



JOURNAL CLUB: 1st November 2011
Chairman: Mr. Bijayendra Singh, Consultant.
Medway NHS Foundation Trust

Title:

Weight Bearing after ankle fracture fixation

The literature is not clear when & whether to allow patients to weight bear, who undergo open reduction and internal fixation (ORIF) for fracture of the ankle.

Early Weight Bearing After Posterior Malleolar Fractures: An Experimental and Prospective Clinical Study

Papachristou G, Efstathopoulos N, Levidiotis C, Chronopoulos E
J Foot Ankle Surg 2003;42:99-104.

Reviewer: Dr Jay Vyas, F2 South Thames Foundation Trainee

Background

Traditionally weight bearing after surgical reduction of posterior malleolar fractures is not recommended until 8 weeks post-surgery. In addition, there is a lack of evidence regarding the difference in force on the tibial plafond in varying anatomical positions of the ankle joint.

Aim

To investigate distribution of forces of the tibial plafond over three different positions in a synthetic model. These results were compared to findings in a case series of patients with posterior malleolus fracture.

Method

Synthetic: Ankle models were made using 1cm thick resin plates with a rubber sheet to represent the articular surface. A fracture was reproduced and then repaired using a 3.5mm Lag screw. The tibia was held in position and talus was fixed into neutral, plantarflexion and dorsiflexion. Models were then loaded with 55kg and 105 kg. The tibial plafond was split into quadrants and the force in each of these was measured.

Clinical: 15 patients between 1981 and 1996 with posterior malleolar fracture all underwent ORIF using either posterolateral or posteromedial approach. Patient's were allowed to weight bear after the first post-op week. There were clinical and radiological assessment at 2 months, 3 months and 2 years.

Results

It was found in the neutral position, there is an increase in load over the three most posterior regions. In dorsiflexion there was a greater distribution of load in the middle two quadrants. In plantarflexion the posterior quadrant remained unloaded in both weights.

In the case series 4 patients had mild pain or swelling after two months and had to use a walking stick. These complaints had disappeared after 3 months and all were able to undertake normal daily activity. At the final evaluation at 2 years patients obtained full function and there was no displacement of posterior malleolus, thus a reduced chance of arthrosis in the future.

Discussion

It was found that the main load bearing areas were the two central quadrants and it is argued that early weight bearing is acceptable as long as ankle is fixed in neutral. In the clinical series the plaster cast maintained the ankle in a neutral position and this protected the posterior malleolus from axial load. The results indicate it may be beneficial for earlier weight bearing than previously thought.

Critique

This synthetic study gave an insight into the mechanical forces through different anatomical positions of the ankle, which should be considered when managing posterior malleolar fractures.

However this study has some pitfalls. In the method a normal ankle joint used to make the synthetic model was not defined and it was also not clear how they reproduced fracture. It is important to know how much plantarflexion and dorsiflexion was used because this would have an effect on the force delivered on the tibial plafond.

For the clinical case series there was no mention of inclusion criteria, thus there may have been selection bias in an already small number of patients. The operations performed were not on isolated posterior malleolar fractures so it is difficult to compare these results to the synthetic arm of the study.

Successful immediate weight-bearing of internal fixated ankle fractures in a general population.
Harager et al.
J Orthop Sci 2000;5:552-4.

Reviewer: Dr. Mike Barrett, CT1, Medway Foundation NHS Trust

A prospective case series at the university hospitals of Gentofte, Copenhagen, and Odense in Denmark. The work was performed in 1995-1996 and published in 2000.

Aim

To assess if full weight bearing following internal fixation of ankle fractures causes complications with fracture displacement.

Methods

Prospective case series of all patients undergoing internal fixation of ankle fractures with >2mm fracture displacement, and 1 or more malleolus involvement. Exclusion criteria; aged under eighteen years, distal tibia fracture (e.g. Pilon, epiphysiolysis), or patients not mobilised immediately post operation.

Participants were placed in a below knee circular full weight bearing cast immediately post surgery and allowed to fully weight bear. Assessment of radiographs at the time of injury, surgery, one week and six weeks post operatively was performed measuring the clear space of the ankle mortice.

Results

62 patients recruited. Only one patient has displacement of the ankle mortice radiographically at six weeks, which did not require further surgery. Two patients had deep venous thrombosis. Mobilising immediately reduced length of stay in those aged <60 years by one day, this reached statistical significance when compared with a group who were non-weight bearing for the first three weeks..

Critique

The end point of this study was radiographic appearance with no clinical correlation. Follow up of patients is limited at six weeks.

Take home message

This study suggests full weight bearing post internal fixation of ankle fractures may be safe, however further research is required to back this up.

Operative versus conservative management in displaced ankle fractures over 55 yrs of age**N.K. Makwana, B. Bhowal, W.M. Harper, A.W. Hui****J Bone Joint Surg [Br] 2001;83-B:525-9****Reviewer: Mr. Rajesh Bawale, Clinical Trust Fellow, Medway Foundation NHS Trust.****Summary:**

It is a prospective, single centre, randomised study aimed to establish the best practice for the ankle fractures over the age of 55.

It involves Case series of 43 patients between 1995 and 1997 treated operatively and non-operatively.

- Randomised by computer generated random numbers for operative management (22) and non-operative management (21)
- Inclusion criteria – pts aged 55 or above required fixation
- Exclusion criteria – irreducible fracture, pathological fracture, contra lateral ankle pathology, intrarticular fracture
- Mean follow up 27 mths (15 to 42) lost 7 pts
- Operative management – using standard AO techniques and implants
- Non op – moulded cast
- All pts assessed by same observer

The authors recommended that ORIF is a better option as the operative group had higher scores and a good ROM compared with the conservative group.

Study strengths:

1. Good number of case series
2. Level I evidence
3. Types of procedures, post-op care, inclusion criteria well defined.
4. The results and the discussion are well described.

Study weaknesses:

1. Biased selection criteria
2. Inadequate information about the follow-up and the excluded patients during the study.

Relevance:

The main aim of this study was well proven, as to establish the preferred method of treating the displaced ankle fractures in patients over 55 yrs of age. As described in this study, High rate of complications (loss of reduction) in closed group- 38% patients needed surgery, no loss of reduction noted in ORIF group which supports the author's recommendation.