



## Posterior Malleolar Fracture Fixation in Semilateral Position: A Review Study of 15 Cases

Authors

Dr Amit Lakhani, Dr Karan Alwadhi, Dr S M Bhatnagar

MMM College and Hospital

### Abstract

**Objective:** Ankle fracture is a common orthopedic injury<sup>1</sup>. Ankle laxity varies depending on the plantar flexion-dorsiflexion position and the direction of the applied force so light rotational forces can cause complex ankle fracture<sup>2</sup>. Careful evaluation of x rays and clinical examination are mandatory for successful outcome.

**Methods:** We reviewed 15 cases of ankle fracture with posterior malleolar involvement. We operated all cases by posterolateral approach in semi lateral position.

**Result:** Semilateral position and posterolateral approach allows a great exposure of all malleoli. This makes interpretation of fracture and fixation easy.

**Conclusion:** we strongly recommend semilateral position and posterolateral approach for all fibula fracture with post. malleoli involvement.

**Keywords:** posterior malleoli, planter flexion, dorsiflexion, pasterolateral, semilateral.

### Introduction

Ankle fracture is one of the most common orthopedic injury. Halloway KL found almost 162 fracture of ankle from 582 fractures of lower limb<sup>1</sup>. He found most of fracture as a result of minimal trauma. This is due to continuous variation of ankle laxity depending on the plantar flexion-dorsiflexion position and the direction of the applied force<sup>2</sup>. So light rotational forces can cause complex ankle fracture. Ankle fracture are associated with high mortality rate in elderly<sup>3</sup>. Toole WP found low-energy ankle fractures in the elderly, very similar to hip fractures, were associated with a high mortality incidence (27.27%) at a mean of  $2.67 \pm 2.02$  months. By mid-century, India's 60 and older population is

expected to encompass 323 million people, a number greater than the total U.S. population in 2012..So we are expected to encounter a lot of ankle injuries in coming time.

Posterior malleolus plays a very important role in ankle stabilization<sup>6</sup>. Displacement of more than 2 mm and fracture size more than 25% (figure 1) are common indications of fixation<sup>4</sup>. Approach to post. malleolus fracture, mode of fixation and indication of fixations are controversial topics . Many orthopaedic surgeons use anteroposterior screw for fixation by indirect reduction while some prefer butteress plate with direct reduction<sup>5</sup>. Posterolateral approach in prone position is most preferred approach by most orthopaedic surgeons<sup>7,8,9,10</sup>.

We used semilateral position and posterolateral approach for fixing 15 cases of trimalleolar fractures. Semilateral position allows easy exposure of posterior malleoli as well as fibula. Just by removing side attachment semilateral position can be easily converted to supine position. So medial malleoli can be easily fixed. C arm position can also be easily adjusted in this position. These are benefit of semilateral position as compared to prone position.

### Material and Methods

This was a prospective study. Approval was taken by our institutional review board. We include 15 patients (9 males 6 females) of mean age 44.5 (28 to 67) year in our study. Four patients had acute ankle dislocation. Dislocation was reduced and pop slab applied in emergency. Limb was elevated and surgery was done after swelling got subsided. Patient was put supine in semi lateral position with the help of sand bag and side support (fig.2). Side support was kept as such that can be easily removed and position changed to supine if needed. After tourniquet inflation, incision was given midway between lateral border of tendoachillis and fibula. Sural nerve was indentified and preserved. Retracting the peroneal tendons medially gives access to posterior aspect of lateral malleoli. Fibula was fixed with screw or semi tubular plate depending on fracture configuration.

Second interval was developed between flexor hallucis longus and peroneal tendon. Flexor hallucis was lifted from tibial part to gain access to posterior malleoli (fig 3). Fracture was fixed with screw or aniglide plate depending upon size of fragment or comminution. C arm can be easily used in this position to check orientation of screw and plate by just rotating the foot (fig 4). After fixing lateral side, side support is removed. Now position is changed to supine and medial malleollus fracture can be easily fixed.

Approach to medial malleoli and c arm positioning are biggest challenge in prone

position, which are not encountered in semilateral position<sup>9</sup>.

### Results

All fracture united with a mean period of 10 weeks (fig 5,6,7) fig (9,10,11,12) fig (1,13). No superficial or deep infection was encountered in any case. Full weight bearing was allowed at three months. Patients were followed for a period of one year.

### Discussion

Main aim of surgical management of ankle fracture is to maintain articular congruity and stable fixation to achieve good functional recovery. Management of trimalleolar fracture is difficult as compared to bimalleolar fracture due to involvement of posterior malleoli as well as lack of protocols.

Posterior malleoli fracture fixation is a controversial topic.

There are very few reports in literatures regarding posterior malleoli fixation. Few studies suggests fixation of post. malleoli<sup>4,8,10</sup> and few finds no statistically significant difference was noted between the clinical results with and without fixation<sup>11</sup>.

But based on his study on large cohort Warner sj strongly recomended accurate and stable fixation of post. malleoli to achieve stable ankle mortis<sup>12</sup>. Nowadays recommended indication of posterior malleolar fixation is fracture affecting over 25% of the articular surface, displacement over 2 mm, ankle instability, and persistent subluxation of the talus<sup>4, 14</sup>.

