

# The Outcome of Proximal Femoral Nailing in Adults Treated for Subtrochanteric Femur Fractures. A Longitudinal Study

NIAZ HUSSAIN KEERIO<sup>1</sup>, ABDUL REHMAN KHAN<sup>2</sup>, HASSAN AMIR US SAQLAIN<sup>3</sup>, KHURRAM SHAHZAD SHAHWANI<sup>4</sup>, FARUKH HUSSAIN<sup>5</sup>, ZAHOOR ILLAHI SOOMRO<sup>6</sup>, SYED SHAHID NOOR<sup>7</sup>

<sup>1</sup>Assistant Professor Orthopaedic, Muhammad Medical College and Hospital Mirpurkhas, Pakistan

<sup>2</sup>Assistant Professor Orthopaedic, DIMC, Dow University of Health sciences Karachi Pakistan

<sup>3</sup>Specialist Orthopaedic, Al Qassimi Hospital, Sharjah United Arab Emirate

<sup>4</sup>Consultant Orthopaedic Surgeon, Bolan Medical Complex Hospital Quetta Pakistan

<sup>5</sup>Senior Registrar Orthopaedic, Jinnah Hospital Karachi Pakistan

<sup>6</sup>Associate Professor Orthopaedic, Peoples University of Medical & Health Sciences Nawabshah, Pakistan

<sup>7</sup>Professor, Liaquat National Hospital and Medical College Karachi, Pakistan

Corresponding author: Niaz Hussain Keerio, Email: [niaz\\_h@hotmail.com](mailto:niaz_h@hotmail.com)

## ABSTRACT

**Aim:** To assess the outcome of proximal femoral nailing (PFN) in adults treated for subtrochanteric femur fractures.

**Study design:** A longitudinal study

**Place and Duration:** This study was conducted at Muhammad Medical College and Hospital Mirpurkhas, Pakistan from June 2020 to May 2021.

**Methodology:** In this study prior to surgery, all patients were immobilised. Before installation and wrapping, the other extremity rotation and length measurements were determined. Closed reduction was implemented along with the internal fixation. The Harris Hip Score was utilised to assess the postoperative outcomes. SPSS version 21 was used for data analysis.

**Results:** In this study, 30 patients were included; 66.66 % (n=20) were males, the majority were 31-50 years old, and the average hospitalisation time was 15.55 days. Except for three patients, all of the others could move around unassisted after five months. According to the Harris Hip Score, 16.66% (n=5) of patients had exceptional outcomes, 20% (n=4) had good outcomes, and 63.33% (n=19) had fair results.

**Conclusion:** PFN is a fantastic implant for femoral ST fractures. The benefits include reduced exposure (closed approach), increased stability, and earlier deployment.

**Keywords:** Proximal Femoral Nailing, Sub Trochanteric, femur fractures, Harris Hip Score

## INTRODUCTION

Sub-trochanteric fractures are defined as fractures that occur in between the lesser trochanter and the isthmus of the femoral shaft's diaphysis, or fractures that occur between a line extending from the superior border of the lesser trochanter to a line 7.5 cm distal to it.[1]

The lower trochanter of the femur is mainly composed of hard cortical bone. It is less likely to fracture than the former and usually occurs at a younger age. Most of the fractures are caused by strong external forces. It is a concentrated area and the proximal bone fragment by the surrounding muscles.[2]

Studies have reported that proximal fracture accounts for 230 fractures in a hundred thousand patients, and around 5-10% occurs in the ST region. [3, 4] ST femur fractures are found more commonly in females, and it is reported that their incidence is 33% more in females than males. [4, 5] Age and gender are considered significant risk factors along with the low total bone mineral density, diabetes mellitus, and the use of bisphosphonate drugs to manage osteoporosis. [6, 7]

Accurate anatomical reduction, maintenance and the treatment of ST femur fractures have developed over the last 50 years as our understanding of fracture's biomechanics has grown. Non-surgical management of these fractures had previously been linked to severe malrotation, shortening and death from extended immobilisation. The anatomical differences between this injury pattern and other proximal femoral peri trochanteric

fractures and femoral shaft fractures add to the difficulties of treating ST fractures. Due to this, it needs to be treated with specifically engineered implants that can tolerate high muscular pressures while healing for more extended periods. ST fractures have only recently been successfully treated due to advances in fracture biology, reduction procedures, and biomechanically enhanced implants. The Proximal Femoral Nail (PFN), developed in 1996, is used as an intramedullary device to repair these fractures. Furthermore, with other benefits of an intramedullary nail, it has several other advantages: early mobilisation, exceptional rotational stability, the capability to be dynamically locked, and the least soft tissue distortion.[8] The purpose of this study was to examine the union of SubTrochanteric (ST) femur fractures that were internally fixed with Proximal Femoral Nailing (PFN).

