

# Management of fractures of shaft of femour by closed and open method by IM Kuntsher Nailing

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## Abstract

**Background:** During the past four decades there has been a great advance in the treatment of femoral shaft fractures. Still there are still controversies in results of femoral shaft fractures treated by close versus open IMN. **Aim and objective:** To compare and evaluate the results of healing and its complications in femoral shaft fracture management treated by open and close IMN technique. **Methodology:** A total of 68 adult patients were operated due to fracture of the femur with close or open IMN technique. A total of 34 patients operated with close IMN technique were included in Group I while 34 patients operated with open IMN technique constituted Group II with inclusion and exclusion criteria. **Results:** Among 68 patients, 30 had undergone close nailing operation and 32 open nailing. The mean age among patients in close nailing and open nailing groups was  $28.2 \pm 4.8$  and  $32.4 \pm 6.2$  years respectively with no statistical significance. The mean time in closed and open technique was  $14.2 \pm 2.6$  and  $17.8 \pm 3.4$  weeks respectively and statistically significant ( $P < 0.001$ ). The infections were more in Group II (18.75%) as compared to Group I (6.67%). The other complications were also more in Group II patients. **Conclusion:** Thus we conclude that closed reduction technique is superior to open reduction in respect to management of femur shaft fracture.

**Key Word:** fractures, IM Kuntsher Nailing.

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## INTRODUCTION

During the past four decades there has been a great advance in the treatment of femoral shaft fractures. Hey Groves was one of the first surgeons who presented intramedullary nailing (IMN) for the treatment of femoral shaft fractures in United Kingdom, and later in Germany Kuntcher made a significant progress in the technique of this operation.<sup>1</sup> Close reduction and intramedullary fixation of fracture shaft femur proposed by Kuntcher, is the most biological way of treating the fracture shaft femur. Different open and close techniques have been described for using this device and each may be preferred by some surgeons according to availability of operating

room equipment (such as C-arm and fracture table), patient's factor (such, as morbid obesity), and fracture pattern and associated injuries (i.e., floating knee injury, concomitant acetabular fracture, and spinal injury).<sup>2</sup> The method of open nailing can be considered at rural health centres in Indian health scenario as comparably good results could be obtained with less expertise required and avoiding the radiological hazards and giving surgical assistance at a very economical basis. Keeping the multiple factors in mind e.g. overcrowded orthopedics wards with fracture femur, early disposal of the patient, less resources and unequipped peripheral hospitals and to avoid the hazards of radiation and various other benefits of open nailing, it was decided to conduct a study of open interlock nailing and its comparison with closed methods in fracture femur. From the early papers until now, there are still controversies in results of femoral shaft fractures treated by close versus open IMN.<sup>3,4</sup> Since, close IMN is not feasible in all patients with femoral shaft fractures and there are reports of serious complications associated with the use of fracture table, such as compartment syndrome in the normal leg and peroneal nerve palsy,<sup>5</sup> The purpose of this study was to compare and evaluate the results of healing and its complications in femoral shaft fracture treated by open and close IMN technique.

## AIM AND OBJECTIVE

To compare and evaluate the results of healing and its complications in femoral shaft fracture management treated by open and close IMN technique.

## MATERIAL AND METHODOLOGY

A total of 68 adult patients were operated due to fracture of the femur with close or open IMN technique between February 2013 to January 2014. A total of 34 patients operated with close IMN technique were included in Group I while 34 patients operated with open IMN technique constituted Group II. Inclusion criteria for our study included adult patients with acute fracture of the femur, and exclusion criteria included pathologic fractures, significant open fractures (Gustilo type 2 and 3), patients less than 18 years old, previous surgery on the femur or hip, anatomical deformity of the femur, non-acute fracture (more than 72 h since trauma insult), and patients who declined to participate in the study. During the follow-up period in Group I, 4 patients dropped out of the study; hence, the results of 30 patients were evaluated. During the follow-up period in Group II, 2 patients dropped out of the study, so the results of 32 patients were evaluated in this group. Demographic details of the patients included age, sex, medical co-morbidities, history of smoking, mechanism of injury, open or closed injury, type of fracture, associated injuries, time to union, malunion, non-union, Infection, and systemic complications were recorded. AO and Gustilo-Anderson classification were used for closed and open fractures respectively. All patients in both groups were operated by two surgeons with reamed, locked IMN technique who were experienced in these techniques. In Group I, patients were operated on the fracture table in the supine position. An incision centered over the great trochanter was made and an entry into the proximal femoral canal was made through the piriformis Fossa. Antegrade nail insertion was used for femoral diaphyseal and subtrochantric fracture and retrograde technique was used for distal femoral fracture. Static locking screws were applied distally and proximally. Proximal and distal screws were applied with insertion guide. In Group II, all patients underwent surgery on standard tables in the lateral position. Access to piriformis fossa was as the same as in Group I, but an additional incision was made over the fracture site and with one or two fingers the reduction and rotation was checked. Subsequently, a guide rod was passed from the piriformis fossa toward the distal fragment. Afterward reaming was performed. Antegrade nail with distal and proximal screws were inserted with insertion guide and without using fluoroscopy. Isometric exercises for quadriceps were started at the post-operative

first day, and the patients were mobilized with crutches on post-operative second day if there was no associated injury. Monthly clinical and radiological follow-up was performed. Union was defined as the absence of pain and instability at the fracture site and the presence of radiological consolidation of the fracture site.

