“FUNCTIONAL OUTCOME OF PROXIMAL FEMORAL NAILING A II IN INTERTROCHANTERIC FRACTURES”: A 1 YEAR HOSPITAL BASED PROSPECTIVE STUDY

By

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Dissertation

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Belagavi, Karnataka

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IN

ORTHOPAEDICS

DEPARTMENT OF ORTHOPAEDICS,

JAWAHARLAL NEHRU MEDICAL COLLEGE,
BELAGAVI, KARNATAKA

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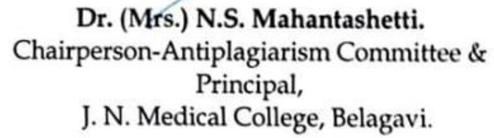

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LIST OF ABBREVIATIONS:

GLOSSARY	ABBREVIATIONS
PFN	PROXIMAL FEMORAL NAIL
PFN- A	PROXIMAL FEMORAL NAIL-ANTIROTATION
HHS	HARRIS HIP SCORE
GT	GREATER TROCHANTER
DHS	DYNAMIC HIP SCREW
LT	LESSER TROCHANTER
IT	INTERTROCHANTERIC
SHS	SLIDING HIP SCREW
IM	INTRAMEDULLARY
TFN	TROCHANTERIC FIXATION NAIL

ABSTRACT

Background: Intertrochanteric fractures are a variant of pertrochanteric fractures occurring in the region extending from the extracapsular basilar neck region to the region along the lesser trochanter proximal to the development of medullary canal. Management of intertrochanteric fractures is a major challenge.

Objectives: To assess the functional outcome of intramedullary fixation using helical blade (PFNA2) in the treatment of Intertrochanteric fractures

Materials and methods: Data was collected from patients who came to casualty or outpatient department (OPD) with intertrochanteric fractures ,who were to undergo closed reduction internal fixation with proximal femoral nailing A II in in Dr. Prabhakar Kore Hospital & Medical Research Centre and Charitable Hospital in Belagavi over a period of one year.

Conclusion: Proximal femoral nail (PFN-A II) gives better control of rotation, length and proximal purchase in unstable pertrochanteric fractures. Restoration of medial cortical continuity and preservation of lateral wall gives good results in unstable intertrochanteric fractures. Our results suggest that proximal femoral nailing (PFN-A II) may allow faster postoperative restoration of weight bearing.

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INTRODUCTION

A sizable percentage of fracture -related hospital admissions are owing to proximal femur fractures.[1] More than 90% of those impacted by these fractures are over 50 years old.[2] These fractures are categorized into three, according to where they are located anatomically: subtrochanteric, intertrochanteric, and neck femur fractures. Each variety has its own set of difficulties, necessitates different treatment procedures, and is linked to continuous discussions about the best management techniques.[3]

Treatment strategies for trochanteric fractures have been impacted by significant advancements in orthopedic principles and implants, as well as improvements in our understanding of the biomechanics and biology of the trochanteric area.[4]Although several intramedullary and extramedullary implants have been developed for surgical fixation, the best implant for internal fixation is still up for dispute. The biomechanical characteristics of the implant and the stability it offers during fixation are the main deciding factors [5–8]

The two most popular methods of fixation in treating intertrochanteric fractures are intramedullary fixation devices (PFN), which share load, Dynamic Hip Screw (DHS), which bears weight [9]Because there is less space between the implant and the hip joint, intramedullary nails are expected to provide theoretical biomechanical advantages over screw-and-plate fixation. Because it enables early patient mobility and a return to functional levels, surgical intervention preferred in these fractures over conservative methods [10]

OBJECTIVE OF THE STUDY :

Asssessment of the functional outcome of patients who suffered IT Femur fractures and were then treated with PFN-A II using Harris Hip Score

ANATOMY

The head of femur articulates with the acetabulum of pelvis to produce the hip joint. The femoral head, neck, and two bony protuberances known as the GT and LT are all part of proximal femur. The anterior IT line and the posterior IT crest are the two ridges that join these trochanters.

Head: The femur's rounded top where it inserts into the acetabulum. It features a little fovea where the ligamentum teres attaches, and is mostly covered with articular cartilage.

Neck: Provides hip movement by connecting the head and shaft at an angle of around 135°.

Greater Trochanter: Large, lateral projection for the gluteus muscles (medius, and minimus), and piriformis muscles, as well as the origin of one of the vastus muscle. Forceful contraction of gluteus medius can cause avulsion fractures here.

Lesser Trochanter: Smaller, posteromedial projection serving as the iliopsoas attachment site. It can also experience avulsion fractures under forceful muscle contraction.

Intertrochanteric Line (anterior): Runs inferomedially between the trochanters, continuing as the line of pectine. Acts as the point where the anterior hip capsule and iliofemoral ligament join.

Crest Intertrochanteric (posterior): Connects the trochanters, featuring the quadrate tubercle for quadratus femoris attachment.

Below this region (the subtrochanteric area), the lesser trochanter sits posteromedially where the iliopsoas inserts, causing flexion(of the proximal fracture fragment). The distal portion is pulled towards midline and upward by adductors, while the proximal component is abducted and rotated externally by the gluteus muscles -medius and minimus. These highly vascularized muscles may cause significant bleeding when fractured or operated on.

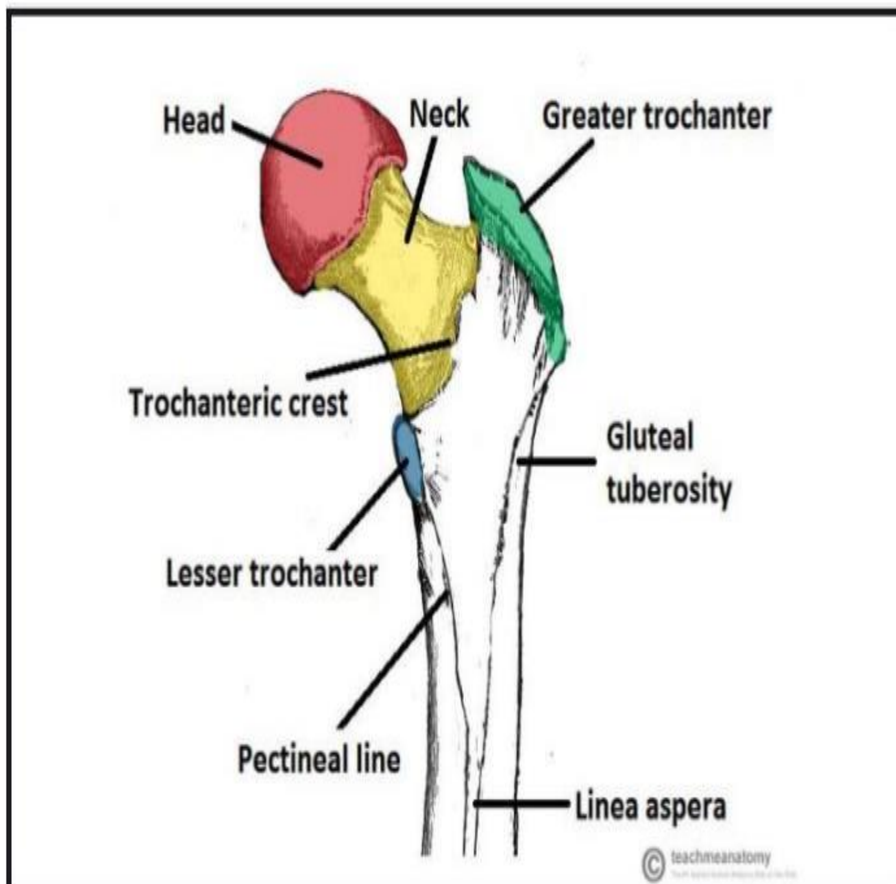


Figure 1 :PROXIMAL FEMUR ANATOMY

REVIEW OF LITERATURE

In 1564, French surgeon Ambroise Paré first documented a proximal femoral fracture. In 1825, English surgeon Sir Astley Cooper advised supporting the thigh in flexion and promoting early mobilization—moving patients from bed to chair, then to protected walking. He also distinguished intracapsular from extracapsular fractures, a key classification still recognized. In 1860, Buck brought into play the technique of strapping using an adhesive plaster as a way of traction method.

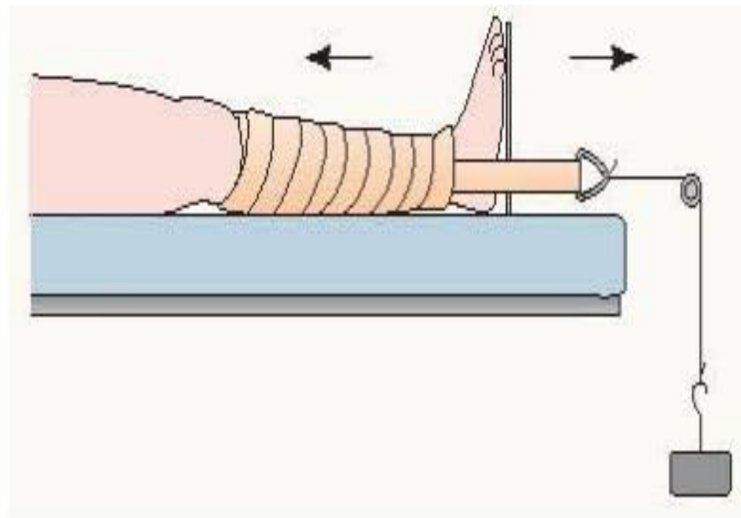


Figure 2 :BUCK'S TRACTION

In the year 1895, Kocher introduced a specialized contrivance aimed at addressing fractures of the proximal femur, thereby refining and advancing upon the initial categorization by Astley Cooper. Steinmann then introduced skeletal traction in 1909 by a pin as fulcrum for pulling force. Later still, in 1924, Hamilton-Russell [12] unveiled an innovative skin-traction technique. Both approaches came to serve as principal conservative treatment options.

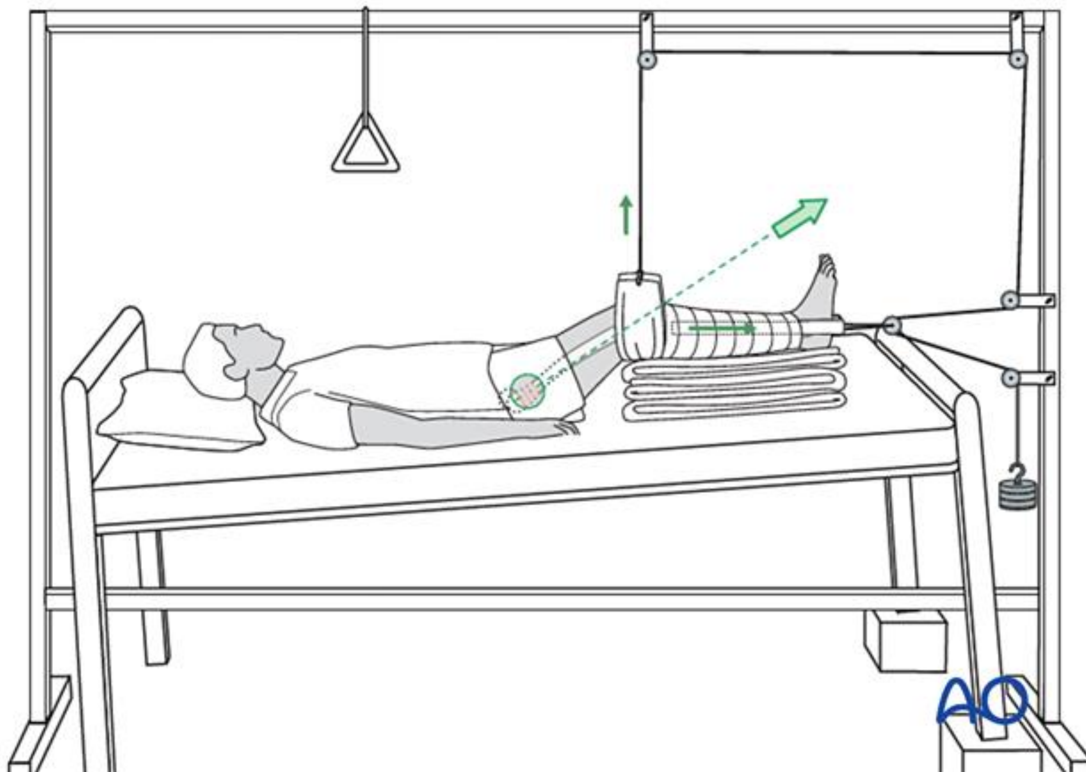


Figure 3:HAMILTON-RUSSEL TRACTION

Around the year 1930, trochanteric fractures were most often treated by conservative measures, among them Russell's traction and skeletal traction were most common. At the outset, treatment comprised various schemes of immobilization following closed fracture reduction. Von-Langenbeck, in 1878, first recorded the practice of open reduction coupled with internal fixation for hip fractures. Yet, it was not until some forty years thereafter—upon the advent of the Triflanged nail—that operative intervention found its true significance.

The Smith-Petersen nail, for its part, brought forth a host of difficulties: upholding proper reduction proved troublesome, the implant had a tendency to back out, and occasionally it breached the joint space via head of the femur. Thornton in the year 1937 introduced Triflanged nail-plate attachment in an attempt to improve lateral shaft fixation. This allowed for more robust stabilization of trochanteric fractures. By 1941, Jewett(13) brought into play a one-piece nail that rapidly gained broad acceptance. Nonetheless, none among these designs could achieve the advantage of fracture impaction.

Figure 4 :JEWETT'S NAIL

Austin Moore[14] designed a 'Blade plate' around the same time period .It did not gain much popularity. McLaughlin in the year 1947, introduced a differential angle nail-plate. The most promising characteristic of this changed into that once The nail plate may easily conform to the femoral shaft during insertion.

Figure 5 :SP NAIL WITH MCLAUGHLIN PLATE

In the year 1949,Boyd n Griffin[15] brought into play a schema for intertrochanteric fractures, delineating four discrete subtypes. That very year, Merwyn and Evans offered an alternate framework, dividing these fractures into stable and unstable categories. By 1955, Jantzen and colleagues had expounded upon the utility of a sliding screw first envisaged by Ernst Pohl. Callender then introduced further refinements to this apparatus, enabling Harrington and Johnson to employ it in the management of a series of unstable IT fractures.

Massie advanced an one hundred fifty° aspect-plate incorporating a telescoping tri flanged nail, which allowed for fracture website impaction however became related to a higher incidence of osteonecrosis.

In the year 1964, Clawson[16,17] stated on the usage of a sliding-screw blended with a plate for trochanteric fracture fixation. The tool changed into at first developed by way of Richard and his employer, after numerous design adjustments, have come to be known as the Richard's Compression Screw.

Egger later improved the plate assembly of this screw via changing these round holes with slotted holes, allowing axial sliding therough the femoral shaft.

The SHS[18] gives several blessings, which includes a massive-width lag screw for improved fixation in porotic bone and minimum injury for the duration of insertion. It enables fracture site impaction, promoting fracture union whilst lowering the instant arm and strain on the implant, hence reducing chances of failure of implant. It minimizes complications which include cut out of the screw.

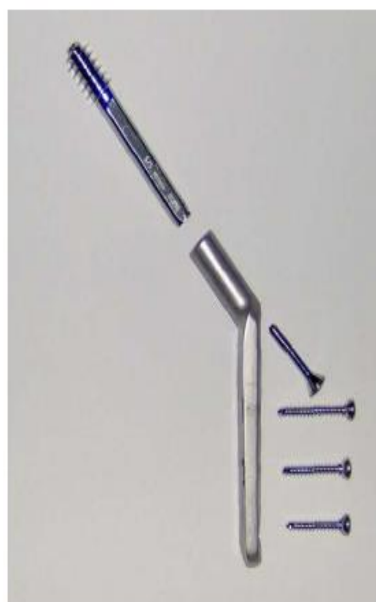


Figure 6 :SLIDING HIP SCREW(SHS)

The Medoff plate [19,20], a biaxial SHS, was first presented in the year 1990. It acts on the femoral side plate and affects fractures along the femur's axis. Its sliding components are a linked pair. It has a low fixing failure rate and a good stability grade.

