APCCR
Advances in Pre-Clinical and Clinical Research

ASCENTIA PUBLISHERS

Original Research

Functional Assessment of Intertrochanteric Fracture Stabilization with a Dynamic Hip Screw

Adeel Nawaz [1]*, Rajesh P. Rathod [1], Ihab F. Ashber [1], Mohamed E. Eldesouky [1], Zakir Ali Shah [1]

[1] Department of Orthopedics, Rashid Hospital, Dubai, UAE

Abstract: Proximal femoral intertrochanteric fractures are common and serious clinical conditions, mainly seen in the elderly, commonly due to low-energy trauma. These fractures pose a considerable challenge because of their impact on mobility, independence, and the risk of complications. Dynamic hip screws (DHS) are widely utilized for the fixation of stable and unstable intertrochanteric fractures, effecting good stabilization, bone healing, and enabling early mobilization. This study aimed to evaluate the functional outcomes of DHS fixation in patients with intertrochanteric fractures. A prospective observational study was conducted among 75 patients aged ≥40 years with isolated intertrochanteric fractures. Patients were managed with DHS fixation, and their functional outcomes were assessed 3 months after surgery using the Harris Hip Score. Demographic information, clinical outcomes, and complications were recorded. The average age of the patients was 58.65 ± 5.72 years, 56% were female and 44% were male. Most patients (82.67%) had a Harris Hip Score in the range of 80-89, signifying good functional outcomes. The average Harris Hip Score was 83.56 ± 2.89, indicating that DHS fixation can restore function in patients with intertrochanteric fractures. This study demonstrated that DHS fixation showed satisfactory functional outcomes in patients with intertrochanteric fractures, with most having good recovery. This study confirms that DHS is a cost-effective treatment with the benefits of early mobilization, fewer complications, and improved quality of life.

Keywords: Dynamic Hip Screw; Intertrochanteric Fractures; Functional Outcomes; Harris Hip Score

Citation: Nawaz A, Rathod RP, Ashber IF, Eldesouky ME, Shah ZA. Functional Assessment of Intertrochanteric Fracture Stabilization with a Dynamic Hip Screw. Advances in Preclinical and Clinical Research. 2025; 5:202505.

***Corresponding Author**: dradeelortho@gmail.com; Tel.: +971 503988674

Funding: None

Conflict of Interest: None

Received: 23 Apr 2025; **Accepted**: 24 Apr 2025; **Published**: 29 Apr 2025

Published by Ascentia Publishers; eISSN: xxxx-xxxx

Introduction

Intertrochanteric fractures of the proximal femur pose a significant clinical challenge, particularly in the elderly population. These fractures are often associated with low-energy traumas, such as simple falls, yet they result in substantial morbidity and mortality due to their occurrence in individuals with reduced physiological reserves and multiple comorbidities. [1,2] With the aging global population, the incidence of intertrochanteric fractures is expected to rise, with important implications for healthcare systems worldwide. The principal goals in the treatment of intertrochanteric fractures are to restore

mobility, prevent complications, and return to pre-injury functional status. [3.4] Early surgical intervention is widely recognized as critical to achieving these objectives, as it facilitates early mobilization, minimizes the risk of complications, such as deep venous thrombosis, pneumonia, and pressure sores, and improves overall survival rates. [5] Numerous fixation devices have evolved over the decades to provide effective stabilization of these fractures, with the Dynamic Hip Screw (DHS) emerging as one of the most established and commonly used methods. [6,7]

The DHS implant is designed as a sliding hip screw that permits controlled dynamic compression of the fracture area. This implant is made up of a large lag screw that is placed within the femoral neck and head and is fixed within the lateral cortex using a side plate. The sliding component of the DHS facilitates compression on the axis of the femoral neck when weight-bearing is performed postoperatively, maximizing fracture stability and bone healing. [8] Numerous studies have confirmed that fixation with a DHS device is accompanied by high rates of nonunion, mechanical alignment restoration, and good functional outcomes in intertrochanteric fractures. Even in the presence of newer implants such as cephalomedullary nails and locking compression plates, DHS is still a cost-effective and rational option for the treatment of the most stable and even some selected unstable intertrochanteric fracture patterns. [9] Functional outcome after fixation is an important indicator of treatment success, not just an indication of fracture healing, but also of the patient's return to prior levels of independence and activity. The Harris Hip Score and other normative functional assessment instruments are frequently employed in clinical trials to measure the parameters of pain, ability to walk, mobility, and complications. It has been reported that most patients undergoing DHS achieve near-normal function within the first year following surgery, recommending continued preference for this treatment in certain types of fractures. [10,11]

