

## Prognosis and Functional Outcomes of Management of Bimalleolar Fracture

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### ABSTRACT:

Ankle fractures are most commonly managed by orthopaedic surgeons in emergency department. The aim of this study to analyze the results, prognosis and management outcomes of bimalleolar fractures for patients treated in Althora hospital, Albida, Libya. This was a prospective study includes 26 cases of closed bimalleolar ankle fractures. The fractures of the ankle are commonly seen in the young adult male population with road traffic accidents and right side ankles being the common cause. Weber type B and Supination external rotation injury were the commonest type of fracture. In conclusion, the Bimalleolar fracture treated with ORIF gain to good ankle function after 6 months. All the patients who had good results returned to normal activity and had regained their full ankle movements by the end of three months.

### INTRODUCTION:

Ankle fractures are one of the most common injuries treated by orthopaedic surgeons.(1) They have been the subject of numerous studies and articles regarding the mechanism of injury, classification and treatment modalities. Classification systems exist to help describe the injury and guide providers in treatment (2,3). The anatomy of the joint makes it very unstable in cases of fractures or ligamentous injuries of the ankle (2,3). Fractures of the ankle have been treated either conservatively or operatively and as treated operatively with various modes of internal fixation devices, the best possible implant is determined according to the anatomy of the fracture. In the postoperative period, the protocol of mobilization of the ankle has been a topic of conflict. The final outcome of a fractured ankle is of prime importance, as the treatment should benefit the patient just not in short term but also in the long term. Because the ankle sustains the weight of the body during ambulation, there is a narrow threshold for error as it relates to restoration of the anatomical alignment of the joint, regardless of whether treatment is approached operatively or by nonsurgical means (4). The treatment of fractures has its challenges in cases where the fracture is complicated by co-morbid conditions such as Diabetes mellitus, peripheral vascular diseases and neuropathic conditions which complicates the treatment and influences the overall outcome. Satisfactory repair of

ankle fractures requires nearly anatomical reduction of the osseous structures, along with secure restoration of the ligaments and joint capsule (13). A thorough understanding of the ankle anatomy, mechanism of the injury, interpretation of the radiographs and adherence to basic principles of fracture management are the basis for a good result. Considering all of the above, we have tried to analyze the results, prognosis and management outcomes of bimalleolar fractures for patients treated in Althora hospital, Albida, Libya.

### MATERIALS AND METHODS:

This was a prospective study includes 26 cases of closed bimalleolar ankle fractures who were treated surgically at Government Althora Hospital, Albida from January 2016 to December 2018.

Patients with epiphysis ankle fractures, bilateral ankle fractures, Pilon fractures, Trimalleolar fractures and managed at Althora Hospital, Albida with a minimum period of 6 months follow up were included in the study.

### RESULTS:

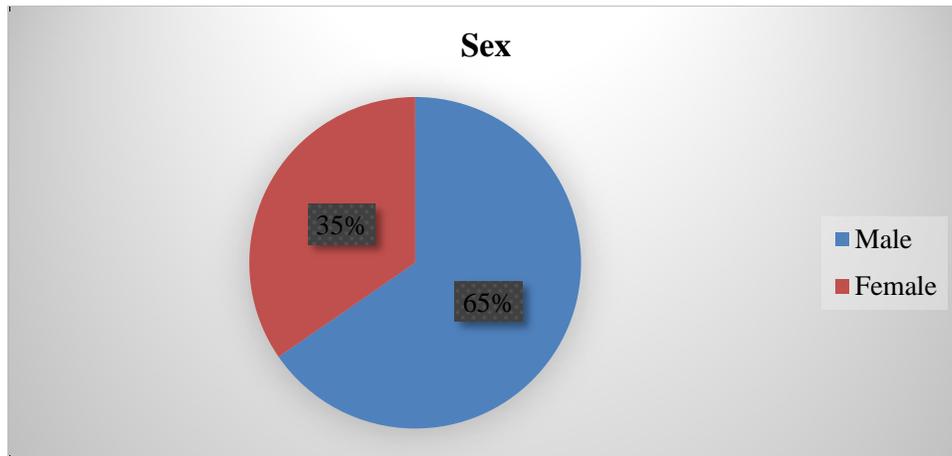
A total of 26 patients were included in this study. Most of patients were 17(65.4%) males and 9(34.6%) were females (Figure 1). The mean patient age was 43 years ranged from 22 to 64 years old, 42.3% in aged range between 21-30 years (Table 1). More than half of male 58.8% were in age 21-30 years (Figure 2). Right-sided

fractures were more predominant than the left side in this study comprising 57.6% and 11(42.4%) were in the left side (Figure 3). 9(34.6%) patients are known cases of chronic illness while 17(65.4%) are free from. The mean follow-up period was 8 months.

