ED Fractures v2.1

Inclusion Criteria
• Suspicion for extremity fracture

Exclusion Criteria
• None

1. Open ED Fracture Order Set
2. Select Upper or Lower Extremity Fracture Panel.
3. Enter Orders
   • Nursing orders (eg. Pain assessment, NPO)
   • X-rays (if not done)
   • Antibiotics and Tetanus for open fracture, if indicated
   • Pain medication PO/IV/IN (if needed)
   • Consider sending discharge pain prescriptions early
4. Complete Upper or Lower Patient Safety Checklist Form, as appropriate

X-ray confirms fracture?

Off Pathway

No Ortho Consult Needed If
• Simple Clavicle Fracture <12 yo
• Type I Supracondylar Fracture
• Distal forearm buckle fracture
• Non-angulated fibula fracture
• Toddler’s Fracture
• Non-angulated finger/toe fractures

Admit?

Consult Needed

ED and Orthopedic Care in ED
• If reduction indicated – Orthopedist and ED Attending/Fellow huddle to discuss pain and sedation options
• If spica cast indicated see criteria for spica casting in ED (see blue box below)
• Continued pain assessments and treatment
• If reduction performed, Ortho to review post-reduction Xrays prior to disposition

Discharge Home
• ED Fracture Discharge Orders – includes pain medication
• Splint/Cast care instructions given
• Orthopedic follow/up in 5-7 days – (via ASCs in ED)

Admit To Orthopedics
• Orthopedist places Admit Orders (to floor or OR)
• Interim orders for floor admissions can be placed by ED if discussed with Ortho

Criteria for spica casting in ED
Patient weight less than 15 kg
AND
Patient age less than 36 months
AND
Ortho attending present before starting sedation
AND
Patient admitted to hospital after procedure

For questions concerning this pathway, contact: EDFractures@seattlechildrens.org
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Last Updated: January 2021
Next Expected Review: March 2022
1. Assessed for associated head injury or multisystem trauma (abdomen, pelvic, etc)
   - Yes
   - No – Reason: ___________________________________________________

2. Assessed patient for concerns of potential child abuse?

   **Red Flags to consider for SCAN (Suspected CHILD Abuse and Neglect) consult:**
   - Developmental history non consistent with proposed mechanism of injury
   - Injury non consistent with mechanism
   - Significant delay in care
   - Other evidence of trauma (e.g. multiple fractures)

   - Yes, assessed and will discuss concerns with ED attending
   - Yes, assessed and no concerns
   - No – Reason: ___________________________________________________

3. Examination of vascular status included wrist pulses and hand perfusion?
   - Yes
   - No – Reason: ___________________________________________________

   If yes,
   a. Result of examination of vascular status including wrist pulses and hand perfusion?
      - Normal
      - Abnormal- Consult Orthopedics urgently
4. Examination of neurological status included median nerve (including anterior interosseous nerve (AIN)), ulnar nerve, and radial nerve (including posterior interosseous nerve (PIN))?

<table>
<thead>
<tr>
<th>Nerve</th>
<th>Motor</th>
<th>Sensory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>‘OK’ sign: flexes thumb/index</td>
<td>Index finger</td>
</tr>
<tr>
<td>(including AIN)</td>
<td>Thumb abduction: lift off palm</td>
<td></td>
</tr>
<tr>
<td>Radial</td>
<td>‘thumbs up’, extends thumb</td>
<td>Dorsal web space</td>
</tr>
<tr>
<td>(including PIN)</td>
<td></td>
<td>between thumb and index</td>
</tr>
<tr>
<td>Ulnar</td>
<td>Make &quot;scissors&quot; with index</td>
<td>Small finger</td>
</tr>
<tr>
<td></td>
<td>and middle fingers</td>
<td></td>
</tr>
</tbody>
</table>

☐ Yes
☐ No – Reason: ________________________________

If yes,
a. Result of examination of neurological status including median nerve (including AIN), ulnar nerve, and radial nerve (including PIN)?

