

*Article— Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures*

# **Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures**

Dr Vishal Thomas Oommen<sup>1</sup>(✉), Dr Ramesh M<sup>1</sup>, Dr Manesh Chacko Philip<sup>1</sup>,  
Dr Joe Jacob<sup>2</sup>, Dr Kiran Sreekandan<sup>1</sup>

<sup>1</sup>Department of Orthopaedics, Jubilee Mission Medical College & Research Institute,  
Thrissur, Kerala, India

<sup>2</sup>Department of Orthopaedics, Government Medical College, Thrissur, Kerala, India

vishal4j@gmail.com

[DOI: 10.58542/jbota.v62i1.158](https://doi.org/10.58542/jbota.v62i1.158)

**Abstract** – Intertrochanteric fractures are common in the elderly population and present significant challenges due to associated comorbidities. Operative fixation techniques have evolved over the decades, with proximal femoral nailing (PFN) being a preferred method. This study compares the outcomes of PFN using a helical blade versus a telescopic lag screw. Conducted at the Department of Orthopaedics, Jubilee Mission Medical College & Research Institute, Thrissur, Kerala, India for a duration of 18 months from January 2023 to June 2024. A total of 50 patients with intertrochanteric femur fractures were included in the study and divided into two groups: Group A (PFN with helical blade) and Group B (PFN with telescopic lag screw). Patients were assessed based on parameters such as time for union, neck shaft angle, Tip Apex Distance (TAD), Harris Hip Score, and complications. Statistical analysis was performed using SPSS software. Neck Shaft Angle was normal in 72% of Group A and 68% of Group B, with no significant difference, Tip Apex Distance (TAD) was higher in Group A at 4, 12, and 24 weeks follow-up, with statistical significance ( $p < 0.05$ ). Harris Hip Score was significantly higher in Group B at 4 weeks follow-up ( $p = 0.014$ ), but no significant difference at 12 and 24 weeks. 16% of patients in Group A experienced screw cut-out, which was statistically significant. One patient in each group experienced screw back-out. PFN with telescopic lag screw demonstrated superior outcomes compared to PFN with helical blade, particularly in terms of lower Tip Apex Distance, increased complication rates such as screw backout, screw cut out and higher Harris Hip Scores at early follow-up. A high Tip Apex Distance correlates with an increased risk of device cut-out from the femur head.

**Keywords** – Unstable intertrochanteric fractures; Helical blade; Telescopic Lag screw; Tip Apex distance; Harris Hip Score

## **1. Introduction**

The number of peri trochanteric femur fractures treated annually is rising, which is consistent with the trend of an ageing population. Osteoporosis, a consequence of an ageing population and longer life expectancy, is a leading cause of hip fractures among people in this age bracket.<sup>1</sup> An unstable fracture accounts for around 35–40% of these cases. The best way to repair these fractures and get them moving like they were before is to stabilize them surgically and return the patients to safe mobility. In response to treating unstable intertrochanteric fractures, a number of fixation devices have been created. Lately, lateral devices have been the go-to for treating these fractures. Intramedullary fixation devices are steadily replacing lateral ones because to the high complication rates associated with the former. An intramedullary system of second generation, the proximal femoral nail aims to enhance the management of unstable trochanteric fractures. When there is no medial buttress present, it is best to repair unstable trochanteric fractures using intramedullary implants.<sup>2</sup> A new intramedullary implant called the PFN was invented in 1997 by the AO for femur fractures. Since PFN prevents varus collapse and has better biomechanics than extramedullary implants, it is gradually replacing them as the standard form of fixation for unstable fracture patterns. The shorter distance between the hip joint and the implant makes the PFN a more biomechanically stable construction. Because of its intramedullary placement at the nail-lag screw junction, PFN resists bending forces and prevents the proximal fragment from translating laterally; as a result, it permits early weight bearing in unstable intertrochanteric fractures. In order to reduce the likelihood of mechanical issues, researchers developed the PFN A (Anti rotation) and PFN A2 (Anti rotation for Asian population) models, which feature helical blades. A hybrid PFN that allows for a telescopic lag screw or helical blade to be used as the proximal screw is also available.

When it comes to treating femur intertrochanteric fractures, there are studies that compare the complication rates, functional outcomes, and radiological results of intramedullary nailing methods that use helical blades versus telescopic lag screws as the proximal component. The new hybrid PFN offers the choice of a helical blade and a telescopic lag screw, while the PFN A2 employs a helical blade.<sup>2</sup> Implant cut out, which results in implant failure, is a feared consequence of PFN use. Using PFN, you can anticipate a cutout rate of 3–10%, and there are studies that highlight the significance of TAD (Tip Apex Distance). Patients with unstable intertrochanteric fractures requiring surgical fixation needs to be examined to see if the use of telescopic lag screws as the proximal component of the PFN has decreased the rates of screw cutout. This study aims to analyse and compare the rate of complications, clinical and functional outcome in patients who sustained unstable intertrochanteric fractures treated with helical blade vs telescopic lag screw as proximal component in Proximal Femoral Nail.

