

ORIGINAL ARTICLE

Functional Outcome of Surgical Management of Trimalleolar FracturesRIZWAN ANWAR¹, OMER FAROOQ TANVEER², TANVEER HAIDER³, MUHAMMAD ABDUL HANNAN⁴, MUNEEB UR REHMAN CHEEMA⁵¹Assistant Professor Orthopedics, Islam Medical College Sialkot^{2,3}Assistant Professor Orthopedic, Khawaja Muhammad Safdar Medical College Sialkot⁴Associate Professor Orthopedic, Khawaja Muhammad Safdar Medical College Sialkot⁵Senior Registrar orthopedics, Khawaja Muhammad Safdar Medical College SialkotCorresponding author: Rizwan Anwar, Email: rizwananwar581@gmail.com**ABSTRACT****Background:** Trimalleolar fracture is very hamstring if it not maintained accurately. It is one of the pitiful condition. Trimalleolar ankle injuries have become more common in the last decade, with up to 40 per 100,000 people affected each year.**Study design:** It is a prospective study conducted for the duration of six months from February 2022 to July 2022 at Islam teaching hospital, Sialkot.**Material and Methods:** The study was carried out on 52 patients who were admitted in tertiary care unit during a period of one year. All the patients were following inclusion criteria, those who were unable to fulfill were excluded from the study. There were 36 males and 16 females taken for study. 30 patients had injury in the right side and 18 reported left side injury. The hospital review board committee give the approval to the study. The data was collected and statistically analyzed by using the renowned software SPSS. The result were presented in the form of table.**Results:** The injury pattern that was frequently observed in patients was supination external rotation reported in 40 patients. While 8 had pronation external rotation and 4 had to face supination adduction pattern. There were 4 cases that complaint about superficial infection and deep infection was observed in case of 2 patients.**Conclusion:** It is concluded that for the fixation of Trimalleolar fractures, there is a need for proper planning and reduction of lateral malleolus fractures by a lateral plating method.**Keywords:** ankle fracture, operative planning and Posterior malleolus fracture.**INTRODUCTION**

Ankle fractures are the most frequent injuries reported in the emergency department. Trimalleolar fracture was first instigate by Henderson. Trimalleolar fracture is very hamstring if it not maintained accurately. It is one of the pitiful condition. It is functionally and sensibly more severe than the bimalleolar fracture. Genuine guidance of trimalleolar fracture is not known properly. Posterior malleolus fracture (PMF) is frequently the proportion of trimalleolar fracture. PMF is seldom isolated. It is used to mentor that the posterior fractures are fixed or leave it. In all cases of trimalleolar fracture, regardless of size, anatomical reduction and preoccupation of the posterior malleolus is required to achieve a good clinical and functional outcome. The goal of management in trimalleolar fractures is to achieve good anatomic restoration of the articular surface, joint stability, axial alignment¹⁻³, and early joint mobility. For the proper maintenance of the trimalleolar fracture interior fixation and the open reduction is required. Trimalleolar ankle injuries have become more common in the last decade, with up to 40 per 100,000 people affected each year. Trimalleolar ankle injuries in the form of fragility fractures will become more common as the elderly population grows, posing a unique challenge for trauma surgeons. Further evidence is needed to specify indications for open reduction and internal fixation or primary Tran's fixation of the ankle joint in patients with postmenopausal osteoporosis trimalleolar ankle fractures and appropriate consequent circumstances. Arthroscopic assisted surgery ameliorate the outcome⁴⁻⁶ in younger patients. The treatment can be done in any patients just after the ankle sign was appear. Ice compression and the strict limb elevation was performed. The mean duration from injury to surgery was 6 days (range 3 -10 days). Few patients developed wrinkles within 3 to 5 days and were referred for surgery. The early occurrence of wrinkle signs may be contributed to their initial soft tissue state with relatively mild swelling and their slim build. Small posterior malleolus fracture was cured cautiously⁷⁻⁸. Many studies have stated that 25% of the coherent plane as a prescription for fixation of the fracture. One of the study stated even 10% as the cutoff limitation. Poster-inferior tibiofibular ligaments is the vital structure for the balance of syndesmosis. Therefore, in the syndesmosis balance the fixation and reduction of posterior malleolus play an essential role⁹⁻¹⁰. Trimalleolar fracture surgical procedure with real operative planning, genuine bodily reduction, and advanced recycling results in beneficial

