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FUNCTIONAL OUTCOME OF PROXIMAL HUMERUS FRACTURES MANAGED WITH PHILOS PLATING

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INTRODUCTION: Proximal humeral fractures refers to fractures occurring at or proximal to the surgical neck of the humerus. It is the commonest fracture affecting the shoulder girdle in adults and its incidence is increasing.

OBJECTIVE: Our study was aimed to evaluate functional result of proximal humerus fractures managed using PHILOS plate by assessing the range of motion of shoulder along with pain and discomfort in the activities of daily living.

MATERIAL AND METHOD: In the orthopedics department of Karwar Institute of Medical Sciences ,Karwar, 40 patients with proximal humerus fractures underwent ORIF with PHILOS plating as part of a prospective observational research. Six months after the surgery, a follow-up research was carried out. Information gathered with a structured proforma. The Constant and Murley score scoring system is used to evaluate the outcomes.

RESULTS: The Constant and Murley score was used to evaluate the functional result at the 6-

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month follow-up. RTA was the second most common mode of injury, accounting for 55% of all cases, after slip and fall. 57.5% of the participants were female and 42.5% were male. 22.5% of

fractures were classified as two parts, 52.5% as three parts, and 25% as four parts by NEER. 20% had an exceptional score, 55% had a fair score, and 25% had a moderate score, according to the Constant and Murley scores. The lowest mean constant score was seen in the age group over 60. Infection was the most common consequence among our patients, accounting for just 5% (2 cases) of all problems.

CONCLUSION: Hence PHILOS Plating greatly improves the functional outcome in patients with displaced proximal humerus fractures and allows for earlier mobilization and prevents complications like malunion.

KEYWORDS: PHILOS plate; constant and murley score; NEER classification

INTRODUCTION

Fractures at or near the surgical neck of the humerus are referred to as proximal humeral fractures, and they strike 2.4% of women over 75. In adults, it is the most common fracture affecting the shoulder girdle, and its frequency is rising. After hip and distal radius fractures, it is the third most common fracture among adults over 65. According to the most recent fracture epidemiology, proximal humeral fractures account for 80% of all humeral fractures and about 7% of all fractures overall. The second most frequent upper extremity fracture in persons over 65 is proximal humeral fractures. The bimodal distribution of these fractures shows that they either occur in young individuals who have experienced high energy trauma or in individuals over 50.

An key factor in determining the frequency of proximal humerus fractures is age. It affects women more frequently than it does men. It is known that the incidence ranges from 15% to 30% in men . Approximately 85 percent of these fractures are mildly displaced, and early mobility followed by immobilization is a good treatment strategy. Of these, 15% are still unstable. Surgical intervention is necessary to prevent small dislocations of the tuberosity or articular surface from compromising the joint's long-term function, particularly in younger patients and active older adults.

About half of all fractures, including proximal humeral fractures, are caused by falls on flat ground, and the majority of these fractures occur at home. Ninety percent of older people's proximal humeral fractures are caused by falls from a standing height. Outside of the home, proximal humeral fractures are more common in younger people and are caused by higher-energy trauma from sports, cars, falls from great heights, and attacks.

Surgical fixation is the preferred method of treatment for proximal humeral fractures classified as 2, 3, and 4 parts by Neer. There are numerous methods for fixing fractures, including intramedullary nailing, locking plate fixation, transosseous sutures, tension band wiring, cervical wiring, closed reduction and percutaneous K-wire pinning, shoulder arthroplasty, and PHILOS plates.

Following humeral fracture surgery, nonunion and implant loosening or failure are potential side effects. There isn't a single therapy approach that is perfect. With many interlocking screws, the PHILOS plate (Synthes, Stratec Medical ltd, Mezzovico, Switzerland) is an internal fixation device that allows for angled stabilization. The AO (Arbeitsgemeinschaft für Osteosynthesefragen)/ASIF group developed it in an effort to lower the high rates of complications associated with proximal humeral fractures. PHILOS is being used more frequently because it requires less soft tissue dissection, improves fracture fixation in older osteoporotic bones, and offers axial and angular stability, all of which lower the risk of fracture displacement. Nevertheless, there aren't many prospective studies that assess the effectiveness of this procedure or detail treatment-related side effects . The purpose of this study was to assess functional outcome of PHILOS plating in Proximal Humerus fracture.

Material and methods:

STUDY SETTING :
The study was conducted in the out-patient clinics of the Department of Orthopedics – Karwar Institute of Medical Sciences, Karwar.

STUDY PERIOD ;
One year after obtaining IEC clearance

PERIOD OF FOLLOW UP
Six months

STUDY POPULATION :40

INCLUSION CRITERIA**:**

1. Displaced proximal humerus fracture
2. Skeletally Matured Patients
3. Patients who have given consent to this study.

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EXCLUSION CRITERIA**:**

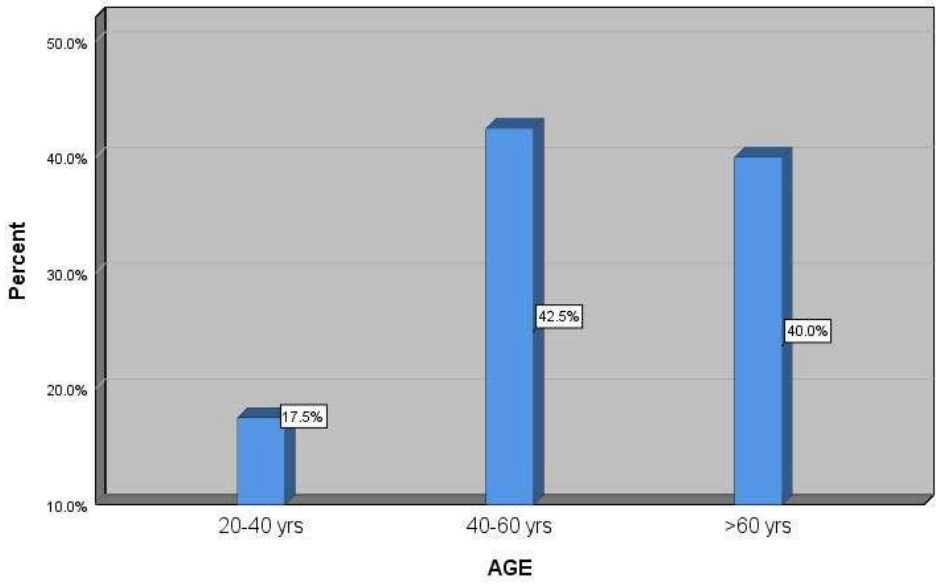
1. Pathological Fractures
2. 1-part Fracture
3. Patients who are unfit for anaesthesia.