Figure 7 :MEDOFF PLATE

In the year 1967, Dimon n Hughston[21] proposed that IT fractures be sorted on the basis of function rather than purely anatomical landmarks, given that outcomes depend chiefly on fracture stability. The distal fragment is moved medially beneath the head-neck section in a primary-medial-displacement osteotomy (PMDO), which they promoted. This maneuver allows the proximal fragment’s bony spike to be driven into the distal piece and thereafter secured with a SHS.

But, this method has extreme drawbacks, inclusive of limb shortening and abductor muscle weakness. additionally, it could restriction the patient’s capability to regain full ROM.

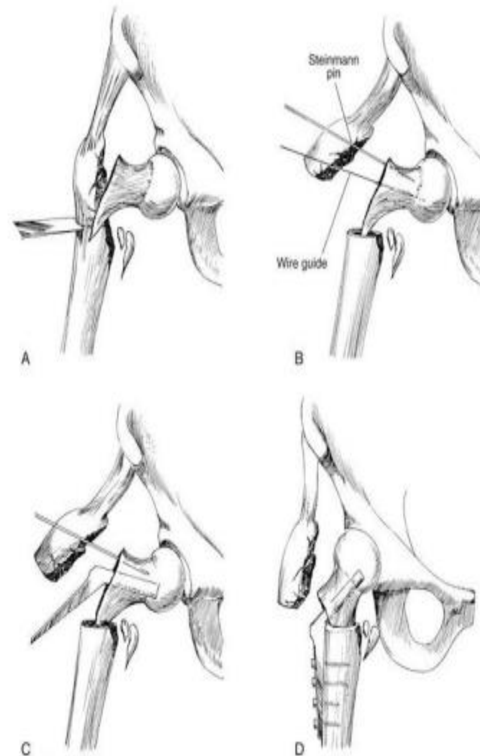


Figure 8 :DIMON AND HUGHSTON OSTEOTOMY

In the year 1970, Augusto-Sarmiento(22) brought into light that inadequate reduction of the medial cortex can result in malalignment(varus), increasing the risk of failure of implant. He emphasized that osteotomy could enhance stability with the aid of achieving valgus. However, he additionally mentioned that during instances with gross medial comminution, even osteotomy won't offer sufficient balance.

In the year 1974, Ender(23,24) introduced nails which are inserted starting from condyles towards proximal aspect of femur using C-arm. These nails, positioned close to the mechanical axis, experience less bending stress. However, they have several disadvantages, including proximal migration through the femoral head, supracondylar femur fractures, rotational deformities, nail back-out, and complaints such as knee pain and joint stiffness.

Figure 9 :ENDERS NAIL

In 1986, reconstruction nails had been developed, inclusive of the Russell-Taylor reconstruction nails, which had been especially designed for trochanteric fractures with ipsilateral other fractures of femur.

In 1990, the Gamma nail[25,26,27,28,29] was introduced mainly with the intent to tackle Boyd n Griffin Type 3 and 4 fractures. As an IM tool, it features as a load sharing implant, supplying the following advantages:

-a shorter lever arm

-better fracture impaction

-decreased soft tissue dissection

-shorter operative time

But, it includes an improved risk of prosthetic fractures on the tip of the nail.

Figure 10 :GAMMA-NAIL

PFN[30,31] was introduced in the year 1997 to tackle complications related to the implant and to better manage unstable proximal femur fractures. Huber S.M et al., studied the biomechanics of PFN and confirmed a reduced load on implant accompanied with an improved stability while in comparison to Gamma-Nail.

Figure 11 : PFN

A 1999 research by Simmermacher et al. [32] showed that using a PFN as a chance to apply a Gamma nail had a very low concern charge.

Compared to patients operated with a 95° blade plate, those operated with an IM Nail experienced shorter hospital stays, less blood loss (no need for blood transfusions), and shorter operating times[33]

In 2003, Boldin et al.[34] concluded that PFN is probably inserted thru a smaller incision, minimizing smooth tissue harm in volatile trochanteric fractures. In 2008, Msg Ballal emphasized the significance of carrying out strong discount and fixation with a well positioned, very well sized nail to prevent failure and the need for revision surgical treatment.

Figure 12 : PFN - ANTIROTATION

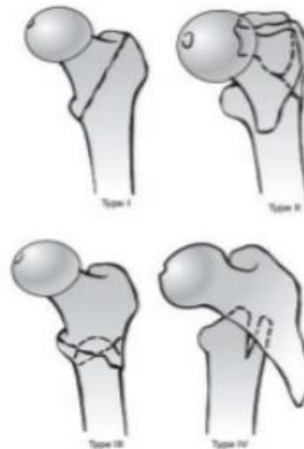
In 2004, AO–ASIF introduced the PFN-Antirotation system, featuring a helical blade in lieu of standard screws. This design was intended to diminish the incidence of mechanical complications while conferring enhanced rotational and angular stability[35,36] compared with the traditional double-screw construct. Additionally, it permits impaction to occur around the helical blade, further aiding in fracture management.

CLASSIFICATIONS

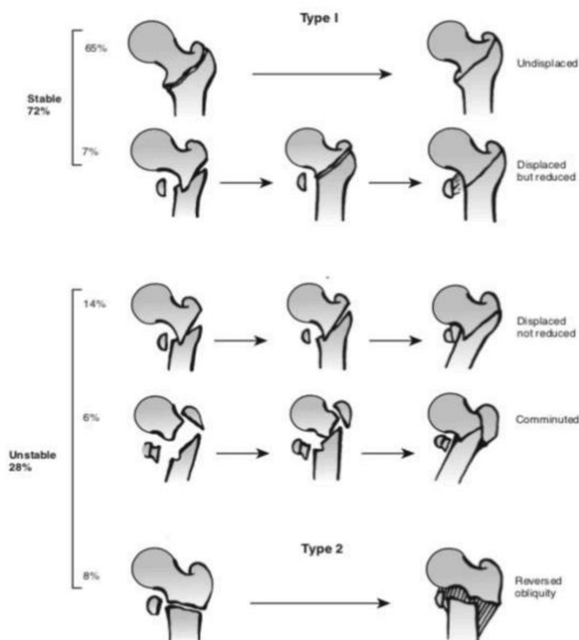
1. BOYD AND GRIFFIN classified fractures based on degree of stability

Boyd and Griffin Classification

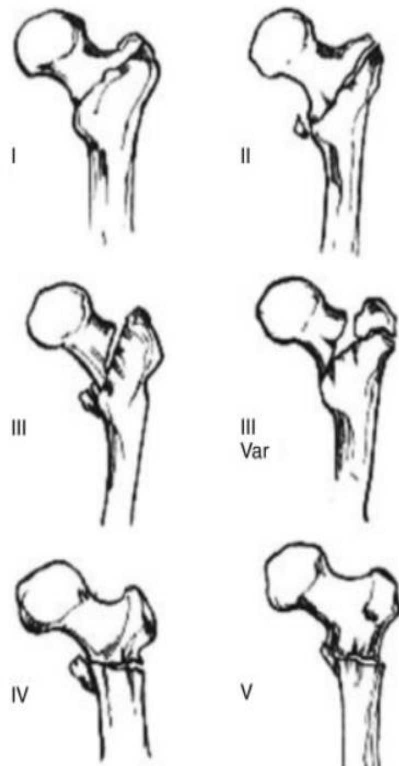
- **Type I** – Stable two part
- **Type II** – Unstable Comminuted
- **Type III** - Unstable Reverse Oblique
- **Type IV** – Intertrochanteric – sub trochanteric with two planes of fracture



2. EVANS CLASSIFICATION is based on the reducibility of stable and unstable fractures



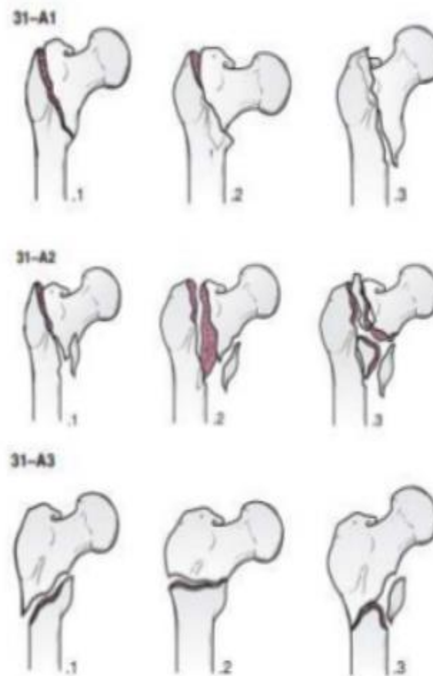
3. TRONZO'S CLASSIFICATION :



4. AO/OTA CLASSIFICATION :

AO/OTA classification

- A1 – Simple two part #. Lateral cortex remains intact.
- A2 – Comminuted with postero-medial fragment. Lateral cortex remains intact.
- A3 – # line extend across both medial and lateral cortices. Include reverse oblique #s.



MATERIALS AND METHODS

Data Source:

Data collected from patients who had come to casualty or outpatient department (OPD) with intertrochanteric fractures ,who were to undergo internal fixation with PFN-A II in Dr.Prabhakar Kore Hospital & MRC and Charitable Hospital, Belagavi

Study : PROSPECTIVE STUDY design

Period: One YEAR

Sample Size: The minimum sample size for the study formulated based on mean n standard deviation is 29

INCLUSION CRITERIA

- Age >18 years

- IT femur fractures classified as A1/A2/A3 according to OTA Classification

- Boyd and Griffin type 1, 2 ,3 or 4

- IT Femur fractures associated with ipsilateral femur shaft fracture

- Patients willing to be enrolled after getting the consent explained in their own vernacular language

EXCLUSION CRITERIA

- Age<18 years

- Pathological fractures
- Compound fractures

- Patients who were not fit for surgery and hence could not be taken up

- Malunited proximal femur fractures or fractures gone into non union

- Associated other fractures, other than those mentioned in the inclusive criteria(which might affect the functional outcome)

METHODS

Preoperative Evaluation

1. Upon patient admission, an in depth history about the mode of damage and any associated comorbid conditions become received.
2. A comprehensive clinical assessment was conducted.
3. Preoperatively, all patients were managed with skin traction to alleviate pain, prevent limb shortening, and minimize unnecessary movement of the fractured limb.

4. Pain relief was provided using NSAIDs.
5. Routine blood evaluation was performed and fitness obtained.

Radiographic Assessment:

- **PBH – AP view**
- **Hip with femur – AnterioPosterior (traction and internal rotation views)**
- **CXR – PA view**

Preoperative Planning

- **Determination of Nail Size:**
- Measured through assessing the canal diameter on the isthmus level the use of an AP X-ray.
- **Neck-Shaft Angle Measurement:**
    - Evaluated for both the normal and injured hip using traction and internal rotation views.

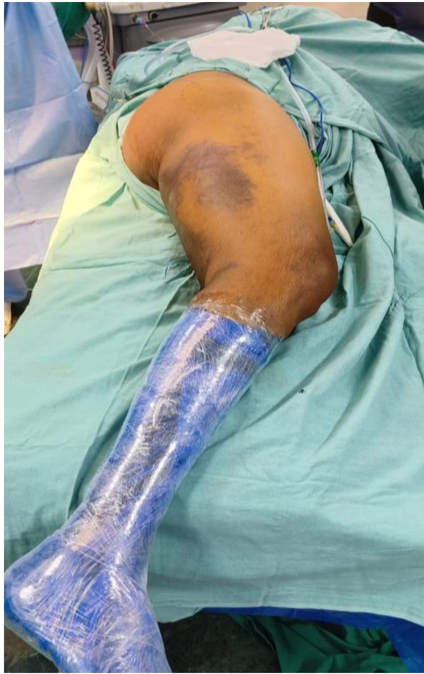
Preoperative Preparation

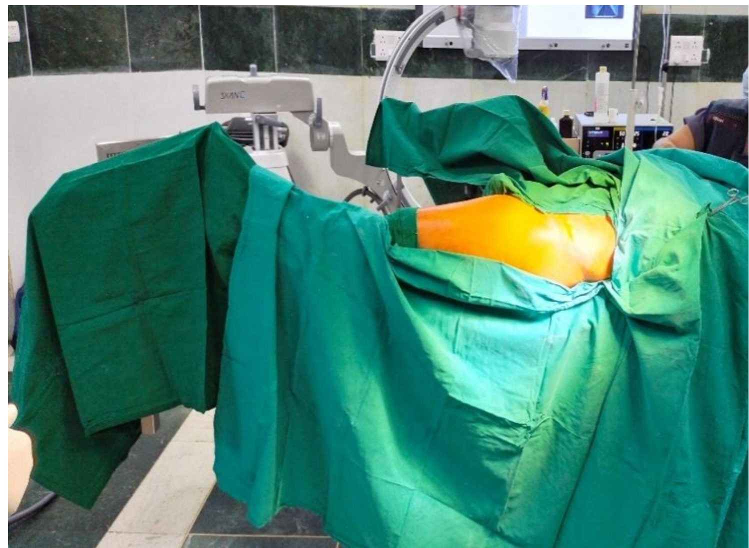
- **Sensitivity Testing:**
    - Injection Xylocaine test dose (0.1 cc) was administered intradermally.
- **Prophylactic Measures:**
    - Injection TT (zero.five cc) changed into given intramuscularly the day before surgery.
    - Intravenous antibiotics were administered one hour before surgery.
- **Surgical Site Preparation:**
    - The back, lateral hip, iliac crest, distal thigh, and groin have been wiped clean and organized for surgical procedure.

OPERATIVE TECHNIQUE

PATIENT POSITIONING: (done by two methods)

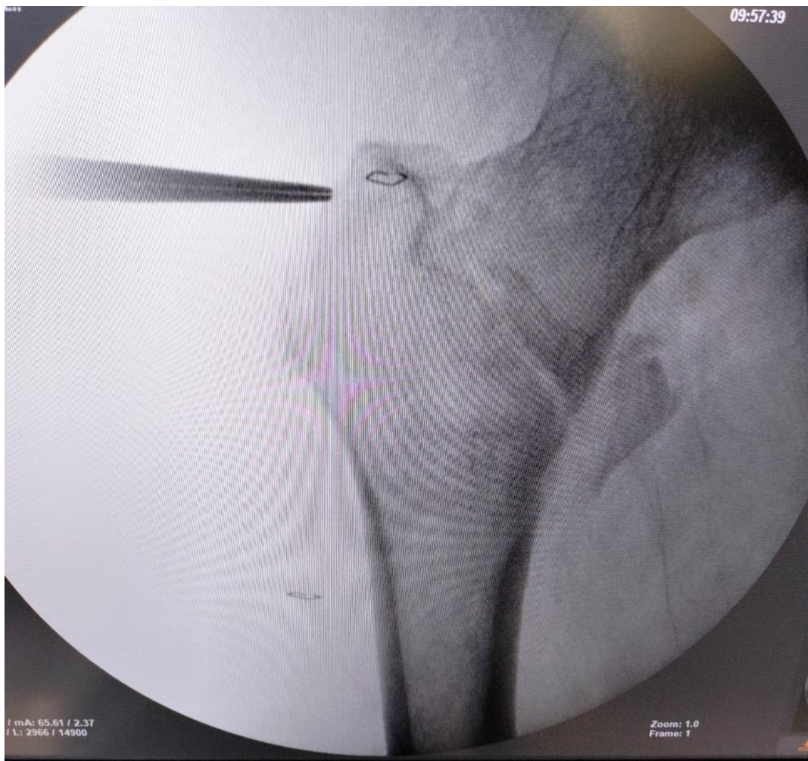
1. The patient was put in supine position on a fracture table. Around15 degrees adduction was given and adequacy of reduction confirmed using C-arm
2. Patient is positioned in lateral position with the unaffected hip below the affected side





CLOSED FRACTURE REDUCTION :

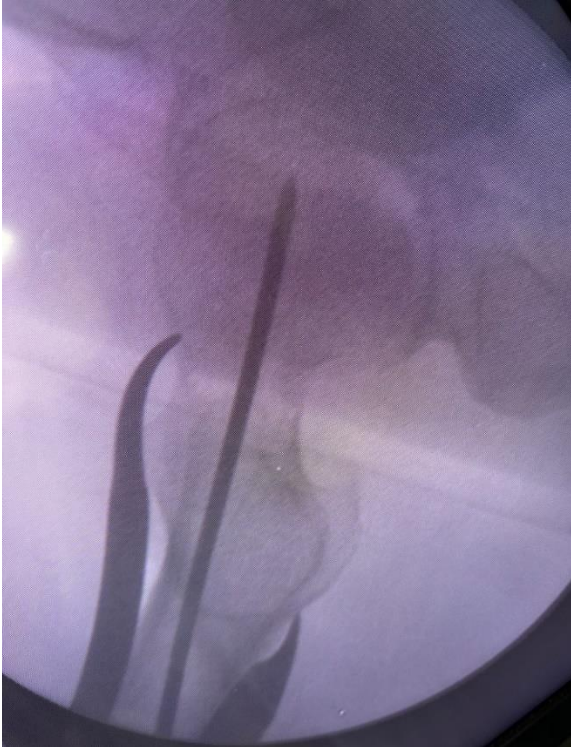
Done by applying adequate traction and internal rotation in case of patients positioned supine or linear traction in case of patients positioned lateral.