**Supination:**

External rotation injury was the most common mechanism of injury in this study according to per Lauge – Hansen’s classification comprising (42.3%) (Table 2). Weber type B fracture were the commonest type in this study comprising 53.8 % of patients (Figure 4). Road traffic accidents followed by fall down injuries were the most common cause of injury in this study. The

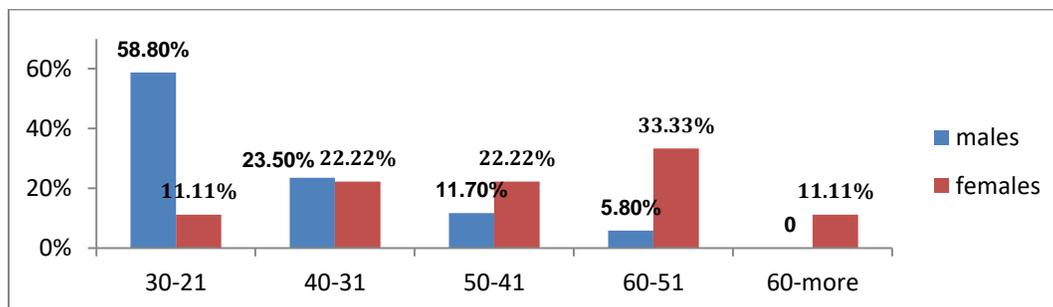
main cause of bimalleolar fracture was RTA in 11(42.4%) patients, fall down 9(34.6%) patients, fall from height in 4(15.4%) patients and sport injury in 2(7.7%) patients. Associated injuries and the co-morbidities were noted in total three cases one with contra-lateral fracture of the distal radius and head injury. One case fracture of ipsilateral humerus and one with fracture of shaft of femur (Table 3).Radiologically 15 cases (57.6 %) patients were in the fair group, 2 cases (7.6%) in good group and 9 cases (34.6%) in poor group according to Kristensons’s radiological criteria pre-management (Figure 5). Radiologically 62 % patients were in the good group according to Kristensons’s radiological criteria post-management (Figure 6).



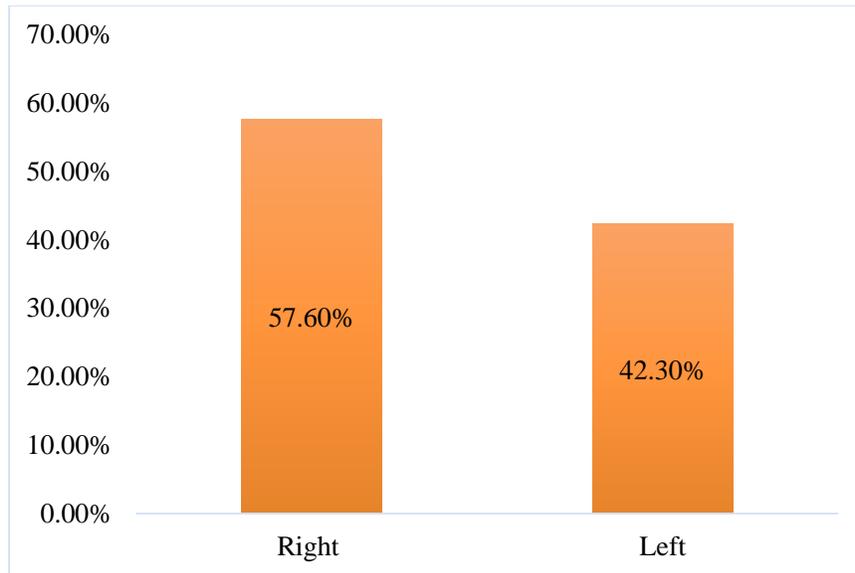
**Figure 1: Sex of patients**

Age in Years	No of patients (%)
21-30	11(42.3)
31-40	6(23.0)
41-50	4(15.3)
51-60	4(15.3)
61-more	1(3.8)
<b>Total</b>	<b>26</b>

