Objectives

• Describe selected orthopedic emergencies
• Discuss immediate evaluation and treatment of orthopedic emergencies
• Review reduction and splinting techniques
Disclosures

- None
- Opinions are my own and do not represent CHI Health
- I am Primary Care Sports Medicine not Orthopedic Surgeon

FYI

- The scene is safe
- Check pulse, motor, sensory before and after intervention
  - Image before and after reduction of dislocation or fracture
- Do not hesitate to consult orthopedics sooner rather than later
DISLOCATIONS

Shoulder

- Most common dislocation in adults
  - High recurrence rate, especially if younger
- Anterior, posterior, inferior
  - May be associated fracture of humeral head or glenoid
  - Also possible rotator cuff or labral tears
- Exam
  - Detailed neurovascular exam (axillary nerve, axillary artery, brachial plexus)
  - Obvious deformity, palpable humeral head, limited ROM
- Imaging
  - X-rays: AP, Scapular Y, Axillary
  - CT: help identify fracture
  - MRI: identify soft tissue injuries, especially inferior dislocations
- Treatment
  - Closed reduction
    - May be attempted immediately on the field
    - May require analgesia/sedation, multiple techniques
  - Immobilize in sling
  - Surgery
    - Irreducible, fracture, prolonged posterior dislocation
Elbow

- Second most common joint dislocation in adults
  - Most common in children

- Simple vs. complex
  - w/o fracture, 50-60%
  - w/ fracture, "terrible triad"
    - Radial head, coronoid tip, UCL tear

- Exam
  - Detailed neurovascular exam (ulnar nerve, brachial artery)
  - Monitor for compartment syndrome

- Imaging
  - X-rays: AP, Oblique, Lateral
  - CT: help identify fracture or other injuries

- Treatment
  - Closed reduction for simple
    - Analgesia/sedation, inline traction, forearm supination, elbow flexion
    - Splint at 90° and sling
  - Surgery
    - Irreducible, terrible triad

Hip

- Rare, associated with high energy trauma
  - Often multiple injuries, always examine knee

- Posterior “dashboard injury”
  - Flexion, adduction, IR

- Exam
  - Detailed neurovascular exam (sciatic nerve, femoral vessels)

- Imaging
  - X-rays: AP, Cross-table lateral
  - CT: help identify fracture, required after reduction

- Treatment
  - Closed reduction within 6 hours
    - Requires analgesia/sedation, apply traction, crutches
    - Contraindicated if femoral neck fracture
  - Surgery
    - Irreducible, fracture, delayed presentation
Knee

- Very rare, high risk of neurovascular injury
  - Often multiple injuries; fracture or internal derangement
- High energy vs. low energy
  - MVA, fall, dashboard injury
  - ADLs w/ morbid obesity, athletic injury
- Exam
  - Detailed neurovascular exam (peroneal nerve, popliteal vessels)
  - Up to 50% spontaneously reduce
- Imaging
  - X-rays: AP & lateral
  - CT: help identify fracture if concern on x-ray, angiogram to assess vasculature
  - MRI: post reduction but prior to surgery
- Treatment
  - Closed reduction
    - May require analgesia/edation, apply traction and reduce deformity
    - ASAP
  - Surgery
    - Almost all require some intervention
    - Likely need vascular consult
Open Fracture

- Fracture with direct communication to external environment
  - High risk of infection & neurovascular injury
- Often additional injuries
  - Compartment Syndrome
- Exam
  - Assess for soft-tissue damage, may be deep
  - Evaluate for vascular insult
- Imaging
  - X-rays include joint above and below fracture site
- Treatment
  - In the field, stabilize, control bleeding, and apply sterile (saline soaked) dressings
  - In ER, antibiotics (3 hours of injury) and tetanus
    - Avoid aggressive irrigation in ER as may push debris deeper
  - Need I&D and operative stabilization
    - Goal of 6 hours

Closed Fracture

- Fracture without open skin
  - Can range from buckle to severely angulated and comminuted
- Check for additional injury
  - Joints around the fracture, compartment syndrome
- Exam
  - Evaluate and document pulse, motor, sensory
  - Careful evaluation of skin
- Imaging
  - X-rays before attempted reduction
- Treatment
  - In the field, stabilize as found and splint w/ appropriate material
    - SAM splint, pelvic binder, traction splint, c-collar, spine board
  - In ER, after imaging reduce as appropriate and splint or consult ortho
    - Hematoma block
    - Do not hesitate to call
ACUTE COMPARTMENT SYNDROME

