

**Original Article**  
**Orthopaedics**

# FUNCTIONAL OUTCOME IN PATIENTS TREATED WITH PROXIMAL FEMORAL NAIL IN TYPE TWO UNSTABLE TROCHANTERIC FRACTURES: A PROSPECTIVE STUDY

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## **Abstract**

**Background:** For many years, the sliding hip screw and plate had been the gold standard in treating pertrochanteric fractures. there is always a grey zone of decision of implant to be applied in unstable type A2.2 and A2.3 fractures.

This study was designed for the functional outcome of the PFN device in patients with unstable type 2 trochanteric fractures (AO/ASIF classification: 31-A2.2 & 31-A2.3)

**Material and method:** In this prospectively designed study, 30 consecutive patients having Fracture according to AO/ASIF classification 31-A2.2 and 31-A2.3 are included for the study. The functional outcome and clinical results of the patients was evaluated and graded using HARRIS HIP SCORE system. Patients were followed up fortnightly in the first month, then monthly until 6 months or till clinical or radiological union is achieved.

**Results:** The average blood loss in PFN was 88.3ml. Hospital stay after surgery in PFN was average days 4.13. Harris hip score in PFN 22 (73.33%) were good, 06 (20%) were fair and 02 (6.66%). Average time of union in PFN was 13.4 weeks.

**Conclusion:** Functional and radiological status of PFN was much better in unstable type of intertrochanteric fractures. It provides a advantage of lesser blood loss, shorter operating time, faster union, better functional

outcome and low infection and complication rate.

**Keywords:** *Unstable trochanteric fractures, PFN*

## Introduction

Unstable trochanteric fractures are a growing concern for the orthopaedic surgeons all over the world. Sliding devices like the Dynamic Hip Screw (DHS) and Intramedullary devices like the proximal femoral nail (PFN) have their own advantages & disadvantages and various meta-analysis conducted so far have come out with conflicting results regarding superiority of PFN over DHS<sup>1</sup>.

For many years, the sliding hip screw and plate had been the gold standard in treating pertrochanteric fractures. Now a days, there is an increasing interest in intramedullary nailing. Intramedullary devices, although technically difficult seems to have a biomechanical advantage over laterally fixed side plates<sup>2</sup>. Literature is full of articles categorizing DHS in stable Trochanteric fractures, (31-A1.1, A1.2, A1.3 and 31-A2.1) and use of intramedullary devices PFN as implant of choice in unstable trochanteric ,subtrochanteric fractures and particularly in reverse oblique (all A 31.3)<sup>3</sup>. But there is always a grey zone of decision of implant to be applied in unstable type A2.2 and A2.3 fractures. This study was designed to evaluate the functional outcome and complications of the PFN device, in patients with unstable type2 trochanteric fracture. (AO/ASIF Classification 31-A2.2 & 31-A2.3).

## Materials & Methods

In this prospective study, 30 consecutive patients with trochanteric femoral fractures having an unstable pattern, of either sex were taken to undergo fixation with the PFN (PROXIMAL FEMORAL NAIL).

Informed written consent from patient was obtained prior to their inclusion in study. A detailed history and clinical examination was done in a systemic manner and noted on a specially designed Proforma. Plain radiographs were obtained on admission and all fractures categorized according to AO/ASIF classification, Patients having fracture classification 31-A2.2 and 31-A2.3 were included for the study.

## Exclusion criteria

- AO/ASIF type other than 31-A2.2 and 31-A2.3.
- Pathological /Compound fracture
- Patient with other fracture in the same limb.

## Assessment Of Results

The functional outcome of the patients was evaluated and graded using HARRIS HIP SCORE<sup>4</sup> system .

Harris Hip Score	Result
90 – 100	Excellent
80 – 89	Good
70 – 79	Fair
O <70	Poor

## Surgical Approach<sup>5,6</sup>

**Proximal Femoral Nail<sup>5</sup>:** Reduction was achieved by aligning distal fragment to flexed and externally rotated proximal fragment. A unicortical 5mm threaded joystick can also be used. A 5cm incision was made approximately 5 to 8cm proximal from the tip of the greater trochanter, and the gluteus medius was spiltted in line of fibres. Under fluoroscopic guidance, entry was made into the tip of greater trochanter, taking care to centre it on both antero posterior

and lateral views. The 9 mm end cutting reamer was used above fracture. The reaming process was continued at 0.5 mm increments until 1mm more than the selected nail size was reached and the proximal fragment entry point was widened with entry point widener. The selected nail was passed over the guide wire. Now sleeves was placed in proximal hole and guide pin was inserted. Then the distal screw hole was drilled with 6.4 mm drill up to 5mm of subchondral bone. Then proximal screw site was drilled with 5.0 mm drill bit and tapped with cortical tap of 6.4 mm and the screw was inserted. Then the distal interlocking screws were inserted.

Postoperatively, Antibiotics were continued, I.V for 3 days and oral antibiotics till suture removal (12<sup>th</sup> Day). Analgesics were given as per patients compliance. Sutures were removed on 12<sup>th</sup> postoperative day. Patients were encouraged to sit in the bed after 24 hours after surgery and quadriceps exercises and knee mobilization was advised in the immediate post operative period.

## Follow-up

Patient were followed up fortnightly in the first month, then monthly until 6 months or till clinical or radiological union is achieved. X-ray of the involved hip with femur was done to assess fracture union.