## METHODOLOGY

This longitudinal study was conducted at Muhammad Medical College and Hospital Mirpurkhas, Pakistan from June 2020 to May 2021. Permission was taken from the ethical review committee of the institute. The study comprised people over 18 years of age who had acute ST femur fractures. In this study, we excluded the Open fractures along with pathological ST femur fractures. All patients were immobilised before the surgery. All of the procedures were performed under spinal or epidural anaesthesia. The high-risk individuals were given subcutaneous low molecular weight heparin prophylaxis

during their stay. The duration of hospitalisation, transfusion and difficulties developed in the hospital were all recorded. Closed reduction and internal fixation were used in this surgery. AO/ASIF was responsible for the development of the PFN. The subjects were placed prone on the fracture table. Anaesthesia was given as per requirement, depending on their condition.

One dose of antibiotic was also given before surgery. The fracture was reduced using longitudinal traction on the fracture table, and the limb was placed in neutral or minor adduction to allow nail insertion into the greater trochanter. The opposite extremity rotation and length measurements were established before installation and draping. Postoperative results were assessed according to The Harris Hip Score. For data analysis, SPSS version 21 was utilised.

**RESULTS**

In this study, 30 patients have been included; 20 (66.66%) were males and 10 (33.33%) were female. Most of the patients were in the age group of 31-50 years, followed by 51-70 years. The average length of hospitalisation was 15.55 days, ranging from 13 to 25 days. Except for 3 patients, all of the others could move around unassisted at the end of the five months. A Zimmer frame was used to mobilise one patient with a contralateral intertrochanteric fracture. Up to six months after surgery, 2 patients needed walkers to get around. There was a statistically significant difference (P=0.05). (As shown in Table 2). According to the Harris Hip Score, 16.66% (n=5) of patients had excellent outcomes, 20% (n=4) patients had good outcomes and 63.33% (n=19) patients had fair results. (As shown in Table 3).

Table 1: Demographic Characteristics of the Study Participants.

Variable	Number	Percentage
Gender		
Males	20	66.66
Females	10	33.33
Total		
Age Group (Years)		
18-30	8	26.66
31-50	11	36.66
51-70	10	33.33
>70	1	03.33

Table 2: Postoperative independence of ambulation

Task	3 Months	5 months	6 months
Walk Independently	4 (13.33%)	26 (86.66%)	30 (100%)
Crutch	14 (46.66%)	03 (10%)	00
Zimmer Frame	12 (40%)	01 3.33%)	00

Table 3: Patients Harris hip score results after 6 months

Results	Number	Percentage
Excellent	5	16.66
Good	6	20
Fair	19	63.33
Total	30	100

**DISCUSSION**

After the union of the ST fracture that was internally mended with PFN, all the participants started to walk

independently after six months. Studies have reported the efficacy of PFN in ST fracture is commendable. Moreover, according to Harris Hip score, all the participants were treated and were in excellent, good, and fair categories. These findings are in accordance with the results of the previous studies. [9]

The grave and lethal consequences should be appropriately catered to prior eventual therapy as ST fracture can be managed. The closed technique is based on anatomical realignment, which involves correcting abnormalities in length and rotation to make the typical result feasible. [9, 10]

Subtrochanteric fractures are frequently caused by high-energy trauma and are difficult to repair with traction. Conservative treatment has been abandoned due to the high frequency of delayed, malunion, and non-union. So Deliberation Conservative treatment, as advocated by Delee et al., has no place in modern trauma care. [11] The dynamic compression hip screw has proven a preferred form of internal fixation for ST femur fractures. It applies compression to the femoral neck, and if the fracture reduction is stable, the bone and implant share the strain. [12, 13]

Intramedullary nailing is strongly linked to "internal biological fixation," in addition to its technical advantages over plate fixation because it allows for a minimally open approach. Intramedullary fixation enables the surgeon to reduce surgical trauma, blood loss, infection and wound complications by minimising soft tissue dissection. [14] The usage of an intramedullary nail in peri-trochanteric fractures is rising, with more researchers opting for it since it is simple to apply and can provide stability even in intrinsically unstable fractures. [15, 16]

In our study, the average time spent in the hospital was 15.55 days. Except for three patients, all patients could move around independently after five months. Up to six months after surgery, the other two patients used a crutch to get around. A superficial infection at the surgical wound site was treated with parenteral antibiotics in one patient. Reoperation was not required in any of the patients.[17]

We believe that the PFN is a superior implant for treating femoral ST fractures. However, to draw firm findings, a comparison study with the other implants would be necessary. Many articles describe the open reduction of irreducible fractures. [18] A study performed in Pakistan also correlates with current study results. Moreover, this study stated that Harris hip Score favours a closed approach over the open technique for subtrochanteric fracture repair. The fracture union rate and complication rate were not statistically different between the two groups.[19].

**CONCLUSION**

PFN is an excellent implant for femoral ST fractures. The benefits include little exposure (closed approach), improved stability, and early mobilisation. In all cases, the fractures were mended, and the functional outcome was satisfactory. Because it allows for early and stable mobilisation, PFN may be preferable for treating ST fractures in the elderly. On the other hand, a more thorough investigation would be needed.

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