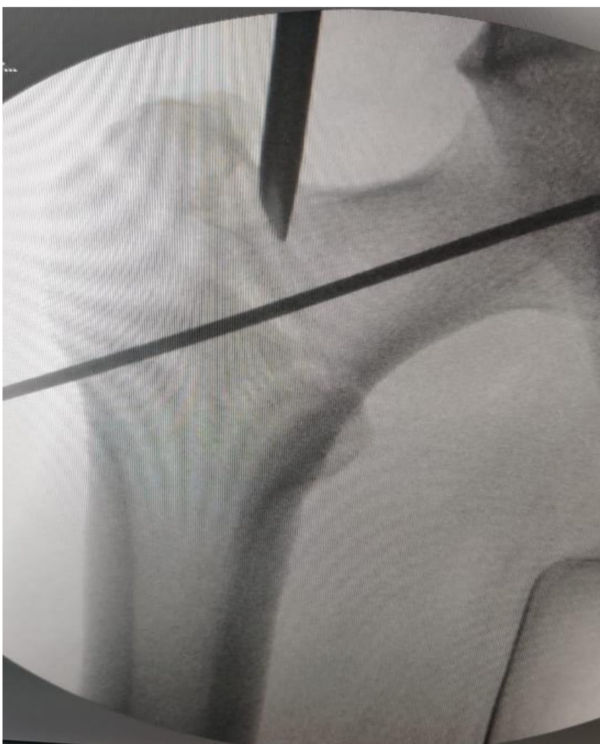
Then the regular 7.5% Betadine scrubbing is done followed by sterile draping.

The following techniques were employed when closed reduction failed :-

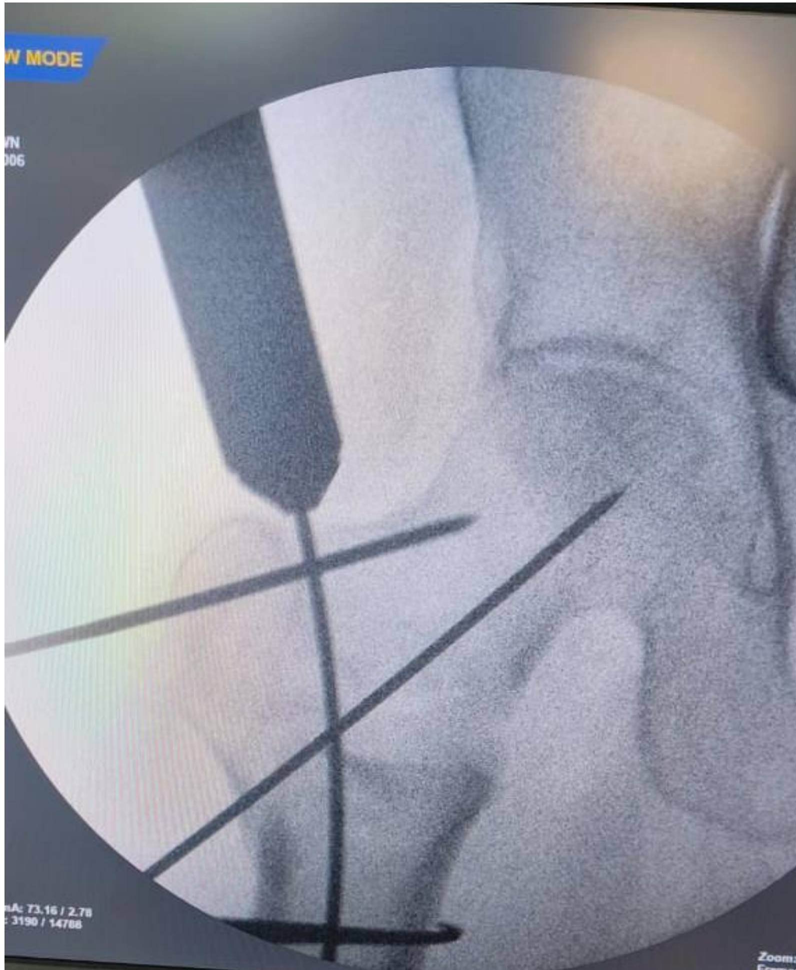
OPEN REDUCTION AND FIXATION :



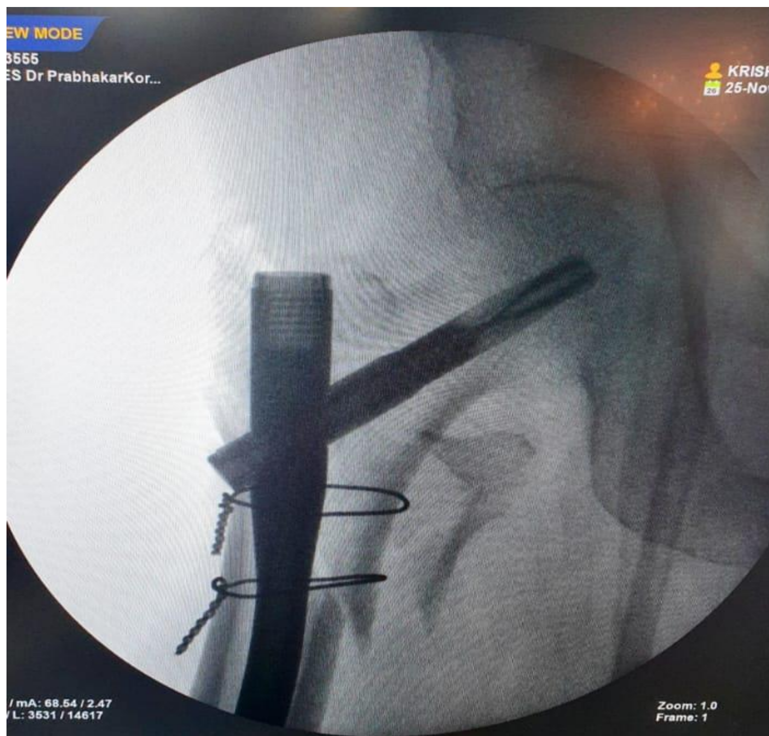
TRANSFIXING WITH ANTEVERSION GUIDE WIRES:

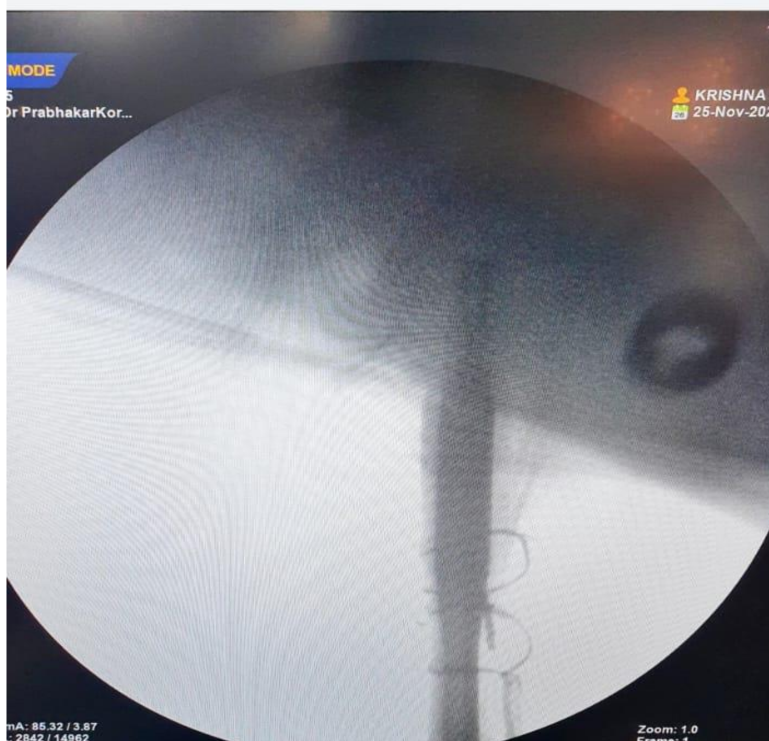


TRANSFIXING WITH WIRES AND HOLDING OPEN REDUCTION WITH HOOK/SPIKE WAS EMPLOYED IN UNSTABLE FRACTURES :



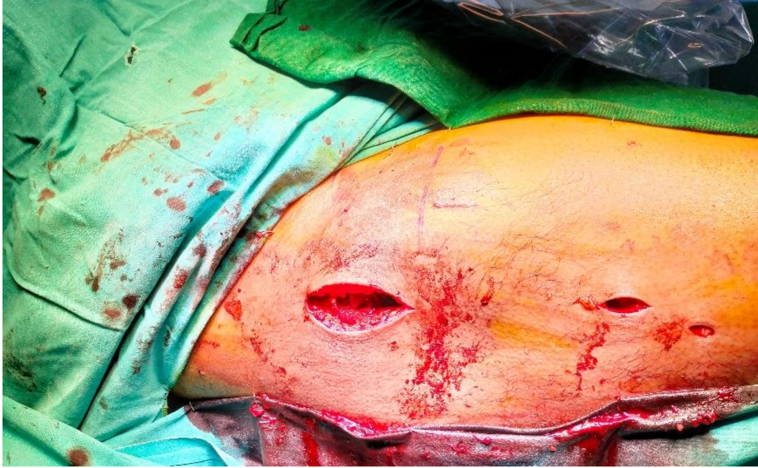
CERCLAGE WIRING IN GT FRACTURE/ MEDIAL WALL COMMINUTION:



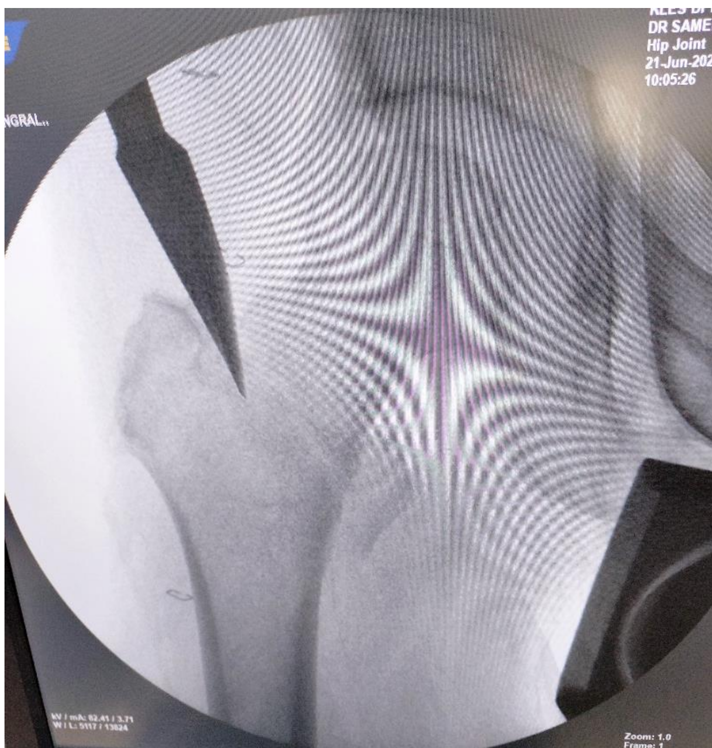


SKIN INCISION:

5cm longitudinal incision made proximal to the tip of GT along the midline of the shaft. The greater trochanter tip can be palpated when the TFL is cut and gluteus medius muscle is blunt dissected till the tip of GT can be palpated.

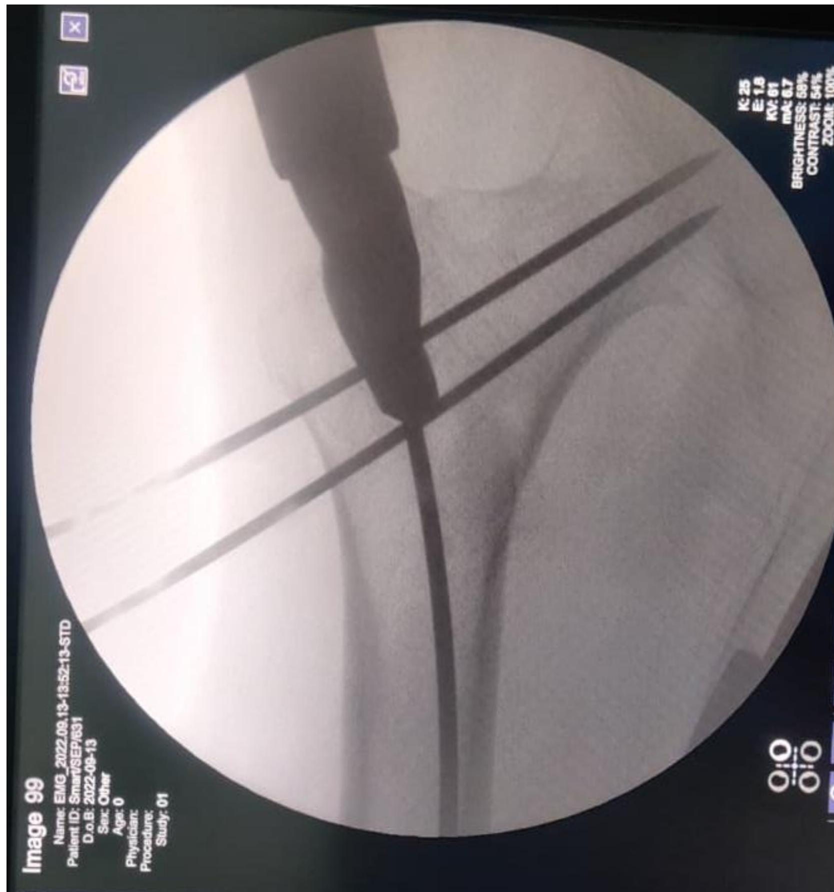


In AP , entry point is just medial to the end of Greater trochanter(in piriformis fossa). In lateral, its in line with the medullary canal. Guide wire is inserted following awl entry.



PROXIMAL REAMING OF FEMUR:

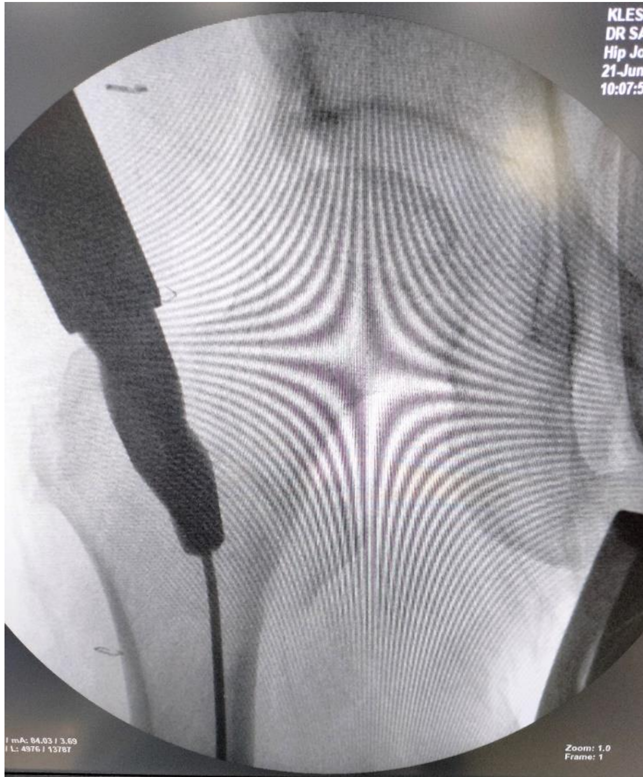
A cannulated proximal reamer is introduced over the guide wire, and proximal reaming was done.



NAIL INSERTION:

After confirming reduction of fracture, an appropriate length nail(as per final reamer size) is mounted onto the Zig and inserted. If the reduction was not found to be stable, femur was open reduced and fracture transfixed with thick K-wires appearing as anteversion guide wires.

