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## Fixation of choice for diagonally fractures of medial malleolus of ankle

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### Abstract

**Background:** Fixation of alternative for diagonally fractures of medial malleolus was invariably been as debate a most of the days the fragment is simple too little to attain placement of two screw heads. Absolute stability of the medial malleolus fragment with one screw is troublesome in comminuted and osteoporotic fragments.

**Materials and Methods:** this is often a prospective study conducted in our centre from Gregorian calendar April month 2014 to January 2018 in thirty five cases.

**Results:** There was a failure of two cases of fixation with single screw out of sixteen cases of primary fixation with single screw, tributary to 11.77% of cases of failure with primary single screw fixation.

**Conclusion:** we tend to advise to mend two screws of 4.0mm cannulated cancellated screws crossing the fracture site if the fragment is giant enough to support screw heads. If the fragments area unit little we tend to choose to do a tension band wiring with two K-wires and a diagonally screw that we tend to had exhausted 52.80% of cases as a primary procedure. All two failure cases in our series achieved union with tension band wiring.

**Keywords:** Cannulated cancellous screws, fracture, medial malleoli, osteoporotic fracture

### 1. Introduction

The medial malleolus is that the distal medial extension of the tibia. it's separated into the anterior and posterior malleolus. On the lateral surface is an articular aspect that abuts against the parallel comma-shaped aspect on the medial side of the talus. The anterior and posterior malleolus are a unit alienated by the inter-malleolur groove on the lateral side. To create easy the ligamentous anatomy, the superficial deltoid ligament is connected to the anterior malleolus and also the deep deltoid ligament to the posterior malleolus and inter-malleolur groove [1-4]. Once the medial malleolus is fractured, its pattern relies on the mechanism of injury. In rotary motion motility injuries, the medial malleolus fracture is superiorly oriented. It should be obliquely directed upward or become vertical in nature. It's the results of inversion of the mortise joint in order that the talus impacts the medial malleolus leading to a push-off sort fracture. In supination-external rotation, pronation-abduction, and pronation-external rotation fractures, the medial malleolus fracture tends to be diagonally in configuration. It's a pull-off type fracture [5-6]. Herscovici has delineated the various medial malleolar fracture patterns [7]. Supported AO principles, the medial malleolus fracture is conventionally addressed when reduction and stabilization of the fibular fracture.

Open reduction and internal fixation of diagonally fracture of medial malleolus fragment to tibia bone may be finished numerous devices as operation is imperative [8-10]. The hardware devices embody cellular screws, K-wires, tension band, bio-absorbable screws, or a combination of all the above [11-14]. The failure of a fixation device can be due to the improper support of fracture fragment, support at one purpose of fixation, shortening and rotation of malleoli and comminution [12]. This failure is a lot of if the fragment of medial malleolus is little or osteoporotic and AO-ASIF recommends tension band wiring for those medial malleolar fragments as screw fixation is unacceptable [12].

The aim of the study is to evaluate the explanations for the failure of fracture fixation of medial malleoli and to evaluate the selection of fixation for the difficult little osteoporotic medial malleolar fragments.

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## 2. Materials and Methods

The Emergency Department of the Govt. General Hospital in Nizamabad. We study a consecutive series of patients who came with fractures. All diagonally fractures of medial malleolus are involved the study, i.e., (simple diagonally fracture, bimalleolar, and trimalleolar fractures). There have been twenty four men and eleven females, with a mean age of 25.9 years (17 to 42); twenty one rights and fourteen left diagonally fractures were concerned.

## 3. Operative procedure

The surgery is performed within the supine position with compression bandage management below image steerage. The medial malleolus is approached through a gently wiggly anteromedial incision. The dissection of skin and body covering tissue is completed fastidiously to forestall venous blood vessel and nerve. Dissection is distributed sharply to the bone, and therefore the interposed periosteum is elevated more or less one millimeter on either facet of fracture. Through the fracture site, the joint is irrigated to remove debris and fracture haematoma, sometimes the connective tissue of tibialis obstructs reduction and therefore the connective tissue has to be backward to assist reduction. The reduction is command with a pointed reduction clamp and stuck briefly with a little diameter K-wire and fixed with either. (i). Two 4.0 millimeter partly cannulated screws if the fragment is small; just 4.0 millimeter partly cannulated screw

is employed. The screws are started close to the tip of malleoli and directed perpendicular to fracture site while not participating opposite cortex however the thread has to cross the fracture site. (ii). Tension band wire around two parallel K-wires; the proximal finish of stainless steel wires is placed through a drill -hole around a horizontally placed screw with or while not washer.

## 4. Results

Among the thirty five patients, eleven patients underwent fixation with two cancellated screws, primary tension band wiring tired seventeen cases, nine patients underwent fixation with 4.0 millimeter cannulated screw. There were two cases of failure of fixation and all three cases of failing fixation occurred with fixation of single screw (Figure 1) particularly once a trial to stay smaller incision was created or within the presence of comminution. All three cases was revised with a tension band wiring with none demand of extra bone graft. There's a failure of 11.77% in cases of fixation with single screw fixation of medial malleoli. Of the three cases, one was a failing try for percutaneous screw fixation within the hope for soft-tissue preservation and therefore the second was a comminuted medial malleolar fragment whereas the third failure was trimalleolar fracture. Altogether the two cases, the fracture united once ever-changing the one screw implant to tension band wiring.



