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## Functional outcome of intertrochanteric fractures treated with dynamic hip screw and influence of tad over it - A prospective study

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### Abstract

Fractures of proximal femur are amongst the most often encountered fractures by orthopedic surgeons. Many treatment techniques are described in literature, but internal fixation with Dynamic Hip Screw (DHS) is the gold standard. Although many factors influence the outcome of DHS, Tip Apex Distance (TAD) is the most important factor that is under the control of operating surgeon. Between December 2011 and June 2013, 41 patients with intertrochanteric fractures, who got admitted in H.S.K Hospital and research center, S.N Medical College, Bagalkot in the department of Orthopedics, were studied. The value of tip apex distance in the treatment of inter-trochanteric fractures treated with dynamic hip screw and its influence on the functional outcome, according to Harris Hip Score was assessed. Out of the 41 cases, TAD < 25mm was achieved in 34 cases and >25mm in 7 cases. At 12 months follow up, 29 patients had excellent to good outcome. Five patients with TAD >25mm had fair to poor outcome. Internal fixation with Dynamic Hip Screw is one of the choices for treatment of intertrochanteric femur fractures. This study shows that TAD <25mm significantly correlates with satisfactory outcome.

**Keywords:** Dynamic hip screw, tip apex distance, intertrochanteric fracture, harris hip score

### 1. Introduction

The demographics of world populations is set to change, with more elderly living in developing countries. The highest hip fracture rates are seen in North Europe and the US and lowest in Latin America and Africa. Asian countries show intermediate hip fracture rates. With rising life expectancy throughout the globe, the number of elderly individuals is increasing in every geographical region, and it is estimated that the incidence of hip fracture will rise from 1.66 million in 1990 to 6.26 million by 2050 [1]. But as three-quarters of the world's population live in Asia, it is projected that Asian countries will contribute more to the pool of hip fractures in coming years. In geriatric population, fall is the leading cause of nonfatal injuries and hospital admissions. Proximal femur fractures are divided into three categories: femoral neck and inter-trochanteric fractures account for 90%, sub-trochanteric fractures occurring in 5-10% [2]. Intertrochanteric fractures unite readily due to broad fracture surfaces, adequate blood supply and they rarely lead to non-unions. If proper precautions are not taken fractures unite in malposition resulting in shortening, limp and restricted movements. Treatment must also consider effective internal fixation to help early mobilisation and to reduce morbidity. A combination of surgical fixation, early postoperative physiotherapy and ambulation is usually the best approach [3]. The overall goal in the treatment of hip fractures is to return the patient to pre-morbid level of function. Among the various internal fixation devices used for trochanteric fractures the dynamic hip screw with sliding plate is one of the implant which permits the proximal fragments to collapse or settle, seeking its own position of stability. The aim of the study was to know the effectiveness of DHS and influence of TAD on the functional outcome in intertrochanteric fractures according to Harris Hip Score [4].

### 2. Material and Methods

**2.1 Ethical clearance:** Ethical clearance and also the informed consent by all the participants was taken for this study. 41 cases of intertrochanteric fractures who were admitted with intertrochanteric femur fracture, in H.S.K Hospital and research center,

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S.N Medical College, Bagalkot, between December 2011 and June 2013 were included in the study. Patients and their relatives were explained the condition, informed consent obtained and all details of the patients were collected in a proforma. The fracture was fixed with the Dynamic Hip Screw and plate and regular follow up was done in outpatient department at intervals 1st, 3rd, 6th months and 1 year post-operative period.

**2.2 Inclusion criteria**

1. Cases of intertrochanteric femur fractures – Boyd & Griffin classification type I and II
2. Patients with age 45 years and above and both sexes are included.

**2.3 Exclusion criteria**

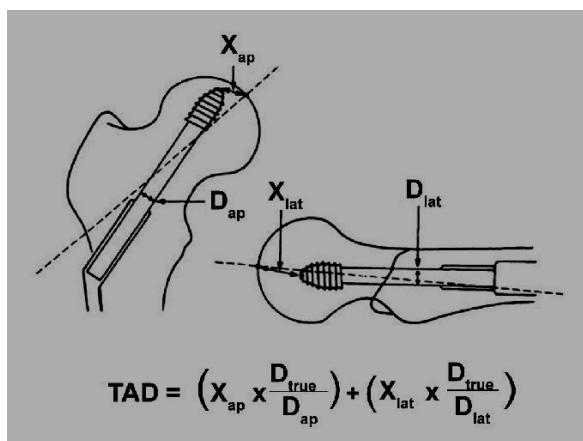
1. Boyd & Griffin classification type III and IV
2. Patients unfit for anesthesia.
3. Polytrauma case.

All the patients were operated on fracture table following standard operative technique for DHS. Tip Apex Distance was measured on post-operative AP and lateral radiographs.

**2.4 Statistical methods applied**

Statistical tests used:

- Descriptive statistics like mean, percentage and standard deviations were used.
- Fischer exact test is applied for significance of proportions.
- Fischer exact is calculated by using [Vassarstars.net/fischer23.html](http://Vassarstars.net/fischer23.html).

