

**Research Article****Distal Locking Jig Is a Use-Full Tool in Interlocking of Femur to Avoid the Use of Image Intensifier and Its Hazards: A Study****Dr. Maruthi CV**

Assistant professor, Dept of Orthopaedics, CIMS, Chamarajanagar, India

**\*Corresponding author**

Dr. Maruthi CV

Email: [orthocvmaruthi@gmail.com](mailto:orthocvmaruthi@gmail.com)

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**Abstract:** Diaphyseal fractures of femur are most common due to increase in road traffic accidents and fall from height from building constructions. Closed reduction or open reduction and intramedullary, interlocking is surgical treatment of choice for the clean diaphyseal fractures. In most of the institutions image intensifier is used to perform the procedure and for the distal locking. Using distal locking jig avoids the usage of image intensifier and its hazards. Thirty cases of closed diaphyseal fracture of femur were managed with interlocking nail without using image intensifier and using distal locking jig for distal locking between May 2012 and December 2014. And post operatively we evaluated the accuracy of distal locking, using check x ray. The results were based on the postoperative radiological observations of the in all the thirty patients the single bolt was locked accurately using the distal locking jig in 19 mid diaphyseal fractures and in remaining 11 double distal bolts locking in distal third shaft fractures. We achieved 100% accuracy in distal locking using the distal locking jig. In conclusion Interlocking nailing using distal locking jig is an excellent tool for the distal locking for the diaphyseal fractures of femur. This reduces the hazards of image intensifier to the patient and surgical team.

**Keywords:** Diaphyseal fracture, distal locking jig, Image intensifier, Interlocking nail.

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**INTRODUCTION**

Diaphyseal fractures of femur are most common injuries encountered in emergency, probably due to the increased incidence of road traffic accidents. The treatment for closed fractures ranging from closed manipulation and hip spica application to the intramedullary interlocking nailing. Closed reduction and internal fixation or open reduction and internal fixation using intramedullary interlocking nailing is the surgical technique of choice. In most of the institutions image intensifier is used to perform the procedure and for the distal locking. But its use is superimposed with hazards of radiation to the patient and surgical team. Using distal locking jig is an alternative approach for

the distal locking which is free from such hazard. Here we have made an attempt to study the accuracy of distal locking jig in patients with diaphyseal fractures of femur managed by intramedullary interlocking nailing using distal locking jig.

**MATERIALS AND METHODS**

We studied thirty cases of diaphyseal fractures of femur, admitted in Department of Orthopaedics in our hospital between March 2012 and December 2014. This included both males and females within the age group of 20 – 80years. Fractures were classified using Winquist and Hansen Classification of Fracture Comminution.

Grade	Degree of Comminution
0	No comminution.
I	Small butterfly fragment or commuted segment with at least 50% cortical contact remaining between the diaphyseal segments.
II	Large butterfly fragment or comminuted segment with <50% cortical contact between the diaphyseal segments.
III	Large butterfly fragment or comminuted segment with <50% cortical contact between the diaphyseal segments.
IV	Complete cortical comminution such that there is no predicted cortical contact between the diaphyseal segments. Segmentally comminuted.

All cases were operated by open reduction and internal fixation using intramedullary interlocking using distal locking jig.

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**Surgical technique**

Under spinal anaesthesia with appropriate aseptic precautions, using lateral position, lateral approach was used. Fractured ends of femur approached proximal and distal fragment retrograde reaming was done. Preoperatively nail length was decided on clinical methods using the other normal limb as guide. Nail was introduced and distal locking was done first using distal locking jig, confirmed by tic tic method using the guide wire. Later proximal locking was done using jig. Wash was given to the fracture site, closure done in layers. Dressing was done. Postoperatively check X-ray was taken to know the accuracy of the distal locking using Antero posterior and lateral views.

**Distal locking jig**

An additional instrument provided with most of the interlocking sets in recent times. It should be fixed to the main jig, which introduces the nail over the guide wire in to the medullary canal of the femur. The sleeves are placed in to the distal locking jig and locking is done. The length of the bolt is determined by using depth gauze.

