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Removal of a bent tibial intramedullary nail and exchange nailing with ipsilateral distal femur plating for an intra-articular distal femur fracture in a single setting in a young male: A rare case

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Abstract
The removal of a bent intramedullary (IM) nail is a technically demanding orthopedic challenge. Although methods for removing bent femoral nails are documented, reports involving bent tibial nails are rare, especially with severe angulation. We report a rare case of a 60° bent tibial intramedullary nail associated with an ipsilateral intra-articular distal femur fracture. Both conditions were managed simultaneously through a single surgical setting involving bent nail removal, exchange nailing, and distal femur plating. The outcome was successful with full functional recovery, underlining the feasibility of combined surgical approaches in complex lower limb trauma cases.

Keywords: Bent tibial nail, distal femur fracture, exchange nailing, IM nail removal, combined surgery, orthopedic trauma

Introduction
Intramedullary nailing is a standard technique for tibial shaft fractures, but complications such as bent nails—particularly following re-injury—present formidable surgical difficulties. While literature exists on femoral bent nail removals, only a few cases involving tibial bent nails have been reported. To our knowledge, this is the first documented case of a 60° posterior bent tibial nail associated with an ipsilateral intra-articular distal femur fracture managed in a single setting. This report emphasizes surgical planning, intraoperative challenges, and favorable postoperative outcomes.

Case Presentation
A 28-year-old male presented to our emergency department with deformity in the left leg following a road traffic accident (RTA) 1 day prior. He had a history of tibial intramedullary nailing 4 years earlier.

Clinical Examination
- Deformity: Gross valgus deformity of the left leg (~60°)
- Open wound: 10×5 cm over the anteromedial mid-third of the left leg
- Swelling: Distal third of the femur
- ROM: Restricted knee motion due to pain
- Neurovascular Status: Intact

Radiological Findings
- A 60° posteriorly and 30° valgus bent tibial intramedullary nail
- Ipsilateral distal femur fracture with intercondylar extension

Surgical Management
A single-setting two-stage procedure was undertaken:

Stage 1
Open Reduction and Internal Fixation (ORIF) of the intra-articular distal femur fracture using a distal femur locking plate
Restoration of anatomical alignment and joint surface

Stage 2
- Removal of the severely bent tibial IM nail
- Exchange nailing of the tibia with a new intramedullary device

Special care was taken to maintain biomechanical stability of both bones while minimizing operative time and tissue trauma.
Rare Technique for Bent Tibial Nail Removal (Without Cutting)
In this case, the tibial intramedullary nail was removed successfully without requiring cutting or osteotomy—despite a severe 60° posterior and 30° valgus deformity. This presented a unique intraoperative challenge, rarely encountered in standard orthopedic trauma cases.

The surgical team used a refined and cautious approach to remove the intact bent nail
1. A careful re-entry through the existing proximal tibial entry point was performed.
2. Gentle limb manipulation under anesthesia helped partially realign the deformity, reducing the stress angle at the bend site.
3. With the help of fluoroscopy and a standard extraction jig, the nail was gradually disengaged using controlled reverse hammering.
4. Remarkably, the nail was retrieved entirely intact, avoiding the need for additional bone exposure or instrumentation.

This technique minimized tissue trauma, reduced operative time, and allowed for immediate exchange nailing—all contributing to an excellent functional and radiological outcome.
This case highlights an important principle: even complex deformities involving bent intramedullary nails can be approached conservatively with proper surgical planning, patience, and technique.

Fig 1: Clinical photograph showing leg deformity and wound.

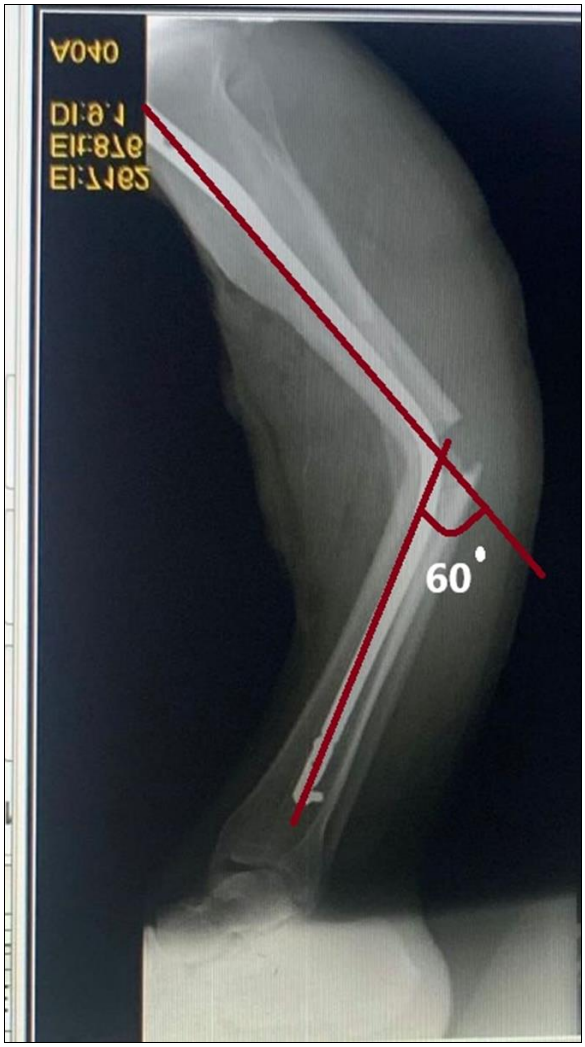

Fig 2: X-ray showing bent tibial IM nail with distal femur fracture.

Fig 3: Intraoperative image of distal femur plating.

Fig 4: Bent nail removed and new IM nail inserted.

Postoperative Course and Recovery

- Post-op Day 1: Radiographs confirmed proper alignment of both tibia and femur
- Day 7: Passive knee range-of-motion exercises started
- Day 14: Knee flexion improved up to 90°
- 4 Weeks:
- Full active ROM from 0° to 140°
- No local tenderness, signs of infection, or abnormal mobility
- 2 Months: Radiographs showed excellent fracture union and implant positioning

Fig 5: Postoperative radiograph - Day 1.

Fig 6: Knee ROM progress - Post-op Days 7-14.

Fig 7: Radiograph - 1 Month Follow-Up.

Fig 8: Radiograph - 2 Months Follow-Up.

Discussion

Removal of a bent tibial nail, especially one with significant angulation, is rare and surgically challenging. Various strategies

including open removal, partial cutting, or customized instrumentation have been discussed in prior literature. However, no cases to date have reported simultaneous management of a severely bent tibial nail and ipsilateral distal femur fracture in a single surgical sitting.

This case highlights the importance of

- Timely intervention
- Preoperative planning with biomechanical considerations
- Combined orthopedic techniques for multi-site trauma

Conclusion

This case demonstrates the successful management of a rare and complex orthopedic trauma using a single surgical setting approach. The simultaneous removal of a severely bent tibial nail, tibial exchange nailing, and distal femur plating resulted in excellent radiological and functional outcomes. Surgeons should be aware of such management strategies for optimizing patient recovery in similar rare scenarios.

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