The difficulty remains in managing complex and unstable fracture patterns, as well as in patients with osteoporosis. Supplemental fixation techniques and alternative implants have been used in such instances. Recent comparative trials have compared minimally invasive DHS techniques and traditional methods and reaffirmed the safety and effectiveness of both, with low implant and reoperation failure rates. Considering the constant advancements in orthopedic implants and techniques, there is still a need to regularly assess the functional results of established techniques, such as DHS. This investigation attempted to measure the functional results of intertrochanteric fracture fixation with a Dynamic Hip Screw, thus contributing worthwhile information for guiding clinical decision-making and maximizing patient care.

Materials and Methods

This prospective observational study carried out for six months, from 28 December 2010 to 27 June 2011 after obtaining approval from the Hospital Ethical Committee. Non-probability purposive sampling was used to select the research participants. All patients of both sexes aged ≥ 40 years with isolated intertrochanteric fractures of the proximal femur (Evans Type 1), as diagnosed by radiographs of the affected hip anterior-posterior view, were enrolled after informed consent was obtained. Patients with open fractures, pathological fractures, polytrauma, intertrochanteric fractures with subtrochanteric extension, pre-existing hip joint pathology, medical instability, and fractures previously operated on or infected were excluded. The sample size was determined using the Harris Hip Score at 3 months, which was 86.2 ± 5.3 in patients with intertrochanteric hip fractures treated with dynamic hip screw fixation. 75 patients had a confidence level of 90% and margin of error of 1%. Radiological evaluation was performed to establish the diagnosis of the fracture.

Initial skin traction was applied to the lower limbs. A preoperative anesthesia checkup was performed. Surgery was performed by a consultant surgeon under spinal anesthesia. The patients were placed on a fracture table in the supine position, and a lateral approach was used to fix the fracture using a Dynamic Hip Screw and a side plate of the correct size. Postoperative radiographs were obtained to assess the position of the implant and quality of reduction and fixation. Mobilization from chair to bed was

promoted as soon as possible. Follow-up was planned at 4, 8, and 12 weeks in the outpatient department. Clinical evaluation and scoring were performed at 3 months using the Harris Hip Score. Statistical analysis was performed using IBM Statistical Package for Social Sciences (SPSS) version 16.0 for Windows. Demographic details such as age, sex, and Harris Hip Scores are described as mean ± standard deviation (SD). Categorical data, such as sex, are described as frequencies and percentages.

Results

The average age of the patients was 58.65 ± 5.72 years. The age distribution was as follows: 16 patients (21.33%) were between the ages of 40-50 years, 29 patients (38.67%) were between the ages of 51-60 years, 18 patients (24%) were between the ages of 61-70 years, and 12 patients (16%) were above 70 years of age. Regarding sex distribution, 33 patients (44%) were male, and 42 patients (56%) were female. (Table 1)

Table 1. Demographic data of study patients (n=75)

Variables	**Values**	
Mean ± SD	58.65 ± 5.72	
Age distribution (years)	**Frequency (n)**	**Percentage (%)**
40-50	16	21.33
51-60	29	38.67
61-70	18	24
>70	12	16
Total	75	100
Gender distribution	**Frequency (n)**	**Percentage (%)**
Male	33	44
Female	42	56
Total	75	100

Table 2. Harris Hip Score distribution among patients with intertrochanteric hip fractures treated by dynamic hip screw fixation (n=75)

Hip Score	**Frequency (n)**	**Percentage (%)**
<70	00	00
70-79	12	16
80-89	62	82.67
90-100	01	1.33
Total	75	100
Mean ± SD	83.56 ± 2.89	