**OBSERVATIONS AND RESULTS**

In our study 7 patients were between 20 and 30 years, 8 between 31 and 40 years and 5 between 41 and 50 years and 3 were in 50 to 60 years, 4 in 60 to 70 and 3 were in 70 to 80 years. Most of them were males 24(80%), females 6 (20%). Majority of the injuries were due to road traffic accident, i.e., in 19 (63.33%) followed by fall from height in 8 (26.66%) and history of assault in 3 (10%) case. The right femur was affected in 18 cases (60%) and the left leg in remaining 12 (40%). Fracture at mid 1/3<sup>rd</sup> constituted the majority at

17(56.66%), lower third 11(36.66%), upper third and junction of upper and mid third constituted 3.33% each. According to the winquest Hansens classification I type was common with 12(40%), 0 type constituted 7 (23.33%) each, II type in 3(10%) and III type in 1(3.33%) IV type in 7.

Results were evaluated using Antero posterior and lateral view X-ray of the femur. Based on the postoperative radiological observations of the in all the thirty patients the single bolt was locked accurately using the distal locking jig in 19 mid diaphyseal fractures and in remaining 11 double distal bolts locking in distal third shaft fractures.

We achieved 100% accuracy in distal locking using the distal locking jig.

**Complications:** No complications were observed in our study.

**DISCUSSION**

Diaphyseal fractures shaft of femur is one of the most common fractures encountered by the orthopaedic surgeon in emergency. Clinically patients will be having pain, swelling, deformity and on examination tenderness, swelling, abnormal mobility at the fracture site. X ray examination of the part wil confirms the diagnosis and by using Winquist and Hansen system we can classify the fracture. Over the years, various modalities of treatment have been used.

In the Winquist and Hansen system [1, 2], fracture comminution is categorized as from Grade 0 to Grade IV based on the percentage of intact femoral shaft at the fracture site.

Grade	Degree of Comminution
0	No comminution.
I	Small butterfly fragment or commuted segment with at least 50% cortical contact remaining between the diaphyseal segments.
II	Large butterfly fragment or comminuted segment with <50% cortical contact between the diaphyseal segments.
III	Large butterfly fragment or comminuted segment with <50% cortical contact between the diaphyseal segments.
IV	Complete cortical comminution such that there is no predicted cortical contact between the diaphyseal segments. Segmentally comminuted.

Several methods of closed management exist for the treatment of femoral shaft fractures. These include spica casting, traction, cast bracing, or combinations thereof. Currently, closed management as definitive treatment for femoral shaft fractures is largely limited to instances in which devices for internal fixation are unavailable or in patients with significant medical comorbidities that make femoral stabilization impossible.

Presently intramedullary interlocking is the best modality of the treatment for the management of the diaphyseal fractures of the femur in adults. In most of the centres which are well equipped has got image

intensifier for the procedure. In set up, where image intensifier is not available, open reduction and internal fixation using intramedullary interlocking has been done.

Distal interlocking is usually accomplished using a free-hand technique that is highly dependent on fluoroscopic imaging. External targeting jigs remain under investigation but have limited applicability because of targeting inaccuracies. This is because of the long length of the implant and the deformation that occurs with nail passage. Computer-assisted navigation systems continue to be explored and will likely increase in popularity in the near future [3, 4].

For the distal locking, surgeons will be struggling and most of the times they will fail to lock. To overcome the problem and to reduce the surgery time, distal locking jig is a use full device in single shot we can lock. In our study based on the postoperative radiological observations of the in all the thirty patients the single bolt was locked accurately using the distal locking jig in 19 mid diaphyseal fractures and in remaining 11 double distal bolt locking in distal third shaft fractures. The results are comparable to other standard studies [5].

#### CONCLUSION

By our study Interlocking nailing using distal locking jig is an excellent tool for the distal locking for the diaphyseal fractures of femur. This reduces the hazards of image intensifier to the patient and surgical team. And it's a tool where the centres not having image intensifier.

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