**Table 1: Age of patients**



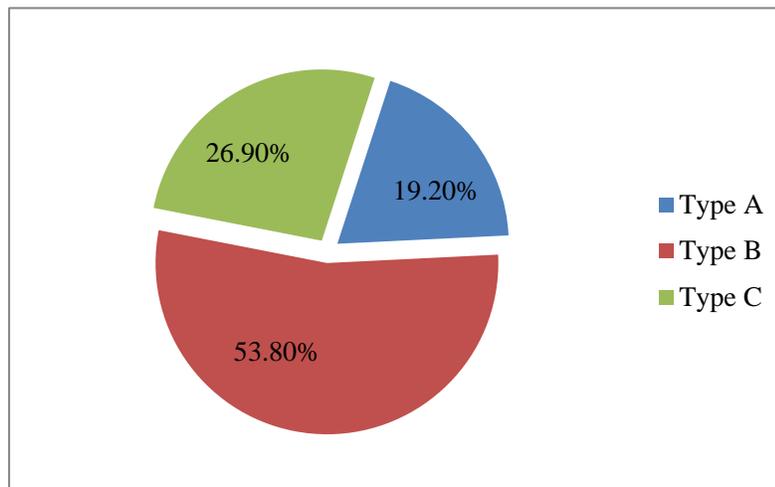
**Figure 2: Sex distribution in different age group**



**Figure 3: Side of ankle fracture**

Type	No of Patients	%
Supination Adduction	5	19.2
Supination External rotation	11	42.3
Pronation Abduction	1	3.8
Pronation External rotation	8	30.7
Pronation Dorsiflexion	1	3.8

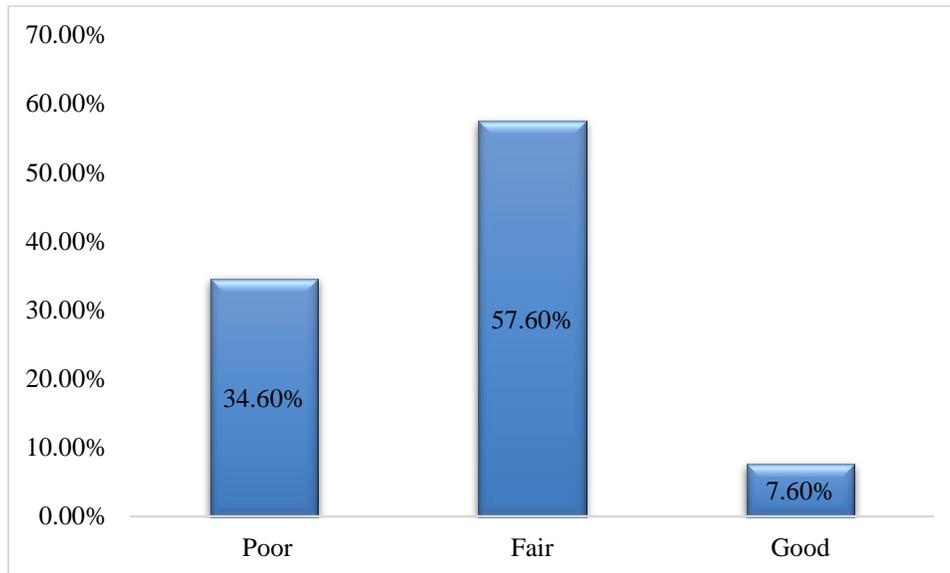
**Table 2: Mechanism of injury as per Lauge Hansen classification**



