

## Functional and Radiological Outcome of Intertrochanteric and Subtrochanteric Fractures Using Proximal Femoral Nail with Helical Blade.

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**Abstract:** Treatment of intertrochanteric and subtrochanteric fractures have been a challenge to the orthopaedic community owing to the inherent instability of the fractures and biomechanical properties of the implant used. Proximal femoral nailing with helical blade offers better stability, reduces operating time and blood loss compared to the extramedullary fixation devices used for fixation of these fractures. Subtrochanteric fractures are better stabilized with long PFNs. Proximal femoral nail with helical blade helps in early fracture union and restoration of function. Proximal femoral nail with helical blade helps in restoration of medial cortical continuity and preservation of lateral wall giving good results in unstable intertrochanteric fractures.

**Keywords:** proximal femoral nail, helical blade, intertrochanteric, subtrochanteric

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### I. Introduction

Injuries to the proximal femur present challenging situation to the orthopaedic surgeon. The primary goal of treatment in proximal femoral fractures is to achieve minimum mortality, morbidity and low reoperation rates in elderly patients. In young patients the goal remains to achieve uneventful fracture union and early successful run up to sustainable mobility. The basic strategy for achieving these goal depends on the biomechanical property of the fixation device and stability achieved by using such devices.(1) Theoretical biomechanical advantages of intramedullary nails over screw and plate fixation are attributed to reduced distance between hip joint and the implant. Advantages of Helical Blade in Proximal Femoral Nail are that helical blade confers additional benefits in patients with osteoporotic trochanteric fractures, both by preventing rotation and ensuring cancellous bone compaction, decreased rate of construct failure and reliable fixation with low mechanical complications(3)

#### Aim

To assess the functional and radiological outcome of intertrochanteric and subtrochanteric fractures treated with Proximal femoral nail with helical blade.

### II. Material And Methods

A total number of 48 patients with proximal femoral fractures treated with proximal femoral nail with helical blade performed during june 2014 to march 2016 by senior orthopaedic consultants were included. We had 32 male patients and 16 female patients. The mean age in our study group was 60.79 years. Of the 48 patients 28 were intertrochanteric and 20 were subtrochanteric fractures. Intertrochanteric were classified using boyd and griffin and seinsheimer for subtrochanteric fractures. The results were prospectively analysed using radiological union and functional outcome by schatzker and lambert criteria.

#### Surgical technique

With the patient on the fracture table and closed reduction done under imaging guidance and through lateral skin incision over the trochanter entry made with bone awl. In all patients serial reaming of the femur was done starting from 8mm reamer. The proximal fragment was reamed up till 13mm to accommodate the proximal part of the nail. Fractures were stabilized with proximal femoral nail with helical blade screw. Distal static locking was done for all patients. Thorough wound irrigation and strict hemostasis was obtained prior to closure of the wound.

#### Rehabilitation

Post operative imaging were taken on the 2<sup>nd</sup> day. All patients above 60 years received post operative thrombo prophylaxis in the form of low molecular weight heparin from the 2<sup>nd</sup> post operative day for 10 days following which oral anticoagulants were continued for four to six weeks in high risk. Regular sterile dressings were done on 2<sup>nd</sup>, 5<sup>th</sup>, 9<sup>th</sup> and 12<sup>th</sup> post operative day. Suture removal was done on day 12. Patients were

mobilized with toe touch weight bearing with walking aid from 10<sup>th</sup> post operative day. Gradual increase in weight bearing was done until the patients were able to walk pain free and without aid at the end of six weeks.

### **III. Results**

According to criteria set by Schatzker and Lambert excellent to good outcome were obtained in 44 patients (91.6%) and fair results in 04 patients (8.3%).

### **IV. Discussion**

In recent times there is no role for conservative management in proximal femoral fractures as advocated by Clanton et al and Delee et al (1). In our series, we used the cephalomedullary interlocked nailing PFN with a helical blade for head-neck fixation which offers more rotational stability than the first generation PFN (4).

The standard PFN is indicated for more proximal fractures, and the long PFN for more distal fractures. At sub trochanteric level there is an overlap in suitability; this type of fracture may be fixed by either a standard or a long implant. In comparison with per trochanteric fractures, sub trochanteric fractures are generally associated with slightly higher failure rates with normal length PFN. The reasons for this include the greater intrinsic instability of the sub trochanteric fractures, demanding more stabilisation; more difficult fracture reduction because the proximal fragment has the tendency ante flex relative to the distal fragment, owing to psoas muscle activity; and shorter distance from locking screw hole to fracture.

We had 48 patients of which 16 (33.3%) patients had sub trochanteric fracture pattern. These fractures required a long PFN (LENGTH 300-400mm) fixation and 32 patients (66%) were treated with the regular length PFN (LENGTH 180-240). The advantages of intramedullary device over extramedullary ones are less extensive surgical approach and thereby reducing the operative time and intraoperative blood loss (5).

In our series 06 (25%) patients required open reduction of the fracture site and thereby extensive surgical dissection. The average operative time was 77 minutes. Reduced surgical handling of the soft tissues in intramedullary nailing directly reduced the blood loss in our patients to an average of 190ml per patient. This reduced operating time and less blood loss during surgery led to no perioperative and postoperative blood transfusion.

At 6 months follow up 36 (75%) patients in our study had no pain. In our study with intramedullary nailing using the proximal femoral nail Antirotation prevented postoperative varus/valgus collapse at the fracture site. At one year follow up we had 20 patients (41.6%) had no loss of flexion, 24 patients (50%) had flexion loss not more than 20 degree. In our series at an average of 4 months, 38 patients (79.1%) showed complete radiological union at the fracture site. The average radiological union time for Intertrochanteric fractures was 18.7 weeks and Sub-trochanteric fractures 19 weeks.

### **Complications**

During the study 08 complications were observed. 04 patients with superficial infections who were treated with antibiotics for three weeks. We had 04 patients where the fracture went for delayed union due to technical failure of improper reduction. However, this finding did not affect the patient recovery and the walking ability was restored at 6 months. We did not encounter any patients with deep venous thrombosis or pulmonary embolism.

### **V. Conclusion**

In our study Proximal femoral nail gives better control of rotation, length and proximal purchase in unstable intertrochanteric fractures. Intramedullary nailing in intertrochanteric and sub trochanteric fractures reduces the operating time, blood loss and minimal soft tissue insult. Restoration of medial cortical continuity and preservation of lateral wall in intramedullary nailing gives good results in unstable intertrochanteric fractures. Proximal femoral nail with helical blade - long is an effective treatment for sub trochanteric fractures.

### **Examples**

Case 1 - type 2 Boyd and Griffin – results- excellent.  
Pre op imm postop 6 months      1 year



case 2 –type 2 boyd and griffin- results – excellent  
Pre op imm postop 6 months 1 year



Case 3 – Russell taylor –type 1 B results-good  
Pre op imm postop 6 months 1 year



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