Table 2 shows the distribution of Harris Hip Scores among the patients who underwent dynamic hip screw fixation for intertrochanteric hip fractures. The average Harris Hip Score was 83.56 ± 2.89. Most patients (62 out of 75, 82.67%) had a score ranging from 80to 89, reflecting a mostly satisfactory

functional outcome. Twelve patients (16%) had a score ranging from 70 to79, and only one patient (1.33%) had a score ranging from 90to 100. None of the patients received a score less than 70, which means that none had poor functional results according to the Harris Hip Score.

Discussion

The present study aimed to assess the functional results of intertrochanteric fracture fixation with a Dynamic Hip Screw (DHS) in a series of 75 patients, considering their age, sex distribution, and Harris Hip Scores. The results indicated a mean age of 58.65 ± 5.72 years, the most common age was 51-60 years (38.67%), and the female sex was predominant (56%). The average Harris Hip Score was 83.56 ± 2.89, and 82.67% of patients had a score of 80-89, which was generally a good functional result after DHS fixation. The demographic profile of the present study was even in terms of gender, with 44% men and 56% women, as was the case with Khan et al., who reported 40% men and 60% women. [11] Both studies may reflect the increased rate of osteoporotic fractures among postmenopausal women owing to the dominance of females.

The mean age of 58.65 years in the present study is also similar to other studies, including Sarfraz et al., who have reported a mean age of 60.1 years for patients with DHS. [12] Most of the present patients belonged to the age group of 51-60 years, which is similar to a typical population affected by intertrochanteric fractures, as intertrochanteric fractures commonly occur in elderly people, frequently due to osteoporosis or falls. The findings of the present study are similar to those of other recent studies on the functional results of DHS fixation for intertrochanteric fractures.

Prakash et al., have given a mean age of 61.09 ± 11.69 years in the DHS group and a slightly increased mean Harris Hip Score of 84.3 ± 7.68. [13] Excellent results were seen in 34.78% of patients, good results in 43.48%, and fair results in 17.39%; only a few (4.35%) patients had poor results. This pattern of outcomes aligns with the present results, where most patients (82.67%) scored between 80-89, indicating good outcomes. The marginally higher mean Harris Hip Score in Prakash et al.'s study can be explained by the presence of both younger and older patients, as their study population had a greater age range, including patients with more complicated fracture types.

Correspondingly, Khan et al. documented a mean Harris Hip Score of 88.40 ± 7.91, and 63.33% of their patients had excellent results. Their cohort was slightly younger (mean age 54.96 ± 8.34 years), which could be the reason for the greater functional outcomes, since patients tend to have a better recovery and rehabilitation after surgery when they are younger. [11] The present study had a more varied population with 38.67% of patients in the age group 51-60 years, and the mean age was greater than that of Khan et al.'s population, which could be the reason for the relatively lower percentage of patients with excellent outcomes. [11] Sarfraz et al. reported a mean Harris Hip Score of 90.27 ± 3.80 at 6 months following DHS, with 62.5% of their population scoring between 80-90. The slightly better functional scores in their study may be attributed to the fact that patients with stable fractures and a younger average age (mean age 60.10 ± 4.48 years) were included. [12] Although the present study had a lower mean Harris Hip Score (83.56 ± 2.89), most patients (82.67%) still exhibited good outcomes, which suggests that DHS fixation is still an effective treatment for intertrochanteric fractures in the present population. Bhaskar and Shivkumar also documented a mean Harris Hip Score of 93.6 in their series, with 75% having excellent results. [14]

This greater score can be explained by the use of only stable intertrochanteric fractures, which generally have a better prognosis and recovery than unstable fractures. [14] However, the present study had a more diverse population of intertrochanteric fractures, which could explain the less impressive functional outcomes observed. For comparison, Verka had a mean Harris Hip Score of 82.12 in their retrospective analysis of DHS fixation with improvement over time. [15] This finding is very similar to the present findings, in which patients demonstrated good functional recovery. Nevertheless, our study

pointed out that none of the patients had a poor outcome (scores <70), which means that DHS fixation tends to yield good results, even in older or more complicated fracture cases.

