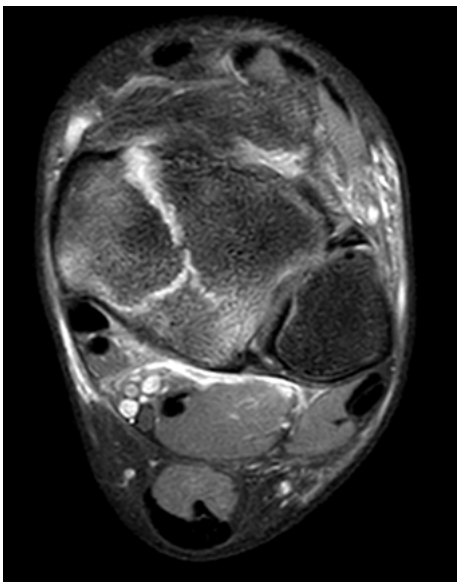


16 year old female, trampoline accident 4 days earlier, walked in without crutches, in pain. Apparent normal x-ray.



CT Findings:

- Minimally displaced comminuted distal tibial triplanar fracture.
- Salter-Harris type IV fracture that consists of
 - Salter-Harris type II fracture posterior malleolus.
 - Partial fusion of the medial physis and Salter-Harris type I of the lateral physis.
 - Comminuted type III of the epiphysis.
- Well corticated ossicles distal to the lateral malleolus from previous injuries.



Left: Axial PD SPAIR image demonstrates comminuted fracture to the distal tibial physis

Right: Sagittal PD SPAIR demonstrates a vertical fracture through the posterior malleolus and a horizontal fracture through the physis



MRI Findings:

- Vertical Salter-Harris type II fracture posterior malleolus fracture through the distal tibial epiphysis.
- Minimally displaced Salter-Harris type I fracture of the lateral physis.
- Comminuted Salter-Harris type III fracture of the epiphysis.
- Periosteal elevation and sub periosteal haematoma over the posterior malleolus.

Discussion:

- **Overview**
 - traumatic ankle fracture seen in children 10-17 years of age characterized by a complex Salter-Harris IV fracture pattern in multiple planes
 - treatment is closed reduction or surgical fixation depending on the degree of fracture displacement
- **Epidemiology**
 - incidence
 - 5-15% of paediatric ankle fractures
 - demographics
 - more common in males
 - occurs in adolescents with closing epiphyseal plates (average age is 13 years old)
 - juvenile ankle physis ossifies in specific order, which leads to transitional fractures such as triplane and tillaux fractures
 - younger than tillaux fracture age group
- **Classification:**
 - By Parts: 2, 3 and 4 fracture fragments.
 - By Pattern: Lateral, Medial and Intra malleolar triplane fractures.
- **Aetiology**
 - Mechanism of injury
 - lateral triplane fractures
 - results from supination-external rotation injury
 - medial triplane fractures
 - results from adduction injury
 - Pathology
 - a complex type IV fracture pattern with components in all three planes
 - may be 2, 3, or 4 part fractures
 - epiphysis is often fractured on the lateral aspect in the sagittal plane (same as tillaux fracture) which may be evident on the AP radiograph
 - physis is distracted/displaced in the axial plane
 - metaphysis is fractured on the posterior aspect in the coronal plane, visible on a lateral radiograph
- **Clinical**
 - Symptoms comprise of pain and inability to weight bear. Possible signs include swelling, localized/referred pain, and deformity of the ankle.
- **Differential diagnosis**
 - Tillaux fracture: are a traumatic condition characterized by a Salter-Harris III fracture of the anterolateral distal tibia epiphysis
- **Management**
 - CT is superior for defining fractures especially in the physis, although all patients should also have MR to assess soft tissue injuries.
 - Non-operative. If small and asymptomatic.
 - Not for ultrasound guided local anaesthetic/ steroid injection.
 - Surgery is usually the management of choice for symptomatic lesions affecting quality of life.
 - Schwannomas can be completely resected from the parent nerve as they do not infiltrate the nerve.
 - Removal of neurofibromas requires resection of the nerve.
 - Recurrence is unusual.

Reference & Further reading:

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