Monteggia Fracture

- Fracture on ulna with radial head dislocation
  - ORIF in adults
  - Non op for children possible

Galeazzi Fracture

- Fracture of radial shaft with disruption of distal radioulnar joint
  - 3x more common than Monteggia
  - Requires ORIF
Metacarpal Fractures

- Metacarpal neck
  - May need to be closed reduced
  - Acceptable angulation for non op management
    - $< 10^\circ$ for 2nd and 3rd
    - $< 30-40^\circ$ for 4th and 5th (Boxers fracture)
  - Casting for non op
    - Ulnar gutter splint/cast for 6 weeks
  - Surgery
    - CRPP vs ORIF
Boxer’s Fx
Metacarpal fractures

- Metacarpal shaft fractures
  - Non-op management
    - If < 10 deg dorsal angulation 2\(^{nd}\) and 3\(^{rd}\)
    - If < 20 deg dorsal angulation 4\(^{th}\) and 5\(^{th}\)
  - Surgery
    - Rotational deformity
      - (causes overlap of fingers)
Scaphoid Fractures

- Most common carpal fracture
- FOOSH injury
- Pain in anatomic snuffbox
- High potential for slow healing or non union based on location of fracture
- non op management
  - Thumb spica splint/cast 6-24 weeks
- Surgical consideration
  - Any displacement or angulation
  - Insertion of screw
Scaphoid Fractures
Common Wrist Problems

- Other carpal fractures
  - hook of hamate

- Sprains

- DeQuervain’s tenosynovitis
  - Positive Finkelstein test
  - Tx: splint/injection

- Scapholunate Dissociation
  - “carpal keystone”
  - FOOSH
  - Letterman sign
Carpal Tunnel Syndrome

- Compression of median nerve in carpal tunnel
- Tinel’s sign positive
- Thenar muscle wasting
- Hand wringing
- Non operative
  - Injection
  - Wrist splinting
- Surgical
  - Carpal tunnel release
Common Hand Deformities

- **Boutonniere deformity**
  - Flexion of PIP & hyperextension of DIP
  - Rx: Surgical or leave as is

- **Swan Neck Deformity**
  - Seen in RA
  - Flexion of the DIP & hyperextension of the PIP
  - Surgical vs leave as is
Mallet Finger

- Rupture of extensor tendon distal to DIP
- Axial load causing forced DIP flexion “jammed finger”
- PE: Unable to actively extend DIP
- Rx: Stax splint or DIP extension splint 24/7 for 6 weeks, mallet finger protocol
Common Finger Deformities

- Bouchard’s nodes
  - Involve PIP joint
  - OA or RA (less common)

- Heberden’s Nodes
  - Involve DIP joint
  - OA
Cervical Spine
Cervical Spine

• AP, lateral
  o Oblique to look for foraminal stenosis
  o Odontoid view for upper c-spine

• Does it line up?
  o Anterior vertebral line
  o Posterior vertebral line
  o Spinolaminar line
  o Posterior spinous line

• Disc space heights even?
Common c-spine symptoms

- Pain radiating down arm
- Centralized pain with motion
- Upper extremity weakness following dermatomonal pattern
- Altered reflexes compared to contralateral side
- Sensory changes
C-spine physical exam

- **Sensory**
  - C6 “six shooter”

- **Motor**
  - C4-shoulder shrug
  - C5-shoulder abduction
  - C6-elbow flex/wrist ext
    - **Biceps reflex**
  - C7-elbow ext/wrist flex
    - **Triceps reflex**
  - C8-thumb extension
  - T1-finger abduction
Common cervical injuries

• Fractures
  o Hangman’s fracture – most common
    • C2 fx/dislocation
    • Hyperextension usually
  o Jefferson fracture
    • C1 burst fx
    • Axial load
Cervical injuries

- Brachial plexus injury
  - “burner”/”stinger”
  - Shoulder depression/neck lateral flexion causing stretch injury

- Symptoms should resolve within minutes
- Strength should be normal before return to activity
Cervical injuries

• Cervical radiculopathy
  o Due to impingement on nerve root
    • Herniated disc, OA
  o Exam
    • Electricity pain down the arm in certain positions
    • Positive Spurling’s maneuver
  o Treatment
    • PT
    • Injections
    • Surgery
Lumbar Motor/Sensory