The nail is then introduced into the canal until the slot for the blade is at the level of femoral neck. In more young patients, serial flexible reamers were used till the maximum diameter possible.

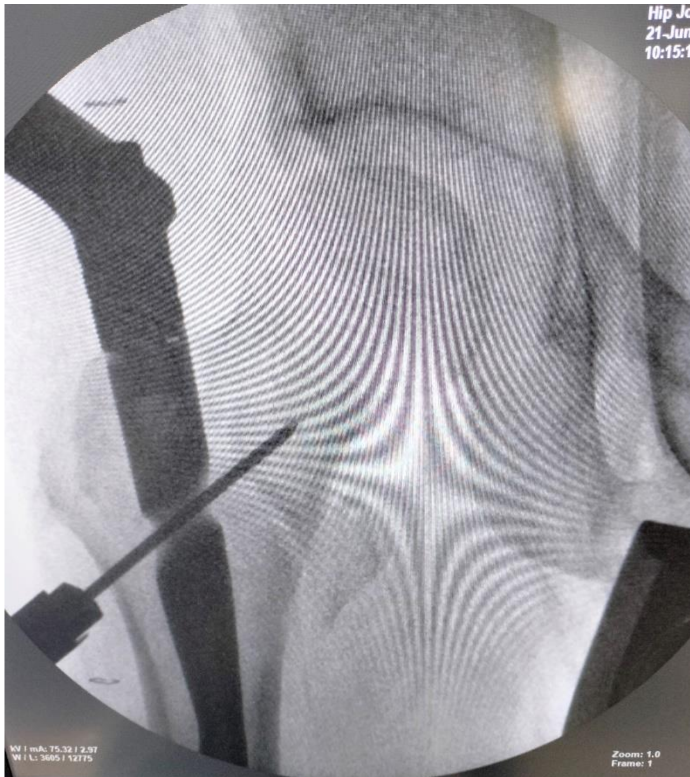


GUIDE PIN INSERTION:

Attaching the outer and inner drill sleeves to the jig ensures that the outer sleeve stays in touch with the lateral aspect of cortex. A 2.5 mm guide wire is then introduced through the drill sleeve following a stab incision.

The guide wire is advanced as much as 5 mm from the subchondral bone. Proper positioning is vital for stable fixation:

- AP View-The guide wire must be positioned inside the inferior half of neck.
- Lateral View-The guide wire have to be placed centrally within the femoral neck.



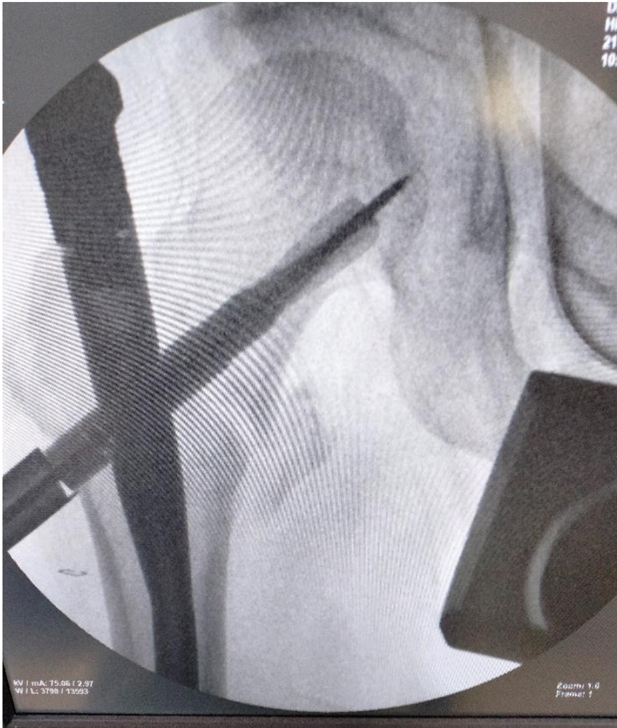
INSERTION OF THE BLADE:

The perfect blade length is determined the use of the measuring device, ensuring it extends about five mm short of the guide pin tip. This measured length is then set on the reamer.

The outer cortex reamer is used, and reaming is finished up to the pre-set mark. As soon as reaming is complete, the guide wire is eliminated.

The blade is set up onto screwdriver and unlocked through twisting it counterclockwise. It is then impacted using a hammer till it reaches the stopper. Proper positioning is confirmed under C-arm guidance.

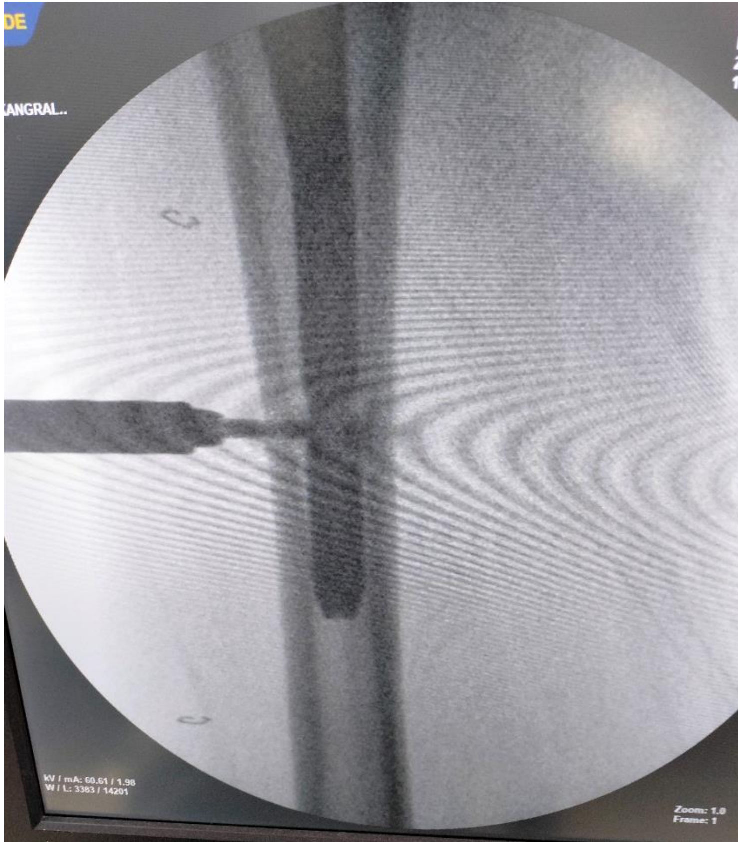
Finally, the screwdriver is twisted clockwise to secure the blade before being removed.



DISTAL LOCKING:

Distal locking is commonly finished using 4. 9 mm locking bolts through the dynamic hole.

1. A sleeve is inserted via a stab incision.
2. A 4 mm drill bit is used to create a hole through both cortices.
3. The correct screw length is measured.
4. The bolt is inserted through the safety sleeve and securely tightened.
5. Very last positioning is taken using an image intensifier in each AP and lateral views.



CLOSURE:

Thorough NS wash is given. Wound is closed in layers after attaining hemostasis . Sterile dressing done followed by compression bandage application.

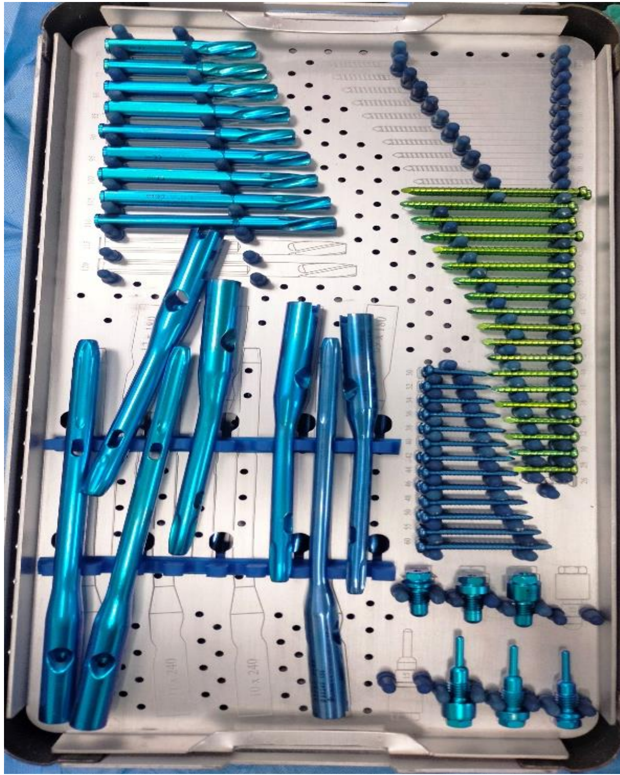


Figure 13 IMPLANT SET

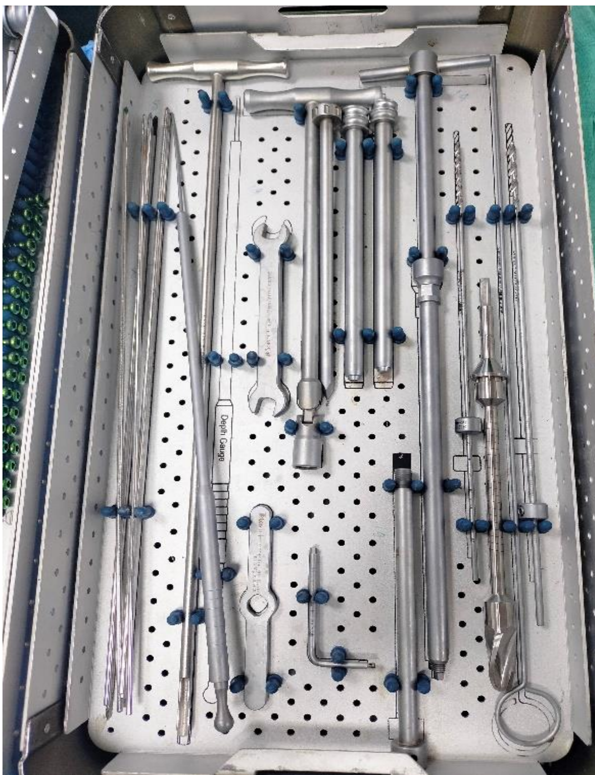


Figure 14 INSTRUMENT SET

DATA COLLECTION PROCEDURE

Patients who sustained Intertrochanteric Femur Fractures and then had undergone Closed reduction and internal fixation using PFN-A II were evaluated and studied over a period of 6 months at KLEs Dr. Prabhakar Kore hospital and MRC, Belagavi. All patients have been then reviewed postoperatively using clinical examination. All patients have been assessed post operatively on 6weeks, 3months and 6months using HHS.

OBSERVATIONS AND RESULTS

TABLE 1: DEMOGRAPHIC PROFILE OF THE RESPONDENT

a. Age

Age	Frequency	Percent
45 – 65	9	28.1
66 – 75	11	34.4
76 – 85	8	25.0
86 – 95	4	12.5
Total	32	100.0
Mean±SD	71.44±11.007	

b. Sex

Sex	Frequency	Percent
Female	15	46.9
Male	17	53.1
Total	32	100.0

c. Side

SIDE	Frequency	Percent
LEFT	15	46.9
RIGHT	17	53.1
Total	32	100.0

d. Boyd and Griffin type

DIAGNOSIS	Frequency	Percent
IT # TYPE I	4	12.5
IT # TYPE II	24	75.0
IT # TYPE IV	4	12.5

Total	32	100.0

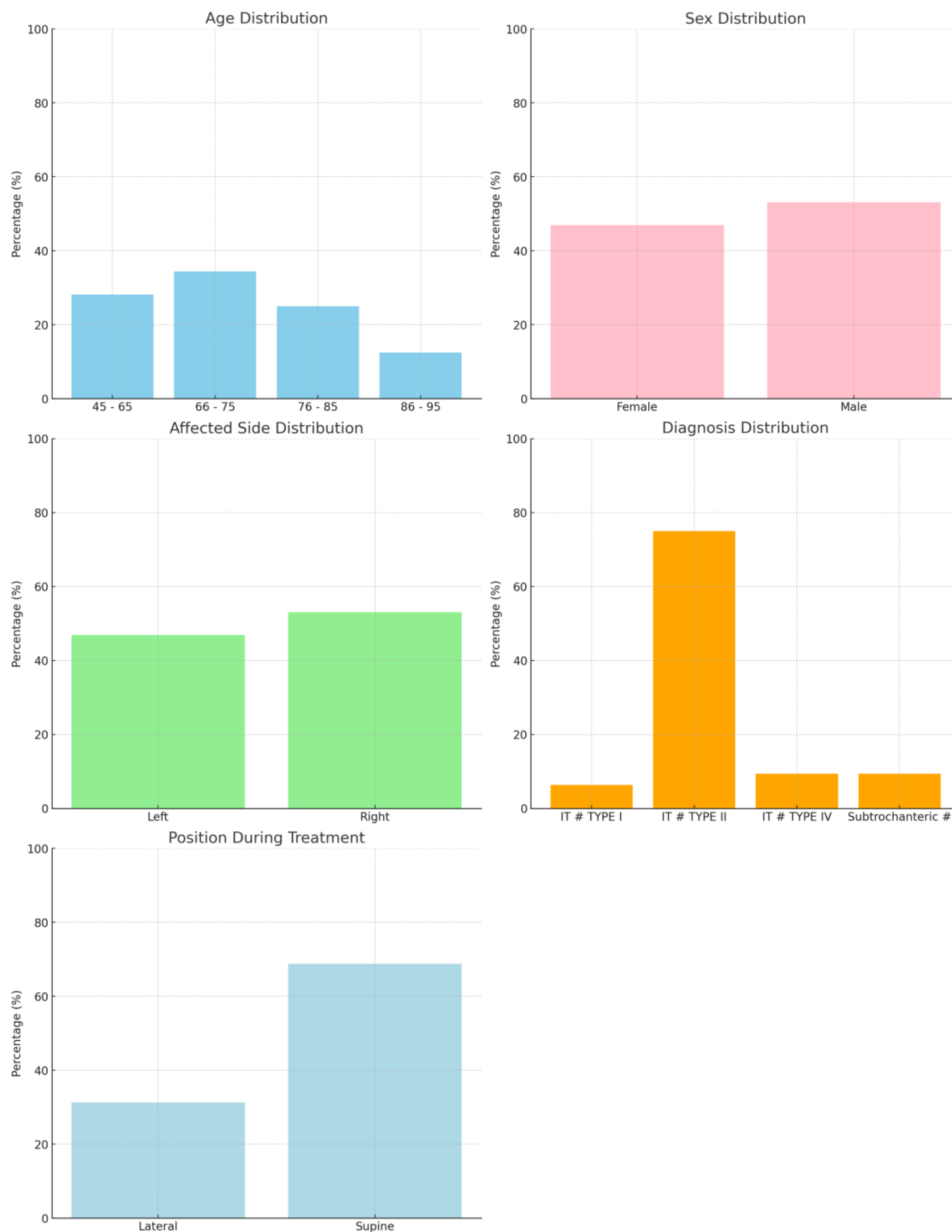
e. Operative position

POSITION	Frequency	Percent
LATERAL	10	31.3
SUPINE	22	68.8
Total	32	100.0

f. Vital Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
6 WEEKS	28	30	44	35.36	3.603
3 MONTHS	28	45	72	62.71	5.304
6 MONTHS	28	63	97	84.46	6.535

CHART 1 : DEMOGRAPHIC PROFILE OF THE RESPONDENT



The figure above provides a comprehensive visual summary of the demography and characteristics of respondents:

Age Distribution: Showcases a broader spread across age groups, with the majority (34.4%) in the 66-75 age bracket, aligning with the mean age of 71.44 years.

Sex Distribution: Demonstrates a slight male dominance (53.1%) over females (46.9%).

Affected Side Distribution: Indicates an even distribution between left and right sides, suggesting no lateral preference in the conditions studied.

Diagnosis Distribution: Highlights the predominance of IT # TYPE II fractures, which constitute 75% of cases, pointing to a specific clinical focus within the study population.