**Fig 1, 2:** Postoperative X-ray showing good reduction

## 5. Discussion

Tension band wiring of medial malleolus around two K-wires and a horizontally located screw has proven more energy than the conventional partly threaded cancellous screws and resists bending forces responsible for fracture [15, 16]. Tension band wiring has the disadvantage of barely longer duration of fixation because it requires proximal dissection and horizontal screw fixation and possible softtissue infection of tibialis posterior and implants prominence, even as most authors like Kanakis *et al.* [17]. Researchers suggest that tension band wiring frequently for all instances. Most authors put it aside for small and/or osteoporotic fragment [18-20]. The researchers advocate that the fixation of tension band to be reserved for small and/or osteoporotic fragments.

## 6. Conclusion

The authors opine not to attempt percutaneous screw fixation within the wish of recognize for soft tissue as the possibilities of slipping of reduction and interposition of periosteum are excessive about in 11.77% of cases and to repair the small and osteoporotic fragment of medial malleolus with tension band wiring (Figure 1, 2). Tension band wiring has a problem of distinguished hardware and irritation of smooth tissues, so we propose to apply cannulated partially threaded cancellous screws with threads crossing fracture site each time the fragment is huge enough to help the screw heads and to revise failed fixation with tension band wiring. In our collection, 52.80% had small fragments with trouble to guide two screw heads, so we needed to do tension band wiring in them as a number one technique.



**Fig 3:** Failed medial malleolus fixation in trimalleolus fracture in an attempt to have minimal skin incision

### 7. References

1. Lauge N. Fractures of the ankle: analytic historic survey as the basis of new experimental, roentgenologic and clinical investigations. *Archives of Surgery*, 1948; 56(3):259-317.
2. Lauge Hansen N. Fractures of the ankle: II. Combined experimental-surgical and experimental-roentgenologic investigations. *Archives of Surgery* 1950; 60(5):957-85.
3. Lauge-Hansen N. Fractures of the ankle: IV. Clinical use of genetic roentgen diagnosis and genetic reduction. *AMA archives of surgery* 1952; 64(4):488-500.
4. Gumann G, Hamilton GA. Arthroscopically assisted treatment of ankle injuries. *Clinics in podiatric medicine and surgery*, 2011; 28(3):523-38.
5. Burns WC, Prakash K, Adelaar R, Beaudoin A, Krause W. Tibiotalar joint dynamics: indications for the syndesmotic screw. A cadaver study. *Foot & ankle* 1993;14(3):153-8.
6. Trafton DG, Bray TJ, Simpson LA. Fractures and soft tissue injuries of the ankle. *Skeleton Trauma*, WS Saunders Philadelphia, 1992.
7. Herscovici D, Scaduto JM, Infante A. Conservative treatment of isolated fractures of the medial malleolus. *Bone & Joint Journal*, 2007; 89(1):89-93.
8. Hughes J. The medial malleolus in ankle fractures. *The Orthopedic clinics of North America*, 1980; 11(3):649-60.
9. Müller ME, Allgöwer M. *Manual of internal fixation: techniques recommended by the AO-ASIF group*. Springer Science & Business Media, 1991, 595-612.
10. Georgiadis GM, White DB. Modified tension band wiring of medial malleolar ankle fractures. *Foot & ankle international*, 1995; 16(2):64-8.
11. Castro MD. Insufficiency fractures after total ankle replacement. *Techniques in Foot & Ankle Surgery* 2007; 6(1):15-21.
12. Vander Griend RA, Savoie FH, Hughes JL. Fractures of the ankle. Philadelphia, J.B. Lippincott Company, 1991, 1983-2001.
13. Rovinsky D, Haskell A, Liu Q, Paiement GD, Robinovitch S. Evaluation of a new method of small fragment fixation in a medial malleolus fracture model. *Journal of orthopaedic trauma* 2000; 14(6):420-5.
14. Bucholz RW, Henry S, Henley BM. Fixation with

- bioabsorbable screws for the treatment of fractures of the ankle. *JBJS* 1994; 76(3):319-24.
15. Johnson BA, Fallat LM. Comparison of tension band wire and cancellous bone screw fixation for medial malleolar fractures. *The Journal of foot and ankle surgery* 1997; 36(4):284-9.
16. Ostrum RF, Litsky AS. Tension band fixation of medial malleolus fractures. *Journal of orthopaedic trauma*, 1992; 6(4):464-8.
17. Kanakis TE, Papadakis E, Orfanos A, Andreadakis A, Xylouris E. Figure eight tension band in the treatment of fractures and pseudarthroses of the medial malleolus. *Injury*, 1990; 21(6):393-7.
18. Trafton PG. Fractures and soft tissue injuries of the ankle. Philadelphia, W.B. Saunders, 1992, 1871-956.
19. Koslowsky TC, Mader K, Kirchner S, Gausepohl T, Pennig D. Treatment of medial malleolar fractures using fine-threaded K-wires: a new operative technique. *Journal of Trauma and Acute Care Surgery*, 2007; 62(1):258-61.
20. Appalaraju S, Vijayabhushanam M. Fixation of choice for diagonally fractures of medial malleolus of ankle. *Journal of Orthopedics, Traumatology and Rehabilitation*. 2017; 9(2):78.