

**Original article:**

**Assessment of Efficacy of Two Screw PFN (Proximal Femoral Fixation) and Single Helical Screw PFN: An Institutional Based Study**

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Date of Submission: 06 December 2012, Date of Acceptance: 22 January 2013

**ABSTRACT**

**Background:** 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. Present study was planned to assess the efficacy of two screw PFN (proximal femoral fixation) and single helical screw PFN.

**Materials & Methods:** The present study included assessment of efficacy of two screw PFN (proximal femoral fixation) and single helical screw PFN. A total of 40 patients were included in the present study and were broadly divided into two study groups; Group A; Patients treated with double screw PFN group, Group B; Patients treated with PFN anti-rotation. Written consent was obtained from all the patients after explaining in detail after entire research protocol. Treatment was carried out in all the patients on the basis of their respective study groups. Outcome was assessed in terms of Harris Hips Score. All the results were compiled by SPSS software.

**Results:** 45 percent of the patients of the double screw group and 40 percent of the patients of the helical screw group were males. Non- significant results were obtained while comparing the mean HHS in between both the study groups at six months follow-up (P- value > 0.05).

**Conclusion:** Both the treatment protocols could be used with equal efficacy.

**Key words:** Helical, Proximal Femoral Fixation.

**INTRODUCTION**

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. 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.<sup>1,2</sup>

Before the introduction of suitable fixation devices, treatment of intertrochanteric fractures of femur was non operative and consisted of prolonged bed rest with traction until fracture healing occurred followed by a lengthy programme of ambulation training.<sup>3,4</sup> Hence; under the light of above mentioned data, present study was planned to assess the efficacy of two screw PFN (proximal femoral fixation) and single helical screw PFN.

**MATERIALS & METHODS**

The present study was conducted in the department of orthopedic, Navodaya Medical College Hospital & Research Centre, Raichur, Karnataka (India) and it included assessment of efficacy of two screw PFN (proximal femoral fixation) and single helical screw PFN. A total of 40 patients were included in the present study and were broadly divided into two study groups;

Group A; Patients treated with double screw PFN group,

Group B; Patients treated with PFN anti-rotation. Written consent was obtained from all the patients after explaining in detail after entire research protocol. Treatment was carried out in all the patients on the basis of their respective study groups. Outcome was assessed in terms of Harris Hips Score. All the results were compiled by SPSS software. Chi- square test was used for assessment of level of significance. P- value of less than 0.05 was considered as significant.

**RESULTS**

Mean age of the patients of the double screw group and helical screw group was 59.3 and 58.5 years respectively. 50 percent of the patients of the double screw group and 55 percent of the patients of the helical screw group were more than 40 to 60 years of age. 45 percent of the patients of the double screw group and 40 percent of the patients of the helical screw group were males. Non- significant results were obtained while comparing the mean HHS in between both the study groups at six months follow-up (P- value > 0.05).

**Table 1: Age-wise distribution of subjects**

Age group (years)	Double screw		Helical screw	
	Number of subjects	Percentage	Number of subjects	Percentage
<b>Less 40</b>	5	25	5	25
<b>40- 60</b>	10	50	11	55
<b>More than 60</b>	5	25	4	20
<b>Total</b>	20	100	20	100
<b>Mean age</b>	59.3		58.5	

**Table 2: Gender-wise distribution of subjects of both the study groups**

Gender	Double screw		Helical screw	
	Number	Percentage	Number	Percentage
Male	9	45	8	40
Female	11	55	12	60
Total	20	100	20	100

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

HHS Score	Double screw	Helical screw	P- value
Preoperative	48.5	50.2	0.52
Postoperative 1 month	59.2	56.8	0.14
Postoperative 6 month	74.8	78.9	0.69

## DISCUSSION

Internal fixation is a most common surgical treatment for intertrochanteric fractures, and intramedullary (nails) and extramedullary (screws or plates) fixations are two commonly used approaches. PFN, introduced by the AO/ASIF group in 1997, has become prevalent in treatment of intertrochanteric fractures in recent years because it was improved by addition of an antirotation hip screw proximal to the main lag screw. However, both benefits and technical failures of PFN have been reported.<sup>5,6</sup> Strauss E et al treated simulated, unstable intertrochanteric fracture in six pairs of cadaveric femurs. One of each pair was treated with an intramedullary nail using a sliding screw system, and the other with a nail using a helical blade. Each specimen was cyclically loaded and measured for femoral head displacement, fracture site opening and implant sliding, and were eventually loaded to failure. There was significantly more inferior femoral head displacement in specimens treated with the screw system, thus demonstrating that fixation with a helical blade is superior to that with a sliding screw system.<sup>7</sup>

In the present study, mean age of the patients of the double screw group and helical screw group was 59.3 and 58.5 years respectively. 50 percent of the patients of the double screw group and 55 percent of the patients of the helical screw group were more than 40 to 60 years of age. 45 percent of the patients of the double screw group and 40 percent of the patients of the helical screw group were males. Non- significant results were obtained while comparing the mean HHS in between both the study groups at six months follow-up (P- value > 0.05).

Hwang J-H et al investigated the biomechanical stability of this device in relation to two common positions (center-center and inferior-center) of the helical blade in the femoral head in unstable trochanteric fractures. Eight pairs of human cadaveric femurs were used; in one group [center-center (C-C) group], the helical blade of PFNA was fixed randomly in central position both in anteroposterior and lateral view, whereas in the other group it was fixed in inferior one-third position in anteroposterior and in central position in lateral view [inferior-center (I-C) group]. Unstable intertrochanteric fracture was created and each specimen was loaded cyclically till load to failure. Angular and rotational displacements were significantly higher within the C-C group compared to the I-C group in both unloaded and loaded condition. Loading to failure was higher in the I-C group compared to the C-C group. No statistical significance was found for this parameter. Correlations between tip apex distance, cyclic loading which lead to femoral head displacement, and ultimate load to failure showed a significant positive relationship. The I-C group was superior to the C-C group and provided better biomechanical stability for angular and rotational displacement.<sup>8</sup>

## CONCLUSION

From the above results, it can be concluded that both the treatment protocols could be used with equal efficacy. However; further studies are recommended.

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