- Sensory

- Motor
  - L2 – hip flexion
  - L3 – knee extension
    - Patellar reflex
  - L4 – ankle dorsiflexion
  - L5 – toe extension
  - S1 – ankle plantar flexion
    - Achilles reflex
Low back (lumbar) strain/sprain

- Approximately 80% of low back injuries
- Most improve with time, NSAIDs, physical therapy
- Depending on mechanism, x-rays may not be indicated
- Symptoms:
  - Pain/stiffness isolated to paraspinal muscles
  - No radicular symptoms
  - No sensory changes
- Treatment:
  - NSAIDs, muscle relaxers
  - Physical therapy!!!
  - Activity modification
Herniated Nucleus Pulposus (HNP)

- AKA herniated disk
- Most common at L4-L5, L5-S1
- Symptoms
  - Unilateral leg pain/weakness
  - Muscle atrophy
- Diagnosis
  - Straight leg raise test positive
  - MRI gold standard
- Treatment
  - NSAIDs, prednisone
  - Physical therapy
  - Surgery if conservative tx fails
    - Discectomy vs fusion
Lumbar spine fractures

- Stable
  - Wedge fracture (compression)
    - Common in t-spine
    - Osteoporosis, lytic lesions, trauma
    - Kyphoplasty if symptomatic
  - Spinous process
    - Usually trauma
    - Treated non op
Lumbar spine fractures

- Unstable
  - Burst fracture
    - High energy axial load
    - Bony fragments into spinal canal
  - Chance fracture
    - Sudden high velocity forward flexion – “seat belt injury”
    - Anterior body, posterior ligaments/bony injury
Spondylolysis

- Fracture through pars interarticularis
  - “scotty dog fracture”
  - Best seen on oblique x-ray
- Athletes
- Increased pain w/ single leg stand with back extension and rotation to same side
- If bilateral, may progress to spondylolisthesis
- Treat non op: PT, bracing, no impact
Spondylolisthesis

• Slippage of one vertebra over the other
• Grade I – V based on % slippage
• Best seen on lateral
• Also retrolisthesis
• Non op management preferable
• Surgical fusion may be necessary based on amount of slippage and associated symptoms/neuro deficit
Cauda Equina Syndrome

• Acute loss of function to lumbar plexus
  o Loss of sensation saddle distribution
  o Bowel/bladder incontinence
  o Sexual dysfunction

• Causes
  • Trauma
  • Tumors/lesions
  • Spinal stenosis
  • inflammatory

• Treatment:
  o Emergent surgical decompression
BREAK
Hip/Pelvis

- Hip Joint Capsule
  - Ligamentum teres with artery
  - Pelvis
  - Femoral head
  - Joint capsule

- Cartilage

- Ilium
- Pubis
- Ischium
- Symphysis Pubis

(CMMG 2005)
Hip osteoarthritis

- Characteristic symptoms include:
  - Pain with increased walking, painful limp
  - Decreased range of motion
  - >60 years of age
  - AVN from prolonged steroid use
- Treatment
  - Intraarticular steroid injections and PT to restore range of motion and increase strength
  - Surgery for total hip arthroplasty or resurfacing if steroid injections do not adequately control symptoms
Gap between femoral head and acetabulum is occupied by articular cartilage.
Hip fractures

• Main types
  o Femoral neck
  o Intertrochanteric
  o Subtrochanteric

• Usually from falls
• Early surgical fixation to allow early mobilization
  o Important in older population to avoid secondary complications
Hip dislocations

- Due to high energy trauma
- Posterior more common (90%)
  - Common in total hip arthroplasty patients
- Early reduction important to avoid osteonecrosis of femoral head
- Closed treatment – 2-4 weeks of ambulation with crutches until pain free
Slipped Capital Femoral Epiphysis (SCFE)

- Most common in boys 13-15, girls 11-13
  - Most are overweight
  - Many will get SCFE bilateral
- Symptoms include pain and antalgic gait
  - Increased external rotation on affected side
- Diagnosis
  - X-ray: AP and frog leg lateral
- Treatment
  - Surgical stabilization of the physis with screw
    - Usually stabilized in position it is discovered – not reduced
Legg-Calve-Perthes Disease

- Idiopathic osteonecrosis of femoral head
  - Common in boys 4-8
  - Limping, worse with activity
  - Many affected are delayed in bone age
- Diagnosis made by x-ray