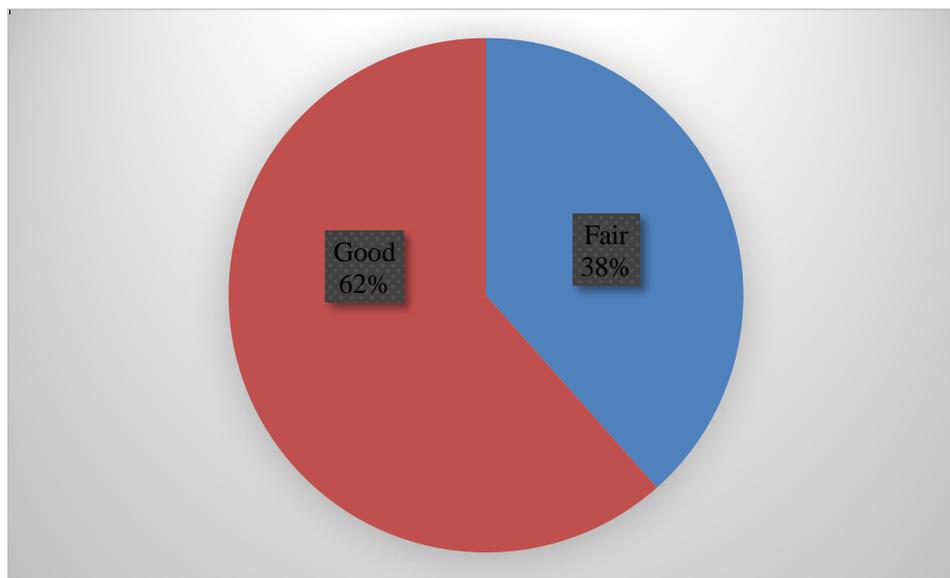
**Figure 4: Type of fracture based on weber classification**

Causes of injury	No of Patients	%
RTA	11	42.3
Fall down	9	34.6
Fall from height	4	15.3
Sport injury	2	7.60

**Table 3: Causes of injury**



**Figure 5: Pre management according Kristenson’s radiological criteria**



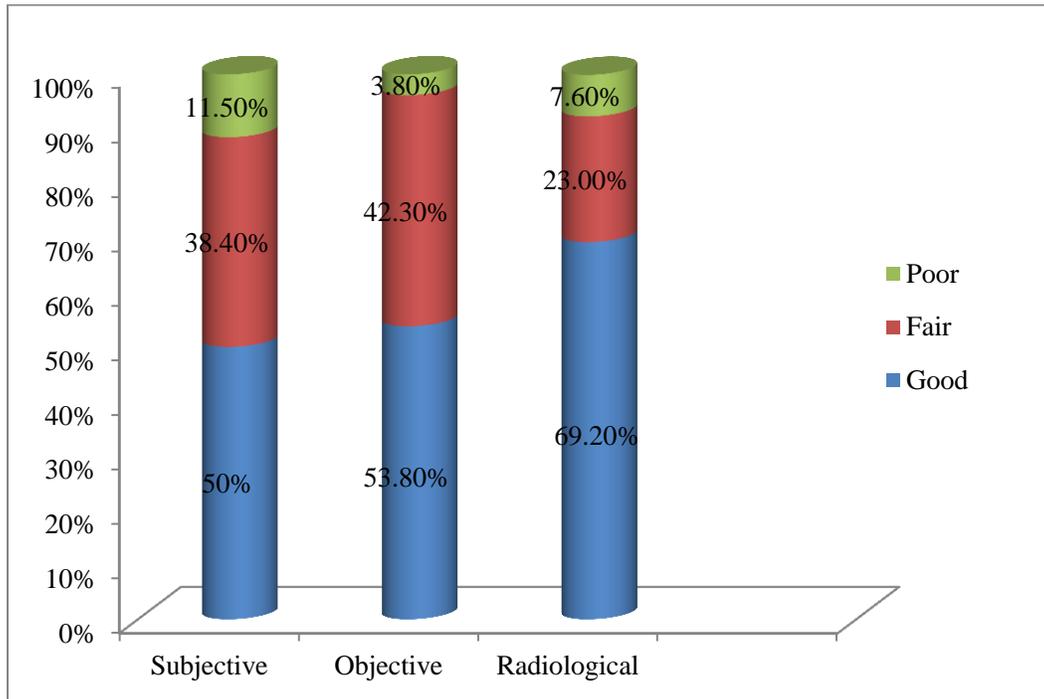
**Figure 6: Post operative according kristenson’s radiological criteria**

	> 24 h	24 - 72 h	> 72 h
Infection	0	2 (11.1)	2(11.1)
Failed reduction	0	0	0
Miscellaneous	0	1(5.5)	3(16.6)

**Table 4: Complications regards the time of operation and pre-operative duration**

In this study no cases operated in <24 hrs. All cases in this study were operated in >48hrs with complications as seen in table 4. 11.1% of patients had infection on 24-72hrs and 11.1% had infection on > 72 hrs. Miscellaneous occurred in 1(5.5%) of patients during 24 - 72 hrs and 3(16.6%) during the > 72 hrs. Total of infectionis 22.2 %, of Miscellaneous is 22.1% and 0 for failed reduction (Table 4). Out of the 26 cases 18(69.2%) were managed operatively by open reduction and

internal fixation and 8(30.8%) were managed conservatively and 2(25%) out of 8 conservative cases by manipulation and 6(75%) without and cast were applied to all conservative ones. 4(22.2%) cases out of 18 operated cases were open fractures. One case was type I, two cases were type II and one case was type III B.