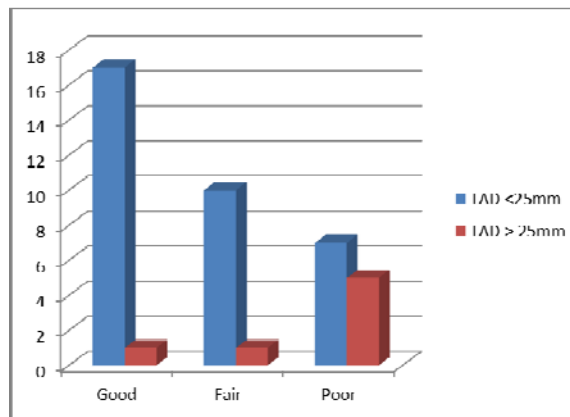


**3. Results**

The mean and standard deviation of age of the patients is  $69.91 \pm 9.07$ . The mean duration of hospital stay for entire sample was found to be  $16.11 \pm 3.6$  days. The study included 21 male patients (51.1%) and 20 female patients (48.9%). Of these 18 cases were right side fracture (44.4%) and 23 were left side (55.6%). Distribution according to Boyd & Griffin classification 26 (62.2%) were type I and 15 (37.8%) were type II.

**Table 1:** Distribution according to Harris hip score at 6 months

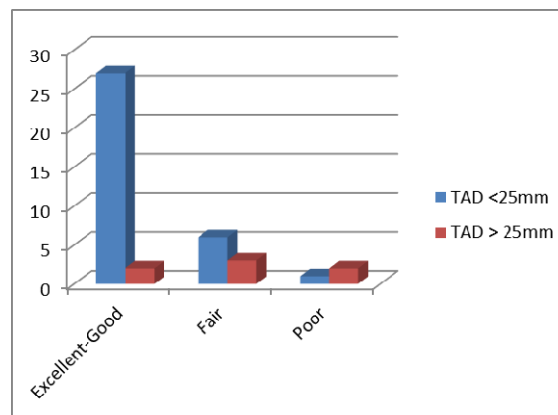
Harris hip score	Good	Fair	Poor
TAD <25mm	17	10	07
TAD > 25mm	01	01	05



**Graph 1:** Distribution according to Harris hip score at 6 months:

**Table 2:** Distribution according to Harris hip score at 12 months

Harris hip score	Excellent-Good	Fair	Poor
TAD <25mm	27	6	1
TAD > 25mm	2	3	2



**Graph 2:** Distribution according to Harris hip score at 12 months

Tip Apex Distance < 25mm was achieved in 34 cases and >25mm in 7 cases. At 6 months, 27 patients had good and fair results, 14 patients had poor results. All 7 patients with TAD >25mm had poor results.

At 12 months follow up, 29 patients had excellent to good results, 12 patients had fair to poor results. Five patients with TAD >25mm had fair to poor result. P value was found to be 0.0333 as it is <0.05, which signifies that cases with TAD <25mm have better functional outcome when compared to cases with TAD >25mm.

**4. Discussion**

The mean and standard deviation of the age of the patients in this study is  $69.91 \pm 9.07$ . The average age is higher in western countries compared to our country. The contributing factors for the low average age in Indians are malnutrition and osteoporosis. The life expectancy of the people from western countries is 10 years more than Indian population. There is no much difference in the sex distribution for the fracture.

This study shows that 34 patients had a Tip Apex distance less than 25mm and 7 patients had TAD more than 25 mm. R K Gupta had similar results in his 64 patients with 10 patients having Tip Apex Distance more than 25mm and 54 patients having Tip Apex Distance less than 25 mm. The patients with TAD less than 25 mm had no complications [5].

In the study by Yih Shiunn Lee *et al* [6] it was 86.9 and in the

study by M. Guven and Kjell matre et al <sup>[7]</sup> it was 88.9. In the present study mean Harris hip score was 83.75 which is comparable.

This study has shown that 17 patients out of 41 patients have given good results at 6 months and the 29 patients have improved to excellent to good results at the end of 1 year. Out of 7 patients with TAD >25mm, 5 had poor to fair results at 1 year. To achieve good results with DHS, it is imperative to meticulously maintain TAD less than 25mm.

Baumgaertner <sup>[8]</sup>, De Bruijn K <sup>[9]</sup> in their studies have concluded that patients with Tip Apex distance less than 25mm had given good results, once again strengthening the fact that Tip Apex Distance is a major predictor of good fracture union and screw cut out.

## 5. Conclusion

- Early surgery on patients with trochanteric fractures improved the ability to return to independent living and complications of prolonged immobilization are prevented.
- Dynamic hip screw provides satisfactory fixation but success is dependent on many factors like fracture type, Tip Apex Distance, postoperative care and rehabilitation.
- Although many factors influence the outcome of intertrochanteric femur fractures treated with DHS not all are under the control of the surgeon (type of fracture, Singh's index etc.). Tip Apex Distance is the most important parameter, which has great influence over the outcome and under the direct control of the surgeon's technique.

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