OBSERVATIONS AND RESULTS

Table 1 :Age distribution

AGE	**No**	**%**
20-40 YEARS	7	17.5
41-60 YEARS	17	42.5
ABOVE 60 YEARS	16	40

Fig 1: Age distribution

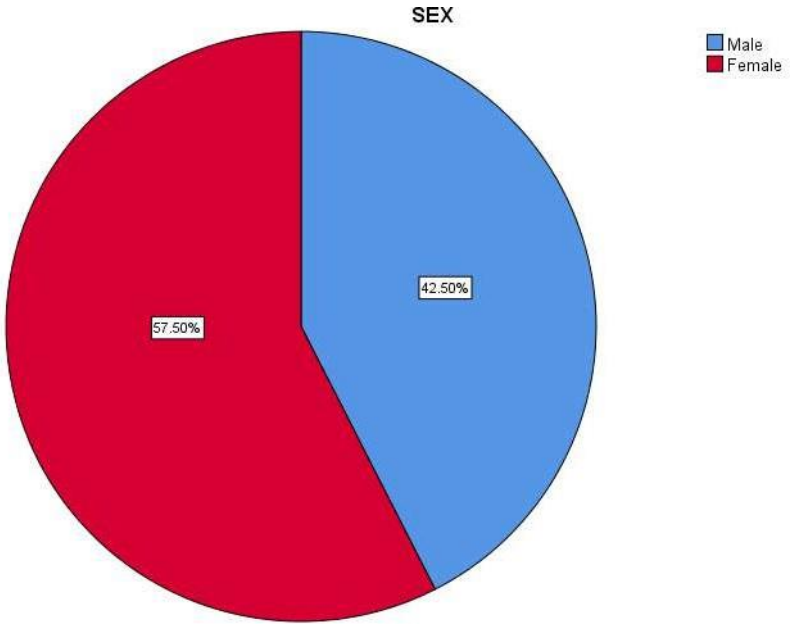


The mean age of our 40 patients was 48.81 (20-70), 16 patients belong to age group more than 60 years suggesting a strong relation of proximal humerus with age related osteoporosis.

Table 2 :Sex distribution

Sex	No.	%
Male	17	42.5
Female	23	57.5

Fig 2: Sex distribution



In our study a female: male ratio of 1.35:1(23:17).

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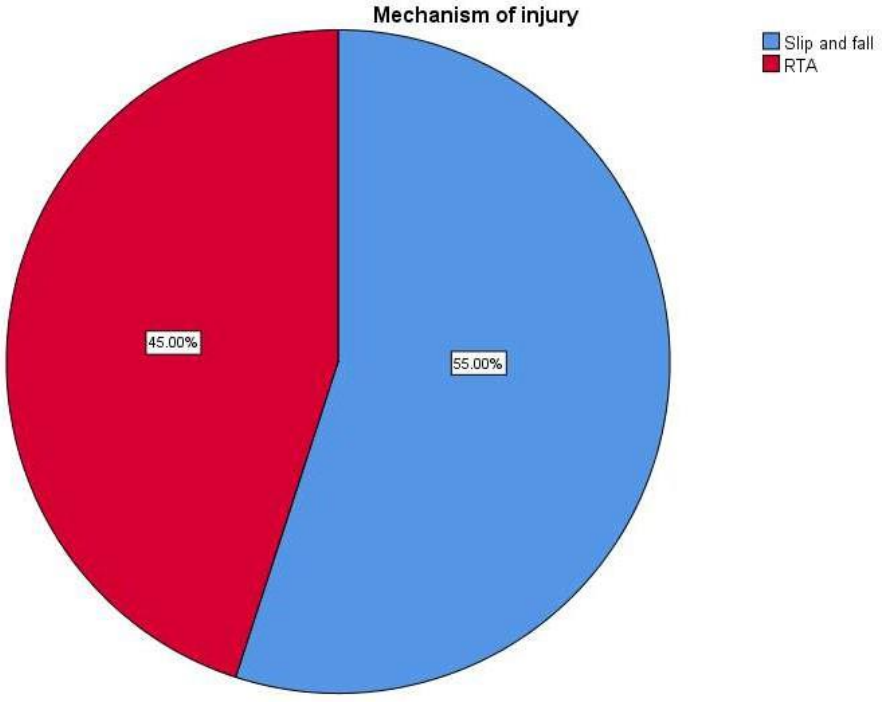
Table 3 : Mechanism of injury

Mechanism of injury	No	%
Slip and fall	22	55
RTA	18	45

Fig 3: Mechanism of injury



In our study Mechanism of injury is due to road traffic accident 45% (18) and fall from height 55% (22).

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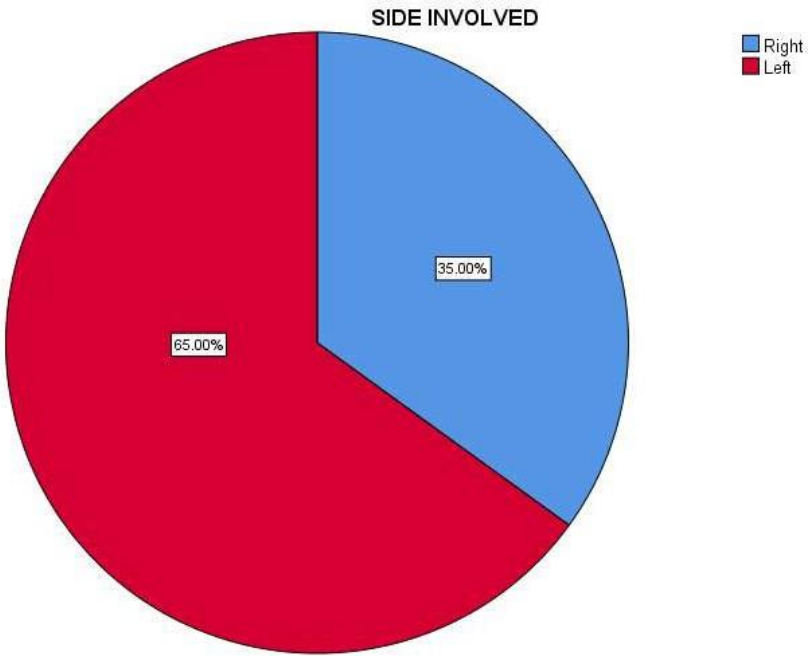
Table 4: Side of involvement

