

Anatomic Approach To The Removal Of A Bent Intramedullary Nail In A Refractured Tibia Minimising Soft Tissue And Bone Injury: A Rare Case Report.

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Abstract

Interlocking intramedullary nailing of closed tibia fractures is the gold standard in current practice. Sometimes patients present with bent nails following another trauma after a fixation. This is somewhat a rare complication posing a difficult challenge of removal with minimal soft tissue and bone injury in developing countries. We report the removal of an angulated tibia nail following a refracture of the tibia and fibula in a 28 year old woman with minimum soft tissue and bone injury.

INTRODUCTION

The use of interlocking intramedullary nails for the treatment of diaphyseal fractures of the tibia in adults is now the gold standard in the modern era of such treatment.¹

The nails are usually left in patients or removed depending on varying indications. The removal of these nails at the request of patients is much less challenging compared to removal as a result of trauma to bone with nail in-situ. It is obvious that an increase in surgical management of fractures will most likely lead to an increase in reported cases of posttraumatic bent nails, which is otherwise a rare complication especially in developing countries.

Several methods for the removal of intramedullary nails of the femur have been reported in literature including, sectioning of the femur and nail at fracture site, partial sectioning and weakening of nail, and straightening of the nail prior to removal by manual force.^{2,3,4}

There are however very few cases of bent tibia nails removal involving straightening, cutting and drilling of nails to weaken and easily remove the nail with varying degrees of angulation.^{5,6,7}

In this report, we are reporting a rare case of removal of a bent tibia SIGN (Surgical Implants Generation Network) nail with anterior angulation due to refracture of the tibia with minimal soft tissue and bone injury using the standard extraction technique with an anatomic approach.

CASE REPORT

A 28 year old woman presented with a history of a road traffic accident and reported to Mulago National Referral hospital in Kampala Uganda. It was a high-energy trauma in which her right leg, was had been entangled between the motorcycle on which she had been riding and a speeding vehicle on a highway.

On examination she was conscious and had a deformed right leg with lateral rotation and wounds of about 10cm x 8cm on the anterior and posterior-medial side of the right leg. There was no abnormal movement of the right leg and it had intact neurovascular status.

Figure 1

Figure 1- Patient a week after debridement and suturing of soft tissue injury.



She had a history of an open reduction and internal fixation with a tibia intramedullary nail(SIGN nail) for a distal tibia fracture secondary to a non-union after an open fracture of the right tibia following a road traffic accident two and half years ago, which had been treated with external fixation and a cast after soft tissue healing.

Her X-rays showed a fracture of right proximal tibia with a bent intramedullary nail on anterior-posterior and lateral view x-rays.

Figure 2

Figure 2- Fracture of proximal tibia and fibula with angulation of the nail.



The patient was taken for surgery in which the wounds were surgically debrided and suturing performed on same night of refracture. The patient was taken back for surgery a week

later after appropriate planning of nail removal was done and wounds were also clean.

An anatomic approach was used to remove the nail by making some basic assumptions regarding the anatomy of the tibia, the proximal tibia and fibula fracture, the SIGN nail bend, and the antero-medial angulation with the standard extraction technique.

A paramedial incision through the old surgical scar was made and dissected into the knee joint. The soft tissues of the apex of the nail were dissected, and the SIGN nail Jig was applied to it and locked. An impactor was used to gently remove the nail- bending it anteriorly while impacting on the nail along the anterior bend of the tibia. The nail was removed uneventfully, without any bone or soft tissue injuries. A new nail was re-introduced through the same entry point to stabilize the fracture and locked proximally.

DISCUSSION

In literature, the techniques described for removal of bent nails involve cutting the nail at the bent and then removing it, or the weakening of the nail by drilling holes at the bent using metal drills or diamond cutters after exposing the fracture site.^{8,9}

Others remove the nail by first straightening it in-situ then removal without exposing the fracture site.⁴

In this patient after reviewing literature on the removal of bent intramedullary tibial nails and given the fact that she has had previous extensive soft tissue injuries, we wanted to minimize injury to bone and tissues, keeping in mind that we did not have the requisite drills or cutters to drill or cut the nail in its bent convexity in our possession.

Upon carefully studying the bent nail and the proximal tibia refracture, the following assumptions were made:

We noticed that the angulation was about 25 degrees anterior medial about 2cm below the bend on the SIGN tibia nail.

The tibia has a slight anterior bend around the tibial tuberosity.

The refracture of the tibia and fibula was about 2 to 3cm distal to the tibial tuberosity.

The proximity of the refracture to the tibial tuberosity anterior-medial bend could give some leverage to gently slide the bent nail, which was virtually continuous with the

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tibia nail bend of 9 degrees anteriorly (SIGN nail).

After these assumptions and planning, a surgical incision through the old scar was made and dissected to the nail head at the point of insertion. The locking screws were removed and the SIGN nail Jig applied. An impactor was used to remove the nail as described earlier with minimal bone and soft tissue injury.

A new nail was introduced by reaming to a diameter bigger than the previous nail to achieve maximum stability. The nail was locked proximally. The lateral rotation of the leg was corrected and patient was satisfied with the outcome. She was discharged after bearing full weight on the leg three days later. (Figure 3,4&5).

Figure 3

Figure 3-Anterior angulation of Tibia nail after trauma



Figure 4

Figure 4-Limb after surgery compare with figure 1.



Figure 5

Figure 5- X-rays day one after surgery with a new nail.



The lesson we learnt from this was the fact that, each case of intramedullary bent nail removal should be analyzed and planned appropriately preoperatively, and should be seen as unique. However, reported cases should be reviewed and other methods as described in literature planned for where applicable.

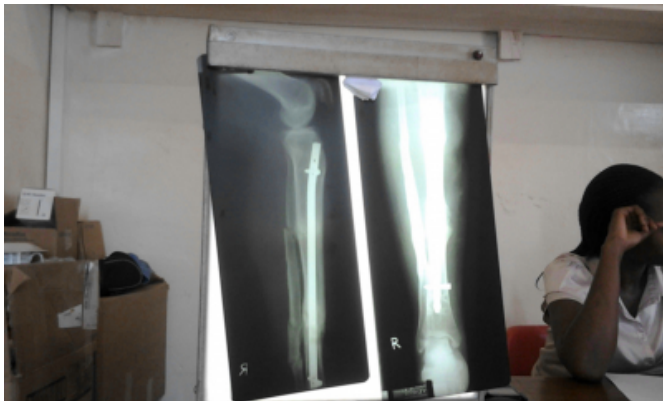
Figure 6

Figure 6. Six weeks after fixation of refracture with bent nail removed.



Figure 7

Figure 7. 12 weeks after fixation.



The challenge of removal of bent nails is going to become even more common in the coming years in most developing countries because of the increasing trends of trauma and internal fixation, with a resultant trauma burden on Orthopaedic surgeons in developing countries. It is unlikely that there will be routine removal of implants. This eventually will lead to a likely increase in cases of refractures with bent intramedullary nails in situ.

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