Position During Treatment: Reveals a preference for the supine position (68.8%)

TABLE 2: FUNCTIONAL IMPROVEMENT OVER TIME

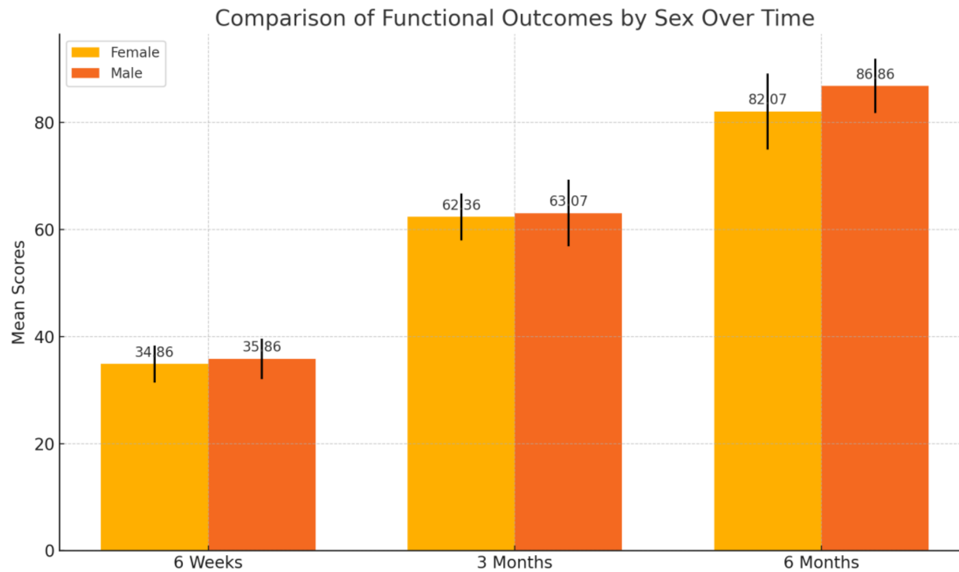
		Mean	Std. Deviation	t	Correlation	Sig. (2-tailed)
Pair 1	6 WEEKS - 3 MONTHS	-27.357	4.305	-33.625	0.591	0.000
Pair 2	6 WEEKS - 6 MONTHS	-49.107	5.287	-49.150	0.589	0.000

CHART 2: FUNCTIONAL IMPROVEMENT OVER TIME

TABLE 3: COMPARISON OF FUNCTIONAL OUTCOMES BY SEX

	SEX	N	Mean	Std. Deviation	T value	P value
6 WEEKS	Female	14	34.86	3.483	0.114	0.739
	Male	14	35.86	3.780		
3 MONTHS	Female	14	62.36	4.378	0.029	0.867
	Male	14	63.07	6.245		
6 MONTHS	Female	14	82.07	7.087	0.689	0.414
	Male	14	86.86	5.112		

CHART 3: COMPARISON OF FUNCTIONAL OUTCOMES BY SEX OVER TIME

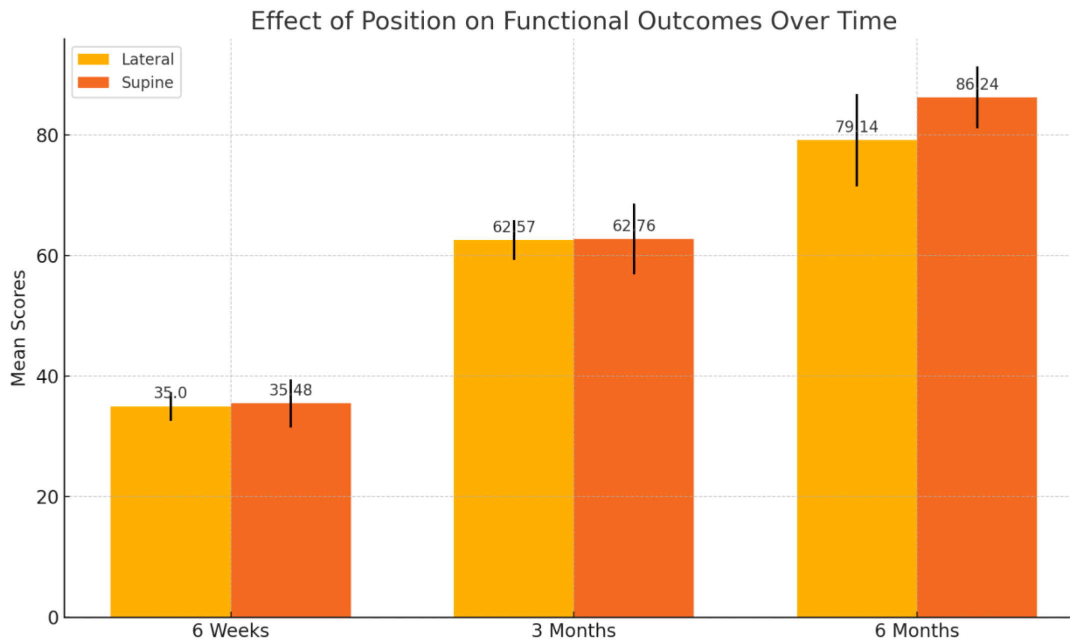


The figure above visualizes the comparison of functional outcomes by sex over three time points: 6 weeks, 3 months, and 6 months post-intervention. The results indicate a trend where male patients consistently show slightly higher mean functionality scores compared to female patients across all time points. At 6 weeks, males scored an average of 35.86 compared to females at 34.86, and this trend continues with males scoring 63.07 at 3 months and 86.86 at 6 months, against females who scored 62.36 and 82.07, respectively. The standard deviations suggest variability within each group, with males displaying a slightly higher spread in scores, especially at 3 months and 6 months. Statistical analysis shows no significant difference between sexes at any time point (p-values: 0.739 at 6 weeks, 0.867 at 3 months, and 0.414 at 6 months), indicating that while males may have higher mean scores, these differences are not statistically significant. This suggests that gender does not play a critical role in the differential recovery trajectories in this cohort, highlighting the need for uniform therapeutic interventions irrespective of sex.

TABLE 4: EFFECT OF POSITION (SUPINE VS LATERAL) ON FUNCTIONAL OUTCOME

	POSITION	N	Mean	Std. Deviation	T value	P value
6 WEEKS	LATERAL	7	35.00	2.380	1.673	0.207
	SUPINE	21	35.48	3.970		
3 MONTHS	LATERAL	7	62.57	3.259	1.352	0.256
	SUPINE	21	62.76	5.898		
6 MONTHS	LATERAL	7	79.14	7.669	0.296	0.591
	SUPINE	21	86.24	5.176		

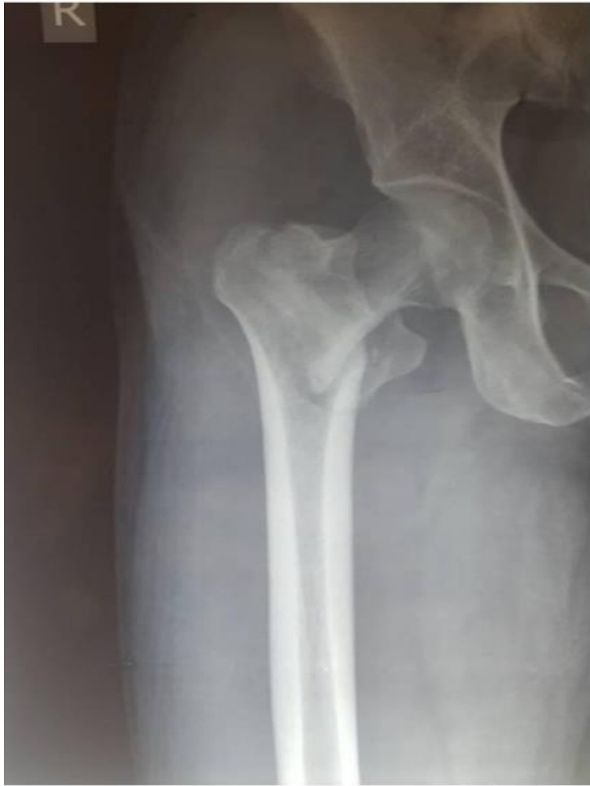
FIGURE 4: EFFECTS OF POSITION ON FUNCTIONAL OUTCOMES OVER TIME



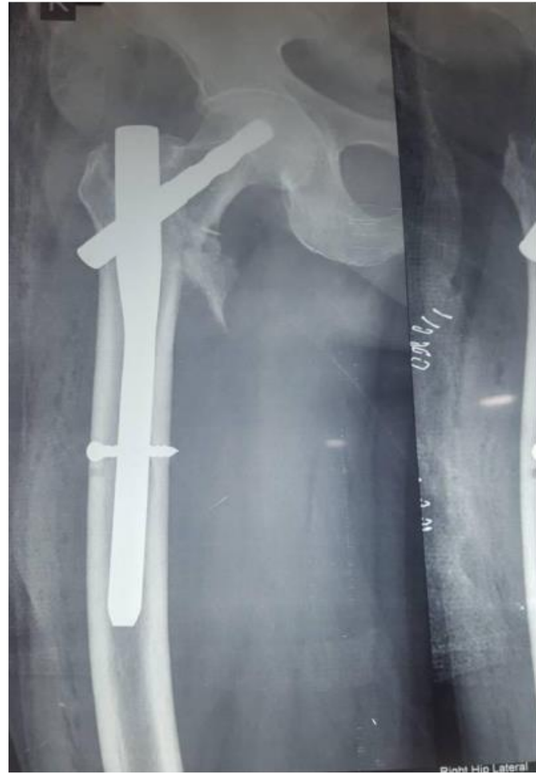
The chart above delineates the impact of patient positioning (Supine vs. Lateral) on functional outcomes over three distinct time periods: 6 weeks, 3 months, and 6 months post-intervention. Initially, at 6 weeks, both positions yield almost identical mean scores with the lateral position at 35.00 and supine at 35.48. However, as time progresses, a divergence appears; by 6 months, patients in the supine position exhibit a considerably higher mean score of 86.24 compared to 79.14 for those in the lateral position. The standard deviations indicate a broader variability in the lateral position, particularly at 6 months. Despite visible trends in the means, statistical analysis shows no significant difference between positions at any time point, with the smallest p-value being 0.207 at 6 weeks. These findings suggest that while supine positioning might be associated with higher functional scores at later stages, the differences are not statistically robust, implying that the position may not critically influence long-term functional outcomes under the conditions studied

CASE ILLUSTRATIONS

CASE 1

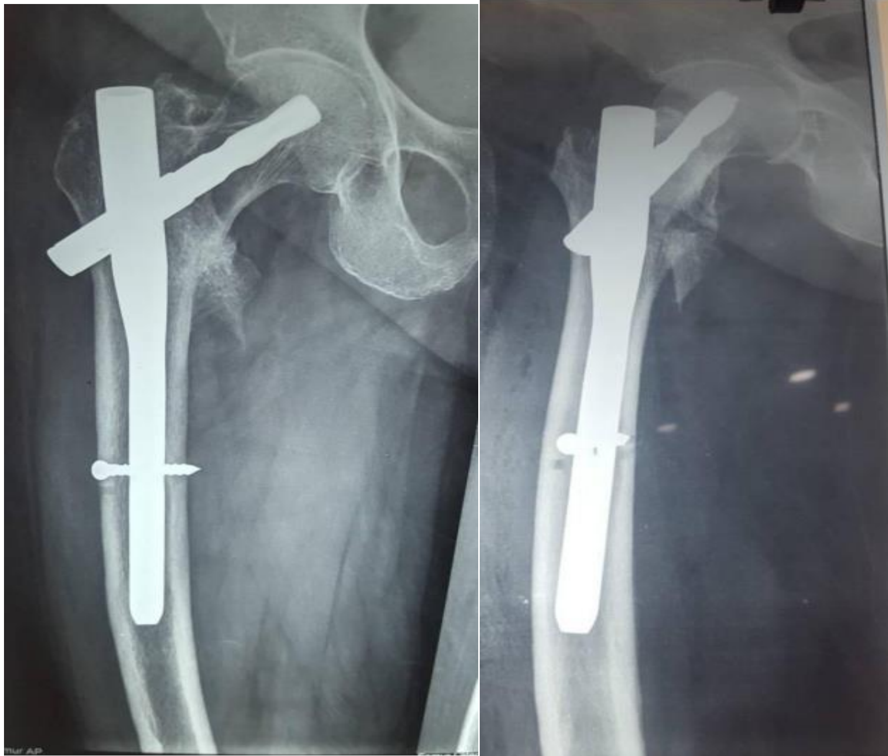


XRAY RIGHT HIP AP VIEW (PRE OP)

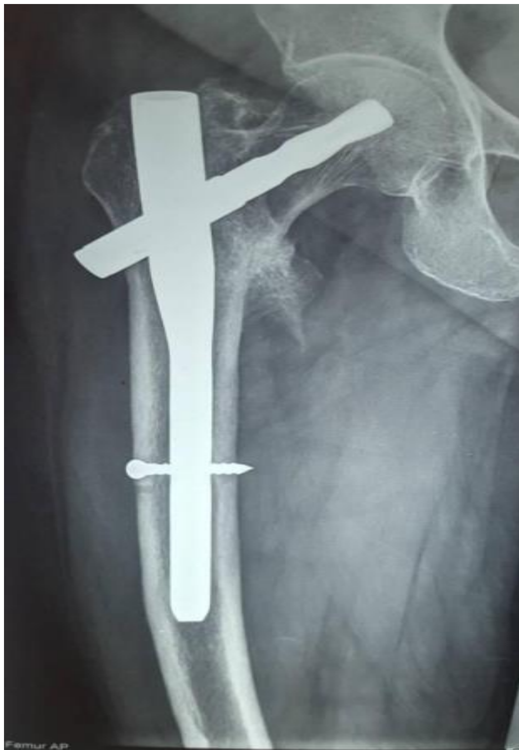


IMMEDIATE POST OP

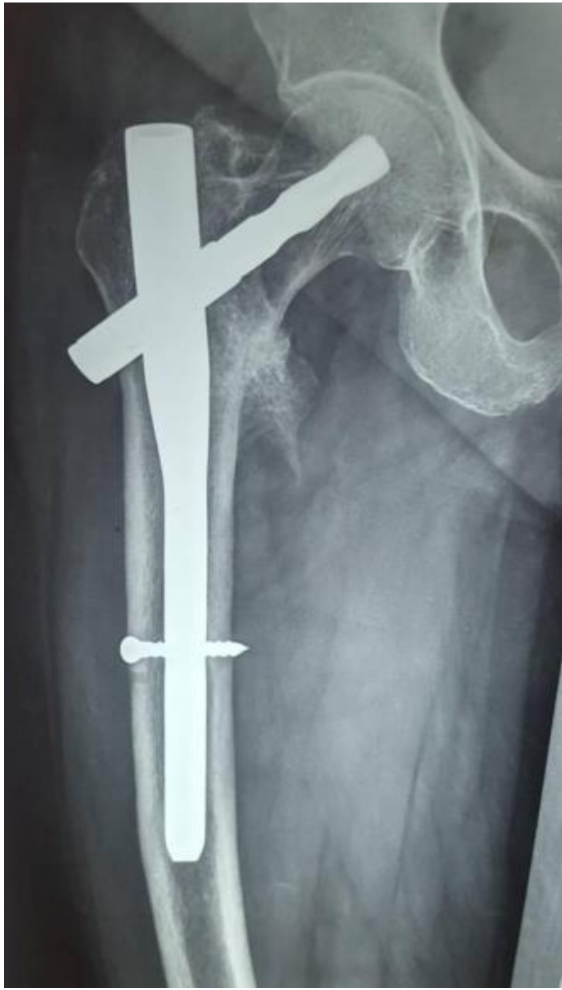
6 WEEKS POST OP :



