

## ORIGINAL RESEARCH

# Comparison of two screws versus single helical screw in proximal femoral nailing for treatment of intertrochanteric fractures of femur

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### ABSTRACT

**Background:** The morphology of the proximal femur, specifically the relationships among the head, neck, and proximal shaft, has been a subject of interest and debate in orthopaedic literature dating back to at least the middle of the 19th century. The present study was undertaken to fix all the intertrochanteric fractures of femur with two screw PFN and single helical screw PFN with a view of comparing results and clinical outcomes of two. **Materials & methods:** A total of 40 patients of intertrochanteric fractures of skeletally mature adults out of which thirty each were operated upon with two screw proximal femur nail and single helical screw proximal femoral nail and were followed up for 6 months postoperatively. Complete demographic and clinical details of all the patients was obtained. A Performa was made and detailed radiographic findings were recorded. Operations were performed on a fracture table under anaesthesia. All patients had suction drains for 48 hours and were given antibiotic and thromboembolic prophylaxis. Full weight bearing was allowed as tolerated and where fixation stability is thought to be adequate. Patients were discharged after primary complications are excluded. Follow up was done for 4 visits in 6 months. **Results:** Mean age of the patients of the double screw and helical screw as 61.2 years and 60.8 years respectively. Mean time for partial weight bearing was 18.23 days in double helical screw and was 14.88 days in helical screw. Significant better results were obtained in terms of functional outcome as assessed by Harris hip score at 6 months follow-up. **Conclusion:** Significant better results were obtained among patients with helical screw group in comparison to double screw.

**Key words:** Screw Helical, Proximal femoral nailing

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### INTRODUCTION

The morphology of the proximal femur, specifically the relationships among the head, neck, and proximal shaft, has been a subject of interest and debate in orthopaedic literature dating back to at least the middle of the 19th century. As an area susceptible to numerous pediatric and adult disorders, many of which may correlate with variations in this morphology or whose treatment might benefit from a detailed understanding of this area's anatomy, a substantial body of research aimed at academically defining and pragmatically measuring the proximal femur's dimensions has developed. These efforts have led to a robust vocabulary for discussing proximal femoral anatomy and abundant methods for its

quantification through various linear and angular measures.<sup>1</sup>

Hip fractures or fractures of proximal femur are one of the most frequent and appalling fractures affecting the elderly population with 90% occurring in >60 years age group. They comprise femoral neck and intertrochanteric fractures. 14% to 36% patients die within 1 year of experiencing them. Last 3 decades have witnessed an expeditious increase in the incidence of these fractures and an estimated 7.3 million individuals are deemed to be afflicted globally by 2050.<sup>2,3</sup>

Intertrochanteric fractures are defined as fractures of proximal part of femur located between lesser and greater trochanter. Peritrochanteric area includes part of femur from extracapsular part of the neck to a point

5 cm distal to lesser trochanter. Weight bearing stress is unequally distributed throughout this area. Koch described that weight bearing force of 1200 pounds per square inch in femur (in a 200 pound man) which is more in medial cortex than in lateral cortex. So medial comminution influences stability of fracture fragments and treatment outcomes. Dynamic Hip Screw with side plate assemblies. Keeping in mind the higher age of patients who suffer from intertrochanteric fractures and most of these patients also have osteoporosis it has been proposed to use a comparatively recent modification of this screw PFN which has a helical blade (in place of two screws) and is supposed to give better hold in osteoporotic neck of femur.<sup>4-6</sup> The present study was under taken to fix all the intertrochanteric fractures of femur with two screw PFN and single helical screw PFN with a view of comparing results and clinical outcomes of two.

**MATERIALS & METHODS**

The present study was undertaken for intertrochanteric fractures of femur with two screw PFN and single helical screw PFN with a view of comparing results and clinical outcomes of two. A total of 40 patients of intertrochanteric fractures of skeletally mature adults out of which thirty each were

operated upon with two screw proximal femur nail and single helical screw proximal femoral nail and were followed up for 6 months postoperatively. Complete demographic and clinical details of all the patients was obtained. A Performa was made and detailed radiographic findings were recorded. Operations were performed on a fracture table under anaesthesia. All patients had suction drains for 48 hours and were given antibiotic and thromboembolic prophylaxis. Full weight bearing was allowed as tolerated and where fixation stability is thought to be adequate. Patients were discharged after primary complications are excluded. Follow up was done for 4 visits in 6 months. At each visit clinical, radiological and functional outcome of the patient was assessed. All the results were analyzed by SPSS software.

**RESULTS**

Mean age of the patients of the double screw and helical screw as 61.2 years and 60.8 years respectively. Mean time for partial weight bearing was 18.23 days in double helical screw and was 14.88 days in helical screw. Significant better results were obtained in terms of functional outcome as assessed by Harris hip score at 6 months follow-up.

