SUPRACONDYLAR HUMERUS FRACTURE (SCH FX)

ALGORITHM. Supracondylar Humerus Fracture

**Pathway Completed**

<table>
<thead>
<tr>
<th>Type I</th>
<th>Type II a.</th>
<th>Type II b.</th>
<th>Type II b.</th>
<th>Type III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge home in splint</td>
<td>Discuss plan with orthopedics</td>
<td>Discuss surgical plan with orthopedics</td>
<td>Contact orthopedics</td>
<td>Contact orthopedics</td>
</tr>
<tr>
<td>Instructions to follow-up within 5-7 days</td>
<td>Pain control</td>
<td>Discharge home with OR instructions</td>
<td>Surgery within 18 hours</td>
<td>Surgery within 18 hours</td>
</tr>
<tr>
<td>Pain control</td>
<td>Acetaminophen</td>
<td>Urgent Room ticket given if scheduled in Urgent Room next day</td>
<td>Admit pre-operatively</td>
<td>Admit pre-operatively</td>
</tr>
<tr>
<td>Acetaminophen</td>
<td>Ibuprofen</td>
<td>Pain control</td>
<td>Oxycodone</td>
<td>Pain control</td>
</tr>
</tbody>
</table>

**In a displaced fracture, the anterior humeral line will not intersect the capitellum**

**Anterior humeral line**

**Type I**
- Discharge home in splint
- Instructions to follow-up within 5-7 days
- Pain control
- Acetaminophen
- Ibuprofen

**1st ortho visit**
- 5-7 days
- X-rays in splint/cast

**2nd ortho visit**
- Immobilize for 3 weeks
- X-rays out of cast
- Gradually resume activities

**Has range of motion returned to normal?**
- Yes
- 2nd post-operative visit
  - 3-4 weeks post-op
  - Remove splint/cast
  - Pull pins
  - X-ray
  - Gradually resume activities
- No
  - 3rd ortho visit
    - 6 weeks after cast/splint removed
    - Continue until resolved

**Pathway Completed**

**Has range of motion returned to normal?**
- Yes
- Pathway Completed
- No
- 3rd ortho visit
  - 6 weeks after cast/splint removed
  - Has range of motion returned to normal?

**2nd ortho visit**
- 6 weeks after cast removed

**Pathway Completed**

**3rd ortho visit**
- 6 weeks after cast/splint removed

**Open fracture?**
- Yes
- Refer to Open Fracture Policy
- No
- Ortho Visit
  - 3-4 weeks
  - X-ray
  - Gradually return to activity

**Review with orthopedic attending on call**

**Pathway Completed**

**Has range of motion returned to normal?**
- Yes
- Pathway Completed
- No
- Nerve Palsy?
  - Yes
  - Pathway Completed
  - No
  - 3rd ortho visit
    - 6 weeks after cast/splint removed
    - Has range of motion returned to normal?

**Posterior Cortex intact?**
- Yes
- Ortho Visit
  - 3-4 weeks
  - X-ray
  - Gradually resume activities
- No
- Anteriorly displaced?
  - Yes
  - Type II a.
    - Discuss plan with orthopedics
    - Closed reduction and casting in the ED
    - Follow-up in 1 week for x-rays and alignment check
    - Is alignment acceptable?
      - Yes
      - 1st ortho visit
        - 5-7 days
        - X-rays in splint/cast
      - No
      - Has range of motion returned to normal?
        - Yes
        - 2nd ortho visit
          - 6 weeks after cast removed
        - No
        - 3rd ortho visit
          - 6 weeks after cast/splint removed
        - Has range of motion returned to normal?
          - Yes
          - Pathway Completed
          - No
          - Nerve Palsy?
            - Yes
            - Pathway Completed
            - No
            - 3rd ortho visit
              - 6 weeks after cast/splint removed
              - Has range of motion returned to normal?

**Pathway Completed**

**Posterior Cortex intact?**
- No
- Type II b.
  - Discuss surgical plan with orthopedics
  - Discharge home with OR instructions
  - Urgent Room ticket given if scheduled in Urgent Room next day
  - Pain control
  - Oxycodone
  - Acetaminophen
  - Ibuprofen

**1st post-operative visit**
- 5-7 days post-op
- X-rays at provider discretion
- Consider overwrap to long arm cast

**2nd ortho visit**
- 6 weeks after cast removed

**3rd ortho visit**
- 6 weeks after cast/splint removed
- Has range of motion returned to normal?
  - Yes
  - Pathway Completed
  - No
  - Nerve Palsy?
    - Yes
    - Pathway Completed
    - No
    - 3rd ortho visit
      - 6 weeks after cast/splint removed
      - Has range of motion returned to normal?
Algorithm: Vascular Injury

Supracondylar Humerus Fracture
Pulseless (unable to palpate or doppler)

Consult Orthopedics
Consider gentle traction and elbow flexion
(In Emergency Department)

Yes, well perfused
Considered urgent to OR

Considered emergent to OR

No, poorly perfused

Well Perfused?

Closed reduction

Reduction acceptable?

Yes, acceptable
Reevaluate vascular exam

Open reduction.