## RESULTS

The final participants in the study were 68 patients, 30 of whom had undergone close nailing operation and 32 open nailing. The mean age among patients was 30.3±5.8 years i.e. in close nailing and open nailing groups was 28.2±4.8 and 32.4±6.2 years respectively. The difference between the mean age of the two groups proved not to be statistically significant based on a t-test ( $P = 0.052$ ). By gender, there were 23 male patients in the close nailing and 26 in the open nailing group respectively; the rest of the patients were female. The majority of fractures in the two groups were located in the femoral shaft (20 patients in close nailing and 24 in open nailing). The difference in the fracture location between the two groups was not statistically significant ( $P = 0.37$ ).

**Table 1:** Demographic profile and Fracture Site among Group I & II

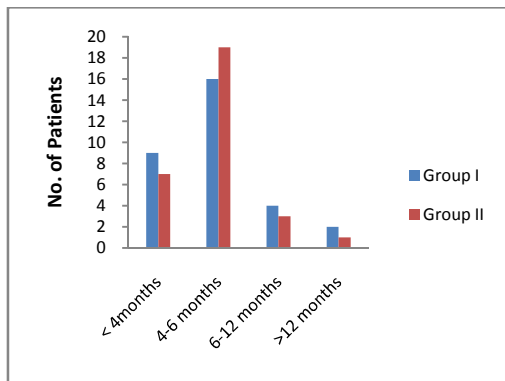
Variable		Group-I (n=30)	Group-II (n=32)	P-value
<b>Age (Mean) years</b>		28.2±4.8	32.4±6.2	0.67
<b>Gender</b>	Male	23 (76.67%)	26 (81.25%)	0.65
	Female	07 (23.33%)	06 (18.75%)	
<b>Site of Fracture</b>	Shaft	20 (66.67%)	24 (75.00%)	0.34
	Subtrochantric	06 (20.00%)	07 (21.88%)	
	Distal shaft	04 (13.33%)	01 (03.12)	

**Table 2:** Time to union of femoral fractures according to patient's variables

Variable		Time of Union (weeks)	p-value
<b>Method of Treatment</b>	Closed	14.2±2.6	< 0.001*
	Open	17.8±3.4	
<b>Gender</b>	Male	15.8±3.2	0.06
	Female	14.2±3.4	
	Shaft	15.4±3.3	
<b>Site of Fracture</b>	Subtrochantric	14.6±3.8	0.35
	Distal shaft	17.2±3.6	

p< 0.05 significant

As per table no.2 we observed that the mean time for union in all patients was 15.4±3.1 weeks. The mean time in closed and open technique was 14.2±2.6 and 17.8±3.4 weeks respectively. The results of time of union according to treatment between the groups were statistically significant ( $P < 0.001$ ). The difference was not significant for sex ( $p=0.06$ ) and site of fracture. ( $p=0.35$ )



**Figure 1:** Distribution according to union of fractures at different time

The figure no.1 showed that majority of fracture gets united between 4-6 months of operative.

**Table 3:** Distribution according to complications in both groups

Complications	Group I (n=30)	Group II (n=32)
Delayed union/non-union	00 (00)	01 (03.12%)
Infection(deep+superficial)	02 (06.67%)	06 (18.75%)
Shortening	01 (03.33%)	00 (00)
Others	02 (06.67%)	03 (09.32%)

The table no. 3 showed that majority of complications was in Group II. The infections were more in Group II (18.75%) as compared to Group I (6.67%). The other complications were also more in Group II patients.

## DISCUSSION

The study conducted with an objective to compare management of femur shaft fracture by open and closed technique by IM nailing. The mean age among patients were  $30.3 \pm 5.8$  years i.e. in close nailing and open nailing groups were  $28.2 \pm 4.8$  and  $32.4 \pm 6.2$  years respectively. In the study there were 23 male patients in the close nailing and 26 in the open nailing group respectively; the rest of the patients were female. The mean time in closed and open technique was  $14.2 \pm 2.6$  and  $17.8 \pm 3.4$  weeks respectively. The results of time of union according to treatment between the groups were statistically significant. The infections were more in Group II (18.75%) as compared to Group I (6.67%). Similar findings were found in various studies<sup>6,7</sup> that also observed that the fracture healing was earlier and superior in closed reduction technique. The rate of infection was also minimum in the closed reduction technique. The

reason for this was as that hematoma in closed reduction remains intact to fracture site and helps healing. The contrast part in routine open reduction and internal fixation of the fractured femur was observed that stripping of the periosteum and subsequent reduction of the blood supply at the fracture site cause extensive soft-tissue damage. This increased blood loss causes fracture non-union and infection. The open technique was less expensive, easy and more convenient for less experienced and newly qualified Orthopedic surgeon. The requirement is also minimum as per instruments. The advantage in open technique was that bone may lead to absolute anatomic reduction and this could not be achieved in close technique mostly in comminuted and segmental fractures. The technique of closed reduction better than open reduction the choice mostly remains on the Orthopedic surgeon which to follow as per infrastructure and experience. But as per our study close reduction was better to manage femur shaft fracture.

## CONCLUSION

Thus we conclude that closed reduction technique is superior to open reduction in respect to management of femur shaft fracture.

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