- Fascial compartment pressures rise to level that decrease perfusion to tissues
  - Muscle and nerve damage
- Occur anywhere muscle is surrounded by fascia
  - Leg, thigh, forearm, hand, foot, buttock, shoulder, paraspinals
  - Trauma (fracture, crush, contusion, GSW), tight cast/dressing, burns, IV extravasation, vascular injuries
  - Trauma -> bleeding/edema -> increased pressure -> loss of perfusion -> ischemia
- Exam
  - Pain out of proportion, pain w/ stretching, paresthesia, paralysis, swelling, absent pulses
  - Often clinical diagnosis in alert patients, may need testing
- Imaging/Testing
  - X-ray to evaluate for fracture
  - Compartment Pressure Testing
- Treatment
  - Emergent fasciotomy of all compartments as indicated
  - Loosen cast/dressings if not true compartment syndrome
Compartment Pressure Testing

- **Stryker Needle**
  - Needle entry within 5cm of fracture site
  - Pressures within 30mm Hg of DBP

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CONCUSSION

**She'll be okay. She just had her bell rung!**
**Definition**

- Clinical syndrome of biomechanically induced alteration of brain function (coup and contrecoup/rapid rotation); affects memory and orientation, may involve loss of consciousness
- No grading system

![Contrecoup](https://upload.wikimedia.org/wikipedia/commons/thumb/0/09/Contrecoup.svg/1200px-Contrecoup.svg.png)

**On the Sideline**

- If suspicious of a concussion – immediate removal from activity
- Symptoms: confusion, amnesia, loss of consciousness, headache, dizziness, nausea or vomiting, emotional changes, vacant stare, photo/phonosensitivity, delayed verbal expression, loss of focus
- Standard who, what, where questions not enough
- Rule out neck or spinal cord trauma
  - If loss of consciousness or neck concern– immobilize and transport to ER
- Common tools
  - Symptom Checklist
  - Sport Concussion Assessment Tool (SCAT)
  - Standardized Assessment of Concussion (SAC)
Imaging

- Not routine – cannot diagnosis concussion with a scan
- CT scan
  - Use if need to rule out more serious injury
  - Obtain if loss of consciousness, severe vomiting, neurologic deficit, concern for skull fracture, seizure, altered mental status
  - 90% are negative
- MRI
  - Use for long term symptom evaluation

Blood Testing

- Brain Trauma Indicator approved by FDA in Feb 2018
- Measures levels of UCH-L1 & GFAP
  - Released at elevated levels after brain/nerve injury
  - Can be detected in approx. 20 mins
- Predict absence of lesion on CT scan with 99% accuracy
- Does not “rule out” concussion
- CT does not DIAGNOSE concussion
- Only approved in adults
Initial Care

- Need responsible adult to monitor first 6-12 hours after injury
- No need to awaken from sleep
  - Monitor for signs of distress every 2-3 hours
- Warning signs: inability to awaken, worsening headache, vision changes, continued vomiting, incontinence, neurologic changes
- Needs physician follow up in 1-2 days after injury
- Anticipate resolution in 14-21 days

Medications

- Pain & headache
  - Acetaminophen (Tylenol) only for first 2-3 days
  - Once ok’d by physician can use ibuprofen (Advil, Motrin)
- Sleep
  - Can use OTC or prescription med, but needs physician ok first
- Nausea
  - Can get prescription from physician
- Mood
  - Long term symptoms may need prescription
TIPS, TRICKS, & TECHNIQUES

Hematoma Block

- Prior to reduction of fracture
  - Marcaine 5cc & lidocaine w/o epi 5cc
  - Inject into fracture site and aspirate
  - Want hematoma return then inject

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Reductions

- Shoulder
- Hip
- Elbow, Knee

Splinting

- Ortho-Glass is most common
  - Cut stockinette longer than you think
  - Pad more than you think, especially over bony prominences
  - Pull felt over the end of the splint to cover shards
  - Requires water to set
  - A good mold is key, avoid fingerprints
- Ensure sling fits properly
- DOCUMENT wounds under splint
Common Splints

Resources

QUESTIONS?

Thank You!

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