Well Perfused?

Inpatient observation for at least 12 hours

Poorly perfused, pulseless

Open vascular exploration and repair needed, consider compartment release

Inpatient observation with Q2 neurovascular checks

24-48 hours

No compartment syndrome?

Yes
Discharge from inpatient unit

No, poorly perfused or developing compartment syndrome

Anschutz: Call Vascular Team at University to notify of potential need for consult.
Colorado Springs/NOC: Call orthopedics on call at Anschutz to discuss emergent transfer
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TARGET POPULATION

Inclusion Criteria
- Patients with supracondylar humerus fracture (SCH FX)

Exclusion Criteria
- Not Applicable

INITIAL EVALUATION, CLINICAL MANAGEMENT, AND IMAGING

Clinical assessment
- Soft tissue swelling
- Ecchymosis
- Skin puckering
  - Sign of considerable soft-tissue damage
  - Results from proximal segment piercing brachialis muscle and engaging deep dermis
- Bleeding/wounds
  - Open fracture (refer to open fracture policy for antibiotic recommendations)

Assess for vascular injury and Neurological deficits
- Refer to Vascular Injury Pathway
- Vascular compromise occurs in approximately 6 to 20% of children with type III supracondylar humerus fracture (SCH fx)
• Neurologic injury occurs in 10-20% of patients
  o Median nerve/anterior interosseous nerve most commonly injured⁵,⁶

Radiographs
• Obtain true anterior/posterior (A/P) and lateral elbow radiographs if not available¹

Assess for other injuries
• Ipsilateral forearm fractures increase risk for development of compartment syndrome⁶

Assess pain
• Use pain assessment strategies that are appropriate to the age/development level of the patient
• Refer to Pain Assessment and Management Policy

Determine need for surgical fixation
• See Algorithm
• Goal for time to OR is less than 18 hours
• Open fracture or poorly perfused hand after reduction are indications for emergent surgery³

THERAPEUTICS
• Pain control – oral, IV, or intranasal medication
• Apply long arm posterior splint
• Ice and elevation for swelling and pain control

MONITORING
• Neurovascular status
  o Continuous pulse oximetry allows the nurse to objectively measure perfusion¹
• Pain control

PARENT | CAREGIVER EDUCATION
• How to evaluate neurovascular status
• Pain control measures
• Return precautions
• Splint/cast care
• NPO and pre-op check-in instructions – Urgent Room Ticket (Anschutz campus only)
• Provide family/caregiver education handout

In Care of Kids Handouts:
• Cast Splints and Braces for Immobilization (English and Spanish)

POST-OPERATIVE DISCHARGE CRITERIA
• Acceptable bone alignment
• Pain control acceptable
  o Admit to observation unit if control of pain, swelling, or neurovascular status is an issue (All Type III fractures to be admitted to observation post-operatively for monitoring)
FOLLOW-UP

- Follow-up in 5-7 days for Type III with orthopedic care team for clinical assessment, neurovascular evaluation and overwrap of cast or splint. X-rays may be taken (2 view elbow) in cast/splint at the discretion of the provider.
- Follow-up in 3-4 weeks for Type II with orthopedic care team for splint/cast removal and pin removal. X-rays (2 view elbow) and pin site evaluation after removal.
- Further follow-up determined by provider
- Recommendations for follow-up in 6 weeks only if range of motion has not returned to normal, concerns for pin site infection, or if nerve palsy present

RELATED DOCUMENTS

- ED/UC Suspected Extremity Fracture Clinical Pathway
- Opioid Prescribing Practices Clinical Pathway
APPENDIX A: ORTHOPEDIC URGENT ROOM TICKET (ANSHUTZ CAMPUS ONLY)

- Tickets given to any patient scheduled for next day outpatient surgery
- Should be given out at any CHCO ED or Urgent Care
- Inform patients and families that limb and/or life-threatening injuries could delay their surgery.
- Instruct families to call numbers on the card to confirm their arrival and surgery time the day of surgery.

ORTHOPEDIC URGENT ROOM TICKET

Patient Name: ________________________________
Surgery Date: ________________________________
Surgeon: ________________________________

No solid food or non-clear liquid after: ________________
Clear liquids (water, apple juice, sprite) until: ________________

Please call between 6-6:30 a.m. on the day of surgery to receive updates on surgery time.
Monday - Friday: 720-777-8241
Saturday: 720-777-4403
Sunday: 720-777-6492
APPENDIX B: SUPRACONDYLAR HUMERUS INFORMATION SHEET

Orthopedic Institute – Pediatric Orthopedic Trauma Program

SUPRACONDYLAR HUMERUS FRACTURE

What is a supracondylar fracture?
• Supracondylar fractures are the most common fracture of the elbow in children.
• These fractures are the result of trauma to the elbow, most often from a fall from height (monkey bars are a common culprit), or other sports or leisure activities.

How are supracondylar fractures treated?
• These fractures are treated differently depending on the severity.
• The most stable fractures can be treated with a cast or splint.
• More complicated and unstable fractures may need surgery. Surgery usually includes putting temporary pins in the bone in order to hold the fracture in place.