3 MONTHS POST OP :



6 MONTHS POST OP :

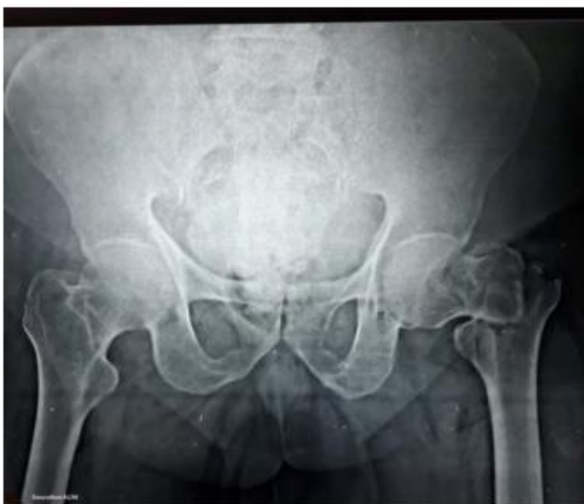


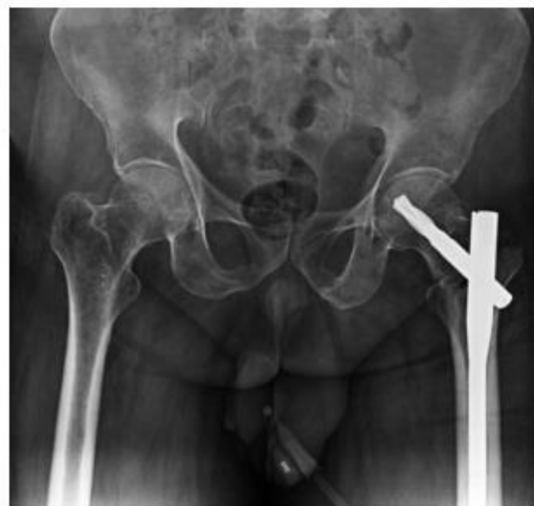
PATIENT DOING ADEQUATE SLR ON 6 MONTHS FOLLOW UP :

PATIENT WITH FULL KNEE AND HIP FLEXION ON 6 MONTHS FOLLOW UP :

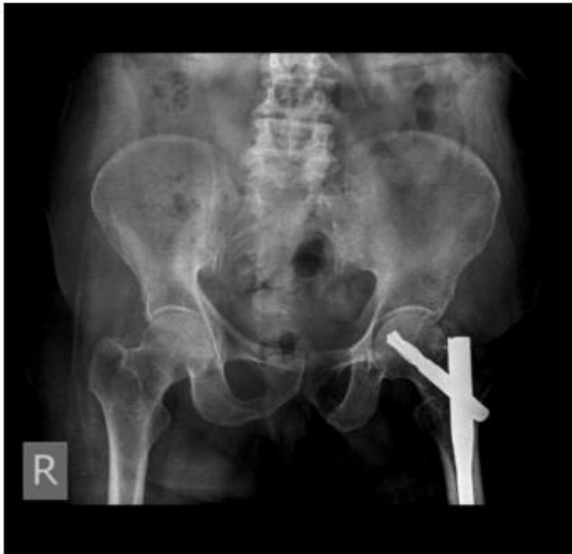
CASE 2

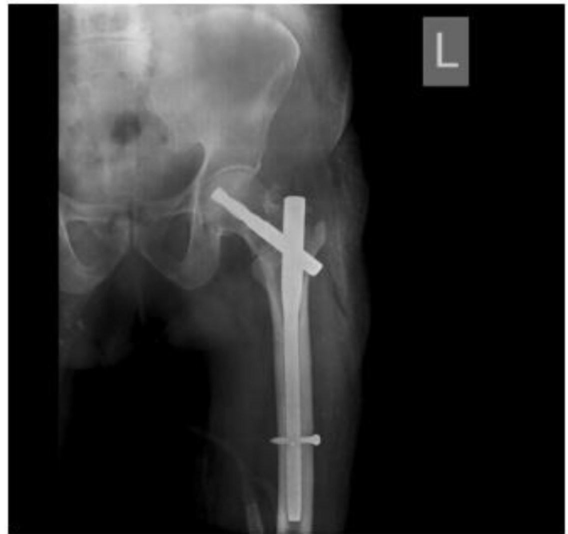
Pre-operative	Post- operative



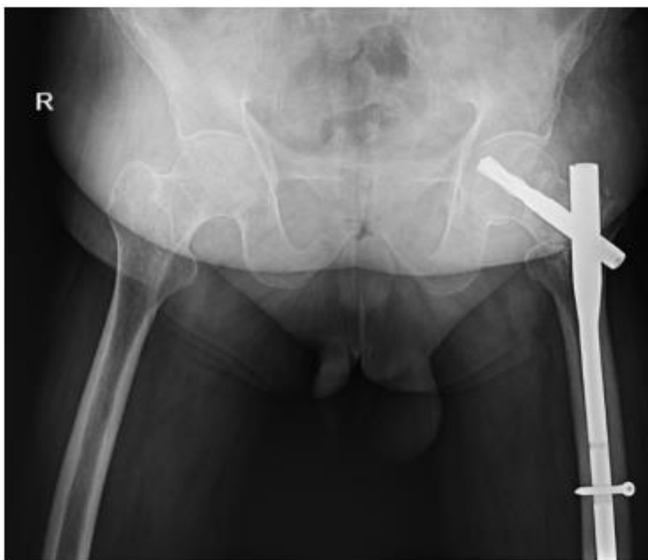


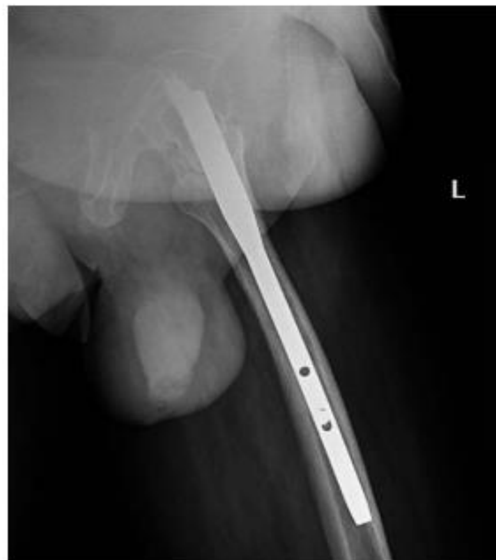
3 MONTHS POST OP :





1 YEAR POST OP :





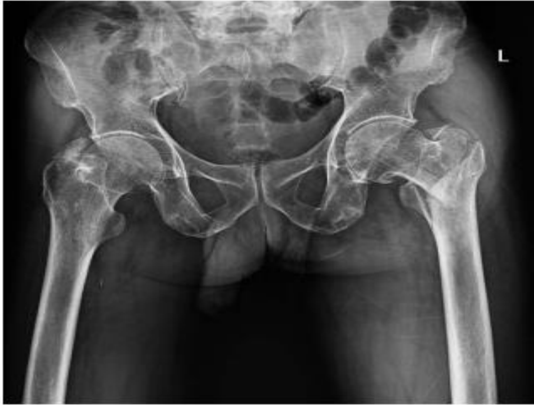
PATIENT ABLE TO DO FULL SLR :

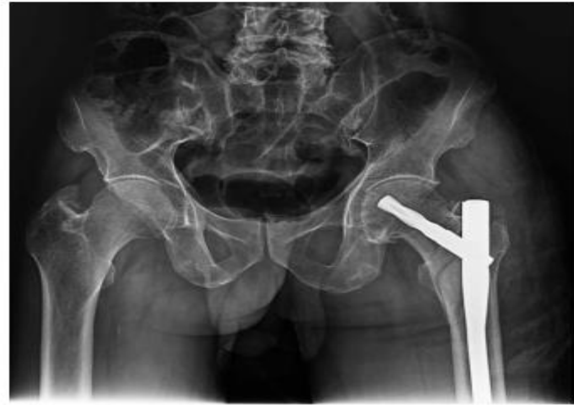
PATIENT WALKING WITHOUT AID :

CASE 3

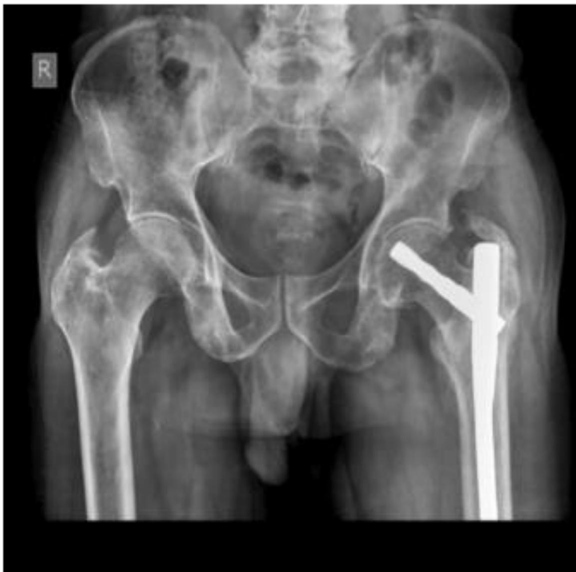
Preoperative X-RAY

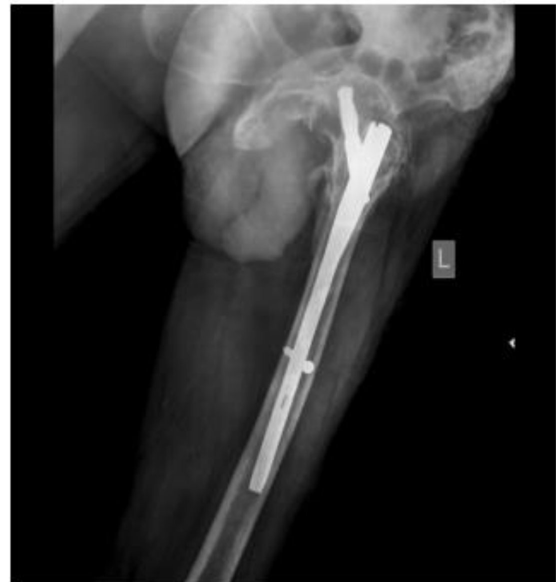
Postoperative X-RAY





6 MONTHS POST OP :



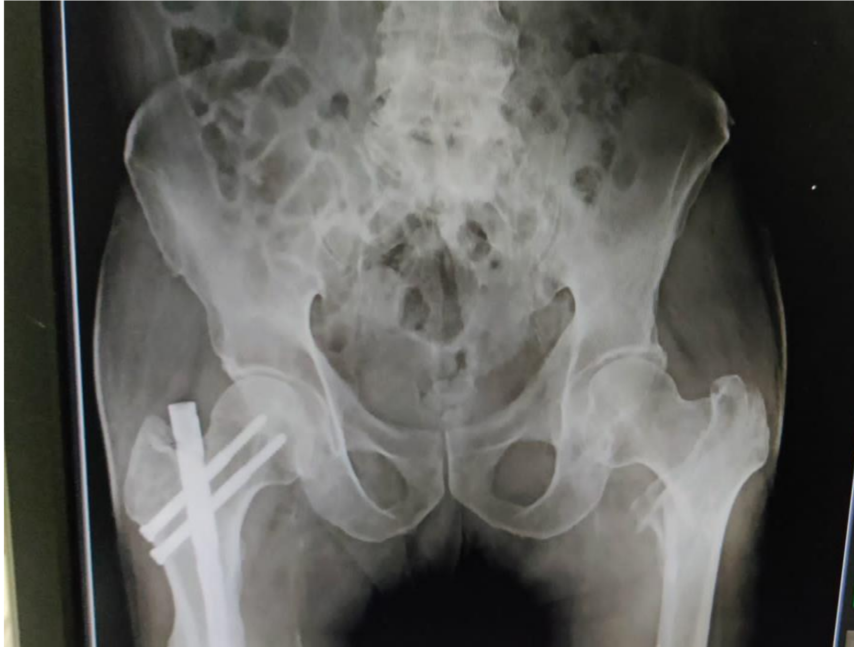


PATIENT SHOWING ADEQUATE HIP AND KNEE FLEXION :

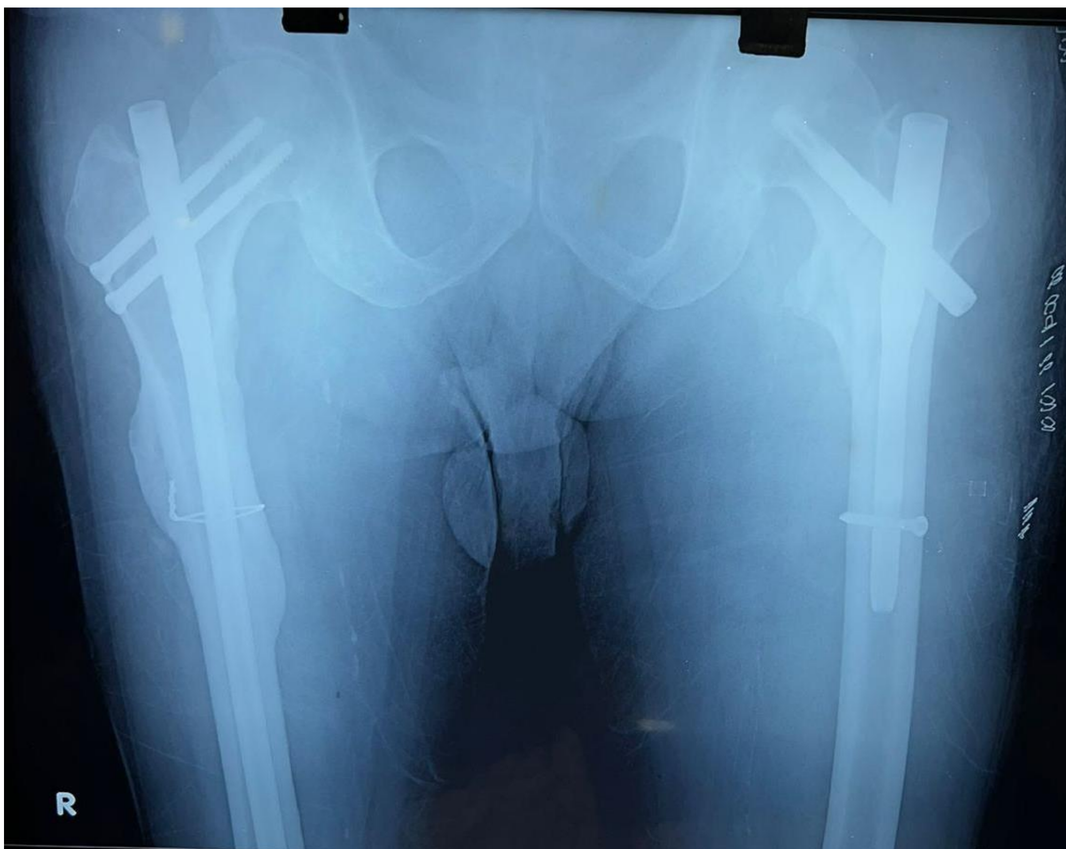
PATIENT SHOWING ADEQUATE SLR :

CASE 4

PATIENT AN OPERATED CASE OF C/L SIDE REGULAR PFN SUSTAINING LEFT IT FEMUR FRACTURE:



OPERATED WITH PFN AII FOR LEFT SIDE:

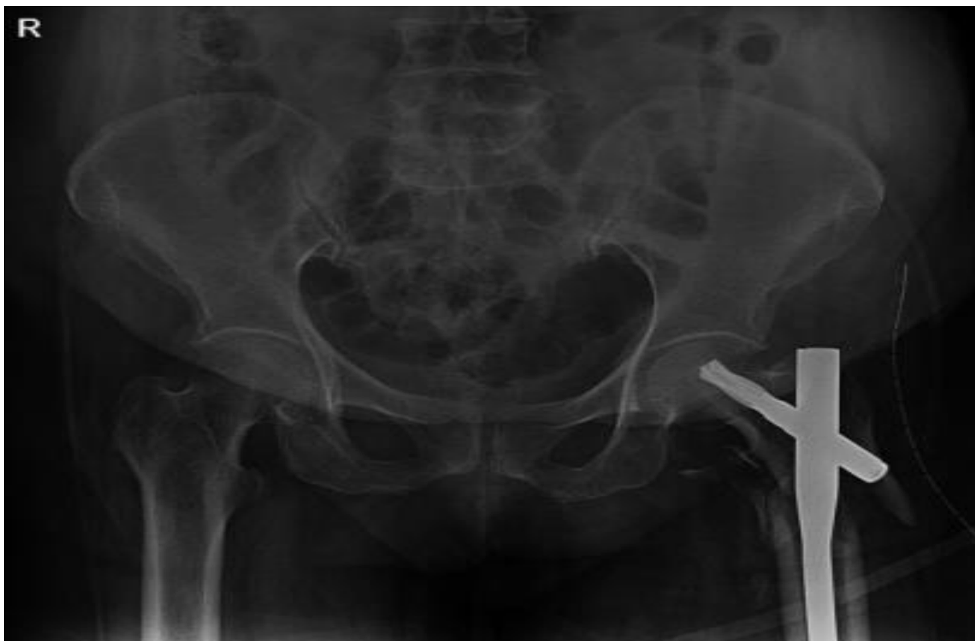


3 MONTHS POST OP PATIENT SHOWING FULL SLR :

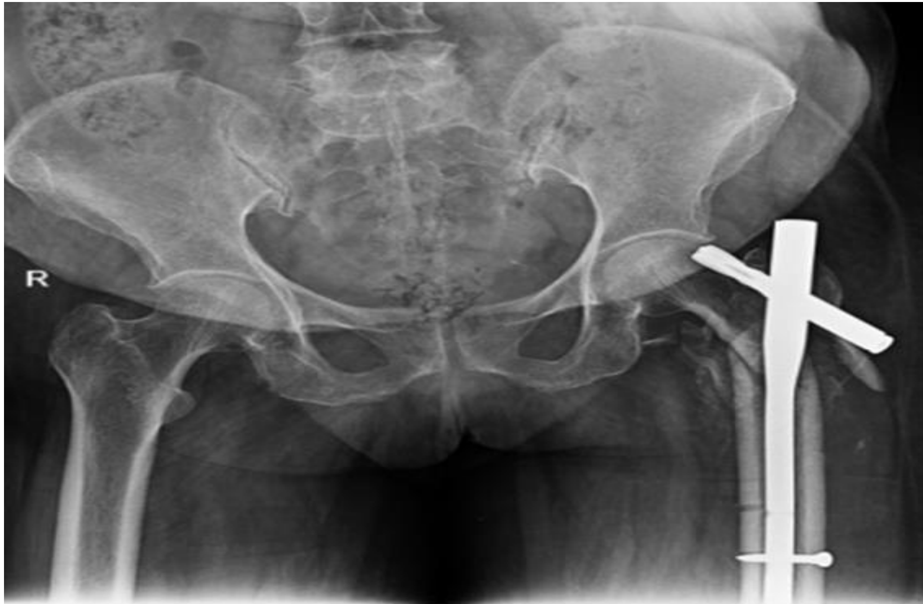
AND PATIENT WALKING FULL WEIGHT BEARING WITH SUPPORT:

