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## Efficiency Of Fibular Plating In Distal Third Leg Fractures In Correcting Valgus Of The Distal Tibial Fragment Treated With Interlocking Nailing.

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### ABSTRACT

Fractures of the distal third of the tibia and fibula are common injuries in an emergency trauma department. Availability of many implants and techniques has resulted in no clear cut method to manage these fractures. Hence we evaluated the influence of fibular plating in the above injury in providing stability to the construct and reduction in valgus deformity of the resultant fixation , concomitant interlocking nail. 25 patients with fractures of distal third tibia and fibula were included in this prospective case control study and were divided into two groups ,group I underwent closed intramedullary interlocking nail for tibia and group II had fibular plating prior to intramedullary interlocking nailing for tibia and followed until union and radiographs taken and the final valgus angle measured. The mean pre-operative valgus angle in the two groups were 8.37° and 11.37° respectively ( $p = 0.09 > 0.05$ ). Mean valgus angle post operatively was 4.36° and 4.96° respectively ( $p = 0.24 > 0.05$ ). Average difference between pre and post-operative valgus angle was 4.0067 and 6.34 in the two groups. Functional outcomes were good to excellent in both groups. It was found that the fibular plating offered no significant advantage in reducing postoperative valgus, but did offer its benefit in the greater extent of correction achieved from preoperative valgus, also aiding in reduction of the concomitant tibia fracture in nailing.

**Keywords:** distal third , tibia , nailing , valgus , fibular plating

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## INTRODUCTION

Fractures of tibia and fibula are one of the commonly encountered cases in any trauma casualty. Most of them are due to vehicular accidents while fractures due to trivial trauma like accidental fall at home are also not uncommon. Fractures in the lower one third of the leg are more often than not treated surgically. Surgical options are intra-medullary nailing – open or closed, open reduction and internal fixation with distal tibial plating. Literature regarding tibial fixation has been associated with plating of fibula sometimes and sometimes not. This study was aimed to find the differences in using fibular plating for distal one-third both bone fractures in leg, before tibial nailing.

## METHODOLOGY

A prospective study was conducted after ethical clearance. Closed fractures and Grade I (Gustillo-Anderson classification) one open distal one-third tibia and with fibula fracture were included in the study. The fracture patterns were transverse, oblique or spiral fractures predominantly. We excluded fractures in upper and middle one-third tibia and fibula, open leg fractures of Grade II and Grade III (Gustillo-Anderson) or if the fracture pattern was comminuted. These patients had pre-operative investigations including blood haemoglobin, blood sugar, blood urea, serum creatinine, ECG, Chest X-ray and radiographs of the involved region. The details of the surgery are explained to the entire set of patients. Those who consented for the fibula plating in addition to the tibia fixation were included in group 1 and those who did not consent for fibula fixation were included in group 2.

In group 1 the patient was placed supine, with a sand bag under ipsilateral buttock by a Henry approach the lower fibula fracture was exposed reduced and fixed with narrow DCP or 1/3 rd tubular plate. This wound was closed.



**Figure: Final valgus angulation (4.34°)**

The tibial fracture was reduced under C arm image intensifier control and the guide wire was passed. Serial reaming was done with flexible reamers and a suitable interlocking nail SSEPL<sup>®</sup> was inserted and proximal and distal locking was done.

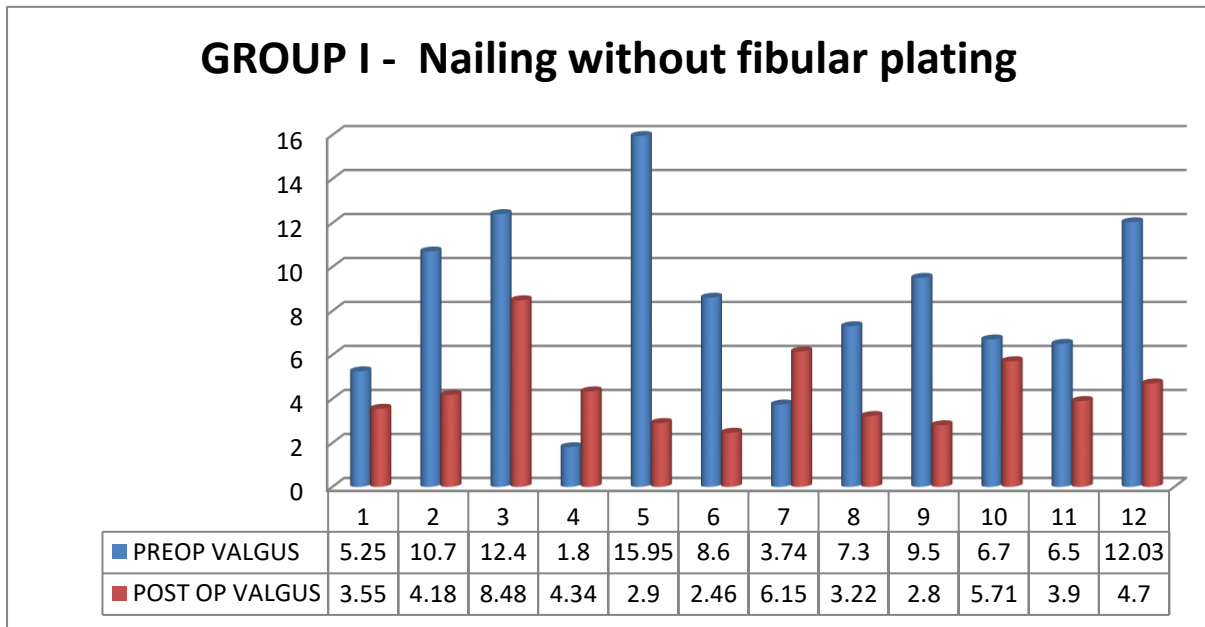
In one patient there was intra-operative deformation of the guide wire making it difficult to retrieve. This case had a loss of fixation needing a fibula fixation with a longer plate. In three cases the guide wire passage was difficult needed a Poller screw. Post-operative X-rays taken – read and measured to calculate value of valgus deformity / degree in both groups and also the mechanical axis to be calculated by full length standing X-rays.