**Figure 7: The final outcomes per Weber's criteria**

In this study, subjective scoring outcome was good in 50%, objective scoring was good in 53.8% and radiological scoring was good in 69.2%. Subjective scoring outcome was fair in 38.4%, objective scoring was fair in 42.3% and radiological scoring was fair in 23%. Subjective scoring outcome was poor in 11.5%, objective scoring was poor in 3.8% and radiological scoring was poor in 7.6% (Figure 7).

### **DISCUSSION:**

This study consists of 26 cases of bimalleolar ankle fractures treated at Althora hospital, Albida, Libya. In this study, Bimalleolar fractures were common in the young and middle aged of life. Mean age of patients was 43 years. Similar results were observed in Mohapatra A, Raj K [8] with mean age of 43.8, however finding by Beris *et al.* [9], Lee *et al.* [10], Roberts SR [11] and Baird and Jackson [5] bimalleolar fracture were common in age group of 31 to 40 years with slight varioution in this study

Bimalleolar fracture had a Male predominance with 58.8%, which is similar with the study by Motwani GN [6] and Maruthi CV [7].

Most common mode of injury is Road Traffic Accidents patients (42.4%), which were in accordance with, study by Mohapatra A, Raj K [8] and Lee *et al.* [10]. Right ankle was more commonly affected, in accordance with Roberts RS (11), Beris et al (9).

In our study, Lauge-Hansen classification system was used for operative evaluation. The most common type of injury was Supination-external rotation 8(30.7%), followed by Pronation-external rotation injury 5 (19.2%), in accordance with by Roberts RS (11), Beris et al (9), Baird and Jackson (5). Out of 26 patients, Weber type B was found to be most common – 53.8% of patients.

The results in current study were compared with that of Burnwell & Charnley (16), Colton (18), De souza et al (17), Beris et al (9). In Colton (18), 70% of the patients had a good to excellent results. Burnwell & Charnley (16) in their series of 132 patients, 77.3% had good

results, 16% had fair results and 6% were found to poor score. In De souza (17) series, 150 cases of ankle fractures treated by open reduction and internal fixation using AO technique, obtained 90% good results. In a study by Beris et al (9), of 144 patients with ankle fractures, 74.3% had good to excellent results.

The functional results of the present study were comparable with that of the above cited studies, with 62% had good results and 38% had fair results according kristenson's radiological criteria.

In our 26 cases 8 patients had complications such as wound infection. Infection was the commonest complication we observed, as compare to Shah ZA, Arif U [19] study were 4 patients had infection.

In this study, subjective scoring outcome was good in 50%, objective scoring was good in 53.8% and radiological scoring was good in 69.2%. Subjective scoring outcome was fair in 38.4%, objective scoring was fair in 42.3% and radiological scoring was fair in 23%. Subjective scoring outcome was poor in 11.5%, objective scoring was poor in 3.8% and radiological scoring was poor in 7.6%.

In Hafiz et al study(20), subjective scoring outcome was excellent and good in 84% and objective scoring was good in 78.8% and poor in 4.2%. The results are comparable with our study that the subjective scoring of Olerud and Molander (21) was excellent and good in 80%, Fair in 4 patients and poor in 2 patients. The objective scoring of Olerud and Molander was Good in 73.3%, Fair and poor in 6.6%.

### **CONCLUSION:**

In this study it was observed that Bimalleolar fracture treated with ORIF gain to good ankle function after 6 months. Supination-external rotation type of injury was common. The Frequency of *Pronation Dorsiflexion* and *Pronation abduction* type of injury was less. All the patients who had good results returned to normal activity and had regained their full ankle movements by the end of three months.

Those patients with fair results complained of swelling which was noticed towards the end of the day and would respond to rest. Associated pain was related to activity.

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