☐ Normal
☐ Abnormal- Consult Orthopedics urgently

5. Assessed for open fracture (remove splint to evaluate unless fracture reduced at outside hospital)?

☐ Yes
☐ No – Reason:

6. Assessed for signs of compartment syndrome (pain, pallor, pulseless, paresthesia, paralysis)?

☐ Yes
☐ No – Reason:
Additional Safety Information

1. Radiographic evaluation should include AP/lateral views of involved area. If concern for forearm fracture, obtain x-rays of the elbow – and for elbow injury, obtain x-rays of forearm.

2. If patient in significant pain or likely needs reduction/operation, give IV pain medication. Consider intranasal pain medication while placing IV.

3. If splinting, immobilize fracture with elbow flexion not greater than 90°.

4. If discharged, orthopedic follow-up appointment should be within 3-5 days (ask ASC to schedule).

5. Send prescription for pain medication early if anticipating discharge.
Lower Extremity Checklist

- Completed during initial evaluation of patient.
- Ordering provider required to compete in ED Fracture Order Set:

### Required

**Patient's exam is concerning for neurovascular compromise or non-accidental trauma? (Yes, No, Other)**

- Yes
- No – Reason: ________________________________

**Assessed patient for concerns of potential child abuse?**

**Red Flags to consider for SCAN (Suspected CHILD Abuse and Neglect) consult:**

- Developmental history non consistent with proposed mechanism of injury
- Injury non consistent with mechanism
- Significant delay in care
- Other evidence of trauma (e.g. multiple fractures)

- Yes, assessed and will discuss concerns with ED attending
- Yes, assessed and no concerns
- No – Reason: ________________________________

**Examination and documentation of neurovascular status completed and normal (dorsalis pedis (DP)/posterior tibial (PT) pulses, motor, sensory)?**

- Yes
- Examined but not normal (consult Orthopedics urgently)
- No – Reason: ________________________________

### Additional Safety Information

1. Radiographic evaluation should include AP/Lateral views of the affected area with adequate visualization of joint above and below
2. If patient in significant pain or likely needs reduction/operation, give IV pain medication. Consider intranasal pain medication while placing IV.
3. Assess for possible pathologic fracture.
4. Criteria for Spica Cast in the ED:

- Patient weight less than 15 kg.
- Patient age less than 36 months.
- Ortho attending present before starting sedation.
- Patient admitted to the hospital after the procedure.
Approved by the CSW Lower Extremity Fracture team and CSW Upper Extremity Fracture team for March 15, 2017 go live

CSW ED Fractures Lower and Upper Extremity Teams:

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Ortho, CSW Co-Owner
Pharmacy
Ortho, Nurse Practitioner
ED, Clinical Nurse Specialist
Surgical, Clinical Nurse Specialist
Fellow
Pharmacy

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Librarian: Sue Groshong
Program Coordinator: Kristyn Simmons

Clinical Effectiveness Leadership:

Medical Director: Darren Migita, MD
Operations Director: Karen Rancich Demmert, BS, MA


Evidence Ratings

This pathway was developed through local consensus based on published evidence and expert opinion as part of Clinical Standard Work at Seattle Children’s. Pathway teams include representatives from Medical, Subspecialty, and/or Surgical Services, Nursing, Pharmacy, Clinical Effectiveness, and other services as appropriate.

When possible, we used the GRADE method of rating evidence quality. Evidence is first assessed as to whether it is from randomized trial or cohort studies. The rating is then adjusted in the following manner (from: Guyatt G et al. J Clin Epidemiol. 2011;4:383-94.):

Quality ratings are **downgraded** if studies:
- Have serious limitations
- Have inconsistent results
- If evidence does not directly address clinical questions
- If estimates are imprecise OR
- If it is felt that there is substantial publication bias

Quality ratings are **upgraded** if it is felt that:
- The effect size is large
- If studies are designed in a way that confounding would likely underreport the magnitude of the effect OR
- If a dose-response gradient is evident

Guideline – Recommendation is from a published guideline that used methodology deemed acceptable by the team.

Expert Opinion – Our expert opinion is based on available evidence that does not meet GRADE criteria (for example, case-control studies).

**Quality of Evidence:**
- ★★★★★ High quality
- ★★★★ Moderate quality
- ★★★ Low quality
- ★★★☆ Very low quality

Guideline
Expert Opinion
Summary of Version Changes

- **Version 1.0 (3/15/2017):** Go Live for Femur Fracture and Supracondylar Fracture Pathways, both of which included an Emergency Department (ED) Fracture phase.