## **2. METHODOLOGY**

After receiving approval from the ethical committee, this prospective observational study was carried out over a period of 18 months, from January 2023 to June 2024, at

the Jubilee Mission Medical College and Research Institute in Thrissur. The study aimed to compare the complications, clinical and functional outcome in patients who sustained unstable intertrochanteric fractures treated with helical blade vs telescopic lag screw as proximal component in Proximal Femoral Nail. The sample size, determined based on previous studies, included 25 patients per group, ensuring a 95% confidence level and 80% power. The study included All unstable intertrochanteric fractures, 31A2, 31A3, Patient age >55, Fixation by PFN using helical blade and telescopic lag screw. All Open fractures, Ipsilateral concomitant pelvic, acetabular or other lower limb bone fractures, Subtrochanteric fractures, patients medically unfit for surgery, patients with walking disability before injury, Revision hip surgeries were excluded from the study. Once the patient with unstable intertrochanteric fracture was diagnosed with clinical and radiological evaluation were evaluated according to the hospital protocol and the patient who met the inclusion criteria and are willing for the study were included in the study. Skin traction applied till the patient is taken up for surgery, Radiograph of pelvis including both hips –AP and lateral views.

Routine preoperative hospital protocol was followed.

After pre-operative medication and anaesthesia all patients were positioned supine on the fracture table. Closed reduction of the unstable fracture was performed. After skin incision is made, entry point was made on the tip of trochanter, guide wire is inserted.

Reaming was done with flexible reamer and the nail of chosen length and diameter was inserted with the jig manually in the femoral opening. Proximal locking was done by a helical blade or telescopic lag screw for PFN of appropriate length, distal locking was done by screw of desired length.

Postoperatively patient receives antibiotics and analgesics, all patients were allowed physiotherapy with non weight bearing ambulation. Sutures were removed on day 14 Assessment of Intraoperative parameters, Clinical and radiological assessment of all patients for fracture union and complication was done postoperatively at 4 weeks, 12 weeks and 24weeks. Factors such as age, gender, BMI, comorbidities, AO classification type, operative duration, time for union, Tip Apex Distance (TAD), Neck shaft angle, complications such as screw cut out and screw backout ,functional outcome was assessed using Harris Hip Score (HHS), also a correlation of Tip Apex Distance with the complications was also derieved. Statistical analysis was done using SPSS software (IBMVersion-25). The categorical variables were analysed through frequency procedure and the test of association was done through cross tabulation followed by chi square test of independence. The comparison of TAD (Tip Apex Distance), rate of screw cut outs and scores like Harris hip score between the two groups were done through independent sample T test. Descriptive statistical procedure was adapted to find mean, standard deviation and quartiles etc. P value of 0.05 was taken as cut off point of significant.

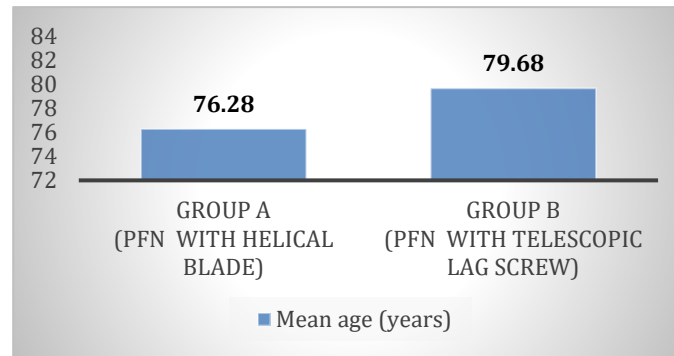
Article— Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures

### 3. RESULTS

#### 1. AGE DISTRIBUTION

**Table 1:** Age distribution

Group	Mean age (years)	Standard deviation (years)	Range	P value
GROUP A (PFN with Helical blade)	76.28	8.63	62-95	0.191
GROUP B (PFN with telescopic lag screw)	79.68	9.46	55-96	



**Graph 1:** Age distribution

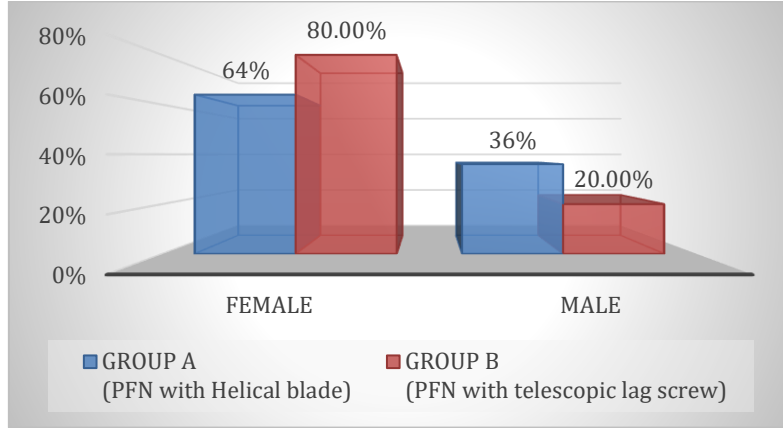
In our study the Mean age of patients in GROUP A (PFN with Helical blade) was 46 years  $76.28 \pm 8.63$  years and Mean age of patients in GROUP B (PFN with telescopic lag screw) was  $79.68 \pm 9$ . This finding was statistically not significant (p value = 0.191).