Side of involvement	No	%
Right	14	35
Left	26	65

Fig 4: Side of involvement

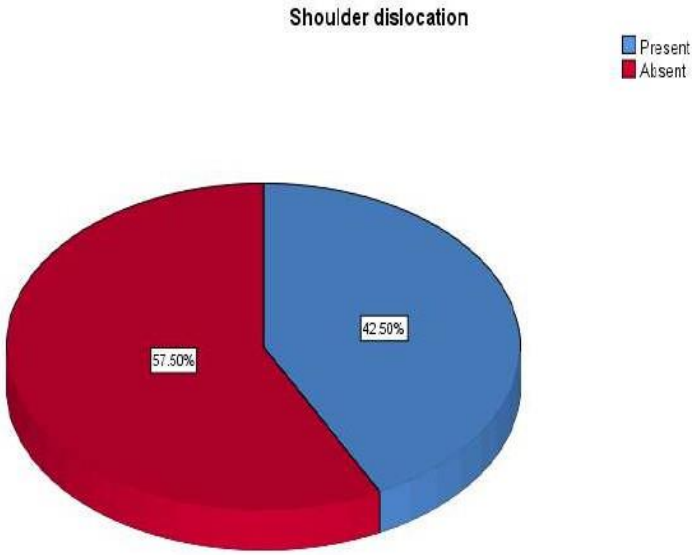


The side predilection more for left than right; 14 cases involved the right side with 35% and rest 26 cases (65%), left side was involved.

Table 5: Shoulder dislocation

Shoulder dislocation	No of cases	Percentage
Present	17	42.5
Absent	23	57.5

Fig 5 : Shoulder dislocation

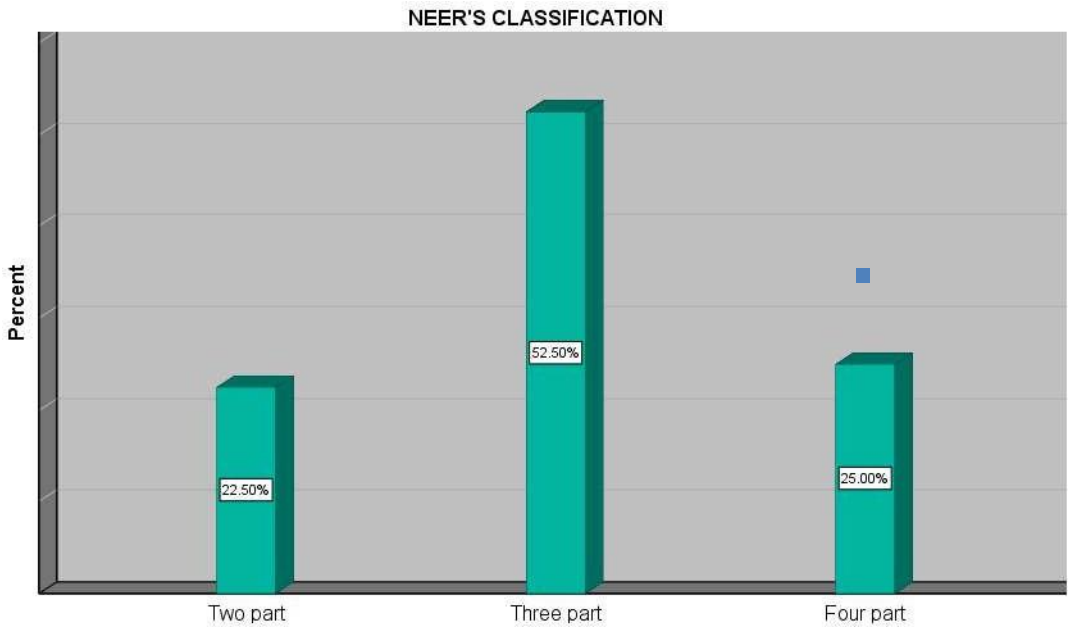


The fracture associated with shoulder dislocation was about 42.5% (17) cases.

Table 6: NEER'S Type

NEER'S Type	No	%
PART 1	0	0
PART 2	9	22.5
PART 3	21	52.5
PART 4	10	25

Fig 6 :NEER'S Type



According to NEER'S classification the percentage of fractures were 22.5% part two, 52.5% part three and 2 5% part four.

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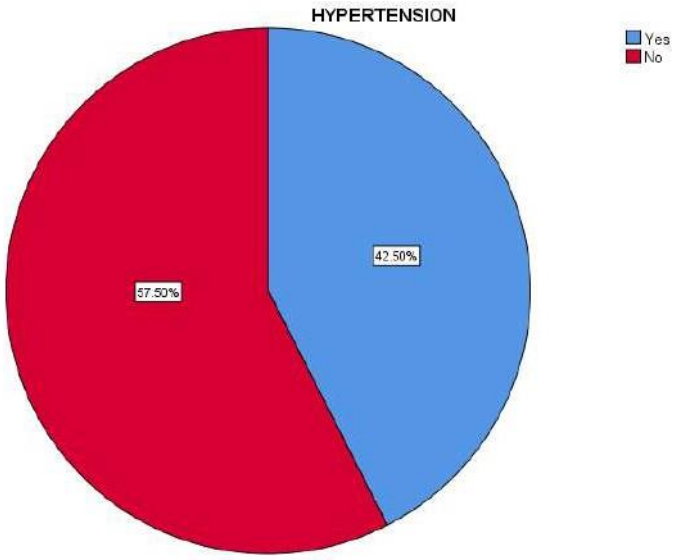
Table 7 : Hypertension

Hypertension	No	%
Present	17	42.5
Absent	23	57.5

Fig 7 :Hypertension

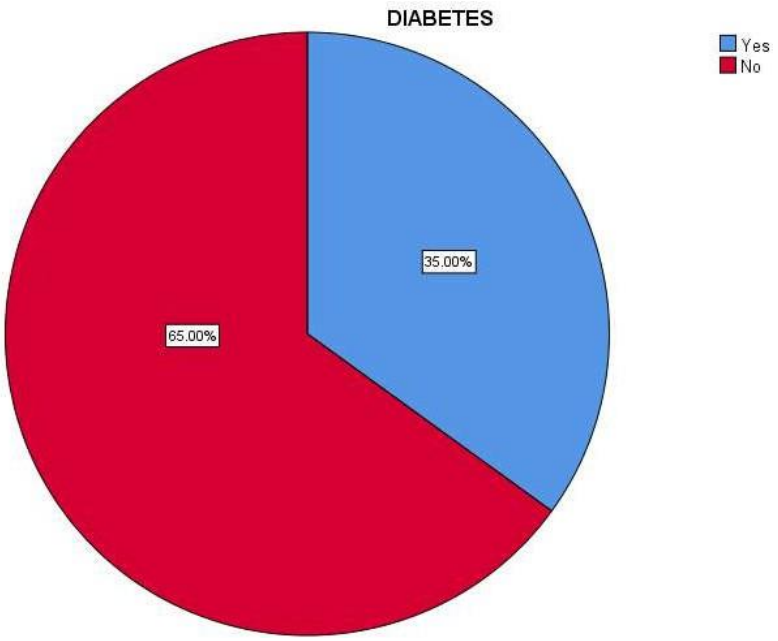


About 42.5% (17) patient had hypertension.