- **Version 2.0 (8/29/2019):**
  - The ED Fracture phase has been removed from the Femur Fracture and Supracondylar Fracture Pathways (those pathways have been retired).
  - The upper and lower extremity checklists, formerly located on the Femur Fracture and Supracondylar Fracture Pathway CHILD pages, are now embedded in the ED Fracture Pathway document along with their associated Approval Citations and evidence Bibliographies.

- **Version 2.1 (1/29/2021):** The algorithm was updated to reflect current Epic build (order set name, list of required orders, and provider acknowledgement of neurovascular and non-accidental trauma assessment).
Medicine is an ever-changing science. As new research and clinical experience broaden our knowledge, changes in treatment and drug therapy are required.

The authors have checked with sources believed to be reliable in their efforts to provide information that is complete and generally in accord with the standards accepted at the time of publication.

However, in view of the possibility of human error or changes in medical sciences, neither the authors nor SCHS nor any other party who has been involved in the preparation or publication of this work warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from the use of such information.

Readers should confirm the information contained herein with other sources and are encouraged to consult with their health care provider before making any health care decision.
Search Methods, Lower Extremity (Femur) Fractures Periodic Review, Clinical Standard Work

Studies were identified by searching electronic databases using search strategies developed and executed by a medical librarian, Susan Groshong. A search was performed in May 2015 in the following databases – on the Ovid platform: Medline and Cochrane Database of Systematic Reviews; elsewhere: Embase, Clinical Evidence, National Guideline Clearinghouse, TRIP and Cincinnati Children’s Evidence-Based Care Recommendations. Retrieval was limited to ages 0-18, English language and the period November 26, 2013 to current. In Medline and Embase, appropriate Medical Subject Headings (MeSH) and Emtree headings were used respectively, along with text words, and the search strategy was adapted for other databases. Concepts searched were femoral and subtrochanteric fractures. All retrieval was further limited to certain evidence categories, such as relevant publication types, index terms for study types and other similar limits. Additional articles were identified by team members and added to results.

Susan Groshong, MLIS
September 8, 2016

<table>
<thead>
<tr>
<th>Identification</th>
<th>10 records identified through database searching</th>
<th>1 additional records identified through other sources</th>
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<tbody>
<tr>
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<td>5 records excluded</td>
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<td></td>
<td>11 records screened</td>
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<tr>
<td>Eligibility</td>
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<td>1 full-text articles excluded, n did not answer clinical question, 1 did not meet quality threshold, n outdated relative to other included study</td>
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<tr>
<td>Included</td>
<td>5 studies included in pathway</td>
<td></td>
</tr>
</tbody>
</table>

Flow diagram adapted from Moher D et al. BMJ 2009;339:bmj.b2535


Search Methods, Upper Extremity (Supracondylar) Fractures Periodic Review, Clinical Standard Work

Studies were identified by searching electronic databases using search strategies developed and executed by a medical librarian, Susan Groshong. A search was performed in May 2015 in the following databases – on the Ovid platform: Medline and Cochrane Database of Systematic Reviews; elsewhere: Embase, Clinical Evidence, National Guideline Clearinghouse, TRIP and Cincinnati Children’s Evidence-Based Care Recommendations. Retrieval was limited to ages 0-18, English language and 2014 to current. In Medline and Embase, appropriate Medical Subject Headings (MeSH) and Emtree headings were used respectively, along with text words, and the search strategy was adapted for other databases. Concepts searched were humeral, supracondylar and elbow fractures. All retrieval was further limited to certain evidence categories, such as relevant publication types, index terms for study types and other similar limits. A guideline was identified by team members and added to results.

Susan Groshong, MLIS
December 7, 2016

Identification

9 records identified through database searching
0 additional records identified through other sources

Screening

9 records after duplicates removed

9 records screened
0 records excluded

Eligibility

9 records assessed for eligibility

8 full-text articles excluded,
  n did not answer clinical question
  0 did not meet quality threshold
  n outdated relative to other included study

Included

1 studies included in pathway

Flow diagram adapted from Moher D et al. BMJ 2009;339:bmj.b2535