

## Osteosynthesis of Fracture Neck Femur in the Sixth and Seventh Decades of Life by Dynamic Hip Screw (DHS) and Antirotation Screw

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### Abstract

**Aim:** To assess the results of internal fixation of fracture neck femur in the sixth and seventh decades of life by dynamic hip screw (DHS) and antirotation screw.

**Material & Method:** 46 patients with displaced fracture neck femur were treated in Department of Orthopedics, Vardhman Institute of Medical Science, Pawapuri, Nalanda, Bihar, India for 12 months by closed reduction and internal fixation by DHS and antirotation screw.

**Results:** The time elapsed between trauma and surgery ranged from few hours to 7 days with an average of 3 days. Bone union was achieved in all patients except five. The time to bone union ranged from 3 to 7 month with an average of 6 months. The time to full weight bearing ranged from 3 to 7 months with an average of 5 months. The reduction in the horizontal offsets ranged from 2 mm to 6 mm with an average of 3 mm. This reduction in neck length and horizontal offset was found statistically to be significant ( $p$  value  $< 0.05$ ).

**Conclusion:** Internal fixation of fracture neck femur in the sixth and early seventh decades of life by DHS and antirotation screw has the advantages of short operative time and early weight bearing with high union rate. It is a hip preserving surgery and if non union or avascular necrosis had occurred, hip arthroplasty could be done without major difficulties. Patients above the age of 65 years and patients with Garden type IV fractures carry the risk of poor results.

**Keywords:** Fracture neck femur; Dynamic hip screw; internal fixation; the sixth decade of life

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### Introduction

Femoral neck fractures (FNF) are common in the elderly population and are associated with significant morbidity and

mortality [1]. It is estimated that at the age of 80, the risk of developing a fracture of the proximal femur is approximately 20%

for women and 10% for men [2]. Surgical management of FNF is indicated in the vast majority of elderly patients, and the indication to fix or to replace the fracture depends on fracture displacement and patient selection [3]. Elderly patients presenting with non-displaced (Garden I and II) FNF with a posterior tilt of  $> 20^\circ$  and those with displaced (Garden III and IV) FNF will preferentially benefit from hip arthroplasty [4–6].

In the 6th and 7th decades of life which is the period between 50-70 years there is no a universal agreement among the surgeons about the best method of treatment. Some are in favor of hip arthroplasty and others are in favor of internal fixation. Internal fixation of the fracture neck femur in this age group has several advantages compared with arthroplasty including: shorter operative time, decreased blood loss, and reduced perioperative mortality [7-9].

The aim of this study is to assess the results of internal fixation of fracture neck femur in the sixth and seventh decades of life by DHS and antirotation screw.

### Material & Method:

46 patients with displaced fracture neck femur were treated in in Department of Orthopedics, Vardhman Institute of Medical Science, Pawapuri, Nalanda, Bihar, India for 12 months by closed reduction and internal fixation by DHS and antirotation screw. The ages ranged from 50 to 69 years with an average of 61 years. 31 patients were males and 15 were females.

### Inclusion criteria

- Patients between 51-69 years of age
- Patients of either sex
- Patients given informed consent

### Exclusion criteria

- Patients less than 50 years old or above seventy were excluded.

- Also patients with undisplaced fractures, pathological fractures or arthritic changes of the hip joint were excluded.

### Methodology

All patients gave their informed consent prior to surgery. After induction of anesthesia, patient was put on the traction table and accurate reduction was achieved under C-Arm control. The proximal femur was approached through a lateral incision started at the greater trochanter and extended distally. One guide wire was inserted in the inferior half of the neck at the proposed site of the lag screw and another **one** guide pins were inserted in the upper half of the neck to avoid rotational force during reaming and insertion of the DHS lag screw. The length of the lag screw was adjusted to keep the tip apex index less than 25 mm. After insertion of the DHS the superior guide wires were removed and partially threaded cancellous screw was inserted parallel to the lag screw of the DHS. The wound was then closed over drain. Active range .

Patients were discharged on an average of 3 days postoperatively and followed up regularly in the outpatient clinic. During each visit patients were examined clinically for wound healing, range of hip and knee movements. Radiological evaluation was done to assess bone union and stability of fixation. Partial weight bearing was allowed from the second postoperative week. Progressive weight bearing was allowed according to the progress of bone healing on the serial radiographs.