Table 8 : Diabetes

Diabetes	**No**	**%**
Present	14	35
Absent	26	65

Fig 8 :Diabetes

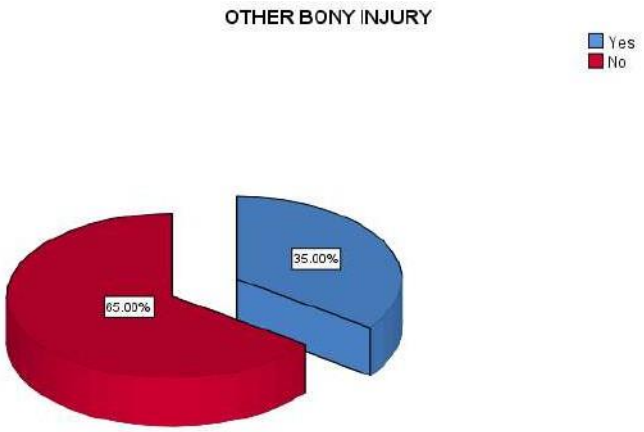


About 35%(14) patients had diabetes mellitus.

Table 9 : Other bony injury

Other bony injury	No	%
Present	14	35
Absent	26	65

Fig 9 : Other bony injury

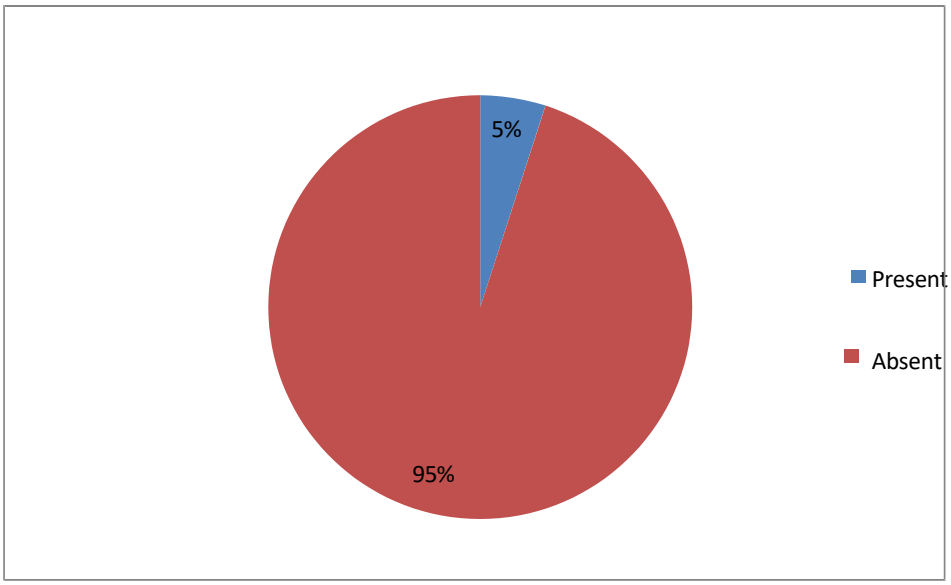


About 35% (14) cases have the other bony injury associated with this.

Table 10 : Infection

Infection	**No**	**%**
Present	2	5
Absent	38	95

Fig 10 : Infection



Post operative infections about 5% (2) cases reported.

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Table 11 : Forward flexion

Forward flexion	No	%
61-90^0	1	2.5
91-120^0	16	40
121-150^0	18	45
151-180^0	5	12.5

