

Jumbo Cutter for Removal of A Bent Femoral Interlocking Nail: A Cost Effective Method

MANJEET SINGH DHANDA¹, HARNAM SINGH MADAN², SANSAR C SHARMA³, NADEEM ALI⁴, ABEDULLAH BHAT⁵

ABSTRACT

Closed diaphyseal femoral shaft fractures can be treated with multiple surgical options. It is more challenging to remove a bent nail than a broken one because it is difficult to retrieve the bent nail through the intramedullary canal. Various authors have published their techniques for removal of bent femoral interlocking nail. This article describes a simple technique using Jumbo cutter for sectioning and removal of bent interlocking nail. This technique will help orthopaedic surgeons to remove bent nail without using any specialised metal cutting instruments.

Keywords: Bent interlocking nail, Bent nail removal, Difficult removal, Femoral interlocking nail extraction, Femoral nailing, Implant failure, Nail removal, Revision nailing

CASE REPORT

A 26-year-old male patient presented in emergency department of our institute with complaints of pain and deformity on left thigh after history of unprotected sudden fall. Patient was haemodynamically stable and there was no other associated injury. On physical examination the skin condition was normal and he had a significant lateral side apex deformity at mid thigh region [Table/Fig-1a]. Neurovascular status was normal distal to injury site. After written informed consent, patient was operated for femoral shaft fracture on the same side with interlocking nail one month back. Anteroposterior and lateral radiographs were obtained [Table/Fig-1b] which showed bent intramedullary nail with lateral apex and the femoral shaft fracture which was not united. Patient has given consent for case to be reported.



[Table/Fig-1]: a) Patient having swelling and deformity
b) Radiographs showing the bent IM nail

SURGICAL TECHNIQUE

Under Spinal anaesthesia patient was positioned in right lateral decubitus position and femur was opened with lateral approach at fracture site. Then distal locking bolts were removed first, manual traction was applied for some distraction at fracture site to visualise the apex angulation of the bent nail [Table/Fig-2a]. We applied Jumbo Cutter at apex of the clearly visible nail and sectioned the nail in two parts with multiple bites by jumbo cutter [Table/Fig-2b]. Care was taken to section the nail flushed with proximal fracture fragment without damaging the surrounding soft tissue. This allowed a sufficient part of nail to be visible at distal fragment site and nail was easily extracted by using pliers as it was post isthmic wide marrow region [Table/Fig-2c&d]. The proximal nail portion was removed using extraction system and exchange antegrade nailing was done with autogenous cancellous bone graft from ipsilateral



[Table/Fig-2]: a) Apex angulation and jumbo cutter application
b) Cut sectioned nail (one part)
c) Complete Extracted nail- Two Parts
d) Post Operative Radiographs

iliac-crest. The postoperative period was uneventful and patient was discharged in stable health condition.

DISCUSSION

Intramedullary nailing is the standard method of treatment for femoral shaft fractures [1,2]. Bending of intramedullary nail is relatively rare and occurs after re-trauma. Review of literature regarding bent intramedullary femoral interlocking nails indicate that majority of bending occur in coronal plane with apex of the bent on lateral side [3]. Only few cases have been reported in the literature with different techniques for removal. However, there is no single universally accepted method. It is more challenging to remove a bent nail than a broken one because it is difficult to retrieve the bent nail through the intramedullary canal [4-8]. Various authors have published their techniques for removal of bent femoral interlocking nail which include- a) in situ straightening via external force on the femur; b) Sectioning the nail and removing the proximal and distal nail fragments using diamond edge blades; c) Weakening the bent nail using high-speed burr and the F-Tool (Synthes, West Chester, Pennsylvania) for partial sectioning; d) Percutaneous technique with locking compression plate & Collinear reduction clamp [5,7,9,10].

In situ straightening of a bent nail using external force as described by Patterson and Ramser does not work in high strength nails [4,9]. Excessive external force applied for straightening may either break the lateral bone cortex or bent the nail in S-Shaped fashion making it further difficult to extract and vulnerable for longitudinal splintering. Other authors have used specialised metal cutting instruments such as high speed burr [3,5], Diamond edged blades for sectioning the nail. Apipop Kritsaneephaiboon [10] et al., described a technique using LCP and collinear reduction clamp for removal of bent femoral nail which further adds to the cost of surgery significantly [10]. Most of these techniques require fracture exposure and costly special cutting instruments for bone dissection or nail resection. The potential complications from these procedures such as soft tissue damage thermal necrosis and metal debris may affect fracture healing [6]. Primarily all these specialised instruments are costly and secondarily these are not easily available in every setup. In this case we have used low cost jumbo cutter for sectioning and removal of nail without any difficulty. Instrument used is low cost and easily available in contrary to instruments used in above mentioned techniques.

CONCLUSION

Dealing with such cases poses a great challenge for the operating surgeon as it needs tailored unique surgical approach which can

be new or any combination & modification of previously described techniques in literature. Our technique for removal of bent nail using jumbo cutter is simple and cost effective method without much soft tissue damage and thermal necrosis.

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PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Orthopaedics, SHKM Govt Medical College Nalhar (Mewat) Nuh, Haryana, India.
2. Assistant Professor, Department of Orthopaedics, SHKM Govt Medical College Nalhar (Mewat) Nuh, Haryana, India.
3. Senior Professor, Department of Orthopaedics, SHKM Govt Medical College Nalhar (Mewat) Nuh, Haryana, India.
4. Senior Resident, Department of Orthopaedics, SHKM Govt Medical College Nalhar (Mewat) Nuh, Haryana, India.
5. Senior Resident, Department of Orthopaedics, SHKM Govt Medical College Nalhar (Mewat) Nuh, Haryana, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Harnam Singh Madan,
26-J/9 Shastri Nagar Ganaur Sonipat, Haryana, India.
Email: harnammadan@yahoo.co.in

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