### Results:

The follow up period ranged from 23 to 52 months with an average of 35 months. The operative time ranged from 32 to 85 minutes with an average of 56 minutes. Bone union was achieved in all patients except five. The time to bone union ranged from 3 to 7 month with an average of 6

months. The time to full weight bearing ranged from **3 to 7 months with an average of 5 months.**

**Table 1** shows that majority of the fractures were Garden type III in 29 patients and garden type IV in 17 patients. However, 2 patients showed avascular necrosis in 66-70 years of age group.

At the final follow up radiological evaluation was done by measurement of the following parameters on both sides: (1) Femoral neck length: the distance between the center of the head to the axis of the femoral shaft along the femoral neck axis; (2) Horizontal offset of the femoral head:the shortest distance from the femoral head center to the femoral shaft axis; (3)

Femoral neck-shaft angle: angle formed by the femoral shaft axis and the femoral neck axis (**Figure 1**).

The neck length and horizontal offsets were reduced on the operated sides in comparison to the normal sides. The reduction in the neck length ranged from 3 to 8 mm with an average of 5 mm. The reduction in the horizontal offsets ranged from 2 mm to 6 mm with an average of 3 mm. This reduction in neck length and horizontal offset was found statistically to be significant ( $p$  value < 0.05).

No changes in the neck shaft angles were observed between the operated and non operated sides.

**Table 1: Incidence of complications according to the age of the patients and displacement of the fractures.**

Parameter	No	Avascular necrosis	Nonunion
<b>Age distribution</b>			
50 - 55 years	4	-	-
56 - 60 years	17	-	1
61 - 65 years	14	1	2
66 - 70 years	11	2	2
<b>Dis placement</b>			
Garden type III	29	2	3
Garden type IV	17	4	2

**Figure 1:A 63 year-old male patient with displaced fracture neck femur.**



**Discussion:**

Arthroplasty has the advantages of short postoperative rehabilitation, rapid return to daily activity and avoid the complications of nonunion and avascular necrosis that are common with internal fixation. On the other hand it is a major surgery with long operative time, increased intraoperative blood loss and high postoperative morbidity and mortality. The mortality rate is approximately 10- 30 % in the first year after surgery. Morbidity rates are about 2% for infection, 1-10% for dislocation, 3% for periprosthetic fractures, 25% for heterotrophic ossifications, and 50% for deep venous thrombosis. In case of infection or dislocation the scope of reconstruction becomes limited and quite difficult[10, 11].

Femoral neck fractures frequently result in an important loss of function despite appropriate rehabilitation. One of the reasons for this is the occurrence of a limp, with or without leg length discrepancy. Functional shortening of the femoral neck due to fracture impaction may result in the loss of the abductors' moment of force on the greater trochanter, resulting in weakness, pain, and patient dissatisfaction. [12]

Nonvascularized free fibular bone grafting[10-13] may help in osteosynthesis of fracture of <3 months old[10] and if the femoral head is viable, vascular and without significant absorption of femoral neck.[13-16]

The vascularized iliac crest,[17] fibular,[18] and periosteal Grafting [19] procedures were not popular because they were time consuming, technically demanding and beyond the competency of average orthopedic surgeons. Furthermore, though the series of such vascularized bone grafting showed high incidence of union rate in their small series and shorter follow-up, it is too early to predict the future occurrence of AVN in those patients.

Dynamic hip screw is a stable construct. The lag screw produces good grip in the head and the sliding mechanism allows for compression at the fracture site without displacement. Zhang et al [20] compared multiple cannulated screws versus dynamic hip screws for femoral neck fractures. They found that DHS is associated with high overall success rate and lower rates of implant failure, reoperation and postoperative complications.

Internal fixation of fracture neck femur should be optimized according to the patient age and bone quality. In young adults the bone stock is usually good and internal fixation by cannulated screws will produce sufficient stability that outstands bone healing. In the sixth and seventh decades of life the bone stock is reduced and cannulated screws become insufficient and a more stable device should be used[21, 22, 23].

### **Conclusion:**

Internal fixation of fracture neck femur in the sixth and early seventh decades of life by DHS and antirotation screw has the advantages of short operative time and early weight bearing with high union rate. It is a hip preserving surgery and if non union or avascular necrosis had occurred, hip arthroplasty could be done without major difficulties. Patients above the age of 65 years and patients with Garden type IV fractures carry the risk of poor results.

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