figure 1. Postoperative pelvis x-ray of the patient shows pins.

is markedly distorted. Trochanteric osteotomy facilitates exposure of the femur and acetabulum and is commonly used in difficult cases (3).

In our case we performed a greater trochanteric osteotomy and fixation was made by tension band wiring.

Sharma et al. reported a case of pin migration into the innominate artery 6 years after a shoulder separation fixation (4). Mamane et al. reported a pin migration to the spinal cord through the T2 foramen 2 m after treatment of a clavicle nonunion (5). A similar case was reported by Bezer et al., where in 2 years after a clavicle fracture



Figure 2. Control x-ray 9-years after surgery shows loosening and broken pins.

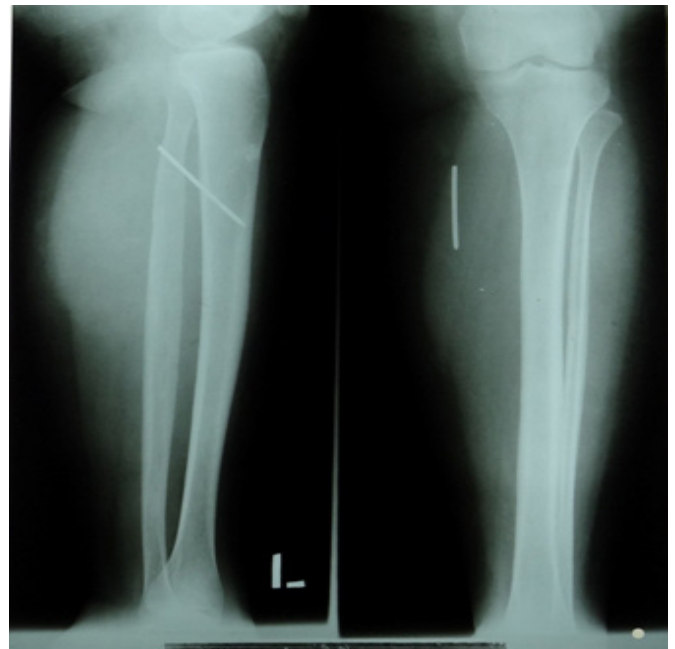


Figure 3. Leg AP and lateral x-ray shows position of the pin in posteromedial compartment of the leg.

fixation, the pin migrated to the opposite hemithorax (1). Also, Tsai reported a pin migration case into the 7th cervical vertebra 8 years after the fixation of a clavicle fracture (2).

In addition, bone fixation with use of Steinman wires could be complicated by wire migration over time. Sarper et al. reported 2 cases of intrathoracic pin migration after an open shoulder reduction and one case of scapula fixation (6).

The migratory device could cause injuries to the nearby organs in the migration path. In Foster's case report, tra-



Figure 4. Pelvis AP x-ray taken before pin removal from the leg demonstrates absence of the broken pin.

chea injury in a 50 year old man due to the migration of Kirschner wires used for stabilization of an acromioclavicular separation presented with hemoptysis was reported (7). Involvement of the ureter was also reported by However, migration may be asymptomatic and discovered on follow-up x-rays. Our patient complained of a mild pain and this pain was related to the irritation of the cutaneous and subcutaneous tissue. The interesting point about our case is the long distance migration path of more than 1 m, in which the pin passed through the knee joint and the patient showed no symptoms during that time.

Yurtcu et al. reported a case of DDH, who was operated on and the hip was fixed by a pin after open reduction, where 4 years later the pin had migrated into the contralateral pelvis (8). Turker et al. reported the migration of a broken k-wire into the Achilles tendon 4 years after an osteosynthesed medial malleolar fracture (9). A broken wire migration case from a fixed patellar fracture into the popliteal fossa after 3 years was reported by Choi (10).

Many authors have tried to explain the mechanisms for pin migration such as regional bone resorption, muscular activity and the great freedom of motion of the joint (11, 12). We propose that gravity as a potential factor along with others, could explain the migration theory.

It could be concluded from the literature that smooth Steinman wires should not be considered safe devices. However, if their usage is necessary, terminally threaded pins are recommended and sometimes bending the pin

could help in minimizing the risk. But the physician should always be aware of unwanted accidents. Additionally, as in our patient, continued stress could lead to pin breakage. The broken distal parts are in risk of migration even if the proximal one is still in place. So medical concerns will persist until all the pins or wires are removed.

A regular followed-up protocol with a physical examination and X-rays could be recommended. It is obvious that if any pin migration is sighted, immediate surgical removal should be considered.

Fortunately, our patient has not endured any particular injury during the migration of the pin. However, regarding the migrate direction next to important structures, it could be assumed as a possibility in the future.

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