#### 2. GENDER DISTRIBUTION

**Table 2:** Gender distribution

Group	Female		Male		Total	
	No	%	No.	%		
GROUP A (PFN with Helical blade)	16	64%	9	36%	25	100%
GROUP B (PFN with telescopic lag screw)	20	80%	5	20%	25	100%
Total	36	72%	14	28%	50	100%
p-value = 0.208						

Article— Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures



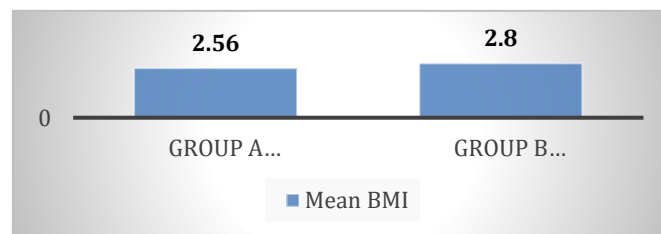
Graph 2: Gender distribution

Among our 50 patients in the study, 14 patients were males and 36 patients were females. Out of the 25 cases of GROUP A (PFN with Helical blade) 64% were females and 36% were males. In GROUP B (PFN with telescopic lag screw) group, 80% were females and 20% were males.

### 3. BMI DISTRIBUTION

Table 3: BMI distribution

BMI	Mean (Kg/m <sup>2</sup> )	Standard deviation	P value
GROUP A (PFN with Helical blade)	2.56	1.04	0.391
GROUP B (PFN with telescopic lag screw)	2.8	0.91	



Graph 3: BMI distribution

*Article— Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures*

In our study the Mean BMI of patients in GROUP A (PFN with Helical blade) was  $2.56 \pm 1.04\text{kg/m}^2$  and Mean BMI of patients in GROUP B(PFN with telescopic lag screw) was  $2.8 \pm 0.91\text{kg/m}^2$ . This finding was statistically not significant ( $p$  value = 0.391)

#### 4. COMORBIDITIES DISTRIBUTION

**Table 4:** Comorbidities distribution

Comorbidities	GROUP A (PFN with Helical blade)		GROUP B (PFN with telescopic lag screw)		Total	
	n	%	n	%	n	%
NIL	4	8%	8	16%	12	24%
DM	4	8%	2	4%	6	12%
HTN	3	6%	1	2%	4	8%
CVA	1	2%	1	2%	2	4%
CKD	2	4%	2	4%	4	8%
DLP	1	2%	0	0%	1	2%
DM,HTN	1	2%	0	0%	1	2%
DM,CVA	0	0%	1	2%	1	2%
DM,DLP	2	4%	0	0%	2	4%
HTN,DLP	2	4%	2	4%	4	8%
DM,HTN,CAD	2	4%	2	4%	4	8%
DM,HTN,DLP	3	6%	3	6%	6	12%
DM,HTN,CAD,DLP	0	0%	3	6%	3	6%
Total	25	50%	25	50%	50	100%

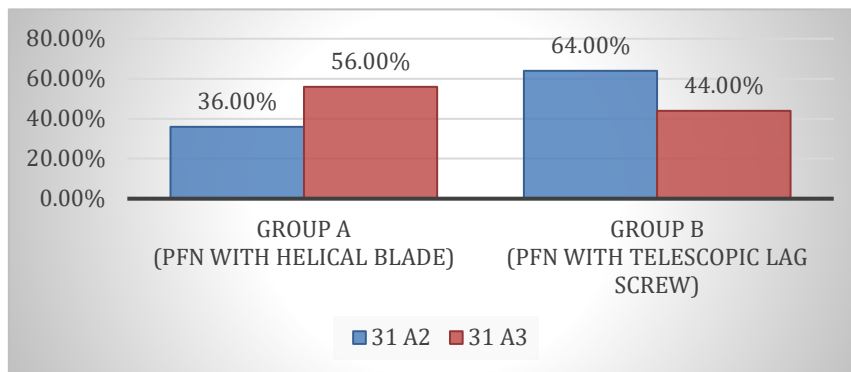
In our study, Diabetes was found to be the most common comorbidity among both the groups followed by Hypertension, dyslipidemia.

