

Pediatric Fractures

Diagnosis and Initial Management

MANAGE THE CHILD'S PAIN

- To rate pain and for medication/dosing recommendations, refer to [TREKK's Pain Treatment Bottom Line Recommendations](#).
- Provide analgesia early and allow adequate time to take effect (depending on route of administration) before imaging or examination. Ibuprofen +/- acetaminophen PO should be offered to any child complaining of pain. Intranasal fentanyl is commonly used for pediatric patients with moderate/severe pain.
- Use a splint to immobilize joints above and below the injury. Elevate injured limb. Apply ice.

ASSESS THE INJURY

- Document child/caregiver's description(s) of injury mechanism and timing. If high-energy mechanism, assess child for other injuries. Refer to [TREKK's Multisystem Trauma Bottom Line Recommendations](#).
- For extremity injuries, examine above and below the injury on the same limb, compare with uninjured opposite limb, examine neurovascular status and assess for an open fracture.

ASSESS FOR POTENTIAL INJURY DUE TO MALTREATMENT

- Ensure that the developmental abilities of the child and the reported mechanism align with the fracture location and morphology. If not, discuss with the Child Protection Specialist at Pediatric Referral Centre. A detailed list of factors to consider when assessing for child abuse can be found at [TREKK's Physical Child Abuse Bottom Line Recommendations](#).

Diagnostic Imaging

- All injuries that demonstrate focal swelling, pain, deformity or change in use of limb should have x-ray imaging unless otherwise indicated by the four musculoskeletal clinical decision rules validated in children:^{1,2}

[Low Risk Ankle Rule](#) [Ottawa Ankle Rules](#) [Ottawa Knee Rules](#) [Amsterdam Wrist Rules](#)³

- In children with forearm injuries without visible deformities, point-of-care ultrasound has been found to be non-inferior to radiographs with respect to functional outcome.
- Approximately 10% of pediatric fractures are not identified on the initial ED visit.¹
 - The most commonly missed serious fractures include: [Growth plate fractures](#), [Tillaux fractures](#), [bowing forearm fractures](#), [slipped capital femoral epiphysis](#) and [Monteggia fractures](#).
 - If the physical exam findings do not align with a *negative* radiograph, consult Diagnostic Imaging or Orthopedic Surgery for next steps and/or immobilize the injury and refer to Orthopedic Surgery for prompt reassessment of a possible occult fracture.
- Identify the bone(s) injured, location (proximal, middle, distal), type (spiral/oblique, transverse, comminuted, buckle, greenstick, growth plate, avulsion), and degree and direction of displacement and/or angulation. Describe growth plate fractures using the [Salter-Harris](#) classification.
- Additional imaging modalities such as computed tomography (CT) are rarely required in the acute setting and should be done in consultation with Orthopedic Surgery.

Definitive Management

- Refer to site-specific protocols for specific fracture management, if available. Reliable pediatric fracture management guidelines: www.rch.org.au/clinicalguide/fractures/.
- For patients requiring closed reduction under procedural sedation, refer to [TREKK's Procedural Sedation Bottom Line Recommendations](#).

General Guidelines for Orthopedic Consultation and Follow-Up*	
Emergent Orthopedic Consultation** (within 1 hour)	Significant vascular compromise (pulselessness) Signs/symptoms of compartment syndrome (6Ps: pain out of proportion, poikilothermia/coolness, pallor, pulselessness, paresthesia, paralysis)
Urgent Orthopedic Consultation** (within 4-8 hours)	Open fracture or impending open fracture (skin tenting) Nerve injury Vascular compromise (reduced pulse with good perfusion) Deformity (discuss need for reduction with Orthopedics if unsure) Salter-Harris III, IV, V
Non-Urgent Outpatient Orthopedic Consultation (within 7 days)	Fractures with acceptable displacement/angulation that are immobilized (cast/splint) in the ED but have potential to be unstable or have prognostic concern
Non-Urgent Outpatient Primary Care Follow-Up (within 1-2 weeks or as needed) – Manage these injuries with a removable supportive device and return to activity as tolerated. – Referral to Orthopedics is only required if the patient is not recovering as expected.	Distal radius buckle fracture +/- ulnar buckle/styloid fracture ² Isolated non-displaced distal fibular fractures (clinically suspected Salter-Harris I, II, avulsion)*** Uncomplicated mid-shaft clavicle fractures ⁵ Uncomplicated fractures of proximal base of 5 th metatarsal and toe phalanges (no significant angulation/displacement or growth plate involvement, not intra-articular)
*The above are suggested guidelines and are subject to clinician discretion and local practice patterns. **If patient requires transport to Pediatric Referral Centre for management, ensure x-rays are sent with patient. ***Clinically suspected Salter-Harris I fractures of distal fibula are far more likely to be ankle sprains. ⁴	

Discharge Instructions

- Ibuprofen PO every 6-8 hours as needed is as effective as morphine in children.⁶ Acetaminophen can be added or used alternately for additional pain management as needed.
- Fractures requiring reduction and other more complex injuries may require a short course (i.e., 3 days duration or 10 doses in total) of adjuvant opioids post-discharge to adequately manage pain and function. Refer to [TREKK's Pain Treatment Bottom Line Recommendations](#) for dosing.
- Provide information on home care of immobilization device, anticipatory guidance on recovery and participation in sports, and scheduled follow-up.
- Return to the ED if increased pain, swelling, fever, cold fingers/toes, cast too tight or other concerns.

ADDITIONAL RESOURCES

- Online resources for follow-up care are available at [About Kids Health](#) and include [cast care](#), [splinting](#), [distal radius buckle fractures](#), [upper arm](#) and [lower leg](#) injuries, and [minor ankle injuries](#).
- For additional practice in pediatric musculoskeletal radiograph interpretation, refer to www.imagesim.com, an online non-profit evidence-based image interpretation learning system.

Scan or click the QR code to learn more and to see a full list of references and development team members



Disclaimer: The purpose of this document is to provide healthcare professionals with key facts and recommendations for the diagnosis and treatment of fractures in children in the emergency department. The TREKK Network is not liable for any damages, claims, liabilities, costs or obligations arising from the use of this document including loss or damages arising from any claims made by a third party. **THIS DOCUMENT IS SUBJECT TO FULL DISCLAIMER HERE:** trekk.ca/terms-of-use/

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