Fig 11 : Forward flexion

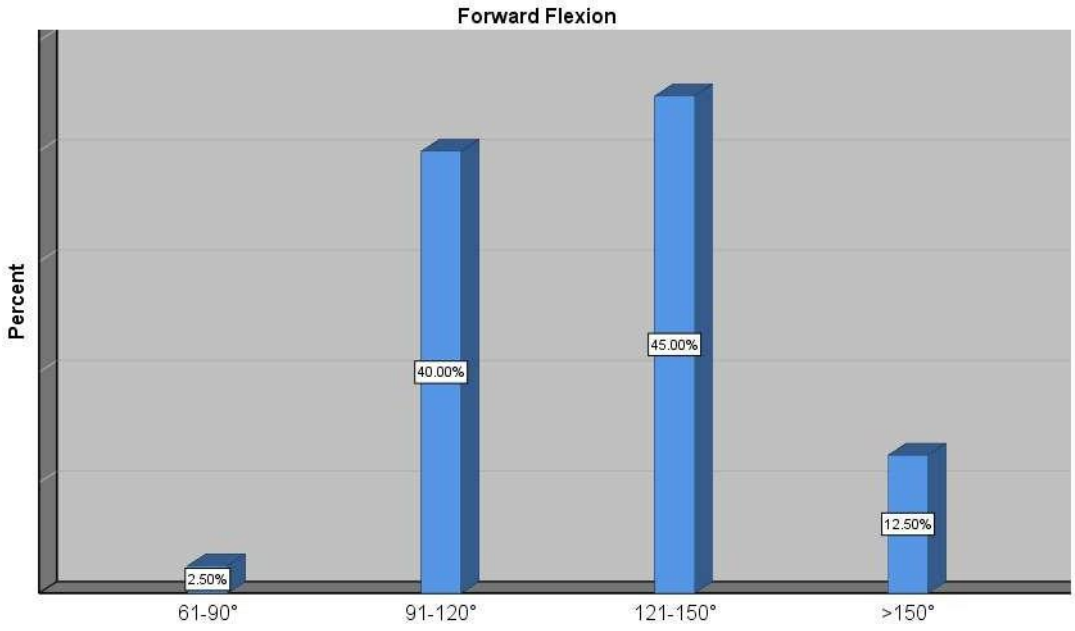

Table 12 : Extension

Extension	No	%
0-30^0	1	2.5
31-60^0	25	62.5
>60^0	14	35

Fig 12 : Extension

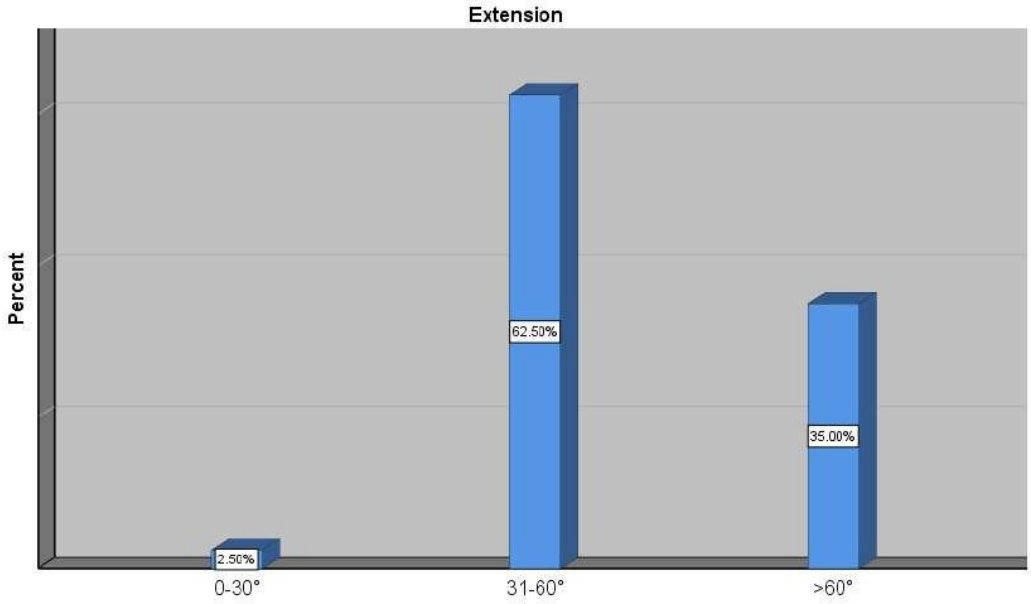

Table 13: Abduction

Abduction	No	%
91-120^0	17	42.5
121-150^0	20	50
151-180^0	3	7.5

Fig 13 : Abduction

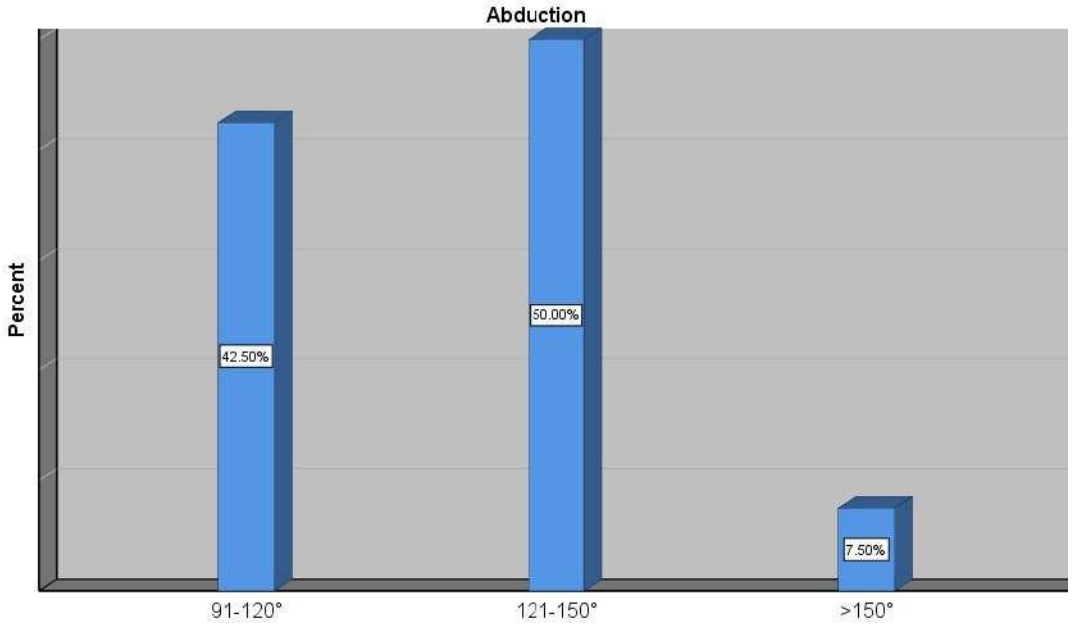

Table 14 : Internal rotation

Internal rotation	No	%
$0\text{-}30^0$	6	15
$31\text{-}60^0$	22	55
$61\text{-}90^0$	11	27.5
$>90^0$	1	2.5

