

# EFFECT OF PROXIMAL FEMORAL NAILING IN PROXIMAL THIRD FEMUR FRACTURE

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## ABSTRACT

**Background:** Proximal third femur fractures are common fractures seen in community. Till date large numbers of intramedullary and extramedullary implant were used in the treatment of these fractures. These fractures differ significantly from femoral shaft fractures and more proximal femoral fractures in mechanisms, treatment and complications. In 1996 AO group has introduced proximal femoral nail (PFN) for treatment of these fractures. The use of PFN in both these fractures resulted in rotational stability along with union in more anatomic position.

**Aims & Objective:** To prove the advantages of PFN like (1) close reduction of fracture which decreases the blood loss and chance of infection; (2) controlled impaction of the fracture; (3) rotational stability; and (4) load bearing capacity of the implant.

**Material and Methods:** We have done a retrospective study of proximal femur fractures operated with proximal femoral nailing at our institute with follow up of 5 – 36 months. Our study included 30 patients with 8 patients having intertrochanteric fracture and 22 patients having subtrochanteric fracture. Patient was asked to come for follow up on 1, 2, 3 and 6 months from the date of surgery. At each follow up patient was assessed clinically as per Harris Hip score 12 and x ray AP/LAT view of hip with femur is taken.

**Results:** It concludes that according to Boyd and Griffith classification type II is the most common variety. In our study excellent to good results noted in 74% patients. All of them performing their routine normal activity well. 5 patients had poor results. Complication rate in our study was much lower. There was only one infection which was known case of diabetes mellitus.

**Conclusion:** The procedure takes less time and the patient can be mobilized fast postoperatively as well after fixation with PFN. PFN should always be considered for management of subtrochanteric fractures in young as well as elderly patients who have multiple pre-existing illnesses. PFN is a closed nailing procedure which achieves a Biological Fracture fixation with minimal blood loss, preserving the fracture hematoma and helping easy healing of the unstable subtrochanteric femoral fracture as well as intertrochanteric fracture.

**Key-Words:** Intertrochanteric Fracture; Subtrochanteric Fracture; Proximal Femoral Nail

## Introduction

Proximal third femur fractures are common fractures seen in community. It includes intertrochanteric fracture – between greater trochanter and lesser trochanter, more common in old age group and associated with low velocity trauma and sub-trochanteric fracture - between inferior aspect of lesser trochanter and distance of about 5 cm distally, more common in younger age group and associated with high velocity trauma. Till date large numbers of intramedullary and extramedullary implant were used in the treatment of these fractures. These fractures differ significantly from femoral shaft fractures and more proximal femoral fractures in mechanisms, treatment and complications.<sup>[1-3]</sup> Girdlestone warned, "There is danger inherent in the mechanical efficiency of our modern methods,

danger lest the craftsman forget that union cannot be imposed but may have to be encouraged. Where bone is a plant, with its roots in soft tissues, and when its vascular connections are damaged, it often requires, not the technique of a cabinet maker, but the patient care and understanding of a gardener."<sup>[4]</sup> In 1996 AO group has introduced proximal femoral nail (PFN) for treatment of these fractures. The use of PFN in both these fractures resulted in rotational stability along with union in more anatomic position.<sup>[5]</sup> Proximal third femur includes head, neck, intertrochanteric region (between greater and lesser trochanter) and subtrochanteric region (below lesser trochanter for about 5 cm). Amongst various classification systems we have used Boyd and Griffin' classification for intertrochanteric fractures and Seinsheimer' classification for sub-trochanteric fractures.<sup>[6]</sup> Again in 2007 P.

Khambhoj, R.C. From India modified the original PFN as per Indian demographic variations and concluded that PFN is an excellent implant for unstable proximal femoral fractures.<sup>[7]</sup> In 2007 the importance of fracture to distal locking screw distance was studied by B.F. Onkiehong and R Leemans in cases of subtrochanteric fractures of femur.<sup>[8]</sup> In 2007 W.M. Gadegone et al published a study of 100 cases of proximal femoral fractures treated by PFN and demonstrated that PFN offers the advantages of high rotational stability of the head-neck fragment, an undreamed implantation technique and the possibility of dynamic or static distal locking.<sup>[9]</sup> Before the evolution of PFN different implants like Dynamic Hip screw/ Enders nail/ Jewett nail<sup>[10]</sup> etc. were used in management of these fractures. We have used PFN in management of both intertrochanteric and subtrochanteric fracture femur. The advantage of PFN includes (1) close reduction of fracture which decreases the blood loss and chance of infection (2) controlled impaction of the fracture (3) rotational stability and (4) load bearing capacity of the implant.

## Materials and Methods

We have done a retrospective study of proximal femur fractures operated with proximal femoral nailing at our institute with follow up of 5 – 36 months. Our study included 30 patients with 8 patients having intertrochanteric fracture and 22 patients having subtrochanteric fracture. Diagnosis of type of the fracture was done by radiographs of the involved hip with femur. After general assessment of the patient routine blood investigation were done as part of preoperative workup. Patient was taken in operation theatre and anaesthetised and shifted to fracture table in supine position. Fracture reduction was done under IITV guidance.<sup>[11]</sup> After confirming the reduction painting and draping of operative area done. Approximately 5 cm sized incision kept over upper lateral aspect of proximal third of thigh just proximal to greater trochanter. Entry made over tip of greater trochanter or just medial to it and a guide wire passed over which proper sized PFN was introduced after initial reaming. After that two lag screws of appropriate sizes were introduced and distal locking done. Post-operative protocol: Antibiotics (inj. Ceftriaxone 1gm i.v. 12