Article— Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures

## 5. CLASSIFICATION

**Table 5:** AO classification

	GROUP A (PFN with Helical blade)		GROUP B (PFN with telescopic lag screw)	
	No.	Percent	No.	Percent
31A2	9	36%	14	56%
31A3	16	64%	11	44%
P = 0.156				



**Graph 4:** AO classification

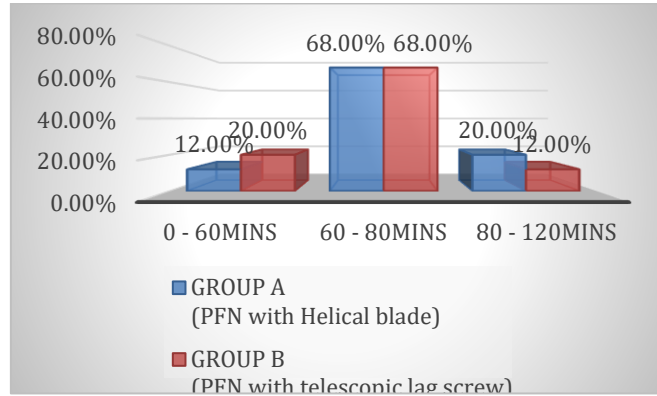
In our study the numbers of patients with AO type 31 A2 and 31 A3 fractures in GROUP A (PFN with Helical blade) group were 36% and 64% and in GROUP B (PFN with telescopic lag screw ) group were 56% and 44% respectively. This finding was statistically not significant (p value = 0.156).

## 6. OPERATIVE DURATION

**Table 6:** Operative duration

Operative duration	GROUP A (PFN with Helical blade)		GROUP B (PFN with telescopic lag screw)	
	No.	%	No.	%
0 - 60mins	3	12%	5	20%
60 - 80mins	17	68%	17	68%
80 - 120mins	5	20%	3	12%
P=0.607				

Article— Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures



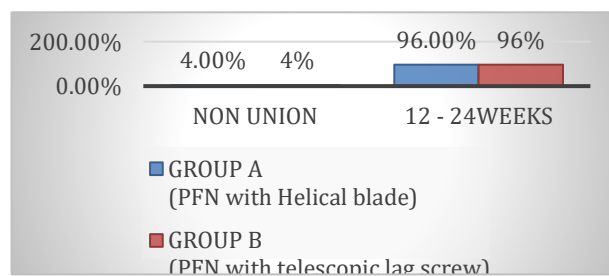
**Graph 5:** Operative duration

The operating time was 60 to 80 mins in most of the patients in both the groups i.e. 68% in both groups. The duration of surgery was more than 80mins in 5 (20%) patients in GROUP A (PFN with Helical blade) and 3 (12%) patients in GROUP B (PFN with telescopic lag screw). This finding was statistically not significant (p value = 0.607).

## 7. TIME FOR UNION

**Table 7:** Time for union

	GROUP A (PFN with Helical blade)		GROUP B (PFN with telescopic lag screw)	
	Number	Percent	Number	Percent
Non-union	1	4%	1	4%
12 - 24weeks	24	96%	24	96%
P = 1				



**Graph 6:** Time for union

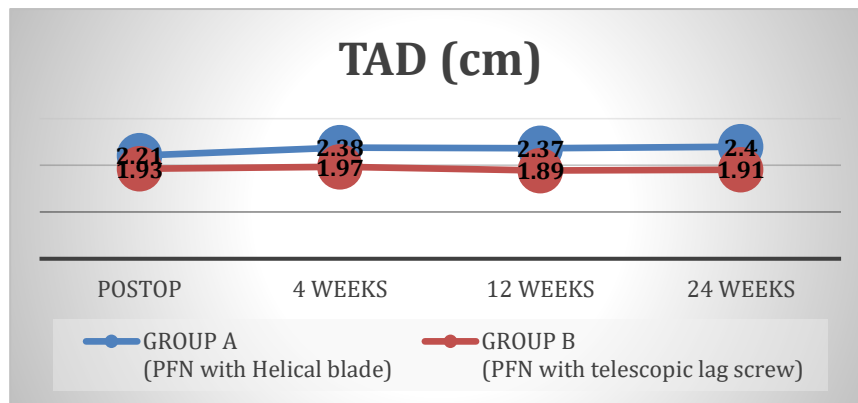
Among the patients in both the groups, 1(4%) fracture out of 25 in each group went in for nonunion. 96% patients in both the groups achieved union between 12 to 24weeks in our study.