What should we do about pain?
• Pain with these injuries usually happens with swelling. Please keep your child’s elbow elevated above their heart and place ice on the area.
• You may utilize Acetaminophen and Ibuprofen for pain.
• Your doctor may also prescribe a narcotic pain medication for severe pain.
• How long will my child be in a cast and when will I follow up?
• Each child’s fracture is different; however, the total time in cast or splint is typically around 3-4 weeks.
• Repeat x-rays are done when your child returns for their 3-4 week appointment to see if the fracture is healed enough to come out of their cast. Complications or slower healing may require more time in a splint or cast.
• For more severe fractures, one extra visit may be required. You will need to follow-up in one week after surgery to get x-rays in the splint or cast to make sure the fracture has not moved. Then in 3-4 weeks to have the cast removed.

How do the pins come out?
• The pins used to hold the fracture in place come out through the skin.
• These are taken out in clinic typically after 3-4 weeks and do not require surgery or sedation.
• There may be minor discomfort associated with pin removal. Please feel free to give your child some pain medication before coming to clinic to get the pins out.

What problems could my child have after this injury?
• Please monitor your child for increased pain not controlled with oral medications, or any decrease in feeling or presence of tingling in the fingers or hand. Please let your provider know of any concerns immediately.
• Most children will not have full motion or strength of the cast arm for up to 6 weeks after cast removal. This usually comes back with time and does not require occupational therapy.

Please call the orthopedic trauma nurse line at 720-777-0115 with any questions or concerns.
APPENDIX C: PCP QUICK REFERENCE GUIDE

Evaluation of Elbow Injury:

Fracture Type with Treatment Recommendations:

- **Type I**
  - Discharge home
  - Instructions to follow-up within 6-7 days
  - Pain control
  - Acetaminophen
  - Ibuprofen

- **Type II a.**
  - Discuss plan with orthopedics
  - Closed reduction and casting in the ED
  - Follow up in 1 week for x-rays and alignment check

- **Type II b.**
  - Discuss surgical plan with orthopedics
  - Discharge home with OR instructions
  - Urgent room ticket given if scheduled in UR next day
  - Pain control
  - Oxycodone
  - Acetaminophen
  - Ibuprofen

- **Type III**
  - Contact orthopedics
  - Surgery within 18 hours
  - Admit pre-operatively

- **Flexion type**
  - Contact orthopedics
  - Surgery within 18 hours
  - Admit pre-operatively

- **Open fracture?**
  - Yes → Refer to Open Fracture Policy
  - No

- **Posterior Cortex intact?**
  - Yes
  - No

- **Anteriorly displaced?**
  - Yes
  - No

- **Displaced?**
  - Yes
  - No

*In a displaced fracture, the anterior humeral line will not intersect the capitellum*
SPLINTING PRINCIPLES

Long Arm Posterior Splint

- Extends from the axilla over the posterior elbow to the distal palmar crease
- Position of Function: 90 degree flexed elbow
- Forearm is neutral and the wrist is slightly extended

Application

- Measure dry splint next to the area being splinted or on the contralateral extremity
  - Add 1 to 2 cm at each end to allow for shrinkage that occurs during wetting, molding, and drying
- If cotton padding available, apply to extremity adding additional layers to bony prominences
- Wet splint and wring out excess moisture
- Place splint on ulnar aspect of arm and mold to the contours of the arm
  - Use palm to mold to avoid pressure point dimples
  - Take caution to avoid creases and wrinkles in the splinting material
- Splint secured with ACE wrap, wrapping distal to proximal
- Recheck neurovascular status post application
REFERENCES


Clinical pathways are intended for informational purposes only. They are current at the date of publication and are reviewed on a regular basis to align with the best available evidence. Some information and links may not be available to external viewers. External viewers are encouraged to consult other available sources if needed to confirm and supplement the content presented in the clinical pathways. Clinical pathways are not intended to take the place of a physician’s or other health care provider’s advice, and is not intended to diagnose, treat, cure or prevent any disease or other medical condition. The information should not be used in place of a visit, call, consultation or advice of a physician or other health care provider. Furthermore, the information is provided for use solely at your own risk. CHCO accepts no liability for the content, or for the consequences of any actions taken on the basis of the information provided. The information provided to you and the actions taken thereof are provided on an “as is” basis without any warranty of any kind, express or implied, from CHCO. CHCO declares no affiliation, sponsorship, nor any partnerships with any listed organization, or its respective directors, officers, employees, agents, contractors, affiliates, and representatives.
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You can also file a civil rights complaint with the U.S. Department of Health and Human Services, Office for Civil Rights, electronically through the Office for Civil Rights Complaint Portal, available at portal.hhs.gov/corporal/lobbyist, or by mail or phone at: U.S. Department of Health and Human Services 200 Independence Avenue, SW Room 509F, HH Building Washington, D.C. 20201 1-800-368-1019, 800-537-7897 (TDD) Complaint forms are available at www.hhs.gov/ocr/offices/file/index.html.

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**ATENCIÓN:** si habla español, tiene a su disposición servicios gratuitos de asistencia lingüística. Llame al 1-720-777-9600.

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