Chapter 51
Pediatric Ankle Fractures

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Keywords Ankle fracture • Pediatric • Salter-Harris

Overview

Comprehensive workup of pediatric ankle fractures (Fig. 51.1) includes evaluation of open versus closed, neurovascular compromise, Salter-Harris classification, associated injuries, displaced versus non-displaced, status of physeal closure, and CT appearance after reduction.

What to Ask

1. Are there any open wounds (possible open fracture) or any sites where skin is tenting/threatened?
2. Are there any associated injuries?

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Figure 51.1 Representative CT and radiographic images of pediatric ankle fractures

3. Does the patient have IV access in place? Initiate antibiotics if there is concern for open fracture.
4. Does the patient have pain out of proportion or paresthesia, or is there any other concern for compartment syndrome?
5. Has the patient been made NPO if sedation for reduction is needed?

What to Request

1. Ensure leg is stabilized, elevated, and iced immediately.
2. X-rays of the knee, tibia, ankle, and foot (if concerned about associated injury).

When to Escalate

1. Open fractures should be irrigated in ED and receive antibiotics (will require formal irrigation and debridement in OR).
2. Compartment syndrome requires immediate ice and elevation, as well as preparation for emergent fasciotomy.
3. Irreducible fractures may require operative intervention (periosteum, tendons, or other soft tissue structures may be interposed).

Imaging

1. AP, lateral, and oblique views of the ankle and distal tibia are necessary for evaluation.
2. AP and lateral views of the knee and full length tibia are required to rule out Maisonneuve-type fracture or associated injury.
3. Postreduction X-rays of the ankle following immobilization.
4. In complex fracture patterns and intraarticular fractures, a CT is required to evaluate the physis and joint surface. The CT should be obtained after reduction and casting/splinting.

Effective Communication

1. Open versus closed
2. Neurovascular compromise
3. Salter-Harris classification
4. Associated injuries

5. Displaced/non-displaced
6. Status of physeal closure
7. CT appearance after reduction (articular fragments, residual displacement)

What to Bring

1. Local anesthetic if planning hematoma block
2. Casting/splinting material (see long versus short leg splintcast, Chapter 6 depending on local practice)
3. Fluoroscopy if used for reduction
4. Ice

Key Exam Pearls

1. Sensation (saphenous/sural/superficial and deep peroneal, tibial).
2. Motor (extensor hallucis longus/flexor hallucis longus/gastrocnemius/tibialis anterior).
3. Evaluate all wounds: dermal violation raises suspicion for open fracture.
4. Close evaluation of imaging for physeal injury (e.g., Salter-Harris type III or IV fracture). The distal tibial physis closes from central to medial, with anterolateral portion closing last.

Reduction/Treatment

Fractures displaced less than 2 mm may be treated with long leg cast and non-weightbearing. Displaced fractures should have analgesia and/or sedation to allow for closed reduction. The most common mechanism for a triplane or Tillaux fracture is external rotation; therefore, internal rotation force with correction of deformity often decreases displacement. Following reduction of closed injuries, a cast is applied with

the ankle in neutral position. Long versus short leg cast should be applied based on local practice. Cast treatment should be avoided if there is significant soft tissue injury, concern for development of compartment syndrome, an oblique fracture pattern with displacement, or the setting of polytrauma. In these situations, temporary immobilization with a splint may be sufficient. A mature patient may better tolerate short leg splint with side gussets.

Adequate Reduction Parameters

1. Less than 2 mm displacement in all planes
2. No interposed structures

Follow-Up

1. Follow-up with a (pediatric) orthopedic surgeon within 1 week.
2. Often admitted for operative intervention or observed for compartment syndrome.
3. Patients and families should be counseled regarding risk of post-traumatic arthritis and stiffness; counseling should also include physeal specific topics such as growth arrest, leg length discrepancy, or angular deformity depending on amount of growth remaining.
4. May be admitted for operative intervention, observation, or pain control if needed.