

## KNEE ARTHROPATHY DUE TO DISTALLY MIGRATED KUNTSCHER NAIL: A CASE REPORT

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### ABSTRACT

**BACKGROUND:** The aim of this article is to report a complication that was common with Kuntscher unlocked intramedullary nail to remind surgeons of its existence even in this era of improved implant design and to consider it as an etiology in knee pathology.

**PATIENTS AND METHODS:** The history, physical findings, results of investigations and past medical history of the presenting patient were reviewed with relevant literature.

**RESULTS:** This is a report of the existence of this condition in our environment and its usual management in a 34-year old lady who presented in the Orthopedic clinic with features suggestive of right knee arthropathy. She had surgical removal of the implant through the knee; post-operative assessment was good with normal knee range of motion.

**CONCLUSION:** Knee arthropathy due to distal migration of K-nail can still be encountered even when the use of the implant is obsolete. Young and upcoming Orthopedic Surgeons should consider it as an etiology.

**KEYWORDS:** Arthropathy, Kuntscher nail, distal migration, knee function.

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## INTRODUCTION

Kuntscher nail (K-nail) was introduced through the creative work of Gerhard Kuntscher working with Professor Fischer and Engineer Ernst Pohl at the University of Kiel in Germany in the 1930s.<sup>1,2</sup> It has undergone various design modifications and was widely accepted for fixation of all long bone fracture especially femoral fractures. It is an unlocked intramedullary (IM) nail that requires reaming and is made of stainless steel. The indications for the use of K-nail and its complications have been widely reported in the literature.<sup>3,4,5</sup> Distal migration of K-nail was reported early in 1942 as one of the complications. This was attributed to faulty implant selection, poor technique, abnormal bone like in Osteogenesis imperfecta, tabetic patient, delayed union with shortening

and chronic infected pseudoarthrosis etc. Early post-operative migration has been attributed to early weight bearing and oblique fractures of distal third of the femur.<sup>4</sup> The unlocked reamed IM nails are almost obsolete now due to the presence of advanced superior interlocking reamed or unreamed IM nails, but some surgeons in developing countries still use it occasionally.

In Nigeria, distal migration and spontaneous extrusion have been reported but none of these reports have suggested its inclusion as an etiology in knee pathology.<sup>1</sup> We present a case of Knee arthropathy resulting from a distally migrated K-nail.

### CASE REPORT

A 34-year old lady who complained of intermittent right knee pain and swelling of one week duration. Pain was dull, aching, continuous and progressively increasing in intensity causing limping and inability to squat easily. It was aggravated by sitting and standing up but relieved by non-steroidal anti-inflammatory

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drugs. Seven years ago she sustained injury to her right thigh with fracture of the femur following a road traffic accident. She had open reduction and internal fixation of the fracture with K-nail. She was scheduled for implant removal 5 years post-insertion but procedure failed due to distal migration and was discharged home.

On physical examination of the right lower limb, she had a scar on the lateral thigh measuring 12cm and a transverse scar of 15cm on the upper part of the buttocks, and walked with antalgic gait. Knee examination revealed wasting of the quadriceps muscle, slight swelling of the knee with no differential warmth, tenderness along the patellar and joint line. Patellar was freely mobile. Active knee range of motion (ROM) was 70° - 80° but passively ROM was 80° - 90° but painful. Distal neurovascular bundles were intact. See figures 1 - 3.

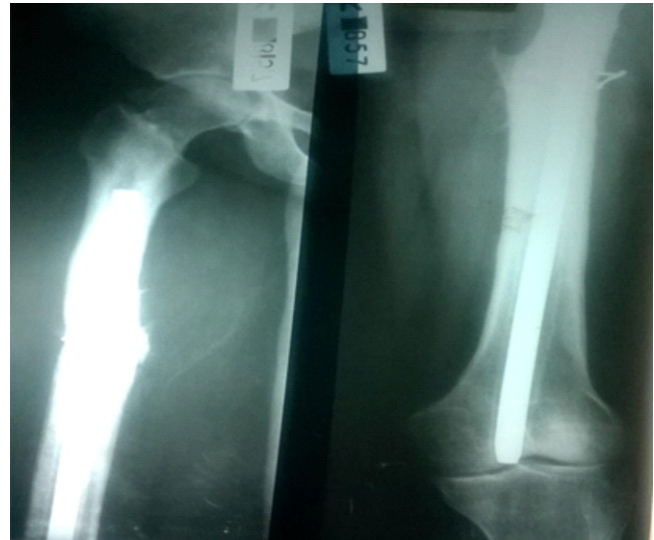
**Figure 1: Immediate pre-operative period.**



**Figure 2: Lateral radiograph of the right knee.**



**Figure 3: Anterior posterior X-ray of affected femur**



The preoperative radiograph confirms the distal migration into the right knee (Figure 2). There is fracture union, features suggestive of intramedullary chronic osteomyelitis. She had been taking antibiotics due to wound infection following the previous failed implant removal. There were no signs and symptoms suggestive of septicemia.

