

# Outcome of Fracture Distal Femur Treated with Retrograde Nailing.

Syed Ghulam Mujtaba Shah,<sup>1</sup> Adeel Ahmed,<sup>2</sup> Saeed Ahmed Shaikh,<sup>3</sup> Nadeem Ahmed,<sup>4</sup> Allah Rakhio Jamali<sup>5</sup>

<sup>1</sup> Senior Registrar

Orthopaedic Unit 1 Civil Hospital Karachi/ Dow University of Health Sciences Karachi.

<sup>2</sup>Senior Registrar Ward 14 JPMC/ Jinnah Sindh Medical University Karachi.

<sup>3,4</sup>Assistant Professor Ward 14 JPMC/ Jinnah Sindh Medical University Karachi.

<sup>5</sup>Professor, JPMC/ Jinnah Sindh Medical University Karachi

## Authorship and contribution Declaration:

<sup>1</sup>**Syed Ghulam Mujtaba Shah:**

Conception and design of the study, acquisition of data

<sup>2</sup>**Adeel Ahmad:** Analysis & Interpreted the data

<sup>3</sup>**Saeed Ahmad Shaikh:** Revised the manuscript critically for important intellectual content

<sup>4</sup>**Nadeem Ahmad:** Drafted the manuscript, acquisition of data

<sup>5</sup>**Allah Rakhio Jamali:** Final approval of the version for publication

## Correspondence Author:

Syed Ghulam Mujtaba Shah

Email:

cuteshah@hotmail.com

cuteshah@hotmail.com

## ABSTRACT

**Objective:** To determine the functional and radiological outcome of fracture distal femur treated with retrograde interlocking nail.

**Methods:** This was a descriptive study conducted at Department of Orthopaedics surgery Jinnah Post Graduate Medical Centre(JPMC) from 15<sup>th</sup> February 2016 to 10<sup>th</sup> January 2019. All patients fulfilling the inclusion criteria were treated with retrograde nailing. Post operative functional outcome was evaluated with Schatzker and Lambert criteria as graded as excellent, good and poor. Radiologically union was assessed with x rays.

**Results:** There were 97 patients with mean age of 35.20±10.66(range 20 to 50 years) of age. Male patients were 74(76.2%) and female 23(23.7%). Majority(70.1%,n=68) of fractures were due to motor vehicle accidents. Right side fracture was present in 60(61.9%) patients and left in 37(38.1%). Excellent outcome was noted in 72(74.2%) patients and good in 25(25.7%). No non union was documented.

**Conclusion:** Excellent and good functional and radiological outcome was achieved in distal femur patients treated with retrograde interlocking nailing. We recommend retrograde interlocking nail as an implant of first choice for selected distal femur fractures.

**Key Words:** Distal femur fracture, Retrograde interlocking nail, Schatzker and Lambert criteria.

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## INTRODUCTION

Distal femur fractures usually results from high energy trauma such as motor vehicle accidents in younger patients and low energy trauma like simple fall in older osteoporotic and female patients.<sup>1</sup> Although it accounts for 6% of overall femur fractures, improper treatment can results in knee

stiffness and osteoarthritis.<sup>2</sup> Distal femur fractures are usually treated surgically and various treatment options are present to treat these fractures but the ultimate goal is to achieve perfect length, alignment, union, early range of knee motion and weight bearing.<sup>3</sup> Closed Intramedullary implants not only respect soft tissue envelope and periosteum but can

achieve this goal without increasing the risk of infection and prolonged immobilization.<sup>4</sup> Retrograde interlocking nail is associated with swift recovery, early union and lesser complications.<sup>5</sup> This implant is preferable to plate and screws because it is load sharing, minimum soft tissue dissection and periosteal stripping is done during its application, chances of union are more and patient is mobilized earlier.<sup>6</sup>

The treatment options of distal femoral fractures in our unit ranges from traction to locking plate, interlocking nails and Ilizarov. We conducted this descriptive study to determine the functional and radiological outcome of fracture distal femur treated with retrograde interlocking nail. The results of this study would help us to formulate standard guidelines to treat distal femoral fractures.

## METHODS

This descriptive study was conducted at Department of Orthopaedics surgery Jinnah Post Graduate Medical Centre(JPMC) from 15<sup>th</sup> February 2016 to 10<sup>th</sup> January 2019. All adults patients of either gender with distal femur fractures(AO type 33A1,A2,A3,C1) presenting within one week to the Accident and emergency Department or Outpatient Department(OPD) were enrolled in this study. Open fractures, pathological fractures and polytrauma patients requiring surgical intervention for other regions of the body were excluded. The study was approved by the Ethical Review Board(ERB) of the hospital. Informed consent was taken from all the participants. All the patients were initially assessed and treated for any life threatening conditions. Complete history and physical examination was done in all the patients. Skin traction or a long slab was applied on arrival. X ray of the limb was taken in both views and fracture classified according to the AO classification system.<sup>7</sup> A 3D CT scan was advised in comminuted fractures. All surgeries were performed under general or spinal anaesthesia on radiolucent traction table. Preoperative second generation cephalosporin(cefuroxime) was administered to all the patients at induction. A senior consultant with at least 5 years post fellow ship experience did the surgery. All surgeries were performed in a standard and uniform manner. The femoral condyle was exposed through a central incision with knee in flexion. Under image intensifier proper entry point was made and guide wire passed while maintain reduction and alignment. A proper length and maximum diameter of nail was inserted closely and locked at both ends. Physiotherapy was started on

