

# A simple technique to retrieve a bent Kuntscher's nail in femur

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**Abstract:** A bent femoral intramedullary nail due to secondary trauma presents unique challenges for nail extraction and subsequent exchange nailing. This article describes a case of a 25 year-old male patient who presented with a bent femoral intramedullary Kuntscher's nail following a repeat trauma after a fall from stairs. The described surgical technique illustrates a simple method to straighten the bend in situ and perform an exchange nailing. Earlier reports outlined methods to remove bent femoral nails through the fracture site and proximally but the importance of the method we are describing here is that it is simple, safe, less time consuming and does not need much expertise if done carefully.

**Keywords:** K nail, intramedullary, extraction, femur, isthmus.

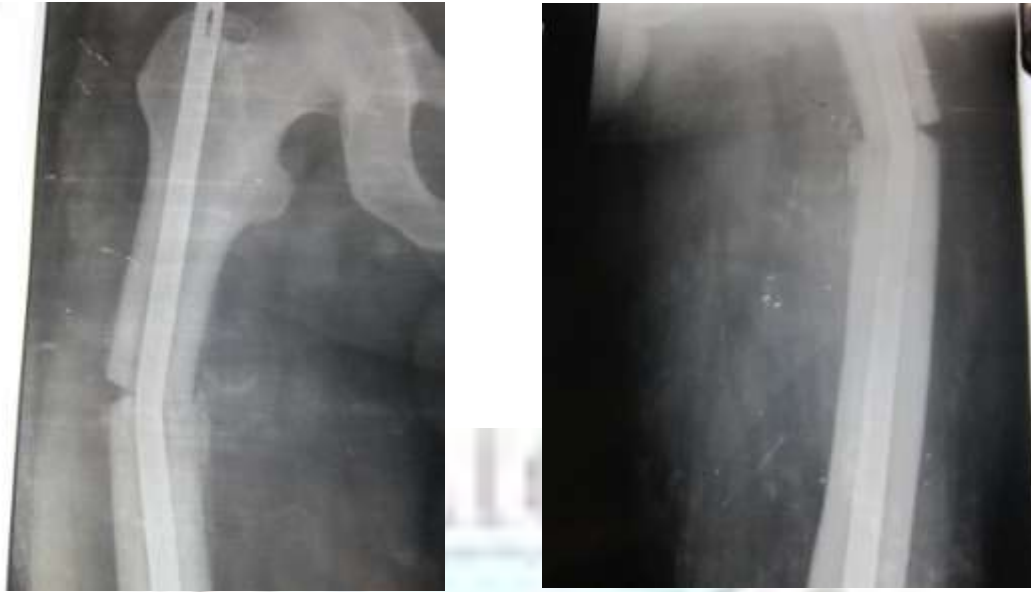
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## Introduction

The use of intramedullary nails for treatment of diaphyseal femoral fractures has been the gold standard<sup>1</sup>. It is evident that more energy is required to cause a refracture and bending of an intramedullary nail in completely healed fractures than in incompletely healed fractures. K nail has been a very cost effective method of treatment with promising results, if done in an appropriate indication of isthmic femoral shaft fractures. It has achieved consistently excellent results in such cases and requires very less operative time. Sometimes in cases where the union has not been achieved the nail may bend at fracture site or it may even break if the trauma is more severe. The removal of a bent nail is a very tantalising situation and requires strategic planning and innovation. Few methods for nail removal already have been described in literature and we here describe below a simple, unique and innovative method for the nail retrieval.

## Case Report and Method

A 25 year old male sustained a fracture of shaft of femur at the isthmus of right side after a road side accident. The patient was operated upon with a K nail after opening the fracture site and was discharged in stable condition. The patient again reported to accident and emergency department after a history of fall from stairs after 5 days while he was being taken to bathroom which was just close to the staircase. He complained of severe pain in right thigh and was unable to move the right lower limb. On clinical examination there was an obvious deformity of right thigh and the limb was kept in external rotation. The radiographs revealed that the nail was bent and at the fracture site and there was a gap at the fracture site and a lateral angulation of femur (Fig- 1a and b). The patient was adequately stabilized and was posted for surgery the next day. The method used to retrieve the nail is being described below.



**Figure 1a and b: Radiographs showing a bent Kuntscher nail.**

A bent intramedullary nail in situ cannot be simply withdrawn by extractor or hammering further (figure 1). Before any attempts at extraction we should try to straighten the nail in the medullary cavity, after which the nail can be pulled easily at one end. We here used a method to align the nail with medullary cavity by closed reduction under image intensifier. In our technique, the patient was laid supine on a conventional operation table. The side post was applied a little proximal to the level of the deformity. After anaesthetizing the patient but before cleaning and draping, the limb was held distally with one hand at knee and the other at the ankle. With the deformity just at the level of the post, a controlled force was applied in suitable direction to correct the deformity (usually varus) making the hinge at the post (figure 2).



**Figure 2: Position of the post and the method of application of force.**

The position of post was double checked so that it was at the level of deformity, under C- arm. The correction of deformity was again checked under C arm before the complete correction of the deformity so as to prevent the development of a S shaped bend in the nail. The S shaped bend might prevent or make it virtually impossible to allow for an easy extraction of nail. If the deformity has become partially corrected, we continue with further straightening of the nail. The nail was then

extracted from the trochanteric side of the nail using the K nail extractor and would be replaced with a nail of larger diameter after reaming it with a larger size reamer (figure 3 & 4). The wound was then closed in layers. The grafting was not required as the reamer curettings would act as very fertile graft to promote the fracture healing. The post surgery physiotherapy was started as soon as the patient was pain free and comfortable. Patients were followed up periodically to assess the radiographs for union.



**Figure 3: Extracted nail.**



**Figure 4a and b: Post operative radiographs of femur with an interlocking nail.**

### **Discussion**

An intramedullary nail imparts stability for a limited period of time until bone healing is attained. There is a constant race between implant strength failure and bone union, conditions like nonunions, delayed unions or refractures predispose to nail

bending and implant failure. Standard accepted method of treatment of a bent nail is to straighten it in-situ; remove it from proximal end; and go for exchange nailing.<sup>1</sup> The method described by us involves a modification of method of force application to avail the desired result of closed manipulation. This method does not entail any incision for removal of nail. This obviously avoided complication of open methods of manipulation like further trauma to soft tissue and bone, stripping of periosteum, further comminution at fracture site. The technique is simple and effective and can be used in peripheral hospitals where advanced gadgetries may not be present. Opening the fracture site and transecting<sup>2,3</sup> or controlled weakening of the nail before removal<sup>4,5,6</sup> are the options available, if one is not able to straighten the nail in-situ through application of a substantial external force. Procedures like transecting or drilling the nail have many disadvantages like production of metal debris and there are chances of shattering of discs/burrs or drill bits. Thermal necrosis of soft tissues and bone can occur due to heat generation while transecting or drilling. Our method is simple and effective, as it does not produce metal debris and heat while cutting, allowing an easier extraction of the bent nail. It may be useful even in high strength nails to produce sufficient weakening to straighten by manual manipulation. The procedure has its application especially in peripheral hospitals, where advanced gadgetries for transecting the nail may not be present. The most important point to look out for during this procedure is to be doubly sure that the hinge for straightening the nail is exactly at the site of maximum deformity or it may make the retrieval process worse. To conclude this method is simple, safe, less time consuming and does not need much expertise if done carefully.

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