She had extraction of the K-nail through the knee. Intra-operatively, a septic membrane was removed from the intra-articular surface of the knee and the cartilage of the medial femoral condyle was friable around the extrusion site. There was discharge of purulent effluent during removal which was sent for culture. The nail was a 10mm by 360mm and cloverleaf - shaped. The bone marrow was curetted through the extraction window and irrigated with highly diluted hydrogen peroxide, then antibiotics saline was used for final irrigation and the knee closed with a drain placed extra-articular.

Post-operatively the knee passive flexion improved to >110°. Drain was removed after 72hours. Physiotherapy was scheduled for 2 weeks post-operatively; non weight bearing was prescribed 4 - 6 weeks. Post - operative radiograph revealed area of lucency at the healed fracture site, removed nail track, osteopenic bone and unremoved cerclage wire at fracture site above (Figure 6).



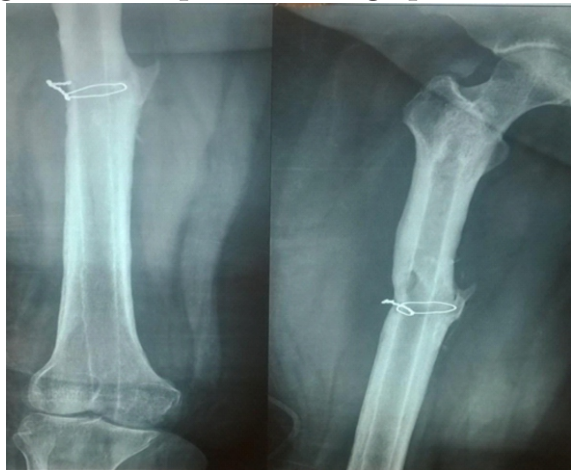
**Figure 4: K-nail being removed**



**Figure 5 The extracted K-nail**



**Figure 6: Post-operative radiograph**



## DISCUSSION

Distal migration of K-nail is a well-documented complication that was common in the era when it was the Gold standard for femoral fracture fixation but that has changed, due to the advent of superior designed intramedullary interlocking nail system. In the index case distal migration was detected 5 years post-insertion but involvement of the knee became symptomatic 2 years later. The reason for migration in this case may be due to faulty implant size selection but the reason for the knee involvement may be iatrogenic. During the failed removal an inexperienced surgeon may have pushed the nail downwards which later penetrated the knee. The attempted removal initially was not done in our establishment so the exact operative detail cannot be given. The presentation by our patient 7 years post-insertion was not different from that reported by other authors whose patients presented between 8 months to 5 years post-insertion.<sup>4,5</sup>

The radiographic features of a thin sclerotic margin resembling a 'tram line' surrounding the implant and the intra-operative finding of synovial reaction, turbid fluid akin to purulent effluent on extraction was similar to that reported in literature.<sup>5</sup>

Most of the cases reported by De Belder<sup>5</sup> had proximal half fractures involving the isthmus, only one had lower most femoral fracture. According to literature distal migration is more common with proximal femoral shaft fractures, same as the index case. The literature reviewed does not indicate which fracture configuration is prone to migration. All his patients had a primary complaint of knee arthropathy except one who was asymptomatic, yet he and other researchers never considered it a possible differential diagnosis in knee pathology.<sup>5-9</sup> K-nail or implant induced arthropathy should be borne in mind as an etiology of knee pathology in adults especially if there is a history of femoral fracture fixation. Young and upcoming surgeons should be reminded that K-nail although obsolete is still being used for management of femoral fractures in poor resource countries and that the complication described here can occur.

The turbid effluent and synovial tissue were sent for culture which was negative with no organism

isolated. This was similar to that reported by De Belder<sup>5</sup> in his case report of seven patients. Though he did not give reasons but in our case, patient has been on repeated short course antibiotics for a long period.

### CONCLUSION

Distally migrated K-nail can be a cause of knee arthropathy. Medical students and young surgeons should consider it as a possible etiology of knee pathology.

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