

## BILATERAL RECON NAILING OF COMMINUTED FRACTURE FEMUR IN A SEVERELY INJURED PATIENT: CASE REPORT

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### ABSTRACT

Severely comminuted fractures of the femur can be challenging injuries to manage. The incidence of these injuries is increasing due to the increase in high speed motor vehicle accidents in Kenya. We present the case of a 35 year old gentleman who was involved in a head on collision with a saloon car while travelling in the front seat of a public service vehicle. He presented to the casualty department at the Kenyatta National Hospital (KNH). Injuries identified included almost identical bilateral fracture femur consisting of high subtrochanteric fracture with segmental fracture of the femur shaft. Additionally, there was a left sided mid-shaft fracture of the humerus. The patient initially underwent open reduction internal fixation of the humerus fracture. Two weeks after the injury he underwent staged recon nailing of both femurs. The two nailing procedures were staged by a week. The patient was mobilized from bed to chair post-operatively. After 4 weeks from the last surgery he was gradually mobilized full weight bearing with a walker. At 4 months follow-up he was walking full weight bearing without support. Recon nails can be employed successfully to treat complex fractures of the femur shaft.

### INTRODUCTION

Locked intramedullary nails have revolutionized the way we treat diaphyseal fractures of the femur(1). Though standard first generation interlocking nails are very useful in diaphyseal mid-shaft fractures, these are less useful in complex fractures such as inter-trochanteric, or sub-trochanteric fractures with extensive diaphyseal comminution (2). This is because the inter-trochanteric or sub-trochanteric nature of the fracture leaves no bone stock proximally to enable adequate proximal locking. This problem has been mitigated by the development of second generation recon nails (3). These are modifications from first generation nails in that the proximal locking bolts go directly into the femoral head giving solid proximal fixation. These supplemented with distal locking bolts helps maintain length and achieve adequate rotational control. Numerous studies have shown the usefulness of recon nailing in complex femoral fractures (4-6). The aim of this report is to show the use of this nail in a patient with complex and almost identical bilateral femoral fractures.

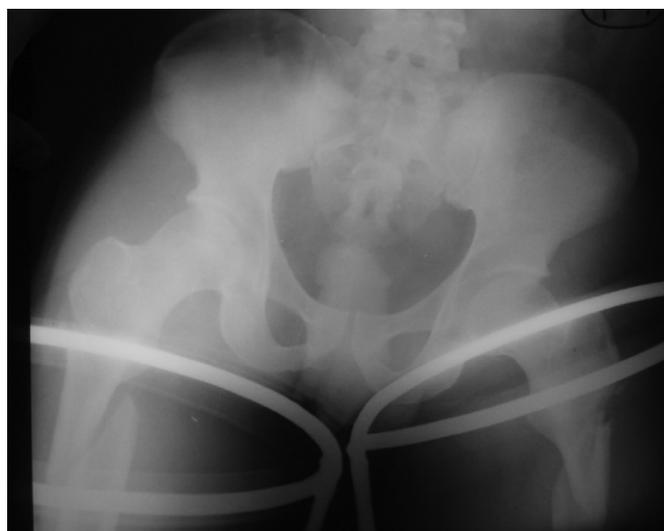
### CASE REPORT

This is a case of a 35 year old gentleman who was a front seat passenger in a public service vehicle which was involved in a head on collision with a saloon car. On being evaluated at KNH he was found to have a mid-shaft fracture of the left humerus (AO 12-A3). He had bilateral fractures of both femurs that were high subtrochanteric with comminuted shaft extension (AO 32-C3). Skin and distal neurovascular status was intact in all fractures.

**Figure 1 (a,b) :** X-rays of humerus shaft fracture

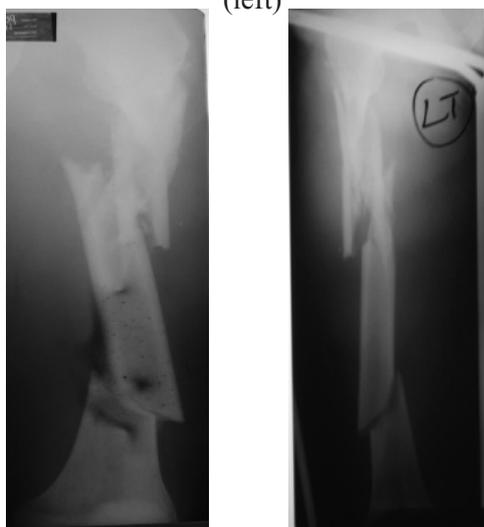


**Figure 2:** X-ray of pelvis AP showing bilateral high subtrochanteric fracture with extension to the shaft



**Figure 3:** X-rays of right and left femur showing

diaphyseal extension and 2 segmental components (right) (left)



Note the almost identical pattern of fractures on both sides.