Fig 14: Internal rotation

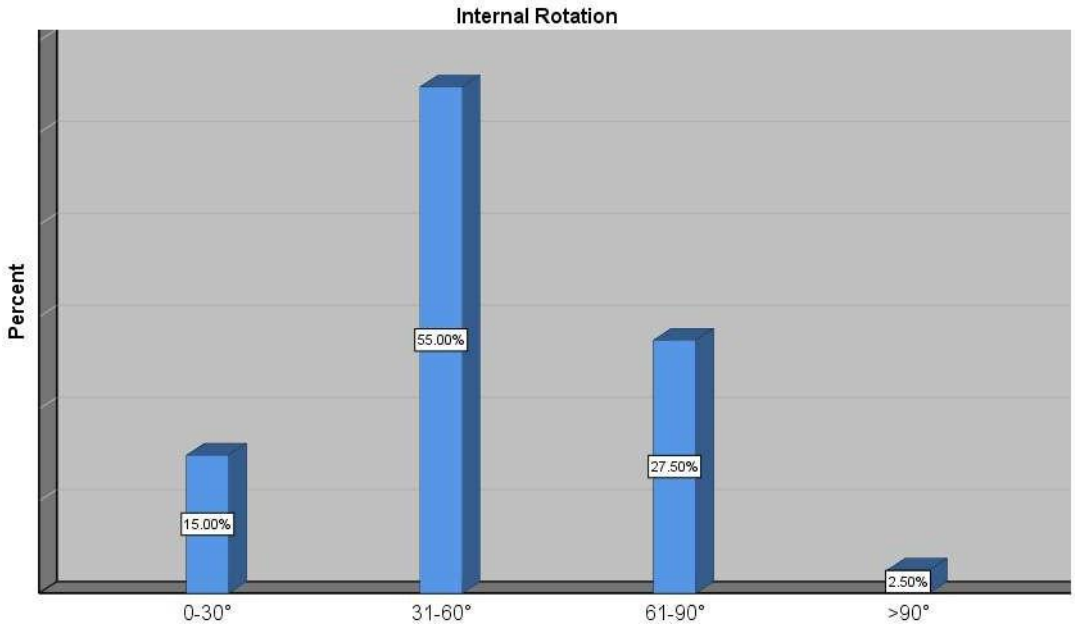

Table 15 : External rotation

External rotation	No	%
0-30^0	6	15
31-60^0	26	65
61-90^0	6	15
>90^0	2	5

Fig 15 : External rotation

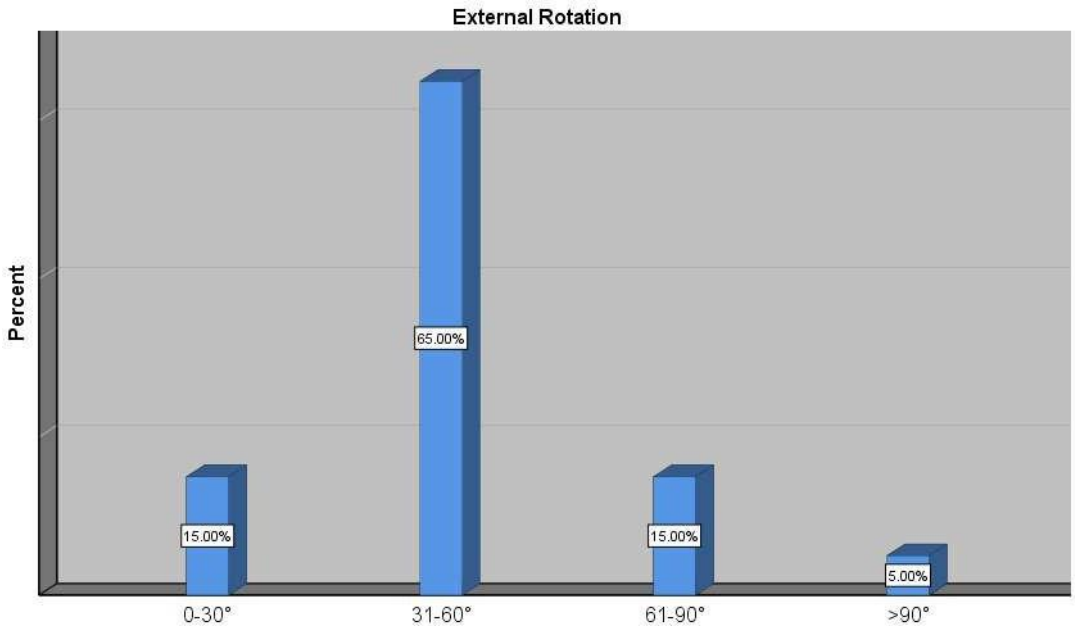

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Table 16 :Circumduction

Circumduction	**No**	**%**
Painless	26	65
Pain present	14	35

Fig 16 : Circumduction

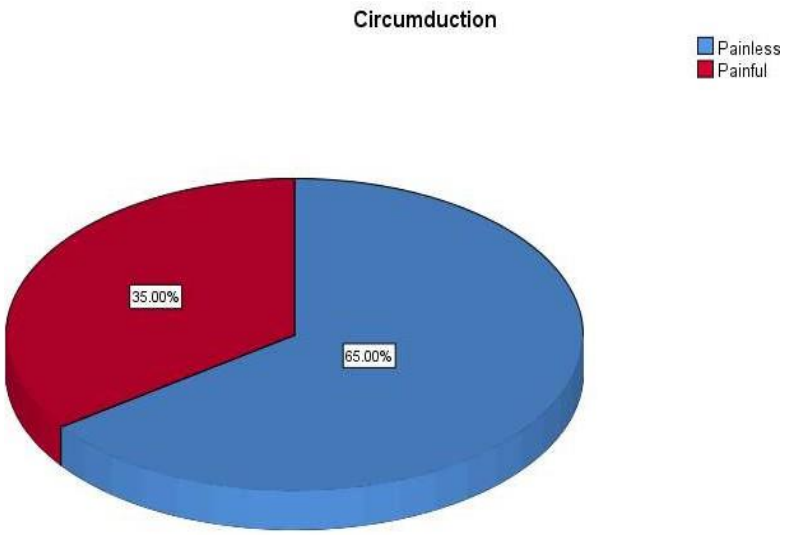

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Table 17 : Improvement of range of motion after 6 months

Improvement	**No**	**%**
Present	35	87.5
Absent	5	12.5

Fig 17: Improvement of range of motion after 6 months

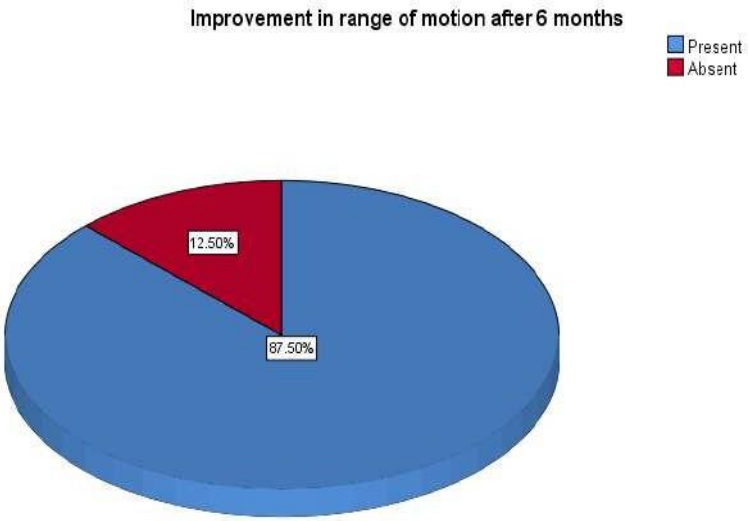

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Table 18 : Bone graft

Bone graft	**No**	**%**
Present	0	0
Absent	40	100

No patients underwent bone grafting.

Table 19 : Signs of avascular necrosis

Signs	**No**	**%**
Present	0	0
Absent	40	100

No patients had signs of avascular necrosis.

Table 20 : Constant Murley scoring system

Score	**No**	**%**
Excellent	8	20
Good	22	55
Moderate	10	25

Fig 18 : Constant Murley scoring system

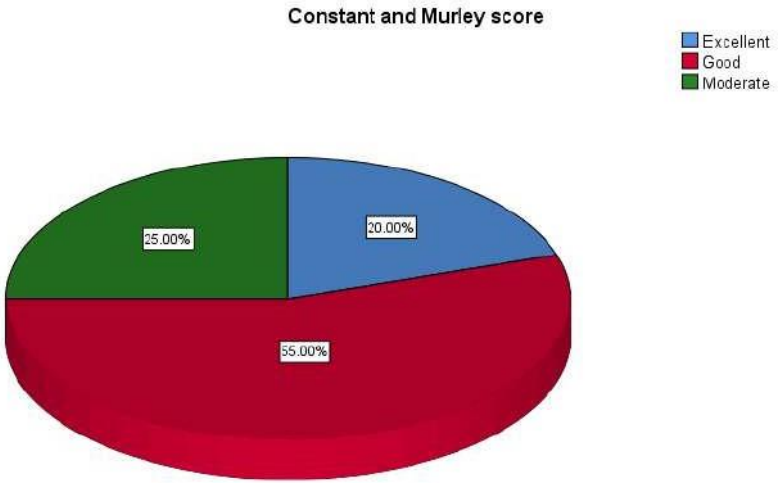


Table 21 : Constant score at follow up visits according to the age of patient.