## 8. TIP APEX DISTANCE

**Table 8:** Tip Apex distance (cm)

Tip Apex distance (cm)	GROUP A (PFN with Helical blade)		GROUP B (PFN with telescopic lag screw)		P Value
	Mean	SD	Mean	SD	
Postop	2.21	0.43	1.93	0.44	0.66
4 weeks	2.38	0.48	1.97	0.48	0.003
12 weeks	2.37	0.68	1.89	0.55	0.011
24 weeks	2.4	0.14	1.91	0.57	0.009



**Graph 7:** Tip Apex distance (cm)

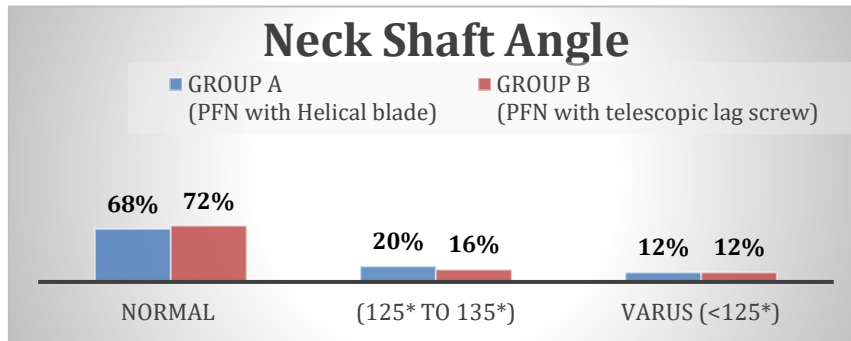
In our study, TAD was high in GROUP A (PFN with Helical blade) at 4 weeks, 12 weeks and 24 weeks follow-up compared to GROUP B (PFN with telescopic lag screw). This finding was statistically significant. ( $p < 0.05$ ). TAD at immediate postop was similar in both groups in our study. ( $p = 0.66$ ).

Article— Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures

## 9. NECK SHAFT ANGLE

**Table 9:** Neck Shaft Angle

Neck Shaft Angle	GROUP A (PFN with Helical blade)		GROUP B (PFN with telescopic lag screw)		P Value
	Mean	SD	Mean	SD	
NORMAL (125* TO 135*)	17	68%	18	72%	0.933
VARUS (<125*)	5	20%	4	16%	
VALGUS (>136*)	3	12%	3	12%	



**Graph 8:** Neck Shaft Angle

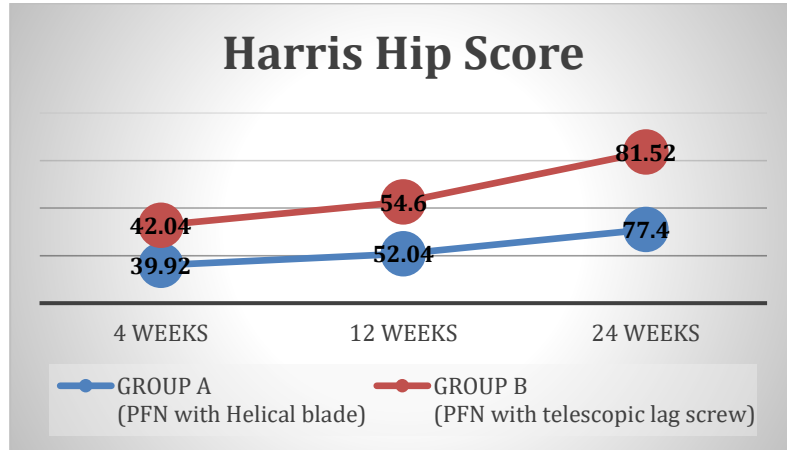
In our study, Neck shaft angle was normal in most of the patients among both groups i.e. 72% and 68% respectively. This finding was not statistically significant. (p =0.93)

## 10. HARRIS HIP SCORES

**Table 10:** Mean Harris hip scores

Mean Harris Hip Score	GROUP A (PFN with Helical blade)		GROUP B (PFN with telescopic lag screw)		P Value
	Mean	SD	Mean	SD	
4 weeks	39.92	2.48	42.04	3.3	0.014
12 weeks	52.04	9.23	54.6	9.72	0.344
24 weeks	77.4	16.85	81.52	17.59	0.402

Article— Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures



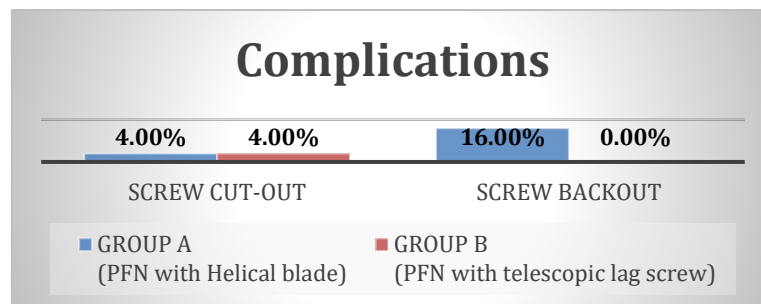
**Graph 9:** Mean Harris hip scores

In our study, Harris hip scores was significantly high in GROUP B (PFN with telescopic lag screw) at 4 weeks follow-up compare to GROUP A (PFN with Helical blade). ( $p = 0.014$ ). Harris Hip scores at 12 and 24 weeks was not statistically different in both the groups ( $p > 0.05$ ).

