

Do Undisplaced Stable Ankle Fractures Ever Displace – Are We Subjecting Our Patients To Unnecessary Radiation And Follow-Up Appointments?

V Selvaratnam, V Shetty, V Sahni

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Abstract

AIM: The aim of this study is to assess whether stable undisplaced ankle fractures treated conservatively with a below knee non weight bearing cast ever displace. **METHODS:** Retrospective case notes analysis was performed. Between August 2007 and August 2009, one hundred and twenty one patients sustained a stable undisplaced ankle fracture which was treated conservatively. Their age range was from 16 to 86 years (mean 53 years). Male to female ratio was 74:47. The mean number of clinic follow ups was 3.7. These patients were classified according to the Danis-Weber Classification for analysis. Thirty (25%) patients had Weber A1 fractures, seventy two (60%) had Weber B1 fractures, five patients (4%) had Weber B2 fractures, three patients (2%) had Weber C1 fractures, ten patients (8%) had isolated medial malleolus fracture and one patient suffered an isolated posterior malleolus fracture. **RESULTS:** An average of 4.7 radiographs were performed on each patient from the time of diagnosis to discharge from clinic. None of these fractures displaced on follow up radiographs. **CONCLUSION:** Stable undisplaced ankle fractures treated conservatively with a below knee non weight bearing cast do not displace.

INTRODUCTION

Ankle fracture is one of the most common of bone and joint fractures. Stable ankle fractures compromise 40 – 75% of this group^{1,2,3}. The incidence of ankle fractures is approximately 187 fractures per 100,000 people each year⁴. Most ankle fractures are malleolar fractures. 60 to 70 percent occur as unimalleolar fractures, 15 to 20 percent as bimalleolar fractures, and 7 to 12 percent as trimalleolar fractures^{1,2}.

The medial ankle ligament complex consists of the deep and superficial fibers of the deltoid ligament. The medial ligament is stronger than the lateral ligaments. The lateral ligament consists of three bands which are the anterior talofibular ligament, the calcaneofibular ligament, and the posterior talofibular ligament⁵. The peroneal tendons, anterior and posterior tibialis tendons, Achilles tendon, and joint capsule provide additional stability.

The syndesmosis of the ankle refers to the articulation of the distal tibia and fibula. Stability is provided by the anterior tibiofibular ligament, the posterior tibiofibular ligament, the transverse tibiofibular ligament (posteriorly), and the

interosseous membrane, which extends from the ankle proximally. These structures strengthen the mortise and prevent the distal tibia and fibula from separating (diastasis). Movements that occur at the ankle joint are plantarflexion and dorsiflexion whereas inversion and eversion occurs at the subtalar joint.

Classifications used in ankle fractures are AO classification, Lauge Hansen classification and the Danis – Weber classification. The simplest and most commonly used classification is the Danis – Weber classification (Figure 1).

Figure 1

Weber A1	There is an isolated fibula fracture
Weber A2	There is also a medial malleolus fracture
Weber A3	There is also a posteromedial fracture
Weber B1	There is an isolated lateral malleolus fracture
Weber B2	There is also a medial injury (medial malleolus or deltoid ligament)
Weber B3	There is also a medial lesion and a fracture of the posterolateral tibia
Weber C1	There is a simple diaphyseal fracture of the fibula
Weber C2	There is a complex diaphyseal fracture of the fibula
Weber C3	There is a proximal fracture of the fibula

Weber A fractures occur distal to the syndesmosis, Weber B fractures occur at the level of the syndesmosis while Weber

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C fractures start proximal to the syndesmosis.

Several studies have shown that stable undisplaced ankle fractures can be managed without the need to repeat radiographs⁶ and produce an insignificant rate of long-term osteoarthritis⁷. Despite this evidence there remains a lack of effective guidelines for the management of these fractures resulting in unnecessary cost due to repeat radiographs and out-patient visits⁸.

Stable ankle fractures are those that do not have displacement and are able to withstand physiologic forces. Stable ankle fractures also do not have medial clear space widening or evidence of tibiofibular widening.

The aim of this study was to assess whether stable undisplaced ankle fractures treated conservatively with a below knee non weight bearing cast ever displace. We also evaluated the number of clinic follow ups and radiographs for each of the fractures.