Conclusion

This study highlights the efficacy of Dynamic Hip Screw fixation in achieving favourable functional outcomes in patients with intertrochanteric fractures. Most patients experienced good recovery, with most reporting functional scores indicative of successful rehabilitation. These findings reinforce the reliability of the Dynamic Hip Screw as a viable surgical intervention, offering optimal stability and promoting healing, which, in turn, helps patients regain mobility and quality of life. This study provides valuable insights for clinical decision making, supporting the continued use of this technique in the treatment of intertrochanteric fractures.

References

1. Yuenyongviwat V. Hip Fracture Management in Elderly Patients. Songklanagarind Medical Journal. 2016;34(6):289-94.
2. Attum B, Pilson H. Intertrochanteric femur fracture. InStatPearls 2023. StatPearls Publishing.
3. Dutta DK. Outcome of external fixator in the treatment of intertrochanteric fracture in elderly patients with co-morbidities. Janaki Medical College Journal of Medical Science. 2019;7(1):3-7.
4. Ghilzai AK, Shah SK, Khan MA, Ghazi MA, Najjad MK. Role of proximal femoral nail in the treatment of unstable intertrochanteric fractures. Biomedical Journal of Scientific & Technical Research. 2018;2(1):2145-9.
5. Hoshino T. Early mobilization and impact on recovery. Elsevier eBooks. 2022:177–192.
6. Raj S, Grover S, Bola H, Pradhan A, Fazal MA, Patel A. Dynamic hip screws versus cephalocondylic intramedullary nails for unstable extracapsular hip fractures in 2021: A systematic review and meta-analysis of randomised trials. Journal of Orthopaedics. 2023;36:88-98.
7. Kandel M, Shrestha R, Poudel KP, Thapa S, Thapa S, Panta S. Dynamic hip screw (DHS) versus proximal femoral nail anti-rotation (PFNA) fixation for unstable (Evans-Jensen II and III) inter-trochanteric fractures of femur in elderly. Journal of College of Medical Sciences-Nepal. 2019;15(3):222-5.
8. Shih Y, Bartschat NI, Cheng EY. Sliding Hip Screw and Side Plate for Intertrochanteric Hip Fractures. JBJS Essential Surgical Techniques. 2022;12(1):e19.
9. Mardani-Kivi M, Mirbolook A, Jahromi SK, Rad MR. Fixation of intertrochanteric fractures: dynamic hip screw versus locking compression plate. Trauma monthly. 2013;18(2):67.
10. Shams A, El-Sayed M, Elsawy M, Hafez K, Gad H. Comparative, prospective, randomized study of the modified minimally invasive technique versus the conventional technique of dynamic hip screw (DHS), fixation for intertrochanteric fractures in the elderly. European Orthopaedics and Traumatology. 2015;6:27-33.
11. Khan MZ, Rehan M, Salman A, Awan MM, Khan AK. Comparative study between dynamic hip screw versus proximal femoral nail devices in the Management of Intertrochanteric Fractures. Pakistan Journal of Medical & Health Sciences. 2022;16(12):839.
12. Sarfraz M, Ahmad S, Raza MS, Zeb SA, Lakhani S, Khan R. A comparative study of proximal femoral nail and dynamic hip screw in the treatment of intertrochanteric fractures of femur. Pakistan Journal of Medical & Health Sciences. 2022;16(04):1101.
13. Prakash AK, Shanthappa AH, Venkataraman S, Kamath A. A comparative study of functional outcome following dynamic hip screw and proximal femoral nailing for intertrochanteric fractures of the femur. Cureus. 2022;14(4).
14. Bhaskar K, Shivkumar TN. Study on the functional outcome of stable intertrochanteric fractures treated with dynamic hip screw. 2019;3(4):04–7.
15. Verka PS. Retrospective Study of Dynamic Hip Screw Fixation in Intertrochanteric Fractures – Outcomes. Journal of Medical Science and Clinical Research 2019;7.