## 11. COMPLICATIONS

**Table 11:** Complications

Complications	GROUP A (PFN with Helical Blade)		GROUP B (PFN with Telescopic Lag screw)		p-value
	No.	Percent	No.	Percent	
Screw Back out	4	16%	0	0%	0.037
Screw Cut out	1	4%	1	4%	1



**Graph 10:** Complications

Article— Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures

4 patients (16%) in GROUP A(PFN with Helical Blade) group had Screw back-out in our study. This finding was statistically significant. ( $p = 0.037$ ). 1 patients(4%) in each group had Screw cut-out in our study.

## 12. CORRELATION OF TAD WITH SCREW CUT OUT AND SCREW BACK-OUT

**Table 12:** Correlation of TAD with Screw Cut-out

	Coefficient B	Standard error	z	p	Odds Ratio	95% conf. interval
Constant	5.34	2.69	1.98	.047	209.13	1.07 - 41064.34
TAD POSTOP	3.84	2.6	1.47	.141	46.42	0.28 - 7640.71
TAD 4 WEEKS	-4.88	2.24	2.18	.029	0.01	0 - 0.61
TAD 12 WEEKS	7.73	4.68	1.65	.098	2274.95	0.24 - 21798344.49
TAD 24 WEEKS	-7.64	4.55	1.68	.093	0	0 - 3.58

Univariate logistic regression was performed for cut out, only TAD at 4 weeks, reached statistical significance on the univariate analysis ( $p = 0.029$ ).

**Table 13:** Correlation of TAD with Screw back-out

	Coefficient B	Standard error	z	p	Odds Ratio	95% conf. interval
Constant	-7.33	91128.71	0	1	0	0 - Infinity
TAD POSTOP	63.73	36552.81	0	.999	4.766215648720628+27	0 - Infinity
TAD 4 WEEKS	-49.21	46683.26	0	.999	0	0 - Infinity
TAD 12 WEEKS	28.73	1328054.33	0	1	3002082421502.61	0 - Infinity
TAD 24 WEEKS	-16.54	1319719.13	0	1	0	0 - Infinity

When univariate logistic regression was performed for screw back-out, no significant correlation was found in our study. Our results indicate that a high TAD correlates

*Article— Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures*

with cut-out of the device from the femoral head. However, it does not seem to affect the occurrence of screw back-o.

## **4. DISCUSSION**

We carried out this prospective observational study to analyze and compare the clinical and functional outcome of patients who sustained unstable intertrochanteric fractures treated with helical blade vs telescopic lag screw. The study was conducted in the Department of Orthopaedics, Jubilee Mission Medical College & Research Institute, Thrissur after getting the ethical committee clearance. The study assessed 50 patients with unstable Intertrochanteric fracture treated with PFN using helical blade or telescopic lag screw as the proximal component. Clinical and radiological assessment of all patients for fracture union and complication were done postoperatively at 4 weeks, 12 weeks and 24weeks. Demographic details, duration of surgery, complications, Tip Apex Index, Harris Hip score and weight bearing were also assessed. All the patients were informed about the study and consent was taken.

Following were our findings:

### **DEMOGRAPHIC DETAILS**

#### **AGE**

The Mean age of patients in GROUP A (PFN WITH HELICAL BLADE) was  $76.28 \pm 8.63$  years and Mean age of patients in GROUP B (PFN with Telescopic Lag screw) was  $79.68 \pm 9$ . This finding was statistically not significant (p value = 0.191). Our study shows more incidence of fracture in elderly population.

#### **GENDER**

Among the study population 14 patients were males and 36 patients were females.

Out of the 25 cases of GROUP A (PFN with Helical Blade) 64% are females and 36% were males. In GROUP B (PFN with Telescopic Lag screw) group 80% were females and 20% were males. Our study shows an increased incidence of intertrochanteric fracture in females.

#### **BMI**

The Mean BMI of patients in GROUP A (PFN with Helical Blade) was  $2.56 \pm 1.04$ kg/m<sup>2</sup> and Mean BMI of patients in GROUP B (PFN with Telescopic Lag screw) was  $2.8 \pm 0.91$ kg/m<sup>2</sup>. This finding was statistically not significant.

#### **COMORBIDITIES**

Diabetes was found to be the most common comorbidity among both the groups followed by Hypertension, dyslipidemia.

#### **CLASSIFICATION OF FRACTURE**

The numbers of patients with AO type 31A2 and 31A3 fractures in GROUP A (PFN with Helical Blade) group were 36% and 64% and in GROUP B (PFN with Telescopic Lag screw) group were 56% and 44% respectively. This finding was statistically not significant (p value = 0.156).

### **OPERATIVE DURATION**

The operating time was 60 to 80 mins in most of the patients in both the groups. (68% in both groups). The duration of surgery was more than 80mins in 5 (20%) patients in GROUP A (PFN with Helical Blade) and 3 (12%) patients in GROUP B (PFN with Telescopic Lag screw). Even-though not statistically significant the duration of surgical time was more with helical blade.