**OPERATIVE PROCEDURE**

*Humerus:* ORIF of the humerus was done almost one week after the initial injury. Patient was placed prone. Posterior triceps splitting approach was used. Dissection was commenced between the lateral and long head of the triceps. Radial nerve was identified, mobilized and secured with mersilk tape. Medial head was split and fracture exposed. Fracture was reduced and narrow 4.5 DCP applied under the radial nerve. Post-operative radial nerve function was preserved.

**Figure 4:** Post-operative X-ray of humerus



*Bilateral femur nailing:* Right sided nailing was done approximately one week after humerus plating. Left sided nailing was spaced one week after the right side. The procedure on both limbs was performed in a similar fashion.

Patient was kept in the lateral position. Some studies have shown that in sub-trochanteric fractures nail entry for piriformis entry nails is easier from the lateral position than from supine (7). The nail entry was done in a percutaneous manner. In both cases the fracture was opened at the junction of the subtrochanteric and segmental shaft fracture to reduce the fracture and direct the guide wire into the medullary cavity. This was because the fractures had callous formation and were not amenable to indirect reduction by traction. Opening the fracture in this fashion may not have been necessary had we had the opportunity to perform the surgery earlier.

In both cases, we used recon-nail from Smith and Nephew. To maintain equal leg length we inserted size 11.5x36 on both sides. Two proximal locking bolts were placed into the head under image intensifier. Care was taken to position the screws in centre-centre position on the lateral image. Two distal locking bolts were placed using the free hand technique.

At the end of the second procedure, leg length was equal on both sides, and the distal neurovascular was intact. The patient was made to bed to chair after the second operation. He was not allowed ambulation for 4 weeks due to the comminuted nature of the fracture, as well as the presence of an internally fixed fracture of the humerus on the left side. At 4 weeks after the last procedure he was allowed gradual weight bearing. At 4 months post-op he was ambulating full weight bearing without support.

**Figure 5:** Post-op pelvis AP



**Figure 6 :** a,b right femur X-rays**Figure 7 a,b:** Left femur X-rays

## DISCUSSION

With the increase in high speed trauma in Kenya, it is likely that orthopaedic surgeons are likely to see higher volumes of complex femur fractures (8). Due to congestion in our wards, as well as numerous studies meriting the economic benefits of early fixation of fractures, it is no longer feasible to treat such fractures by prolonged traction.

The recon-nail is a second generation piriformis entry nail. It is biomechanically superior to standard interlocking nails in that the two proximal screws are fixed directly into the femoral head. This provides superior fixation for high femoral fractures (such as those with sub-trochanteric or inter-trochanteric extension) where there may not be adequate bone stock for fixation by conventional nails.

In a polytrauma patient staged reconstruction of all long bones is preferred (9). This results in reduced surgical stress for the patient and reduced complications such as fat embolism, excessive blood loss and SIRS.

As both lower limbs were fractured, it is prudent to operatively fix the fracture of the humerus. The author prefers to use plating to achieve bony union of the

humerus shaft. Though some studies have shown a rate of up to 10% radial nerve palsy with this procedure, if the nerve is adequately exposed and isolated prior to embarking on fixation, one can avoid injuring it (10). Moreover, it avoids the problems of shoulder pain and non-union that occur with interlocking nailing of the humerus (11, 12).

Some studies have shown that positioning the patient in the lateral position for nailing makes it easier to make the entry for the nail for fractures extending to the subtrochanteric region (7, 13, 14). In the supine position the pull of the iliopsoas tendon on the lesser trochanter shifts the proximal femur into flexion, making anatomical entry difficult. This can be overcome by putting the patient in the lateral position and slightly flexing the hip. In this position however, errors can occur in judging foot rotation and leg length when doing distal locking. This can be overcome by turning the patient to supine and then doing distal locking once correct rotation of the foot and leg length have been confirmed.

With both femurs fractured in a comminuted manner, estimating the length of the nail may be challenging. We prefer using the method of measuring from the tip of the olecranon to the tip of the little finger and subtracting by 2 as suggested by Nazir *et al*(15). It is also crucial that the nails inserted in both the limbs are exactly the same length to avoid any limb length discrepancy.

Hopefully, the availability of trochanteric entry recon nails in Kenya with more locking options will add to our armamentarium of modalities to treat these difficult fractures.

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