## Observations And Results

The following observations were made from the data collected during this prospective study of proximal femoral nail in treatment of unstable type 2 trochanteric fractures of 30 cases. The cases were followed up

periodically .

In our Study, out of 30 patients, age of patients range from 24-90 years with fracture more common in 6<sup>th</sup> decade of life, 22(73%) patients were male and 8(26.6%) patients were female. Out of 30 patients, 17 (56.6%) have AO Type Fracture 31-A2.2 and 13 (43.3%) patients have AO Type Fracture 31-A2.3.  $X^2 = 0.2$ ,  $OR=0.65$  (0.23-1.86)

**Table No. 1 AO Type Fracture**

AO Type	PFN
31.A2.2	17 (56.6%)
31.A2.3	13 (43.3%)

Out of 30 patients, 17(56.6%) sustained injury following fall from height and 13(43.33%) sustained Road traffic accident injury.

14(46.66%) patients were below 60 years of age and 16 (53.33%) patients were above 60 years of age. Showing trochanteric fracture more common in old age.

The average time for PFN surgery was 44.83 minutes, standard deviation (SD) =  $\pm 4.83$  .

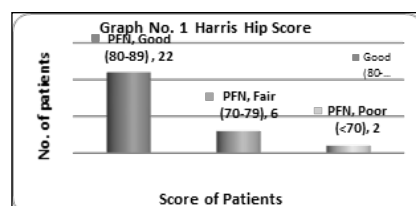
The average blood loss in PFN was 88.3ml, standard deviation (SD) =  $\pm 12.88$ .

Hospital stay after surgery in PFN was average days 4.13 standard deviation (SD)=  $\pm 0.49$  .

**Table No. 2 Harris Hip Score**

Score of Patients	PFN
Good (80-89)	22 (73.33%)
Fair (70-79)	06 (20%)
Poor (<70)	02 (6.66%)

$$x^2=6.94$$



**Fig no. 1 Follow Up Images Of Pfn Fracture Type AO 31 A2.2**



**Fig No. 2 . Follow up images of PFN. Fracture type AO 31 –A2.3**

Duration of analgesic intake in PFN was average days 11.7 standard deviation (SD) =  $\pm 2.11$  .



**Table No. 3 Intra Operative complication PFN**

Complication	No. of Patients	%
Failure to achieve closed reduction	01	3.3%
Fracture of Lateral Cortex	03	10%
Varus Malrotation	02	6.6%
Fracture displacement by Nail insertion	01	3.3%

**Table No. 4 Infection**

No. of Patients	PFN
Infection	01 (3.03%)
Normal	29 (96.7%)

$$x^2=0.87 \text{ OR (95\%CI)=0.22 (0.02=2.14)}$$

**Table No. 5 Implant Failure**

Implant	No. Of Patients	Percentage
PFN	1	3.3%

Average time of union in PFN was 13.4 weeks standard deviation (SD) 1.19

## Discussion

Fractures of intertrochanteric femur have been recognized as a major challenge by the Orthopaedic community, not solely for achieving fractures union, but for restoration of optimal function in the shortest possible time that to with minimal complications. The aim of management accordingly has drifted to achieving early mobilization, rapid rehabilitation and quick return of individuals to pre-injury state and work as a functionally and psychologically independent unit.

Operative treatment in the form of internal fixation permits early rehabilitation and offers the best chance of functional recovery, and hence has become the treatment of choice for virtually all fractures in the trochanteric region. Literature so far does not support any treatment DHS or PFN as an exclusive option for unstable type II fracture.

In this study an attempt was made to evaluate our success in the management of such individuals by using **Proximal femoral nail (PFN)**.

In 2009, Mehboob I. et al. JNMA conducted study on 26 patients of unstable type 2 fracture, operating time was short, less blood loss during surgery and few early complications were found.

**Ujjal Bhakat et al**<sup>7</sup> in his study of 60 patients, reported average operating time for the patients treated with PFN was 45 min as compared to 70 min in patients treated with DHS. **In 2016, Neritan Myderrizi**<sup>8</sup>, Conducted study on 63 patients, average operating time for the patients treated with PFN was 49.3 min. **Ujjal Bhakat, Ranadeb Bandyopadhyay**<sup>7</sup>, conducted study on 60 patients, average blood loss was 100 ml in PFN surgery and blood loss is 250 ml in DHS surgery. This study shows similar results for duration of

surgery and blood loss.

**In 2011 Richard Armelin Borger**<sup>19</sup>, conducted study on 70 patients of trochanteric fracture. 40 patient underwent osteosynthesis with PFN with unstable trochanteric fracture. The Harris score one year after the operation in 16% of the patients, was excellent, 19% good, 28% reasonable and 38% poor.

**In 2015, S.K. Venkatesh Gupta**<sup>10</sup>, Conducted study on 400 patients. In his study functional outcome was better in Pfn group (good results in 73.3% in pfn vs 40% in dhs group

**Umesh M. Shivanna**<sup>11</sup> conducted study on 30 patients of trochanteric fracture. All the fractured united at a mean of 12 weeks. **In 2015, Hemant Sharma**<sup>12</sup>, on 30 patient. There was no significant difference in time to union between the two groups (mean 16.71 vs. 17.27 weeks)  $P > 0.05$ . In our study, out of 300 patients, Average time of union for PFN was 13.4 weeks.

## Conclusion

In Type 2 unstable trochanteric fractures PFN gives advantage of lesser blood loss, short operating time, faster union, better functional outcome and low complication rate.

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