In a study by Herrera et al also showed more duration of surgery with helical blade.<sup>3</sup>

### **TIME FOR UNION**

Each group had 1(4%) fracture which went in for nonunion. 96% patients in both the groups achieved union between 12 to 24weeks in our study.

### **NECK SHAFT ANGLE**

In our study, Neck shaft angle was normal in most of the patients among both groups i.e. 72% and 68% respectively. These finding was not statistically significant. ( $p = 0.933$ ).

### **TIP APEX DISTANCE**

TAD was high in GROUP A (PFN with Helical Blade) at 4 weeks, 12 weeks and 24 weeks follow-up compared to GROUP B (PFN with Telescopic Lag screw). These finding were statistically significant. ( $p < 0.05$ ). TAD at immediate postop was similar in both groups in our study. ( $p = 0.66$ )

### **HARRIS HIP SCORE**

Harris hip scores was significantly high in GROUP B (PFN with Telescopic Lag screw) at 4 weeks follow-up compare to GROUP A (PFN with Helical Blade). ( $p = 0.014$ )

Harris Hip scores at 12 and 24 weeks was not statistically different in both the groups ( $p > 0.05$ )

While comparing with other studies, the results by Eric et al demonstrated the superiority of helical blades over telescopic lag screws.<sup>4</sup>

### **COMPLICATIONS**

4 patients (16%) in GROUP A (PFN with Helical Blade) had Screw cut-out in our study and this was statistically significant.

1(4%) patient in each group had Screw backout in our study.

Schwarzkopf R discovered that the helical screw had a mean head displacement of 2.18 mm as opposed to the telescopic screw's 1.87 mm. A notable variation in the lag screws' lateral movement was discovered. The mean lateral sliding of the helical lag screws was 2.68 mm, while that of the telescopic screws was 0.25 mm. By screw cutoff from the head, neither of the lag screw constructions failed.<sup>5</sup>

Also, J. Haung et al found that the helical blades had a comparable mechanical failure rate, outstanding and good fracture reduction rates, and postoperative hip discomfort to lag screws. The results of the treatments showed no discernible difference between the two implants but in our study we found that telescopic lag screws are better than helical blades.<sup>6</sup> But according to Chong AC<sup>7</sup>, complications were discovered in 22% of lag screw cases and 16% of helical blade cases

Article— Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures

### **CORRELATION OF TAD WITH COMPLICATIONS**

TAD at 4 weeks, reached statistical significance on the univariate analysis ( $p = 0.029$ ).

Our results indicate that a high TAD correlates with cut-out of the device from the femoral head. However, it does not seem to affect the occurrence of screw back-out.

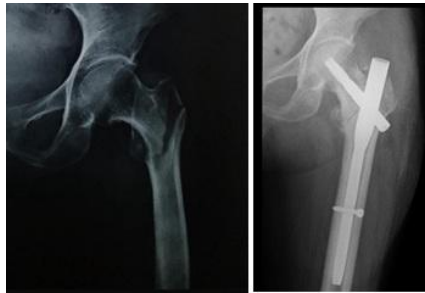
In order to avoid intertrochanteric fixation failure, Baumgaertner et al suggested that optimizing the tip apex distance (TAD) to less than 25 mm is essential.<sup>8</sup>

Similarly a study by A Herrera et al reported that the PFN group experienced fewer operating delays, peri-operative blood loss, and early problems than the gamma nailing group and this finding was similar to our study.<sup>3</sup>

According to Chapman T. et al., there were seven fixation failures (5.6%), and each one involved the use of a helical blade. The average tip apex distance did not differ between the cases fixed with screws and those fixed with blades. This study supports the utility of screw fixation in these fractures by demonstrating a greater failure rate with the blade.<sup>9</sup>

Cutout with the helical blade was shown to be much more common than with the lag screw by Stern LC et al. Patients who had cutout in both the lag screws and the helical blades had an average tip-apex distance (TAD) that was noticeably higher which was comparable to our findings.<sup>10</sup>

### **FIGURES**



**Figure 1:** Preop and Postop x ray of patients operated with PFN using proximal Helical blade



**Figure 2:** Preop and Postop x ray of patients operated with PFN using proximal Telescopic Lag Screw

## 5. CONCLUSION

Fractures around the hip is common in elderly population and 50% of these are intertrochanteric fractures. With the advent of surgical fixation devices, operative treatment is the mainstay for treatment of the same as well. Proximal Femoral Nail has been pivotal in providing a biomechanically stable construct. The proximal screw directed to the head of the femur plays a major role in maintaining the reduction and thereby the union of the fracture. The helical blade is compared with telescopic lag screw in this study to assess and compare the complication rates and functional outcome of the two