**RESULTS**



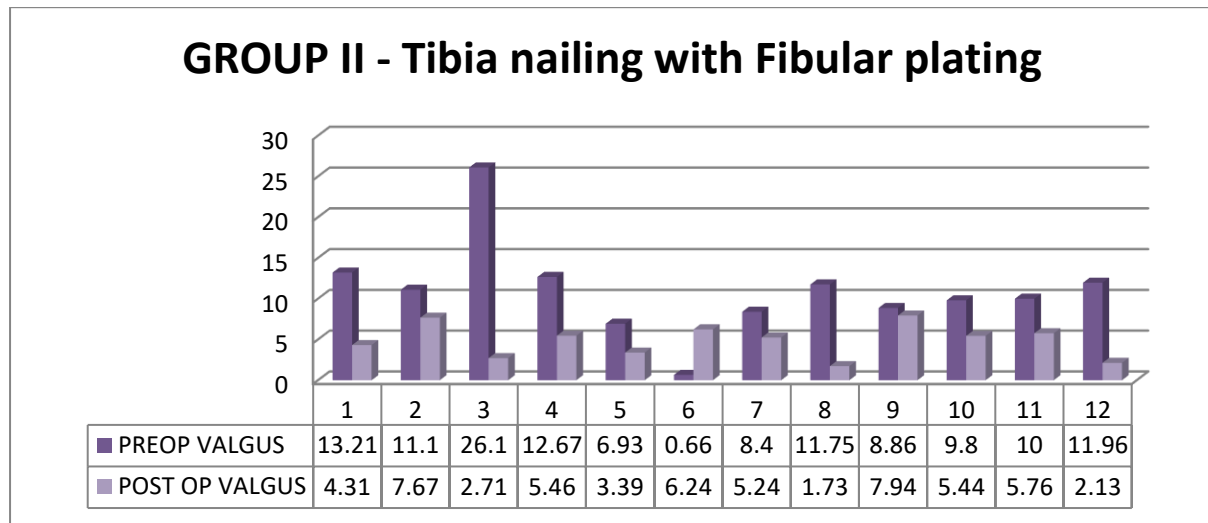
Anteroposterior view      Lateral view  
Pre operative(13.21 °) and Post operative valgus (4.31 °) angles

**PRE-OPERATIVE AND POST OPERATIVE VALGUS ANGLES**



One case of group I , had a pre-operative lateral displacement and post operative varus angulation of 1.99°

**GROUP II**



One patient had premature weight bearing causing self dynamisation leading to breaking of the locking bolt. Eventually the fracture united. One of our earlier cases were fixed in slight external rotation. Half of our patients had anterior knee pain of some degree possibly due to irritation of the patellar tendon or fat pad. In these cases the nail was nicely buried in the bone and not was prominent. All but two cases united. One delayed union case of the plating group was due to aseptic non-union due to interposition of soft tissue. Another case had no obvious reasons for non union. These two cases needed bone grafting to unite. We had eight bolt site infections, 4 in each group. These settled with antibiotics. One of these cases needed implant removal but the fracture was united by then. There was no established osteomyelitis in any of our cases. One of these cases had a pull out of locking bolt but the infection settled with antibiotics and fracture united without any other procedures.

**Table 1 showing the details of the cases which were studied**

Number of cases	50
Males	23+23
Females	2+2
Side	Right – 29 left 21
Implant	Universal tibia nail SSEPL <sup>®</sup> 1/3 <sup>rd</sup> Fibula plating
Anesthesia	Spinal anaesthesia
United	48 united 2 delayed union
Needed second procedure bone grafting	Two
Mean follow up	18 months ( 6 - 30 months )
Lost for follow up	Nil
Mean preoperative tibial angle in group 1 without fibula plating	8.37°
Mean preoperative tibial angle in group 2 with fibula plating	11.37°
Mean post operative tibial angle in group 1 without fibula plating	4.36°
Mean post operative tibial angle in group 2 with fibula plating	4.96°
Significant difference in the tibial axial angle between groups	p = 0.09 – without plating p = 0.24 – with plating
Varus angulation post operatively	1 in each group

## DISCUSSION

Few studies found that fibular plating maintains the alignment [1] and it maintains leg segment length, indirect reduction of tibia and lesser soft tissue injury [2-4]. It also maintains the rotational stability [5-7]. However fibular plating – neither an advantage nor a disadvantage [8] fibula fixation found to be of no use [9]. Proper tibia nailing with two distal bolts sufficient [10]. Also, secondary procedures are commonly done in plated group, also the nail group can be allowed early full weight bearing [10].

## CONCLUSION

In this study it was found that in fractures of both bones leg, fibular plating offered no significant advantage in reducing postoperative valgus. However it did offer its benefit in a greater extent with respect to the correction achieved from preoperative valgus of the particular case. It also, aiding in reduction of the concomitant tibia fracture in nailing and maintain the same till intra-medullary nailing was completed, without any increase in the rate of post operative complications..Prior fixation of the fibula also offered a notable assistance in maintaining the length of the tibia and in turn, the leg, especially in comminuted fractures of the tibia. It also additionally aided in indirect reduction of the tibial fracture.

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