**Table 1: Mean age of the subjects of both the study groups**

Parameter	Double screw	Helical screw
Mean Age (years)	61.2	60.8
Standard deviation (SD)	4.46	4.88

**Table 2: Comparison of mean time when patients were allowed to partially bear weight among subjects of both the study groups**

Parameter	Double screw		Helical screw		Mann-Whitney test	P- value
	Mean	SD	Mean	SD		
Mean time for partial weight bearing (days)	18.23	2.36	14.88	1.86	24	0.000 (S)

**Table 3: Comparison of mean HHS among subjects of both the study groups**

HHS Score	Double screw	Helical screw	P- value
Preoperative	48.1	52.7	0.112
Postoperative 1 month	61.5	62.3	0.852
Postoperative 2 month	68.3	68.4	0.454
Postoperative 3 month	73.7	78.3	0.767
Postoperative 6 month	79.8	86.1	0.00 (Significant)

**DISCUSSION**

Intertrochanteric fractures are extracapsular fractures of the proximal femur affecting the region between the greater and lesser trochanters. These fractures are most common in the elderly, accounting for approximately half of all fractures around the hip in this age group. 90% of hip fractures occur in individuals more than 65 years of age. These fractures classically occur through bones affected by osteoporosis and reduced bone mineral density. Demographic changes in the next 60 years will lead to a spurt of elderly population in Asian countries including India, leading to a steep increase in the

incidence of intertrochanteric fractures in the near future. While in younger individuals these fractures occur as a result of high energy trauma, 90% of intertrochanteric fractures in the elderly result from a domestic fall. A direct fall onto the hip, along with an absence of adequate protection in the form of surrounding fat and muscle, compound the presence of senile osteoporosis in causing an intertrochanteric fracture. The presence of osteoporosis becomes an important aspect in the management of these fractures because fixation of the proximal fragment depends to a large extent on the quality of cancellous bone present in the fragment. Also, loss of the postero-

medial buttress renders these fractures unstable, and such fractures in highly osteoporotic bone are a challenge to manage, with failure rates ranging from 8%-25%.<sup>7-10</sup>

Mean age of the patients of the double screw and helical screw as 61.2 years and 60.8 years respectively. Mean time for partial weight bearing was 18.23 days in double helical screw and was 14.88 days in helical screw. Significant better results were obtained in terms of functional outcome as assessed by Harris hip score at 6 months follow-up. Sharma A et al compared the commonly used Proximal Femoral Nail (PFN) and Proximal Femoral Nail Antirotation (PFNA) implants, especially in relation to osteoporosis. They assessed comparative performance of PFN and PFNA in the setting of osteoporosis. The study included 48 patients with unstable intertrochanteric fractures, of which 23 were treated with PFN and 25 with PFNA. Average age of PFN group was 60.78 years and of PFNA group was 74.12 years. In PFN group 8 patients (38.09%) and in PFNA group 13 patients (54.1%) had Singh's osteoporotic index of  $\leq 3$ . The average Harris Hip Score was 75.37 and 78.85 in PFN and PFNA groups ( $p=0.54$ ) respectively. From PFN and PFNA groups, 35% and 32% patients respectively were able to return to pre-injury mobility status as assessed by the Parker-Palmer mobility score. Out of eight implant related complications; seven were in patients treated with PFN. Among patients with Singh's grade  $\leq 3$ , 3 in PFN group suffered from implant failure whereas all 13 patients in PFNA group had successful outcome. Although functional outcomes achieved with both implants are similar, number of implant related complications were fewer with PFNA, even in osteoporotic group.<sup>10</sup> Kumbaraci M compared the radiological and functional outcomes of anti-rotation trochanteric nails (ATNs) with proximal femoral nail anti-rotation (PFNA) in the treatment of intertrochanteric femur fractures in elderly patients. In total, 165 intertrochanteric fractures were treated. One hundred forty patients were included. The operation time, amount of blood loss, fluoroscopy screening time, and length of hospitalization were recorded. The radiological position of the implant, quality of fracture reduction, and tip-apex distance were evaluated, and the postoperative complications as well as functional condition of the patients were assessed. There were no significant differences between the ATN and PFNA groups for the presence of general complications, length of hospitalization, and functional capacity. The mean operation time, blood loss amount, and fluoroscopy screening time were more in the ATN group than in the PFNA group. Reoperation was needed for nine and two patients in the ATN and PFNA groups, respectively, because of implant-related complications. Both ATNs and PFNA were suitable for the fixation of intertrochanteric fractures, but the risk of complication occurrence and need for reoperation were found to be higher in patients who

were treated with ATNs.<sup>11</sup> Mundla MKR et al compared the management, complications, functional and radiological outcome of PFN with DHS in management of type II intertrochanteric fractures. Intraoperative details, complications and outcome of the procedures were noted, compared and analysed statistically. The mean age in DHS group was 57.5 and PFN group was 56.5 yrs. Female preponderance was observed in the study. Most of the injuries were on right side due to slip and fall in both the groups. Mean radiographic exposure (60 sec) and duration of operation (90 min) were more in PFN group compared to DHS group. Mean blood loss was 230 ml in PFN group and 320 ml in DHS group. Better anatomical and functional results were observed in PFN group compared to DHS group. PFN is the better surgical procedure for elderly patients with IT fractures in terms of reduced blood loss, shorter operating time, rotational stability, good fixation, less morbidity and good outcome (anatomical and functional).<sup>12</sup>

## CONCLUSION

Significant better results were obtained among patients with helical screw group in comparison to double screw.

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