result. The study aimed to determine the functional outcomes associated with surgically treated trimalleolar fractures.

MATERIALS AND METHODS

It is a prospective study conducted for the duration of six months from February 2022 to July 2022. The patients were diagnosed with Trimalleolar fracture were selected for the study. The study was carried out on 52 patients who were admitted in tertiary care unit during a period of one year. All the patients were following inclusion criteria, those who were unable to fulfill were excluded from the study. There were 36 males and 16 females taken for study. 30 patients had injury in the right side and 18 reported left side injury. The hospital review board committee give the approval to the study. The data was collected and statistically analyzed by using the renowned software SPSS. The result were presented in the form of table. According to the exclusion criteria following patients were excluded from the study;

- The patients diagnosed with polytrauma
- The patients with open fracture neurovascular compromise
- The patients with co-morbidities
- The patients diagnosed with arthritis

RESULTS

30 patients had injury in the right side and 18 reported left side injury as shown in table no.1. 38 cases were related to road traffic accidents, 10 included fall from the height and 4 were sports related injuries. The injury pattern that was frequently observed in patients was supination external rotation reported in 40 patients. While 8 had pronation external rotation and 4 had to face supination adduction pattern. There were 4 cases that complaint about superficial infection and deep infection was observed in case of 2 patients.

Table 2 shows distribution of patients in different domains as per OMAS coring system. The data was taken after 6 months, 1 year and 2 years. Score weight was also calculated. Most of the patients had pain while walking outdoor on un-even surfaces. While few had problem even walking on even surface as well. In most of the patients there was no stiffness level observed among the patients. Patients had no problem climbing the stairs, however, squatting was not possible for patients.

Table 1: Various factors of patients

Variables	No. of patients n=52
Gender	
Male	36
Female	16
Injury side	
Right	30
Left	18
Type of injury	
Road accident	38
Fall from height	10
Sports related injury	4
Mechanism	
Supination external rotation	40
Pronation external rotation	8
Supination adduction	4
Complications	
Superficial infection	4
Deep infection	2

Table 2: As per OMAS scoring system, distribution of patients in different domains and the score weight

Domains	OMAS 6 months n=52	OMAS 1 year n=52	OMAS 2 year n=52	Score weight
Level of pain				
Constant and severe	-	-	-	-
While walking indoor	-	-	-	-
While walking outdoors on even surface	4	4	4	10
While walking outdoor on uneven surface	46	46	46	25
Radiographs				
Positive	34	30	30	5
Negative	18	22	21	10
Stiffness level				
No stiffness	38	26	46	10
Stiffness	14	6	6	5
Stairs climbing				
Impossible to climb	-	-	-	0
Difficult climbing	10	4	4	5
No problem	42	48	48	10
Jumping				
Possible	42	40	43	5
Impossible	10	12	9	0
Squatting				
No problem	42	48	42	10
Impossible	10	4	10	5

As per braid and Jackson scoring system the composite score shows that most of the patients 53% fall under excellent score category then it was followed by good category where 32 patients fall. There were few cases that had poor composite score as shown in table no.3.

