ED/UC Suspected Extremity Fracture

**ALGORITHM**

**Suspected Extremity Fracture**

- **Triage, Intake, or Direct Bed**
  - *See ESI level Chart below*
  - If CMS is NOT intact, patient is off pathway, notify provider immediately

**Pain Assessment**

- **No Pain**
  - Score = 0
  - Splint
  - Elevate
  - Ice
  - *Do not delay x-ray. Can be completed after x-ray*

- **Mild Pain**
  - Score = 1-3
  - Occasional crying, restless/tense, distractible, etc.
  - Splint, Elevate, Ice
  - Ibuprofen or Acetaminophen
  - *Do not delay x-ray. May be completed after x-ray*

- **Moderate Pain**
  - Score = 4-6
  - Intermittent crying/grimace with touch, consolable, etc.
  - Splint, Elevate, Ice
  - Ibuprofen or Acetaminophen
  - Consider Oral Opioid
  - Acetaminophen-Hydrocodone
    - (0.15mg/kg, max of 10mg hydrocodone comp)
    - Oxycodone if patient received tylenol
    - (0.05-0.15mg/kg, max 10mg)
  - *Should be completed prior to x-ray*

- **Severe Pain**
  - Score = 7-10
  - Screaming/sobbing, difficult to comfort, quivering, etc.
  - Splint, Elevate, Ice
  - Ibuprofen or Acetaminophen
  - Intranasal fentanyl
    - (1mcg/kg, max 100mcg)
  - *If patient has IV, use morphine
  - *Should be completed prior to x-ray*

**X-ray (if indicated)**

- **Refer to Femoral Shaft or Supracondylar Pathways if applicable**
  - If x-ray result shows fracture?
    - Yes
      - Off Pathway
    - No
      - Off Pathway

- **Is injury consistent with child development and mechanism?**
  - Yes
    - Off Pathway
    - Consult Child Protection Team
  - No
    - Ortho Consult Needed?
      - Yes
        - Splint and Discharge
      - No
        - Reduction Needed?
          - Yes
            - Refer to Sedation Manual
          - No
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TARGET POPULATION

Inclusion Criteria
- Suspected extremity fracture

Exclusion Criteria
- Trauma Red and Level 1 Activations
- Active bleeding
- Concern for NAT
- Concern for compartment syndrome
- Co-morbidities that put patient at risk for respiratory depression

BACKGROUND | DEFINITIONS

Background
Pain is under-treated in patients presenting to the ED with long bone fractures and has room for improvement¹.

Definitions
Long bones- for this pathway, long bones are defined as the humerus, radius, ulna, femur, tibia, fibula, and clavicle.

INITIAL EVALUATION

- Vital signs
- Comprehensive pain assessment
  - Nursing pain assessment including pain score
    - FLACC, FACES, self reporting
- Check CMS (circulation, motion, sensation) in triage/nursing assessment
- History and physical exam
o Assess for pulse and any signs/symptoms of compartment syndrome or vascular injury
o Check capillary refill
o Check motor and sensory function distal to the injury

CLINICAL MANAGEMENT

- Assess and treat pain within 30 min of arrival to ED.
- Treat pain with both pharmacologic and non-pharmacologic modalities
  o Non-pharmacologic: ice, elevation, splint
  o Pharmacologic: based on patient's pain score, previous treatments, and clinical assessment
  o If patient already received pain medication prior to assessment, care team should consider going “up a step” to treat pain.
- Radiographic studies performed quickly to assess for fracture.
  o Pain should be addressed prior to xray for moderate to severe pain
- Pain should be reassessed after pain medications based on half life of initial medication with a goal to decrease pain score by at least 2 points
  o Within 30 min for IV or Intrasanal medications
  o Within 60 min for oral medications
- If patient still in pain, provider, nurse and family should create pain plan. Consider next step in WHO pain ladder.
- Orthopedics should be consulted, if necessary. Refer to the femoral shaft and supracondylar pathways if applicable.
  o If sedation is necessary, an IV should be placed and the team should refer to the sedation manual.