COMPLICATIONS

BLADE CUT OUT :

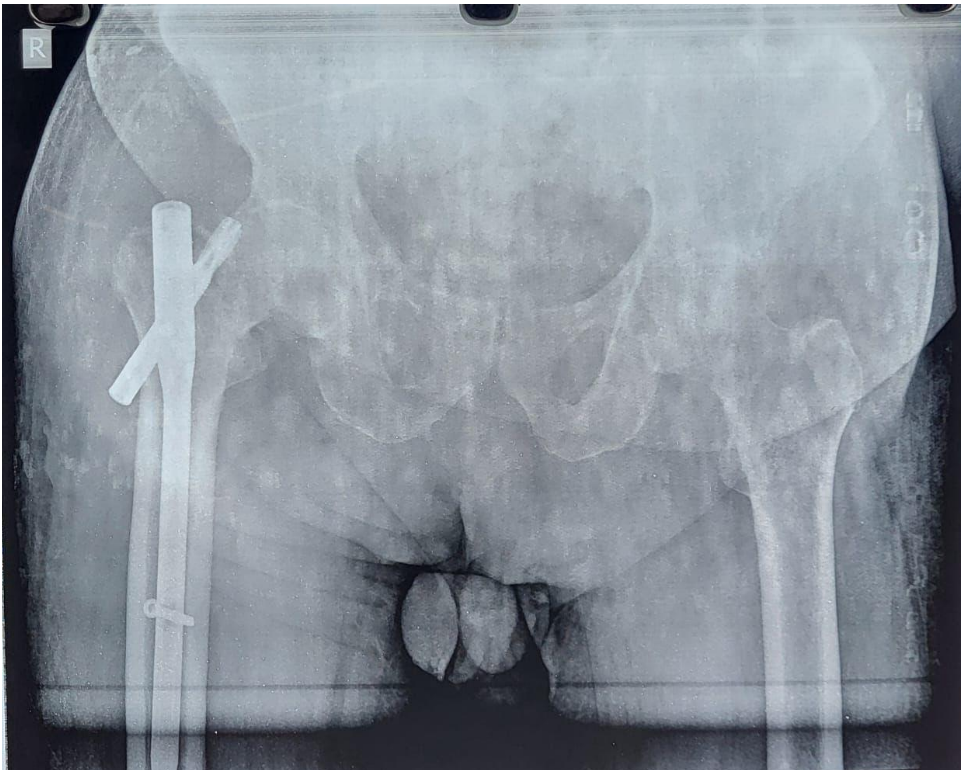


IMMEDIATE POST OP XRAY

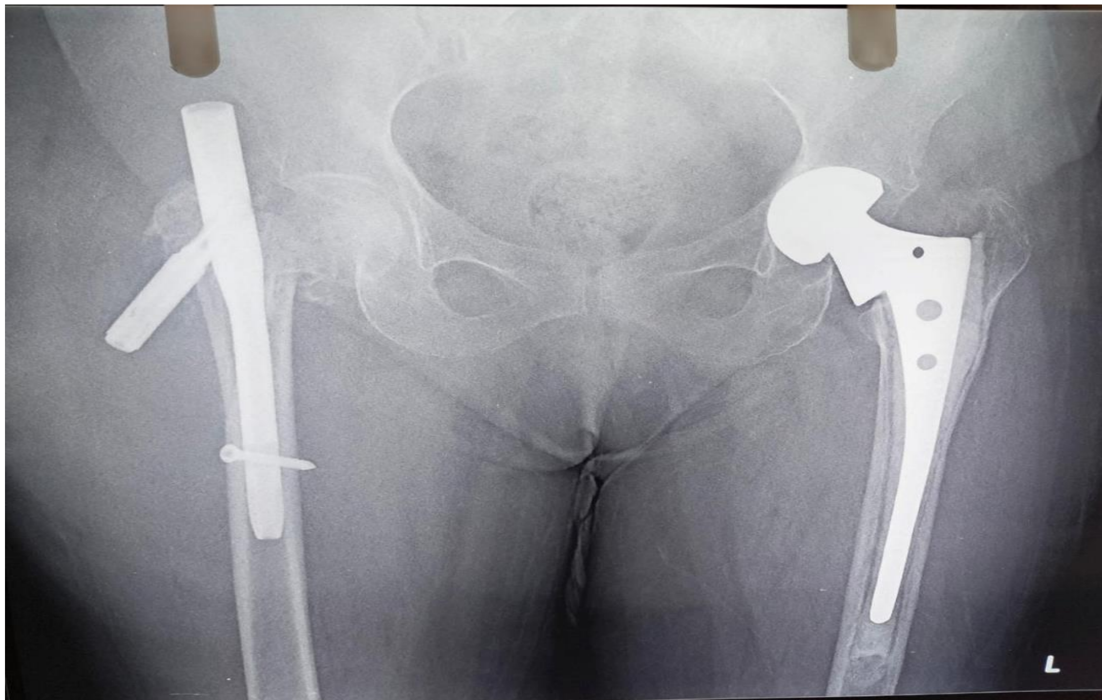


3 WEEKS POST OP XRAY

BLADE CUT OUT – 2 :



BLADE AND NAIL BACK OUT(FOLLOWING REPEAT TRAUMA) :



DISCUSSION

PFN-A II features a blade designed for fixation into the neck, distinguishing it from earlier intramedullary devices that utilized screws. The insertion of the blade compacts the cancellous bone, making it in particular effective for fractures in osteoporotic patients. Biomechanical research indicate that the blade configuration gives more balance and demonstrates excessive resistance to collapse in comparison to standard screw designs. Studies by means of Simmermacher et al.(32) indicates that the helical blade, by using coping with metaphyseal impaction, may also help save penetration through the head in cases of unstable fractures. Constrained research have evaluated this fixation approach, but findings suggest that the PFN-A II theoretically provides rotational and angular stability by the use of a blade component.(35,36) Cadaveric studies have proven that cancellous bone compaction enhances purchase in porotic bone, thereby reducing the chances of cut-out(39) whilst compared to DHS and Gamma nails.(40)

Garg B et al., in his study concluded that PFN-A II offers biomechanical benefits over dynamic hip screws for stabilizing unstable IT fractures. It ensures solid intramedullary fixation, resists varus collapse of the proximal fragment and fixation failure, and is related to shorter operative time, reduced fluoroscopy exposure, and lesser intraop blood loss(41) In addition, Liu-Y et al., determined PFN-AII to be a fantastically powerful implant for treating IT femur fractures. The tool is both secure and consumer-pleasant, though technically demanding, as incorrect approach may additionally cause complications(42)

Weiguang Yu et al. suggested that PFNA-II can be the desired alternative in instances regarding unstable fracture patterns[43] Moreover, Kumar et al[44] proposed of their prospective study that PFN-AII is an powerful implant for treating intertrochanteric fractures while suitable surgical techniques are used. According to our study, the mean age was found to be 71.44 years, that is akin to findings by Ahmad et al.,[45] who stated a median age of 72 years. Our look at populace consisted of 53% adult males and 47% females, aligning with the study with Sharan Mallaya et al[46] which found a male predominance of 56%. The fracture affected the right side in 53% of cases and the left in 47%, a distribution just like that mentioned by using Kasha et al[47] where the left-to-right ratio become 36:42. The most common mode of injury was found to be self-fall, considering the advanced age of the patients, a finding steady with Ahmad et al.,[45] who pronounced that 92% of cases resulted from trivial falls.

At six months postoperatively, the mean for Harris Hip scores was found to be 84.46, surpassing the imply HHS of 78 concluded in a study at by Singh et al.[51] Mora Marimon et al.[53] determined that PFN-AII has a lesser chance of blade cut-out compared to different implants. Simmermacher et al.[32] described blade cut-out due to varus deviation, rotation, and retroversion of the head/neck fragments because of continuous axial loading.

Theoretically, blade cut-out effects from impaction at the fracture site. A study by Ashok Sunil Gavaskar et al[52] pronounced instances of lower back-out with out clinical symptoms. Similarly, Kasha et al[47] documented radiological evidence of blade cut-out without any associated signs. In our study, revision surgical procedure was done in a single case, involving implant removal followed by bipolar hemiarthroplasty. Because of concurrent injuries, the patient remained non-weight-bearing till radiological union became confirmed.

No instances of medial migration of the blade or varus collapse of the proximal fragment have been determined. Intraoperative varus malreduction ought to be averted with the aid of making sure enough traction and abduction, with even needing open reduction carried out in complicated cases if essential. A study by Park et al[55] suggested superior stability, mobility scores, and decreased complication rates with helical blade nails. Additionally, our study highlights the predominance of IT type II fractures, which accounted for 75% of cases, and no reverse oblique fractures had been determined. Surgeons in our study at preferred the supine position in 78.8% of instances. But no practical variations were stated among the groups.

CONCLUSION

Proximal purchase in unstable intertrochanteric fracture is higher in Proximal femoral nail (PFN-A II) because of the drilling of lesser cancellous bone. It also gives higher control of rotation and length. Medial cortex continuity and preserving lateral wall offers better fixation in unstable intertrochanteric fractures. We conclude that PFN-A II may additionally permit weight bearing early post operatively.

PFN-A II is a great alternative for treatment of porotic intertrochanteric fractures which aids in early post operative rehabilitation and weight-bearing.

LIMITATIONS OF THE STUDY :

1. Even though efficacy of the nail has been well described and analysed in this study, directly comparing with other options for IT fractures like DHS or regular PFN or TFN would have been more favourable in choosing what mode of fixation to go for.
2. Radiologically measuring union time in different fracture patterns and different fixations would have given even more precise data.
3. Positioning patients supine and lateral intra op, the data observed in this study is very robust considering the small sample size. A study with more patients and collecting data on intra-op blood loss and timings would have given us a clearer picture.

ANNEXURE I

BIBLIOGRAPHY :

1. Fox K.M., Magaziner J., Hebel J.R. Intertrochanteric versus femoral neck fractures: differential characteristics, treatment, and sequelae. J Gerontol A BiolSci Med Sci. 1999;54:635–640.

2. Zuckerman J.D. Hip fracture. N Engl J Med. 1996;334:1519–1525.

3. Mittal R., Banerjee S. Proximal femoral fractures: principles of management and review of literature. J. Clin. Orthop. Trauma. 2012;3:15–23.

4. Rüedi TP, Murphy WM. AO principles of fracture management. Stuttgart: Thieme, 2000:441-4.

5. Blatter G, Janssen M. Treatment of subtrochanteric fractures of the femur: reduction on the traction table and fixation with dynamic condylar screw. Arch Orthop Trauma Surg 1994;113:138-41.

6. Hotz TK, Zellweger R, Kach KP. Minimal invasive treatment of proximal femur fractures with the long gamma nail: indication, technique, results. J Trauma 1999;47:942-5.

7. Siebenrock KA, Muller U, Ganz R. Indirect reduction with a condylar blade plate for osteosynthesis of subtrochanteric fractures. Injury 1998;29Suppl 3:C7-C15.

8. Tornetta P III. Subtrochanteric femur fracture. J Orthop Trauma 2002;16:280-3.78

9. R.K.J. Simmermacher, A.M. Bosch, chr.van der werrken. The AO/ASIF-proximal femoral nail: a new device for treatment of unstable proximal femoral tiactures. Injury, Int. J. Care Injured 30 (I 999) 327 -332.

10. Burge R, Dawson-Hughes B, Solomon DH, Wong JB, King A, et al. (2007) Incidence and economic burden of osteoporosis-related fractures in the United States, 2005-2025. J Bone Miner Res 22: 465-475

11. Stewart JDM, Hallett JP. Traction and Orthopaedic appliances.2nd Edition. New Delhi: B.I. Churchill Livingstone; 1997.p 3-9.87

12. Siler VE, Caldwell JA. Treatment of intertrochanteric fractures of the femur by modification of Russell balanced traction. Am J Surg 1940; 47:431–442

13. Jewett E.L.: One – piece Angle Nail for Trochanteric fractures; Journal of Bone and Joint Surgery, 1941, 23: 803-810.

14. Moore GH, MacEachern AG, Evans J. Treatment of intertrochanteric fractures of the femur, a comparison of the Richards screw-plate with the Jewett nail-plate. J Bone Joint Surg1983 ; 65(B) : 262–267.

15. BoydHB,Griffin. "Classification and treatment of trochanteric fractures" Arch surgery 1949;58:853-86.

16. Clawson D.K.: "Intertrochanteric Fracture of the Hip", American journal of surgery, 1957, 93: 580-587

17. Clawson D.K.: "Intertrochanteric fractures Treated by the Sliding Screw Plate Fixation Method"; Journal of Trauma, 1964, 4: 733-756.

18. Dopplet S.H.: "The Sliding Compression Screw: Today's Best Answer for Stabilization of Intertrochanteric Hip Fractures"; Orthopaedic Clinics of North America, 1980, 11: 507-523.

19. Medoff RJ, Maes K. A new device for the fixation of unstable pertrochanteric fractures of the hip. J Bone Joint Surg Am 1991;73:1192–1199,

20. A Comparison between the medoff sliding plate and the compression hip screw; JBJS (B) 2001, 74, 321-326 88

21. Dimon JH, Hughston JC. Unstable intertrochanteric fractures of the hip. J Bone Joint Surg1967 ; 49(A) : 440

22. Sarmiento A, Williams EM. The unstable intertrochanteric fracture treatment with a valgus osteotomy and I-beam nail-plate a preliminary report of 100 cases. J Bone Joint Surg 1970; 52(A) : 1309

23. Collado F. Condylocephalic nailing for trochanteric fractures of femur. J Bone Joint Surg 1973; 5-B: 774

24. Singh M, Nagrath AR, Maini PS: "Changes in Trabecular Pattern of the Upper End of the Femur as an Index of Osteoporosis"; Journal of Bone and Joint Surgery, Am 1970; 52: 457 - 467.

25. Halder SC. The Gamma nail for peri t rochanteric fractures. Journal of Bone and Joint Surgery - B ri t ish Volume, 74-B(3);340-4.

26. A Randomized study of the compression hip screws and gamma nail in 426 fractures Clin. Orthop 2002; Aug 401: 209-211

27. Ahrengart L, Tornkvisk H, Fornander P, Thangren KG, Pasenen L, A Randomised study of the compression hip screws and gamma nail in 426 fractures; ClinOrthop Aug 2002; (401); 209-22.