Table 3: As per braid and Jackson scoring system, composite score of patients

Composite score	No. of patients	Percentage
Excellent (95-100)	28	53
Good (91-95)	17	32
Fair (81-90)	4	7
Poor (0-80)	3	5

DISCUSSION

With the increase in knowledge about anatomy and the demands of society, there is a need for better treatment of fractures of ankle joints and complete reduction and fixation of such fractures. Trimalleolar fractures are the most common type of fracture treated by surgeons. The management of such fractures is largely determined by the pattern of the fracture, the surgeon's choice, the condition of the delicate tissues surroundings the fracture, and the condition of the neurovascular system around it. For the fixation of the fracture, there is a need for the reduction of articulating surface

and the formation of bone in the mortise of the ankle¹¹. This study is solely based on 52 patients including 36 male and 16 female patients. All of these patients were diagnosed with Trimalleolar fracture by clinical and radiological approaches. The relative parameters of all patients included in this study were also measured. By using the OMAS scoring system, the level of various attributes was estimated, and by using the Braid and Jackson scoring system the composite score of the patients was calculated, most of the patients showed excellent results which is similar to the hypothesis of some studies¹². For anatomical saving, all the fractured zone need to be fixed. So, the fixation surgeries were done after the appearance of wrinkles. Before any surgery, the elevation of the limb and its compression in ice was done. The surgery was done after 7 days of injury. Usually, the surgery was done internally after 3 to 9 days of fracture. The appearance of fracture is not defined, in some patients wrinkles appear after 10 days and in some patients, the wrinkle appears quite early after 3 to 4 days. The appearance of wrinkles is taken as a sign of the need for surgery. When wrinkles appear then mild swelling begins in the surrounding tissues, and tissues appear red and became thin¹³⁻¹⁵. In past, the malleolus fractures of posterior regions were treated by some ancient conservative methods and a number of studies show that for the fixation of the fracture, there is a need for a 25% surface of articulation with a cut off value of about 10.0%. But a number of studies claim that malleolar fracture of the posterior region should be treated without considering its size. Whenever there is a fracture at the malleolar site of the posterior zone PITFL is left. For the stability of syndesmosis, this posteroinferior tibiofibular ligament plays a vital role¹⁶.

The present study is about the fixation of malleolar fractures in the lateral region by using the method named "recon plate" or fibular locking plate. After the fixation of malleolar fractures in the lateral region, approaches were made to fix the malleolar fractures in the posterior and medial region using buttress mode and "tension band wiring". The medial malleolus fractures can be handled by using screws but this is not true for the malleolar fractures of the posterior zone. There is a need for additional surgical instruments for the posterior malleolar fractures. The methods of fixation used in this study are according to the internationally used protocols and supported by the literature¹⁷⁻¹⁸.

After the fixation of fractures, the stability of the ankle joint was also tested by a loading test. Excellent results were obtained in the case of lateral malleolar fractures, the function and clinical state of the ankle joint were quite better with the posterior plating method of fixation. Several biomechanical studies predicted better results by the posterior plating method as compared to the lateral plating method but some studies do not show any observable difference¹⁹. When the apex of fibular fracture was studied in the case of posterior and lateral injuries, it was observed that the plating method of fixation is much more durable as compared to other employed methods. The key to this study of malleolar fracture fixation is that for the reduction of Trimalleolar fractures, the reduction of malleolar fracture in the lateral region is mandatory and beneficial because the displacement follows the lateral malleolus. The poor reduction of lateral malleolus fracture leads to permanent displacement²⁰. Some studies are showing that posterolateral plating shows better results for the fixation of malleolar ankle fractures and it is clinically verified in this method screws are used for treatment purposes in the anterior and posterior regions. However, this study is limited due to inadequate time of follow up sampling, small population size, personal errors of measurements of various parameters, and cooperation by patients²¹⁻²³.

CONCLUSION

From this study, it is concluded that for the fixation of Trimalleolar fractures, there is a need for proper planning and reduction of lateral malleolus fractures by a lateral plating method. The lateral plating method is superior to other methods of reduction of

fractures in the ankle joint. However, in case of severe injuries, fracture fixation is compromised.

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