Upper Extremity Splinting Recommendations
Reference Only - contact orthopedics if further clarification is needed

<table>
<thead>
<tr>
<th>Splint</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volar</td>
<td>• Non-displaced distal radial fx.</td>
</tr>
<tr>
<td></td>
<td>• Buckle fx, distal radius.</td>
</tr>
<tr>
<td></td>
<td>• Wrist (carpal) fracture (except scaphoid).</td>
</tr>
<tr>
<td>Pre-Fabricated Volar</td>
<td>• Wrist Sprains.</td>
</tr>
<tr>
<td>Posterior Long Arm</td>
<td>• Supracondylar (type I) fx.</td>
</tr>
<tr>
<td></td>
<td>• Proximal radial AND ulnar fx.</td>
</tr>
<tr>
<td>Sugar- Tong</td>
<td>• Distal radial and ulnar fx.</td>
</tr>
<tr>
<td>Ulnar Gutter</td>
<td>• 4th / 5th metacarpal fx.</td>
</tr>
<tr>
<td></td>
<td>• Ulna fx.</td>
</tr>
<tr>
<td>Thumb Spica</td>
<td>• Non-displaced scaphoid fx.</td>
</tr>
<tr>
<td></td>
<td>• Non-displaced fx 1st metacarpal.</td>
</tr>
<tr>
<td>Pre- Fabricated Thumb Spica</td>
<td>• Thumb Injuries. No fx.</td>
</tr>
<tr>
<td>Finger Splint (Aluminum U-shaped)</td>
<td>• Distal phalangeal fx.</td>
</tr>
<tr>
<td>Buddy Tape</td>
<td>• Non-displaced proximal or middle phalanx fx.</td>
</tr>
</tbody>
</table>
## Lower Extremity Splinting Recommendations

**Reference Only - contact orthopedics if further clarification is needed**

<table>
<thead>
<tr>
<th>Splint</th>
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<tbody>
<tr>
<td>Posterior Long Leg</td>
<td>• Non-displaced Proximal Tib/Fib fx.</td>
</tr>
<tr>
<td>Posterior Short Leg</td>
<td>• Non-displaced Ankle fx.</td>
</tr>
<tr>
<td>Ankle Sprain</td>
<td></td>
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<tr>
<td>Pre-Fabricated Ankle Stirrup</td>
<td>• Non-displaced Ankle fx.</td>
</tr>
<tr>
<td>Knee Immobilizer (Pre-Fabricated)</td>
<td>• Severe Ankle Sprains.</td>
</tr>
<tr>
<td>Ankle Sprain.</td>
<td></td>
</tr>
<tr>
<td>Cast Shoe (Pre-Fabricated)</td>
<td>• Calcaneal fx.</td>
</tr>
<tr>
<td>Buddy Tape</td>
<td>• Metatarsal fx.</td>
</tr>
<tr>
<td></td>
<td>• Non-displaced Distal Tib/Fib fx.</td>
</tr>
</tbody>
</table>

Crutches **SHOULD NOT be used for lower extremity sprain/pain**

Ensure adequate padding when placing splint

## IMAGING

**Nursing order**

Refer to standing order guidelines for Xray

- Triage in NOC
- Secondary assessment (DB) at Anschutz or Colorado Springs

**Provider order**

Use order set to order appropriate study in Intake or on first assessment

**All Xrays should include at least 2 views**

## THERAPEUTICS

**NSAIDS**

- Acetaminophen (per manufacture recommendations)
- Ibuprofen (per manufacture recommendations)

**Combination medications**

- Hydrocodone-acetaminophen:
  - 5mg-217mg/10mL oral solution: 0.15mg/kg/dose of hydrocodone PO (max dose 10mg hydrocodone)
  - 5-325mg oral tabs: 1-2 tabs PO
Opiates

- Oral
  - Oxycodone:
    - oral solution: 0.05-0.15mg/kg/dose po (max dose 10mg)
    - immediate release tab: 0.05-0.15mg/kg/dose po (max dose 10mg)

- IV or Intranasal fentanyl
  - Intranasal fentanyl: 1-2 mcg/kg/dose IN (max dose 100mcg)
  - IV fentanyl: 1-2 mcg/kg/dose IV (max dose 100mcg)
  - IV morphine: 0.05-0.1mg/kg/dose IV (max dose 4mg)

PARENT | CAREGIVER EDUCATION

Use DC extremity trauma smart set
REFERENCES


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APPROVED BY

ED/UC Pathways & Policies Committee – February 15, 2017
Pharmacy & Therapeutics Committee – April 6, 2017
Clinical Pathways and Measures Committee – April 11, 2017

<table>
<thead>
<tr>
<th>MANUAL/DEPARTMENT</th>
<th>Clinical Pathways/Quality</th>
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<tbody>
<tr>
<td>ORIGINATION DATE</td>
<td>April 11, 2017</td>
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<tr>
<td>LAST DATE OF REVIEW OR REVISION</td>
<td>March 15, 2019 (Colorado Springs alignment)</td>
</tr>
</tbody>
</table>
| COLORADO SPRINGS REVIEW BY | Michael DiStefano, MD  
Chief Medical Officer, Colorado Springs |
| APPROVED BY       | Lalit Bajaj, MD  
Medical Director, Clinical Effectiveness |

REVIEW | REVISION SCHEDULE

Scheduled for full review on April 11, 2021.
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