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## Study Of Functional Outcomes Using Appropriate Scoring System (Harris Score) For Patients With Subtrochanteric Femur Fractures Treated With Different Surgical Modalities.

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### ABSTRACT

This prospective observational study aimed to assess the functional outcomes of subtrochanteric femur fractures treated with different surgical modalities using the Harris hip score. The study was conducted at the Department of Orthopaedics, Deenanath Mangeshkar Hospital, Pune, from September 2016 to September 2018. A total of 50 adult patients with subtrochanteric femur fractures were included. Patients were categorized into two groups based on surgical modality: surface fixation (DHS/DCS/PFP) and intramedullary fixation (PFN). Harris hip scores, range of motion, and absence of deformity scores were evaluated at 1, 3, and 6 months postoperatively. The intramedullary fixation group demonstrated superior outcomes compared to surface fixation. At 6 months, the PFN group exhibited a significantly higher proportion of excellent Harris hip scores (>90%) (42.9% vs. 9.1%), higher mean Harris hip scores (88.11 vs. 82.18), and increased range of motion scores compared to the surface fixation group. No significant difference in absence of deformity scores was observed. Intramedullary fixation, particularly with PFN, led to significantly better functional outcomes in subtrochanteric femur fractures, as indicated by Harris hip scores and range of motion. This study supports the preference for intramedullary fixation in the management of subtrochanteric femur fractures.

**Keywords:** Subtrochanteric femur fractures, Harris hip score

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## INTRODUCTION

Subtrochanteric femur fractures pose significant challenges in orthopedic management, necessitating comprehensive studies to evaluate functional outcomes and guide optimal treatment strategies [1]. The intricate anatomy and biomechanics of the subtrochanteric region demand meticulous attention to achieve satisfactory results. This study focuses on assessing functional outcomes using the Harris score, a widely accepted scoring system that quantifies hip function and pain, in patients with subtrochanteric femur fractures [2]. The choice of surgical modality plays a crucial role in determining patient recovery, with various approaches, such as intramedullary nailing, dynamic hip screw fixation, and other evolving techniques, presenting diverse implications for postoperative outcomes [3]. By systematically comparing the Harris scores of patients undergoing different surgical interventions, this research aims to contribute valuable insights into the most effective treatment modalities, ultimately enhancing the clinical decision-making process and improving the overall quality of care for individuals with subtrochanteric femur fractures [4-6].

## MATERIAL AND METHODS

The study was conducted at the Department of Orthopaedics at Deenanath Mangeshkar Hospital and Research Centre, Erandwane, Pune, from September 2016 to September 2018. The target population comprised adult patients with subtrochanteric femur fractures. Employing a prospective, observational study design, all eligible patients meeting the inclusion criteria were enrolled in the research. The two distinct groups were formed based on the surgical modalities employed: the Surface Fixation Group (comprising patients treated with DHS, DCS, and PFP) and the Intramedullary Fixation Group (consisting of patients treated with PFN).

The sample size for the study was determined using a sample size justification formula, considering a 45% incidence of proximal femoral nailing (PFN) as the treatment modality, with a  $\pm 20\%$  margin of error, at a 95% confidence level and 80% power. The final sample size was established at 50 patients presenting with subtrochanteric femur fractures. Inclusion criteria encompassed all adult patients aged 18 years and above with subtrochanteric femur fractures, while exclusion criteria excluded patients with polytrauma, open fractures, head injuries, or any condition impeding postoperative assessment, early mobilization, and physiotherapy.

Data collection involved obtaining informed consent from eligible patients and utilizing study proforma and patient information sheets. Comprehensive patient data were collected through history-taking, clinical examinations, and relevant investigations in adherence to hospital protocols. Patients were categorized into either the Surface Fixation Group or the Intramedullary Group based on the surgical modality received—surface fixation or intramedullary nailing, respectively—following the established group allocation criteria.

## RESULTS

Our study demonstrates the Functional outcomes of subtrochanteric femur fractures treated with surgical fixation which were analyzed By Harris hip score. In a study population of 50 cases, 22 cases underwent surface fixation (DHS/DCS/PFP) and 28 underwent Intramedullary fixation (PFN) and accordingly were placed in surface fix. and Intramedullary (PFN) group. Of 50 cases studied, 22 (44.0%) had PFP/DCS/DHS implant used and 28 (56.0%) had PFN used.

**Table 1: Inter-group distribution of Functional outcome according to Harris hip score at 6-months.**

Harris hip score	Surface fix (n=22)		PFN (n=28)		P-value
	n	%	n	%	
Excellent (>90)	2	9.1	12	42.9	0.020*
Good (81 - 90)	12	54.5	12	42.9	
Fair (71 - 80)	8	36.4	4	14.3	
Poor (<70)	0	0.0	0	0.0	
<b>Total</b>	<b>22</b>	<b>100.0</b>	<b>28</b>	<b>100.0</b>	

Values are n (% of cases), P-values by Chi-Square test. P-value<0.05 is considered to be statistically significant. \*P-value<0.05.

The distribution of Harris hip score differs significantly between two study groups (P-value<0.05). Significantly higher proportion of cases from PFN had relatively better functional outcome compared to group of cases from Surface fix (P-value<0.05).

**Table 2: Inter-group distribution of mean Harris hip score at 6-months.**

Harris hip score	Surface fix (n=22)		PFN (n=28)		P-value
	Mean	SD	Mean	SD	
6-Month	82.18	5.51	88.11	7.15	0.002**

P-values by independent sample t test. P-value<0.05 is considered to be statistically significant. \*\*P-value<0.01.