28. Aune et al; Gamma nail Vs Compression screw for trochanteric femoral fractures; ActaOrthopScand 1994; 65; 127-130.

29. Valverde JA, Alonso MG, Porro JG et al (1998) Use of Gamma nail in treatment of fractures of the proximal femur. ClinOrthop 350:56–6189

30. Domingo LJ, Cecilia D, Herrera A, Resines C (2001) Trochanteric fractures treated with a proximal femoral nail. IntOrthop 25:298–301.

31. Domingo LJ, Cecilia D, Herrera A, Resines C (2001) Trochanteric fractures treated with a proximal femoral nail. IntOrthop 25:298–301.

32. Simmermacher RKJ, Bosch A M, Van der Werken C. The AO ASIFproximal femoral nail (PFN): a new device for the treatment of unstable proximal femoral fractures. Injury 1999; 30: 327-32.

33. Sadowski C, Lubbeke A, Saudan M. Treatment of reverse oblique and transverse intertrochanteric fractures with use of an intramedullary nail or a 95 degrees screw-plate, a prospective randomized study. J Bone Joint Surg2002 ; 84(A) : 372-81.

34. ChristianBoldin, Franz J Seibert, Florian Fankhauser, GeroifPeicha, Wolfgang Grechenig and Rudolf Szyszkowitz. "The proximal femoral nail (PFN) - a minimal invasive treatment of unstable proximal femoral fractures A prospective study of 55 patients with a follow-up of 15 months ActaOrthopScand 2003;74(1):53-58.

35. Brunner A, Jockel JA, Babst R. The PFNA proximal femur nail in treatment of unstable proximal femur fractures — 3 cases of postoperative perforation of the helical blade

36. Mereddy P, Kamath S, Ramakrishnan M, Malik H, Donnachie 90N. The AO/ASIF proximal femoral nail antirotation (PFNA): a new design for the treatment of unstable proximal femoral fractures. Injury 2009;40:428—32.

37.Fogagnolo F, Kfuri M, Paccola Ca. Intramedullary fixation of per trochanteric hip fractures with short AO ASIF PFN. J Arch Orthop Trauma Surg 2004;124(1):31-7.

38.Pajarinen J, Lindahl J, Michelsson O, Savolaien V, Hirvensalo E. Pertrochanteric femoral fractures treated with a dynamic hip screw or a proximal femoral nail. A randomised study comparing post-operative rehabilitation. J bone Joint Surg Br. 2005; 87(1):76-81. 14

39. Takigami I, Matsumoto K, Ohara A, Yamanaka K, Naganawa T, Ohashi M, et al. Treatment of trochanteric fractures with the PFNA (proximal femoral nail antirotation) nail system — report of early results. Bull NYU HospJt Dis 2008;66:276—9

40. Sommers MB, Roth C, Hall H, Kam BC, Ehmke LW, Krieg JC, et al. A laboratory model to evaluate cutout resistance of implants for pertrochanteric fracture fixation. J Orthop Trauma 2004;18:361—8.

41. Garg B, Marimuthu K, Kumar V, Malhotra R, Kotwal PP. Outcome of short proximal femoral nail antirotation and dynamic hip screw for fixation of unstable trochanteric fractures. A randomised prospective comparative trial. Hip Int 2011;21: 531—6. 91

42. Liu Y, Tao R, Liu F, Wang Y, Zhou Z, Cao Y, et al. Mid-term outcomes after intramedullary fixation of peritrochanteric femoral fractures using the new proximal femoral nail antirotation (PFNA). Injury 2010;41:810—7.

43. Yaozeng X, Dechun G, Huilin Y, Guangming Z, Xianbin W. Comparative study of trochanteric fracture treated with the proximal femoral nail anti-rotation and the third generation of gamma nail. Injury 2010;41:1234—8.

44. Kumar GNK, Sharma G, Khatri K, Farooque K, Lakhotia D, Sharma V et al (2015) Treatment of unstable intertrochanteric fractures with proximal femoral nail antirotationll: our experience in Indian patients. Open Orthop J 9:456–459

45. Functional and Radiological Results of Proximal Femoral Nail Antirotation (PFNA) Osteosynthesis in the Treatment of Unstable Pertrochanteric Fractures.Radaideh AM1 , Qudah HA2 , Audat ZA3 , Jahmani RA4 , Yousef IR5 , Saleh AAA6 .

46.Mallya S, Kamath SU, Madegowda A, Krishnamurthy SL, Jain MK, Holla R. Comparison of radiological and functional outcome of unstable intertrochanteric femur fractures treated using PFN and PFNA-2 in patients with osteoporosis. European Journal of Orthopaedic Surgery and 92 Traumatology. 2019 Jul 1;29(5):1035-42. https://doi.org/10.1007/s00590-019-02401-x

47. : Kasha S, Rathore S, Suri HS et al. PFNA-II in peritrochanteric femur fractures: experiences in osteoporotic elderly Indians. International Journal of Research and Review. 2017; 4(2):56-62.

48.Kashid MR, Gogia T, Prabhakara A, Jafri MA, Shaktawat DS, Shinde G. Comparative study between proximal femoral nail and proximal femoral nail antirotation in management of unstable trochanteric fractures. Int J Res Orthop 2016;2:354-8.

49. Proximal femoral nail antirotation (PFN-ATM) fixation of extracapsular proximal femoral fractures in the elderly: Retrospective study in 102 patients E. Soucanye de Landevoisin,A. Bertani et al. Orthopaedics and Traumatology: Surgery and Research, 3, 5 2012

50. Akhilesh Singh Kushwaha, Pankaj Sharma, MohitDhingra, PawanRawat, NavneetBadoni and Puneet Gupta. Functional outcome of proximal femoral nail antirotation with helical blade fixation in extra capsular hip fractures in Himalayan region.International Journal of Orthopaedics Sciences. 2018; 4(1): 659-664. DOI: 10.22271/ortho.2018.v4.i1j.95 93

51. Singh NK et al., Is PFNA-II a better implant for stable intertrochanteric fractures in elderly population ? A prospective randomized study, Journal of Clinical Orthopaedics and Trauma, doi.org/10.1016/j.jcot.2019.02.004

52.Gavaskar AS, Subramanian M, Tummala NC. Results of proximal femur nail antirotation for low velocity trochanteric fractures in elderly. Indian J Orthop 2012;46:556-60

53. Mora A, Marimon I, Rius M, Brill W, Corral A, Gaya S. PFN versus PFNA in treatment of trochanteric femoral fractures: A prospective study. Bone and Joint Journal Orthopaedic proceedings. 2011;93(2):136.

54. Sharma, Anirudh&Mahajan, Anupam& John, Bobby. (2017). A Comparison of the Clinico-Radiological Outcomes with Proximal Femoral Nail (PFN) and Proximal Femoral Nail Antirotation (PFNA) in Fixation of Unstable Intertrochanteric Fractures.Journal of Clinical and Diagnostic Research. 11. RC05-RC09. 10.7860/JCDR/2017/28492.10181.

55. Park JH, Lee YS, Park JW, Wang JH, Kim JG. A comparative study of screw and helical proximal femoral nails for the treatment of intertrochanteric fractures.Orthopaedics. 2010;33(2):81-85.

ANNEXURE II

PROFORMA :

STUDY SERIAL NUMBER :

NAME :

AGE :

SEX :

IP NO :

MOBILE NUMBER :

DIAGNOSIS :

COMORBIDITIES :

DATE OF ADMISSION :

DATE OF SURGERY :

DATE OF INJURY :

ADDRESS :

OPERATING SURGEON :

SURGICAL POSITION :

HARRIS HIP SCORE :

AT 6 WEEKS -

AT 3 MONTHS -

AT 6 MONTHS -

COMMENTS(IF ANY) :

ANNEXURE III

INFORMED CONSENT FORM :

This Informed Consent Form is for men and women who comes to Dr Prabhakar Kore Hospital and Research Centre and who we are inviting to participate in our study on title “FUNCTIONAL OUTCOME OF PROXIMAL FEMORAL NAILING AII IN INTERTROCHANTERIC FRACTURES – A HOSPITAL BASED PROSPECTIVE STUDY”

Objective:

To assess the functional outcome of intramedullary fixation using helical blade (PFN AII) in the treatment of intertrochanteric fractures

Introduction:

I am conducting study on the FUNCTIONAL OUTCOME OF PROXIMAL FEMORAL NAILING AII IN INTERTROCHANTERIC FRACTURES. I am going to give you information and invite you to be a part of this research. There may be some words that you may not understand. Please contact me for more information as needed.

Intertrochanteric fractures are proximal femoral fractures and can be surgically treated with Dynamic Hip Screws or Intermedullary fixation using PFN. Proximal Femoral Nailing using Helical Blade will be the surgery associated with this study and post operative functional outcome will be measured using Harris Hip Score

Explanation of procedure: Patients diagnosed as Intertrochanteric Fractures of Femur using X-Ray are operated using Proximal Femoral Nailing AII. Post operatively functional outcome will be analysed by Harris Hip Score at the interval of 6 weeks, 3rd month and at 6th month

Voluntary Participation :

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. Whether you choose to participate or not, all the services you receive at this clinic will continue and nothing will change. If you choose not to participate in this research project, you will be offered the treatment that is routinely offered in this clinic/hospital for osteoporotic fracture, and we will tell you more about it later. You may change your mind later and stop participating even if you agreed earlier.

Withdrawal from participation in the study: Participation in this study in voluntary. You will be free to decide whether to participate in this study or continue participation once enrolled. In case you decide to withdraw your participation, you are free to do so. However, please convey the decision to the principal investigator.

Possible benefits from participating in the study: You may or may not get any benefits by participating in this study. The data gathered will help population at large.
Possible risks from participating in the study: There are no risks involved in participating in this study.
Privacy and confidentiality: The information collected from you will be coded, to prevent any person to identify you. Your identity will never be revealed. The data collected from you will be kept confidential and only processed or aggregated data will be used for publication.
Financial incentives: You will not receive any payment for participating in this study.
Cost of investigations done during the course of study will be paid by the **principal investigator / Participant.**
Authorization for publication of aggregated data: Results obtained after processing of the aggregated data will be published for scientific purpose and or presented to scientific groups. However, your identity will never be revealed.
Questions: In case of any questions with regard to this study or complaints with regard to your right as study participant, you may contact Dr Harsha Hegde, Chairperson, Ethical committee of JNMC, 0831-2473777 Extension 4052.
Legal rights: By signing this consent form, we are not waving any of your legal rights

ANNEXURE IV

HARRIS HIP SCORE :

Item	Score
I. PAIN (44 POSSIBLE)	
A. None or ignores it	44
B. Slight, occasional, no compromise in activities	40
C. Mild pain, no effect on average activities, rarely moderate pain with unusual activity	30
D. Moderate pain, tolerable but with limitations in ordinary work or life	20
E. Marked pain, serious limitation of activities	10
F. Totally disabled, crippled, pain in bed	0
II. FUNCTION (47 POSSIBLE)	
A. Gait (33 possible)	
1. Limp	
a. None	11
b. Slight	8
c. Moderate	5
d. Severe	0
2. Support	
a. None	11
b. Cane for long walks	7
c. Cane most of the time	5
d. One crutch	3
e. Two canes	2
f. Two crutches	0
g. Not able to walk	0
3. Walking distance	
a. > 1 km	11
b. 0,5-1 km	8
c. 100-500 m	5
d. Only inside the house	2
e. Confined to chair or bed	0
B. Activities (14 possible)	
1. Stairs	
a. Normally without using a railing	4
b. Normally using a railing	2
c. In any manner	1
d. Not able to do stairs	0
2. Shoes and socks	
a. With ease	4
b. With difficulty	2
c. Unable	0
3. Sitting	
a. Comfortably in ordinary chair for 1 hour	5
b. On a high chair for one-half hour	3
c. Unable to sit comfortably in any chair	0
4. Uses public transport	1
TOTAL	

The scoring after assessment by Harris Hip Score is as follows :

90-100 = Excellent

80-90 = Good

70-80 = Fair

<70 = Poor

ANNEXURE V

MASTER CHART :

Sr. No.	AGE	SEX	IP NO.	D.O.A	D.O.S	SIDE	DIAGNOSIS	POSITION	6 WEEKS	3 MONTHS	6 MONTHS
1	78	F	1156991	8TH DEC 2022	10TH DEC 2022	LEFT	TYPE II	LATERAL	_	_	_
2	74	M	1161192	29TH DEC 2022	2ND JAN 2023	LEFT	TYPE II	SUPINE	_	_	_
3	60	F	1178579	26TH MAR 2023	29TH MAR 2023	RIGHT	TYPE II	SUPINE	38	65	90
4	68	M	1182956	17TH APR 2023	19TH APR 2023	LEFT	TYPE II	SUPINE	37	63	86
5	70	F	1182957	18TH APR 2023	20TH APR 2023	LEFT	TYPE II	SUPINE	36	66	83
6	66	M	1192164	28TH MAY 2023	1ST JUN 2023	LEFT	TYPE II	SUPINE	42	66	92
7	83	M	11716776	17TH FEB 2024	24TH FEB 2024	LEFT	TYPE I	LATERAL	_	_	_
8	78	F	1174282	2ND MAR 2023	6TH MAR 2023	LEFT	TYPE IV	LATERAL	32	60	63
9	59	M	1194686	18TH JUN 2023	20TH JUN 2023	LEFT	TYPE II	SUPINE	38	67	90
10	78	M	1178894	26TH MAR 2023	27TH MAR 2023	RIGHT	TYPE II	SUPINE	33	62	88
11	86	F	1183201	15TH APR 2023	19TH APR 2023	RIGHT	TYPE II	LATERAL	34	58	80
12	67	M	1184953	24TH APR 2023	28TH APR 2023	RIGHT	TYPE II	SUPINE	32	45	76
13	72	F	1186291	1ST MAY 2023	6TH MAY 2023	LEFT	TYPE I	SUPINE	34	68	90
14	57	F	1187419	6TH MAY 2023	8TH MAY 2023	RIGHT	TYPE II	SUPINE	37	66	86
15	58	M	1187406	6TH MAY 2023	7TH MAY 2023	LEFT	TYPE I	SUPINE	44	72	97
16	60	M	1191925	28TH MAY 2023	31ST MAY 2023	RIGHT	TYPE I	SUPINE	33	65	90
17	82	M	1180550	3RD APR 2023	5TH APR 2023	LEFT	TYPE II	LATERAL	32	63	86
18	74	M	1195236	12TH JUN 2023	13TH JUN 2023	RIGHT	TYPE II	SUPINE	35	66	87
19	93	F	1196618	19TH JUN 2023	21ST JUN 2023	RIGHT	TYPE II	SUPINE	30	60	80
20	47	M	1196778	19TH JUN 2023	21ST JUN 2023	RIGHT	TYPE II	SUPINE	33	58	83
21	62	M	1196930	19TH JUN 2023	21ST JUN 2023	LEFT	TYPE II	SUPINE	37	59	89
22	58	M	1198934	27TH JUN 2023	30TH JUN 2023	RIGHT	TYPE II	LATERAL	_	_	_
23	58	F	1199809	3RD JUL 2023	5TH JUL 2023	RIGHT	TYPE II	SUPINE	30	55	77
24	87	F	1202048	11TH JUL 2023	14TH JUL 2023	RIGHT	TYPE II	LATERAL	37	60	78
25	76	F	1203625	18TH JUL 2023	19TH JUL 2023	RIGHT	TYPE II	SUPINE	30	60	80
26	69	F	1006150	8TH SEP 2023	16TH SEP 2023	RIGHT	TYPE II	SUPINE	42	70	91
27	73	M	1007451	14TH SEP 2023	15TH SEP 2023	RIGHT	TYPE IV	SUPINE	32	66	87
28	78	F	10012074	6TH OCT 2023	10TH OCT 2023	LEFT	TYPE IV	SUPINE	35	59	84
29	72	M	10018169	3RD NOV 2023	6TH NOV 2023	LEFT	TYPE II	LATERAL	36	66	85
30	70	M	10035012	20TH JAN 2024	26TH JAN 2024	LEFT	TYPE II	LATERAL	38	65	80
31	85	F	10039358	8TH FEB 2024	10TH FEB 2023	RIGHT	TYPE II	LATERAL	36	66	82
32	88	F	10043879	28TH FEB 2024	1ST MAR 2024	RIGHT	TYPE II	SUPINE	37	60	85
34	70	M	10043997	3RD MAR 2024	5TH MAR 2024	RIGHT	TYPE II	SUPINE	36	62	87
35	73	M	10054262	5TH APR 2024	10TH APR 2024	LEFT	TYPE IV	SUPINE	_	_	_