In our study we included 15 patients of post. malleolar fracture . Out of fifteen, thirteen patients had trimalleolar fracture. Two patients had deltoid ligament involvement without involving medial malleollus (fig 8).

We operated all cases through posterolateral approach in semilateral position. All studies in literature recommend prone position and same approach. But there are certain draw backs of prone position. Patient discomfort, C ARM

positioning and fixation of medial malleoli are difficulties in prone position. But in semilateral position we did not faced any of these difficulties. Mode of fixation was based on size of fracture fragment and bone quality. We used t butteress plate in old aged with osteoporotic bone. Rest in all cases we used partial or full threaded 4mm cancellous screw. Fibula was fixed with semi t or interfragmentary screw. Syndesmotoc injury was assessed on table by checking movement of fibula (more than 4mm) and radiology (clear space less than 5mm)<sup>14</sup>. We operated all cases after subsiding of soft tissue swelling to decrease the chance of wound dehiscence.

Depending on result of this study we strongly recommend semi lateral position and posterolateral approach to fix all trimalleolar fracture.

#### References

1. Foot Ankle Int. 2005 Aug;26(8):633-7., Arch Osteoporos. 2017 Aug 28;12(1):75. doi: 10.1007/s11657-017-0369-5., Lower limb fracture presentations at a regional hospital.. Holloway KL1, Yousif D2, Bucki-Smith G2, Hosking S2,3, Betson AG2, Williams LJ2, Brennan-Olsen SL2,3,4,5, Kotowicz MA2,5,6, Sepetavc A2, Pasco JA2,5,6.
2. Analysis of ankle-hindfoot stability in multiple planes: an in vitro study. Fujii T1, Kitaoka HB, Luo ZP, Kura H, An KN.
3. J Foot Ankle Surg. 2015 Mar-Apr;54(2):203-6. doi: 10.1053/j.jfas.2014.10.015. Epub 2014 Dec 5., Are low-energy open ankle fractures in the elderly the new geriatric hip fracture?, Toole WP1, Elliott M2, Hankins D2, Rosenbaum C2, Harris A2, Perkins C2.
4. J Orthop Trauma. 1992;6(1):96-101. Posterior malleolar ankle fractures: an in vitro biomechanical analysis of stability in the loaded and unloaded states., Scheidt KB1, Stiehl JB, Skrade DA, Barnhardt T.
5. J Orthop Trauma. 2015 Apr;29(4):e151-6. doi: 10.1097/BOT.000000000000230."A to p" screw versus posterolateral plate for posterior malleolus fixation in trimalleolar ankle fractures. O'Connor TJ1, Mueller B, Ly TV, Jacobson AR, Nelson ER, Cole PA.
6. Orthopade. 1999 Jun;28(6):460-8. [The upper ankle joint. Biomechanics and functional anatomy].[Article in German], Seiler H1.
7. Bone Joint J. 2016 Jun;98-B(6):812-7. doi: 10.1302/0301-620X.98B6.36497. Open reduction and internal fixation of posterior malleolar fractures using the posterolateral approach. Verhage SM1, Boot F1, Schipper IB2, Hoogendoorn JM2.
8. Eur J Trauma Emerg Surg. 2015 Dec;41(6):587-600. doi: 10.1007/s00068-015-0560-6. Epub 2015 Aug 8. Posterior malleolar fractures of the ankle. Bartoniček J1,2, Rammelt S3, Tuček M4, Naňka O5.
9. Can J Surg. 2005 Dec;48(6):487-90. Posterolateral approach for open reduction and internal fixation of trimalleolar ankle fractures. Talbot M1, Steenblock TR, Cole PA.
10. Foot Ankle Clin. 2017 Mar;22(1):125-145. doi: 10.1016/j.fcl.2016.09.009. Epub 2016 Dec 20. Posterior Malleolar Fractures: Changing Concepts and Recent Developments. Bartoníček J1, Rammelt S2, Tuček M3.
11. J Bone Joint Surg Am. 1988 Oct;70(9):1348-56. Posterior malleolar fractures of the ankle associated with external rotation-abduction injuries. Results with and without internal fixation. Harper MC1, Hardin G.
12. Foot Ankle Int. 2015 Apr;36(4):377-82. doi: 10.1177/1071100714558845. Epub 2014 Nov 3. Analysis of PITFL injuries in rotationally unstable ankle fractures.

Warner SJ1, Garner MR2, Schottel PC2,  
Hinds RM2, Loftus ML3, Lorch DG4.

13. Odak S, Ahluwalia R, Unnikrishnan P, Hennessy M, Platt S. Management of Posterior Malleolar Fractures: A Systematic Review. *J Foot Ankle Surg.* 2016;55(1):140–5. doi: 10.1053/j.jfas.2015.04.001.[PubMed]
14. Donatto, 2001. Donatto KC: Ankle fractures and syndesmosis injuries. *Orthop Clin North Am* 2001; 32:79.