The distribution of mean Harris hip score (functional outcome) at 6-month follow-up is significantly higher in PFN compared to Surface fix (P-value<0.01).

**Table 3: Inter-group distribution of mean range of motion (ROM) score.**

ROM score	Surface fix (n=22)		PFN (n=28)		P-value
	Mean	SD	Mean	SD	
1-Month	3.00	0.00	3.04	0.19	0.381 <sup>NS</sup>
3-Month	3.18	0.39	3.64	0.49	0.001 <sup>***</sup>
6-Month	3.86	0.35	4.25	0.52	0.004 <sup>**</sup>

P-values by independent sample t test. P-value<0.05 is considered to be statistically significant. \*\*P-value<0.01, \*\*\*P-value<0.001, NS-Statistically non-significant.

The distribution of mean ROM score at 1-month follow-up did not differ significantly between two study groups (P-value>0.05).

The distribution of mean ROM at 3-month, 6-month follow-up is significantly higher in PFN compared to Surface fix (P-value<0.01 for both).

**Table 4: Inter-group distribution of mean absence of deformity score.**

Absence of deformity score	Surface fix (n=22)		PFN (n=28)		P-value
	Mean	SD	Mean	SD	
3-Month	4.00	0.00	4.00	0.00	0.999 <sup>NS</sup>
6-Month	4.00	0.00	4.00	0.00	0.999 <sup>NS</sup>

P-values by independent sample t test. P-value<0.05 is considered to be statistically significant. NS-Statistically non-significant.

The distribution of mean absence of deformity score at 3-month and 6-month follow-up did not differ significantly between two study groups (P-value>0.05 for both).

## DISCUSSION

Subtrochanteric femur fractures present a complex orthopaedic challenge, necessitating careful consideration of surgical interventions and their subsequent impact on functional outcomes. The present study investigated the functional outcomes of subtrochanteric femur fractures treated with two distinct surgical modalities: surface fixation (DHS/DCS/PFP) and intramedullary fixation (PFN). The analysis, based on the Harris hip score, revealed noteworthy differences between the two groups [5, 6].

The distribution of Harris hip scores at the 6-month follow-up demonstrated statistically significant differences between the surface fixation and intramedullary fixation groups. The proportion of cases achieving an excellent Harris hip score (>90) was markedly higher in the PFN group (42.9%) compared to the surface fixation group (9.1%), indicating superior functional outcomes with intramedullary fixation. This finding aligns with previous literature suggesting the advantages of intramedullary nailing in providing biomechanical stability and early mobilization, contributing to improved functional recovery [7, 8].

Moreover, the mean Harris hip score at the 6-month follow-up was significantly higher in the PFN group compared to the surface fixation group. The mean scores of 88.11 and 82.18, respectively, reinforced the trend observed in the distribution of Harris hip score categories. This difference further underscores the beneficial impact of intramedullary fixation on overall hip function, emphasizing the importance of considering PFN as a preferred treatment modality for subtrochanteric femur fractures [9].

The analysis of the range of motion (ROM) scores at different follow-up intervals provided additional insights into functional recovery. At the 1-month follow-up, there was no significant difference in ROM between the two groups, suggesting comparable early postoperative mobility. However, at the 3-month and 6-month follow-ups, the PFN group exhibited a significantly higher mean ROM compared to the surface fixation group. This disparity in ROM aligns with the observed differences in Harris hip scores, reaffirming the superior functional outcomes associated with intramedullary fixation [10].

The absence of deformity scores at the 3-month and 6-month follow-ups did not reveal statistically significant differences between the two groups. Both surface fixation and intramedullary fixation groups demonstrated comparable outcomes in terms of deformity correction. This may suggest that both surgical modalities effectively address deformity concerns, with the absence of notable differences in the follow-up period assessed.

The observed superiority of intramedullary fixation, as evidenced by Harris hip scores and ROM, can be attributed to several factors. Intramedullary nailing, particularly with PFN, provides biomechanical advantages, including enhanced axial and rotational stability, reduced stress on the fracture site, and preservation of periosteal blood supply. These factors collectively contribute to improved fracture healing and functional recovery [11].

Surface fixation methods, such as DHS, DCS, and PFP, while effective in certain scenarios, may have limitations in achieving comparable stability and promoting early mobilization. The nature of these fractures, located in the subtrochanteric region, demands meticulous attention to achieve optimal outcomes. The biomechanical principles of intramedullary fixation appear to better address the specific challenges posed by subtrochanteric femur fractures.

The findings of this study align with and contribute to the existing body of literature emphasizing the advantages of intramedullary fixation in subtrochanteric femur fractures. However, it is crucial to acknowledge the study's limitations, including its single-center nature and the relatively modest sample size. Multi-center studies with larger cohorts could provide further validation of these findings and enhance the generalizability of the results.

## CONCLUSION

In conclusion, our study highlights the significant influence of surgical modality on the functional outcomes of subtrochanteric femur fractures. Intramedullary fixation, particularly with PFN, demonstrated superior results in terms of Harris hip scores and range of motion at the 6-month follow-up. This supports the consideration of intramedullary fixation as a preferred treatment option for subtrochanteric femur fractures, providing valuable insights for orthopedic surgeons in clinical decision-making.

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