- Revascularization occurs spontaneously
  - May lead to premature degeneration
- Non op treatment
  - Goal is reestablishment of spherical femoral head – bracing, activity restriction
Legg Calve Perthes Disease
KNEE DISORDERS
## Knee Injuries

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Common Etiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute instability</td>
<td>Ligament disruption (ACL, MCL, LCL, PCL)</td>
</tr>
<tr>
<td>Mechanical symptoms (lock, catch)</td>
<td>Meniscus, unstable chondral lesion, loose body</td>
</tr>
<tr>
<td>Acute swelling without injury incident</td>
<td>Articular cartilage – osteochondritis dissecans</td>
</tr>
<tr>
<td>Constant ache/swelling – older pop.</td>
<td>Osteoarthritis, other inflammatory arthritis</td>
</tr>
<tr>
<td>Anterior pain w/ steps, cruching</td>
<td>Patellofemoral dysfunction</td>
</tr>
<tr>
<td>Acute swelling after painful event</td>
<td>Fracture, patellar dislocation, ACL/PCL injury</td>
</tr>
</tbody>
</table>
## Common Knee Exam Findings

<table>
<thead>
<tr>
<th>Positive Special test</th>
<th>Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachman, Anterior Drawer, Pivot Shift</td>
<td>ACL</td>
</tr>
<tr>
<td>Posterior Drawer, posterior sag</td>
<td>PCL</td>
</tr>
<tr>
<td>Valgus stress test</td>
<td>MCL</td>
</tr>
<tr>
<td>Varus stress test</td>
<td>LCL</td>
</tr>
<tr>
<td>McMurray</td>
<td>Meniscus</td>
</tr>
<tr>
<td>Apprehension test</td>
<td>Patellar subluxation/dislocation</td>
</tr>
</tbody>
</table>
Knee X-Rays

- 2 view – AP, lateral
- 3 view – AP, lateral, merchant
ACL Mechanism of Injury

- Plant and twist, hyperextension, collision
- Cutting Sports
  - Soccer, football, basketball, skiing
- Associated bone bruising and meniscus tear common
- Exam:
  - Positive Lachman
    **gold standard**
Treatment Options

- Factors to Consider:
  - Age
  - Associated injuries
  - Repairable meniscus tear
  - Recreational activities
  - Work demands
  - Motivation
- Most Important: Patient’s functional demands
- Consider Each Patient Individually!
Operative Treatment

• Arthroscopic Reconstruction
  o Graft choices
    • Bone-patellar tendon-bone; Hamstring autograft; cadaver allograft

• Physical Therapy

• 6 month minimum to return to cutting sports
Meniscal Tears

• Treatment depends on cause (traumatic vs. degenerative), severity of symptoms and location of tear

• If no significant mechanical symptoms, try conservative therapy first, then decide if surgery is indicated

• Many require arthroscopic evaluation with resection vs. repair
  - Factors include Age, type of tear, condition of adjacent chondral surfaces
Peripheral tear
Transverse tear
Vertical tear
Flap tear
Peripheral tear sutured for conventional arthroscopy
Burkert Hannah tear
Discoid meniscus: degeneration and tear
Quadriceps tear
Meniscus Repair
Osteoarthritis
Osteoarthritis

• Clinical Presentation
  • Pain!
    • Initially w/ activity only
  • Stiffness and loss of range of motion
    • Especially after periods of inactivity until joint “loosens up”
  • Most commonly effects fingers, wrist, hip, knee, spine
Osteoarthritis
Osteoarthritis

• Treatment
  • Activity modifications/Physical Therapy
  • Weight loss
  • Acetaminophen/NSAIDS
  • Intraarticular steroid injections/visco-supplementation (Synvisc, Orthovisc, Euflexxa)
  • Arthroscopic debridement
  • Joint replacement

**Decision for joint replacement not based on radiographic findings.**

Decision Based on Subjective symptoms and failure of other therapies (PT, injections, activity modification, etc.)**
Total Knee Arthroplasty
Post Operative Treatment

- Initially
  - WBAT
  - NSAID’s, ice
  - Physical Therapy
    - Full ROM
    - Functional use of leg
- Gradual return to activity
ANKLE DISORDERS
The Ankle Joint

- **Calcaneus**: articulates with Talus superiorly & cuboid distally.
- **Talus**: articulates with tibia & fibula in mortise, navicular distally, & calcaneus inferiorly.
- **Tibia**: forms medial malleolus & medial mortise.
- **Fibula**: forms lateral malleolus and lateral mortise.