hrly) was continued for first 3 days and then it was shifted to oral. Intravenous analgesics were given for 1 day followed by oral analgesics when necessary. Quadriceps physiotherapy: Strengthening exercises, Static quadriceps exercise and calf pumping are started as soon as the patient is out of anaesthesia, followed by Knee and Ankle mobilization on post op day 1. Sutures were removed on 12th post-Operative day. Patients were advised to walk non weight bearing walking (NWBW) as soon as tolerable usually after suture removal. Partial weight bearing walking (PWBW) was started once further collapse is not expected radiologically around 8 weeks. Full weight bearing walking was allowed after assessing for radiological and clinical union. Hospital stay: Patient is discharged as soon as the wound and general condition of the patient is satisfactory, around POD-5. Follow up: Patient was asked to come for follow up on 1, 2, 3 and 6 months from the date of surgery. At each follow up patient was assessed clinically as per Harris Hip score<sup>[12]</sup> and x ray AP/LAT view of hip with femur is taken.

## Results

Sub trochanteric fracture is more common in middle age patients and more common in male (Table 1). It concludes that according to Boyd and Griffith classification type II is the most common variety (Table 2). According to seinsmer's classification type II (two part fracture) is more common than others (Table 3). Most of patients are with equal limb length. Limb length discrepancy was noted in type IV and type V (Table 4). 25 patients performing their routine normal activity well. 5 patient having poor results. One of them had associated fracture shaft femur which gone into non-union. Another 3 were old aged and had associated co morbid conditions. Complication rate was much lower. There was only one infection which was known case of diabetes mellitus. Lag screw breakage noted in one patient but patient is doing well with Harris hip score as in excellent index. In other complication there is trochanteric bursitis which leads to pain and restriction in squatting and cross leg sitting. There was no single incidence of non-union. (Table 5).

**Table-1: Age Distribution**

Age(year)	Male	Female
20-60	63%	7%
>60	13%	17%

**Table-2: Boyd and Griffith Classification**

Type	I	II	III	IV
Patients (%)	12	88	0	0

**Table-3: Seinsheimer's Classification**

Type	I	II	III	IV	V
Patients(%)	0	59	27	14	0

**Table-4: Limb Length Discrepancy**

Limb Length Discrepancy	No. of Patient
Normal	23
<1 cm	4
>1 cm	3

**Table-5: Results According to Harris Hip Score**

Result	Patient (%)
Excellent	47
Good	27
Fair	10
Poor	16

## Discussion

Most of our patients are in middle age group with mean age 42.6 years which was significantly lower compared to that in Boldin et al (72 years) and I.B. Schipper et al (82 years). Male predominance (77%) noted in our study opposite to Boldin et al<sup>[17]</sup> and I.B. Schipper et al<sup>[18]</sup> which have female predominance with 70% and 82% respectively. Right side (57%) is more commonly involved than left which was also reported in I.B. Schipper et al (52%). High velocity trauma mostly associated with subtrochanteric fracture or reverse oblique (95%) and intertrochanteric fracture. Low velocity trauma produces intertrochanteric fracture (59%) than subtrochanteric (41%) which was significantly different from W.M. Gadegeon et al<sup>[19]</sup> which shows 75% of the fractures were due to domestic falls and this can be explained by the higher mean age group of patients in this study. Type II (59%) which was different from the Seinsheimer et al where type III was more common (38.29%). The mean Harris Hip score was in our study was 80.76% which was higher than I.B. Schipper et al where the mean was 77.6.

PFN is a closed nailing procedure which achieves a Biological Fracture fixation with minimal blood loss, preserving the fracture hematoma and helping easy healing of the unstable subtrochanteric femoral fracture as well as

intertrochanteric fracture. Proximal and distal bolts passed through the femoral nail gives good stability in axial and rotational axis, preventing shortening and malunion postoperatively. As compared to other modalities there is a low infection rate, as well as few postoperative complications. Prolonged Immobilisation and non-weight bearing seen in other implants causes joint space narrowing and leads poor outcome.<sup>[12]</sup> The amount of blood loss during operation was less because the fracture site is not exposed compared to extramedullary implant like DHS, DCS.<sup>[13]</sup> The average union time in our study was 5.1 months, lower than some of union rates of series with other extramedullary implant (AO blade plate 7.7 Months).<sup>[14]</sup> Proximal Femoral nailing has very low non-union rate. There are 0 non-unions in our study. All 30 case have good clinical as well as radiological union in relation to Shieng et al study.<sup>[15]</sup> The eccentrically placed extramedullary implants are more prone to fatigue breakage due to their mechanical load-bearing effect. The Fixation of Subtrochanteric Fractures with intramedullary nails significantly stronger than DCS and DHS (other extramedullary screw plate device).<sup>[16]</sup> Thus, the Conducive environment provided by PFN allows early mobility, independence to the patient and lessens the complications due to bedridden states and decreases the time in returning to work. The procedure takes less time and the patient can be mobilized fast postoperatively as well after fixation with PFN. PFN should always be considered for management of subtrochanteric fractures in young as well as elderly patients who have multiple pre-existing illnesses.

## Conclusion

The procedure takes less time and the patient can be mobilized fast postoperatively as well after fixation with PFN. PFN should always be considered for management of subtrochanteric fractures in young as well as elderly patients who have multiple pre-existing illnesses.

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