METHODS

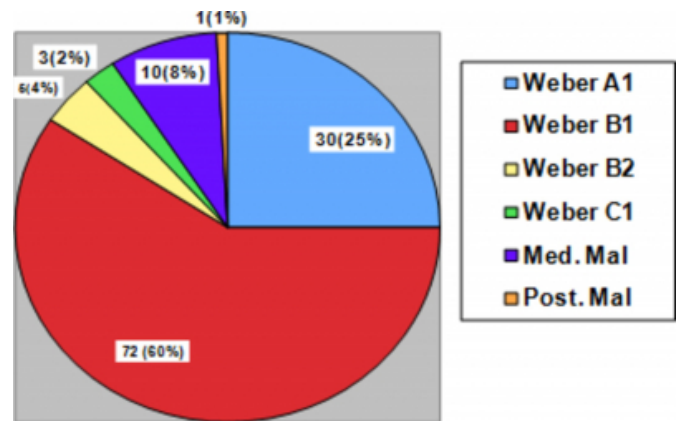
A retrospective case notes and radiograph analysis was performed. All patients who presented to the Trauma and Orthopaedic department in Southport and Ormskirk Hospital after sustaining a stable undisplaced ankle fracture who were treated non operatively with a below knee non weight bearing cast were identified. The exclusion criteria comprised patients less than 16 years, patients followed up elsewhere, incomplete information, late presentation and multiple injuries.

Between August 2007 and August 2009, one hundred and twenty one patients sustained a stable undisplaced ankle fracture which was treated non operatively. Their demographic details, total duration of follow-up including number of attendances and number of repeat radiographs were collected. All these patients were treated with a below knee non weight bearing light weight fiberglass cast. Their age range was from 16 to 86 years with a mean of 53 years. There were 74 male patients and 47 female patients.

RESULTS

We classified patients according to the Danis-Weber Classification for analysis (see pie chart).

Figure 2



Pie Chart showing types and number of ankle fractures.

Patients who sustained Weber A1 fractures had an average of 3.3 fracture clinic follow ups and an average of 4.3 radiographs from initial diagnosis in the accident and emergency department to discharge from fracture clinic.

Those who had Weber B1 fractures had an average of 3.8 follow ups and 4.8 radiographs while the B2 fractures had 5.4 clinic follow ups and 6.4 radiographs. All the B2 fractures had medial joint line tenderness but had no fracture on the medial side or talar shift.

Patients with C1 fractures had 3.3 fracture clinic follow ups and 4.3 radiographs. There was no evidence of syndesmosis disruption on radiograph. The ten patients who sustained an isolated undisplaced medial malleolus fracture had an average of 3.6 fracture clinic follow ups and 4.6 radiographs. The patient who had an isolated posterior malleolus fracture (15% of articular surface) had three fracture clinic follow ups and 4 radiographs in total prior to discharge.

All 121 patients were discharged from fracture clinic between the fourth and the twelfth week of injury. On average these patients had 3.7 fracture clinic follow ups and an average of 4.7 radiographs from the time of diagnosis to discharge.

All patients were kept non weight bearing for a total of six weeks from the time of injury. None of the 121 fractures displaced on follow up radiographs.

DISCUSSION

Immobilisation provides the basis for fracture healing. For many complex and unstable fractures, immobilization is best achieved by means of internal fixation of the fracture. However, many stable fractures at low risk of displacement

can be immobilized effectively with casting.

We suggest that patients with stable undisplaced ankle fractures that do not need surgical fixation be put in a below knee non wearing cast and only x-rayed once at 2 weeks instead of frequent serial radiographs.

If at 2 weeks the fracture is found to have displaced, then surgical intervention can be offered to patients. If the fracture is to be treated non operatively then the patient is followed up at 6 weeks with removal of cast and mobilisation.

If the ankle has clinically united with good range of movement, patients can be discharged at this stage with advice to return in case of any problem. A repeat radiograph is not done routinely unless indicated.

CONCLUSION

From our study we can conclude that stable undisplaced ankle fractures treated conservatively with a below knee non weight bearing cast do not displace. Hence these patients do

not require to be followed up frequently with serial radiographs as they may be exposed to unnecessary harmful radiation and follow up appointments thereby saving time, money and resources.

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Author Information

Veenesh Selvaratnam

Southport and Ormskirk Hospital NHS Trust

Viswanath Shetty

Southport and Ormskirk Hospital NHS Trust

Vishal Sahni

Southport and Ormskirk Hospital NHS Trust