Age	**Mean constant score**
20-40	78.14
41-60	77.47
>60	76.38

Fig 20 : Constant score at follow up visits according to the age of patient.

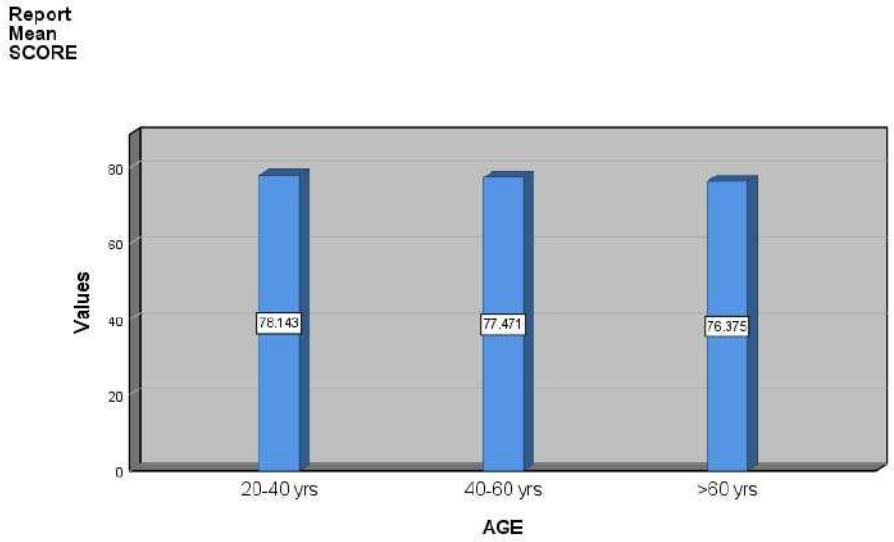


Table 22 : Constant score at follow up visits according to the sex of patient.

Sex	**Mean constant score**
Male	80.24
Female	74.87

Fig 21 : Constant score at follow up visits according to the sex of patient.

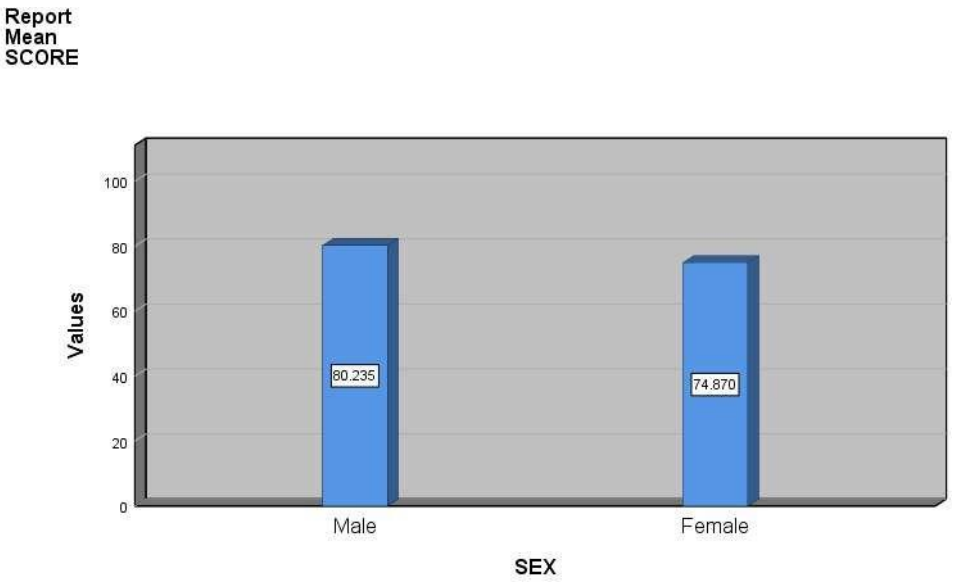
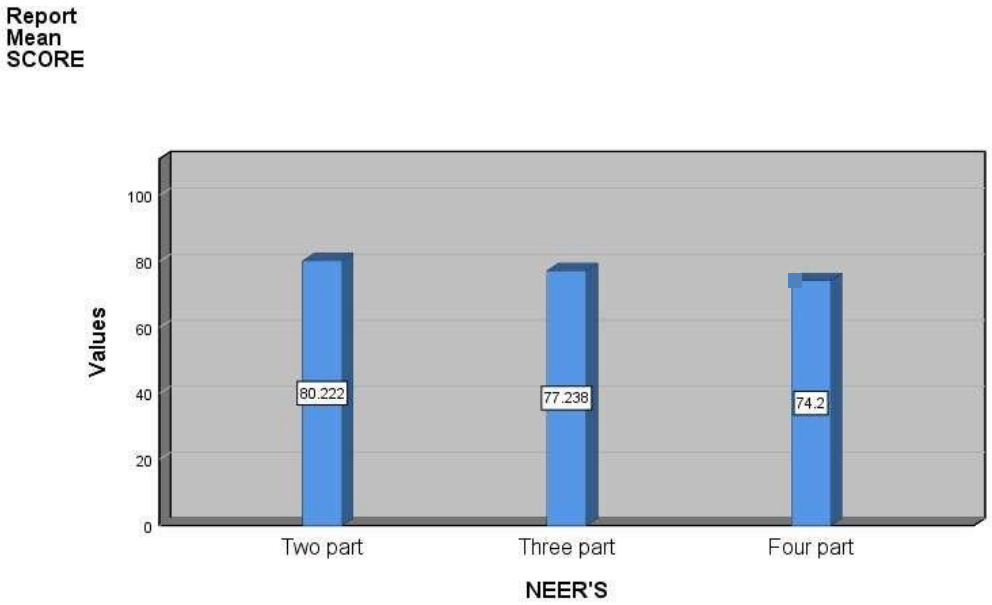


Table 22 : Constant score at follow up visits according to fracture types.

NEERS type	Mean constant score
PART 2	80.22
PART 3	77.24
PART 4	74.20

Fig 22 : Constant score at follow up visits according to fracture types.



Constant scores of the patients at the final follow up visit according to fracture types, age and sex respectively. Overall the functional outcome was found to be good to excellent in 75% of our patients. The mean Constant score achieved was 77.15%. We found that patients with Neers' type two and three fractures had the highest Constant scores while patients with Type IV had the lowest Constant scores. Patients less than 60 years of age group showed better response , and painless range of movement is increased in 87.5%(35)patients.