Both Helical blade and telescopic lag screw are good choices for proximal screw in PFN for surgical fixation of unstable intertrochanteric fractures. In our study, we observed a significantly higher screw backout in the PFN using helical blade compared to PFN using telescopic lag screw. The reduced screw backout with telescopic lag screw may be attributed to the innie screw used for locking the telescopic lag screw. The operative duration, time for union, postoperative neck shaft angle didn't show significant changes in both categories. The Harris Hip Score was used to assess functional outcome showed a significantly higher score in initial 4 weeks for the telescopic lag screw compared to helical blade. However at 12 weeks and 24 weeks follow up the Harris Hip Score did not show significant difference among the two groups. Tip Apex distance was measured at each follow up visits and showed significant relation with screw cut out and no relation with screw back out.

We conclude that PFN with Telescopic Lag screw is superior to PFN with Helical Blade for treating intertrochanteric femur fractures. We also conclude that a high Tip Apex Distance results in cut out of the device from femur head.

## 6. REFERENCES

1. Guo XF, Zhang KM, Fu HB, Cao W, Dong Q. A comparative study of the therapeutic effect between long and short intramedullary nails in the treatment of intertrochanteric femur fractures in the elderly. *Chin J Traumatol.* 2015;18(6):332-5.
2. Krishnan BH, Rai SK, Vikas R, Kashid M, Mahender P. A comparative study of the fracture union between long and short proximal femoral intramedullary nails anti-rotation in the treatment of intertrochanteric femur fractures in the elderly: a multicentric analysis. *Int J Res Orthop.* 2019 Feb;5:288-94.
3. Herrera A, Domingo L, Calvo A, Martinez A, Cuenca J. A comparative study of trochanteric fractures treated with the Gamma nail or the proximal femoral nail. *International orthopaedics.* 2002 Dec;26:365-9.
4. Strauss E, Frank J, Lee J, Kummer FJ, Tejwani N. Helical blade versus sliding hip screw for treatment of unstable intertrochanteric hip fractures: a biomechanical evaluation. *Injury.* 2006 Oct 1;37(10):984-9.
5. Schwarzkopf R, Takemoto RC, Kummer FJ, Egol KA. Helical blade vs telescopic lag screw for intertrochanteric fracture fixation. *Am J Orthop.* 2011 Sep 1;40(9):452-6.



*Article— Comparative Study between Treatment Outcomes in using Helical Blade and Telescopic Lag Screw in Proximal Femoral Nail for the Treatment of Unstable Intertrochanteric Fractures*

6. Huang J, Wei Q. Comparison of helical blade versus lag screw in intertrochanteric fractures of the elderly treated with proximal femoral nail: A meta-analysis of randomized-controlled trials. *Joint Diseases and Related Surgery*. 2022 Dec;33(3):695.
7. Chong AC, Schommer JV, Shearer JD, Timmer TK, Brown AN. The Effect of Bone Quality on Treatment of Intertrochanteric Fractures with Helical Blade Versus Lag Screw Fixation in Cephalomedullary Nails. *Kansas Journal of Medicine*. 2023;16:207.
8. Baumgaertner MR, Solberg BD. Awareness of tip-apex distance reduces failure of fixation of trochanteric fractures of the hip. *The Journal of Bone & Joint Surgery British Volume*. 1997 Nov 1;79(6):969-71.
9. Chapman T, Zmistowski B, Krieg J, Stake S, Jones CM, Levicoff E. Helical blade versus screw fixation in the treatment of hip fractures with cephalomedullary devices: incidence of failure and atypical “medial cutout”. *Journal of orthopaedic trauma*. 2018 Aug 1;32(8):397-402.
10. Stern LC, Gorczyca JT, Kates S, Ketz J, Soles G, Humphrey CA. Radiographic review of helical blade versus lag screw fixation for cephalomedullary nailing of low-energy peritrochanteric femur fractures: there is a difference in cutout. *Journal of Orthopaedic Trauma*. 2017 Jun 1;31(6):305-10.

## 7. AUTHORS

**Dr. Vishal Thomas Oommen**, Post Graduate Resident, Department of Orthopaedics in Jubilee Mission Medical College and Research Institute, Thrissur, Kerala, India.

**Dr. Ramesh M**, MS Orthopaedics, Professor and Head of the Department at the Department of Orthopaedics, Jubilee Mission Medical College and Research Institute, Thrissur, Kerala, India.

**Dr. Manesh Chacko Philip**, MS Orthopaedics, Associate Professor at the Department of Orthopaedics Jubilee Mission Medical College and Research Institute, Thrissur, Kerala, India.

**Dr. Joe Jacob**, MS Orthopaedics, Senior Resident at the Department of Orthopaedics, Government Medical College, Thrissur, Kerala, India.

**Dr Kiran Sreekandan**, Post Graduate Resident, Department of Orthopaedics in Jubilee Mission Medical College and Research Institute, Thrissur, Kerala, India.