the first post operative day to encourage early range of motion of knee. Patients were called for follow up at 2<sup>nd</sup>, 4<sup>th</sup> and 6<sup>th</sup> week initially and then monthly for one year. In each visit patients were clinically assessed for knee range of motion and ability to tolerate weight. X rays were done to see bone union. At 36<sup>th</sup> week functional outcome was assessed with Schatzker and Lambert<sup>8</sup> criteria and radiological healing with X ray AP and Lateral View. Categorical variables( like gender, side of fracture, type of fracture) were represented as frequency and percentages while quantitative variables(like age) were represented as mean and standard deviation. Stratification of important variables(like)age was done to control effect modifiers and Chi-square test was applied to see for statistical significance. *P* value < 0.05 was considered as significant. Data presented in tabulated form and graph where necessary.

## RESULTS

The total number of patients in our study were 97. The mean age of our sample was 35.20±10.66. Male patients were 74(76.2%) and female 23(23.7%). Most(48.4%,n=47) patients were in the age group 21 to 30 years, followed by 31 to 40 years(28.8%,n=28) and 41 to 50 years(22.6%,n=22). Right side was involved fracture in 60(61.9%) patients and left in 37(38.1%).



**Graph I:** Functional outcome assessed with Schatzker and Lambert criteria

Motor vehicle accident had caused fracture in 68(70.1%) patients while 29(30.2%) patients sustained fractures due to fall on ground. The type of fractures were AO type A1 in 36(37.1%) patients, A2 in 27(27.83%), A3 in 20(20.6%) and C1 in 14(14.4%) patients. Excellent outcome according to the Schatzker and Lambert criteria was noted in 72(74.2%) patients and good in 25(25.7%) as shown

in graph I. Age wise stratification (table I) shows that younger patients(21 to 30 years) had excellent outcome than other age groups(P value < 0.05).No poor outcome was reported. No non union was documented. Superficial skin infection was reported in 8(8.2%) patients which resolved with local care and antibiotics.

**Table I:** Age wise stratification of functional outcome

Age Groups	N	Excellent n=72	Good n=25
21 to 30 Years	47	42(89.3%)	5(10.6%)
31 to 40 Years	28	18(64.2%)	10(35.7%)
41 to 50 Years	22	12(54.5%)	10(45.4%)

## DISCUSSION

The patterns of distal femur fractures are so diverse that no single treatment option can be recommended to treat all of these fractures.<sup>9,10</sup> However closed intramedullary nailing has the advantage of early mobilization and lesser complications than other treatment options.<sup>11,12</sup> The demographic profile of our study participants were almost identical to those reported in previous studies.<sup>1,3,13,14</sup>

In our study excellent outcome according to the Schatzker and Lambert criteria was noted in 72(74.2%) patients and good in 25(25.7%) patients. Kim and Oh<sup>15</sup> reported excellent and good outcome in 84%(26 out of 31 patients).But their sample size was 31.They also reported 3 non union femur in their series.They are of the opinion that retrograde nailing is a good option to treat distal femoral fractures but care should be taken in cases of extremely comminuted fractures and fractures closer to the knee joints. Rathi NB<sup>1</sup> treated 20 patients with retrograde nailing and noted excellent results in 50%,good in 20% and fair in 5% patients.The outcome assessment tool of Rathi NB was however, Neer's scoring system.Younger patients in their series had good results like our study. But they reported many complications like pulmonary embolism in 2 patients ,shortening of femur in 3 patients, stiffness of knee in 2 and delayed union in 3 patients.Seifer<sup>10</sup> reported no non union in his series.Gupta<sup>13</sup> reported 9% non union in his study.

In our study we achieved a higher union rate with minimal complications.Similar results were obtained in previous studies.<sup>16-19</sup>Retrograde nailing is

a closed treatment option without interrupting the fracture hematoma and leads to early callus formation.This observation was confirmed by Henderson in his comparative study of nailing versus locking plate.He found excessive early periosteal callus formation in nailing group than plating group.<sup>20</sup> Kumar<sup>21</sup> recommended titanium nails to treat distal femoral fractures in elderly patients particularly extra articular distal femoral fractures. Kregor<sup>22</sup> compared traditional open reduction versus retrograde intramedullary nailing and found a significantly higher need of subsequent bone grafting and frequency of malunion in ORIF group than nailing group.A higher infection rate and nonunion was also noted in ORIF group but that was statistically not significant.Harin<sup>23</sup> reported contrary results to previous studies after comparing fixed angle blade plate and retrograde nailing,He found that although nailing and plating had equally good outcome, nailing group had more complaints of knee pain and more revision surgeries for removal of nails. Two local studies<sup>24,25</sup> conducted on 31 and 140 patients respectively concluded that retrograde nailing for distal femur fracture produced excellent functional and radiological results with minimal complications.

The design of our study was descriptive. Our study had a small sample size and short follow up duration. We recommend randomized trials of larger sample size and larger follow up period to confirm our results.

## CONCLUSION

Excellent and good functional and radiological outcome was achieved in distal femur patients treated with retrograde interlocking nailing. We recommend retrograde interlocking nail as an implant of first choice for selected distal femur fractures. With this treatment option patients are earlier mobilized and return to job and social life is therefore quicker than other treatment methods adopted for similar fractures.

**Conflicts of interests:** None

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