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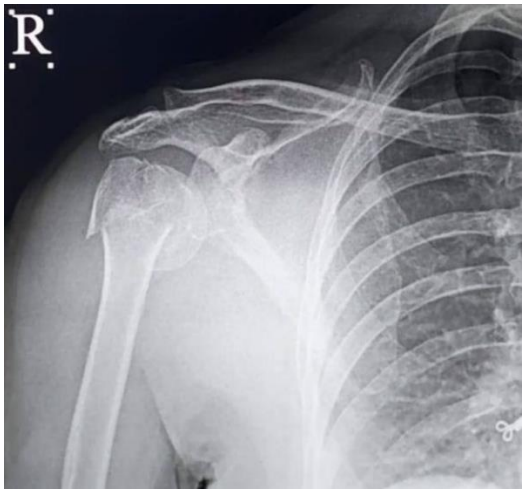
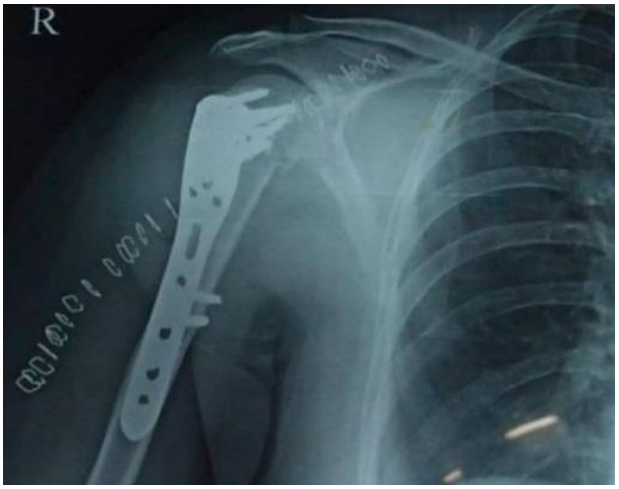
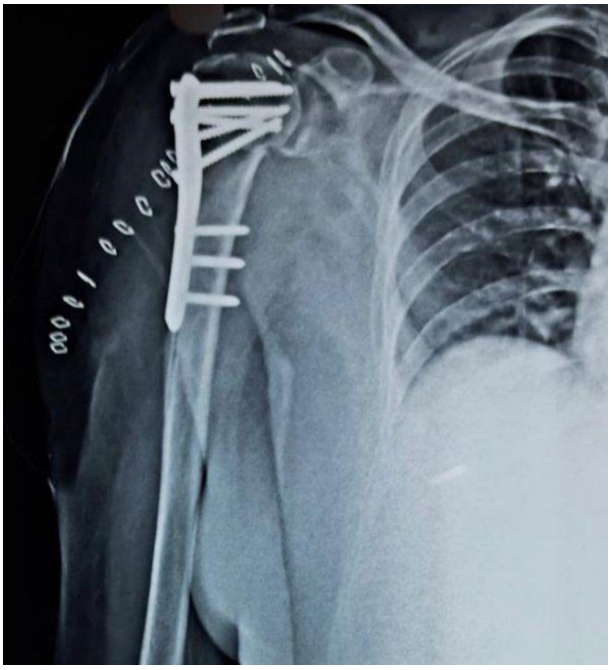
X RAYS 1

PREOPERATIVE X RAY POST OPERATIVE XRAY

2

PREOPERATIVE X RAY POST OPERATIVE X RAY

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3

PREOPERATIVE X RAY POST OPERATIVE X RAY

4

PREOPERATIVE X RAY POST OPERATIVE X RAY

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FOREWARD FLEXION EXTENSION

ABDUCTION EXTERNAL ROTATION

INTERNAL ROTATION

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DISCUSSION

In our study, both men and women experienced more complex fractures as a result of high-velocity injuries sustained in traffic accidents. Western literature indicates that proximal humerus fractures are more prevalent in elderly women. 55% of the patients in our study had slip-and-fall injuries, which is consistent with most studies in the western literature that consider low energy falls to be a more common cause of fractures of the proximal humerus. Falls with modest velocity are the primary cause of osteoporotic fractures. The primary cause is a traffic accident that occurred when the individuals were young.

The most terrible fractures in the elderly are proximal humeral fractures. Osteoporosis and perimenopausal women are particularly prone to these fractures4. Our data indicates that road traffic accidents (RTA) account for approximately 45 percent of all injuries in this age group, while slip and fall incidents account for about 55 percent. Surgically treating proximal humeral fractures is never easy.
After six months of follow-up in our study, a patient's mean Constant Murley score was 77. Our results resembled those found in western literature in certain ways.

In their examination of 30 patients, Thyagarajan found that Neer's 2-part, 3-part, and 4-part fractures had an average overall constant score of 57.5.In one prospective study, 19 patients had a mean constant score of 68.31. Following ORIF with the PHILOS plate, Kettler reported a Constant-Murley score ranging from 52 to 77.82 points. In these particular fracture types, Hente attained a mean Constant- Murley score of 55 points, which was lower than for fractures without dislocation. It is challenging to compare studies' Constant-Murley scores.

Although most studies have found positive functional outcomes and advised the use of locking plates for proximal humerus fractures, especially in older patients with low bone quality, Thanasas comprehensive review revealed an overall Constant score of 74.

The mean Constant score for 4-part fractures in our study was 74.2, which was lower than the scores for 2- and 3-part fractures (80.2 and 77.2 respectively). This outcome is consistent to a prospective research in which 4-part fractures had a lower mean Constant score than other types of fractures. These outcomes were anticipated given the complexity of the fractures and the difficulty of internal fixation and open reduction.

We discovered that patients' outcomes varied depending on whether they were under or over 60 years old.

Patients under 60 years old responded better than older patients. Aggarwal reported similar results, indicating that younger patients had higher Constant scores than older patients (those over 65).
In our study, there were more patients in the younger age group (under 60 years). In our study, patients between the ages of 20 and 40 made up 17.5 percent, those between the ages of 41 and 60 made up 42.5 percent, and those over 60 yrs made up 40 percent.

Only a few problems were seen after the procedure. The most frequent consequence is an infection. They were treated by switching the patient's antibiotics and managing their diabetes.
No patients were reported with signs of Avascular necrosis. As per the published literature, the chances of AVN of the shoulder are directly proportional to the severity of the injury. The risk of osteonecrosis increases if the anterolateral branch of the anterior humeral circumflex artery is damaged. Utmost care should be taken while exposing the biceps tendon in the bicipital groove.
The study's limitations include the absence of a control group, a briefer follow-up period, and a lack of evaluation of any patient characteristics other than diabetes and hypertension that may be risk factors for failure.

CONCLUSION

Most of the osteoporotic proximal humerus fractures are low velocity fall. In young age the cause is mostly due to road traffic accident. The functional outcome was better in two and three part fractures , younger age groups and in males.

However, there was no statistically significant association between any groups. The mean constant score obtained in our study was 77. No patients in our study had a poor score.
Hence PHILOS plating greatly improves the functional outcome in patients with displaced proximal humerus fractures.

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