ORTHOPAEDICS

FOR PRIMARY HEALTH CARE

LION
LEARNING INNOVATION VIA ORTHOPAEDIC NETWORKS

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Ankle and plafond fractures

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Learning objectives

1. Understand the indications for surgery based on soft tissue and X-Ray assessment.
2. Know the conservative management plan for appropriate fractures.
3. Understand the significance of the Weber classification with regards to the syndesmosis.
4. Exclude occult injuries which are associated with ankle fractures.

Ankle fractures

When a fracture of the lower limb involves the medial malleolus of the distal tibia, the distal part of the fibula (lateral malleolus) or the posterior part of the distal tibia (posterior malleolus), it is classified as an ankle fracture. A distinction must be made between isolated stable fractures which can be treated conservatively, and unstable fractures, usually caused by a rotational injury, which needs to be treated surgically.

Anatomy

The ankle consists of the three malleoli discussed above, which form the slot into which the talus fits. Besides the bony anatomy, the soft tissue stabilisers are the lateral collateral ligaments, medial collateral (deltoid) and the anterior and posterior tibiofibular ligaments. If one of these structures is injured in isolation, it is usually a stable injury. If a combination of these structures is damaged, it is an unstable injury where the talus can displace in relation to the tibia.

Clinical evaluation

The ankle has a poor blood supply and soft tissue coverage, and it is crucial to note any soft tissue damage, such as swelling, abrasions, blisters or open fractures.

In ankle trauma without an obvious fracture, tenderness over the following areas could indicate an occult fracture or tendon tear.

- Medial or lateral malleolus
- The base of the 5th metatarsal
- Navicular
- Peroneal tendons around the lateral malleolus
- Tibia-fibular syndesmosis
- Anterior process of the calcaneus

Fractures with obvious displacement or dislocation need to be reduced before X-rays.

Clinical picture of an ankle fracture dislocation. Must be reduced urgently prior to doing X-rays. If left untreated will develop an internal pressure sore and convert a closed to an open fracture.

Radiology

X-rays should include an AP, lateral and mortise view (15o internal rotation). On the mortise view, there should be symmetrical joint space around the talus. The clear medial space should be <4mm. The tibiofibular clear space should be <6mm at a level 1cm proximal to the joint. An X-ray of the whole lower limb should be done to exclude a high fibula fracture.

An external rotation stress radiograph or gravity stress radiograph will assess the integrity of the deltoid ligament (positive if >5mm medial clear space or talar tilt) in unclear cases.

A 'pull-off' injury of the medial malleolus causes a transverse fracture pattern, and a 'push-off' injury causes an oblique or spiral fracture pattern. Rupture of the syndesmosis is assumed when there is separation (diastasis) between the tibia and fibula.

Classification

There are different classifications with low inter- and intra-observer reliability, but they help to communicate the injuries.

Weber classification

This classifies lateral malleolus fractures according to the level of the fracture concerning the syndesmosis.

Weber A

The lateral malleolus is fractured below the syndesmosis, which remains intact.

Weber B

This is the most common type of ankle fracture and causes a transverse fracture of the medial malleolus and oblique fracture of the lateral malleolus at the level of the syndesmosis. Part of the syndesmosis may be ruptured.

Weber C

The syndesmosis is always ruptured, and the fibula fracture is spiral and a few cm proximal to the ankle joint.

Example of a Weber C ankle fracture. Associated syndesmosis injury likely and needs fixation.

Non-operative treatment

Non-operative treatment is indicated for isolated and stable fractures.

An initial reduction under sedation or general anaesthesia may be done if displaced. The plaster needs to be adequately applied and moulded (see respective chapter). The ankle must be elevated until the swelling subsides. In severely swollen ankles, patients should be admitted for regular soft tissue checks. Otherwise, the patient should be seen in the fracture clinic after two weeks to confirm reduction with a follow-up X-ray. A full circular plaster must be applied once the swelling has subsided until bony union (6–8 weeks).

Surgical treatment

ORIF is necessary when an acceptable reduction cannot be achieved or maintained. This is indicated with:

- Talar shift
- Displaced isolated medial or lateral malleolar fractures.
- Most bimalleolar fractures (needs to be decided on an individual basis by the orthopaedic surgeon).
- Posterior malleolar fracture with >20-25% of joint involved or 2mm step-off.
- Open fractures

The initial reduction and plaster slab must be done at the first presentation to a medical facility. After that, the patient can be referred to an orthopaedic unit.

Tibial plafond fractures

A distal tibia fracture is termed a tibial plafond fracture and not an ankle fracture if it involves more of the tibia than just the posterior malleolus. These fractures are usually not caused by rotation, but by the talus moving upwards, usually at a much greater force than that seen in ankle fractures. Here, soft tissue swelling is often more dangerous than the fracture itself and is best dealt with by urgent orthopaedic referral. Unless it is completely stable and not displaced, these fractures typically require open reduction and fixation.

Assessment

A 58-year-old female with diabetes presents with a bimalleolar ankle fracture to the ER. The fibula is fractured above the level of the syndesmosis. Management of the injury should include:

A. Below knee circular cast with crutches for 2 weeks followed by a moonboot for another 4 weeks.
B. Fixation of the lateral malleolus only and cast application.
C. Medial and lateral malleolus surgical fixation with immediate weight bearing.
D. This is a stable injury and can be treated in a cast for 8 weeks.
E. This is an unstable injury that needs medial and lateral fixation as well as fixation of the syndesmosis followed by casting for 6 to 8 weeks.

Answer:

A. Incorrect – moonboot does adequately immobilise fracture.
B. Incorrect – This is an unstable injury with an associated syndesmosis injury that needs surgical fixation.
C. Incorrect – See above answer. After fixation of an ankle fracture 6 weeks of casting is still recommended.
D. Incorrect – Seen answer (B) and (C).
A. Correct

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ABOUT THE BOOK

Informed by experts: Most patients with orthopaedic pathology in low to middle-income countries are treated by non-specialists. This book was based on a modified Delphi consensus study* with experts from Africa, Europe, and North America to provide guidance to these health care workers. Knowledge topics, skills, and cases concerning orthopaedic trauma and infection were prioritised. Acute primary care for fractures and dislocations ranked high.

Furthermore, the diagnosis and the treatment of conditions not requiring specialist referral were prioritised.

* Held et al. Topics, Skills, and Cases for an Undergraduate Musculoskeletal Curriculum in Southern Africa: A Consensus from Local and International Experts. JBJS. 2020 Feb 5;102(3):e10.

THE LION

The Learning Innovation via Orthopaedic Network (LION) aims to improve learning and teaching in orthopaedics in Southern Africa and around the world. These authors have contributed the individual chapters and are mostly orthopaedic surgeons and trainees in Southern Africa who have experience with local orthopaedic pathology and treatment modalities but also in medical education of undergraduate students and primary care physicians. To centre this book around our students, iterative rounds of revising and updating the individual chapters are ongoing, to eliminate expert blind spots and create transformation of knowledge.

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