Common Orthopaedic and Sports Medicine Problems

Crash Course

Anthony Luke
MD, MPH, CAQ (Sport Med)
University of California, San Francisco
FP Board Review 2015
Disclosures

• Founder, RunSafe™
• Founder & CEO, SportZPeak Inc.

• Sanofi, Investigator initiated grant
Overview

• Quick approach to MSK problems
• Highlight common presentations
• Joint by joint
• Discuss basics of conservative and surgical management
History is Key

Who?

What?

- Numbness
- Fever
History is Key

When?
• Acute vs Chronic (2 weeks? 6 weeks?)

Where?
• Think anatomy
• One finger test

How?
• Mechanism of injury
Red Flag Symptoms

- Severe disability
- Numbness and tingling
- Night pain
- Constitutional symptoms (fever, wt loss)
- Swelling with no injury
- Systemic illness
- Multiple joint injury
Intrinsic Risk Factors
- Growth
- Anatomy
- Muscle/Tendon imbalance
- Illness
- Nutrition
- Conditioning
- Psychology

Extrinsic Risk Factors
- Training
- Technique
- Footwear
- Surface
- Occupation

TO PREVENT INJURIES!!
Treatment Options

Conservative
• MICE (Modified activity, Ice, Compression, Elevation)
• Medications/Analgesia
• Rehabilitation therapy
• Casting/ Braces / Orthoses
• Crutches

Surgery
• Reconstruction
• Repair
• Re-align
• Remove internal derangement
Ankle Sprains

Mechanism
• Inversion, plantarflexion (most common injury)
• Eversion (Pronation)

Symptoms
• Localized pain usually over the lateral aspect of the ankle
• Difficulty weight bearing, limping
• May feel unstable in the ankle
Physical Exam

LOOK
• Swelling/bruising laterally

FEEL
• Point of maximal tenderness usually ATF

MOVE
• Limited motion due to swelling
Special Tests Anterior Drawer Test

- Normal ~ 3 mm
- Foot in neutral position
- Fix tibia
- Draw calcaneus forward
- Tests ATF ligament

<table>
<thead>
<tr>
<th>Sens</th>
<th>Spec</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>80%</td>
<td>74%</td>
<td>91%</td>
<td>52%</td>
</tr>
</tbody>
</table>

Subtalar Tilt Test

- Foot in neutral position
- Fix tibia
- Invert or tilt calcaneus
- Tests Calcaneofibular ligament

No Sens / Spec Data
Subtalar Tilt test
# Grading Ankle Sprains

<table>
<thead>
<tr>
<th>Grade</th>
<th>Drawer/Tilt Test results</th>
<th>Pathology</th>
<th>Functional Recovery in weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Drawer and tilt negative, but tender</td>
<td>Mild stretch with no instability</td>
<td>2 – 4</td>
</tr>
<tr>
<td>2</td>
<td>Drawer lax, tilt with good end point</td>
<td>ATFL torn, CFL and PTFL intact</td>
<td>4 – 6</td>
</tr>
<tr>
<td>3</td>
<td>Drawer and tilt lax</td>
<td>ATFL and CFL injured/torn</td>
<td>6 – 12</td>
</tr>
</tbody>
</table>
Ottawa Ankle Rules

• Inability to weight bear immediately and in the emergency / office (4 steps)

• Bone tenderness at the posterior edge of the medial or lateral malleolus (Obtain Ankle Series)

• Bone tenderness over the navicular or base of the fifth metatarsal (Obtain Foot Series)

• Sens 97%, Spec 31-63%, NPV 99%, PPV <20%
Treatment of Ankle Sprains

Acute
• Rest or modified activities
• Ice, Compression, Elevation
• Crutches PRN
• Bracing (Grade 2 and 3)
• Early Motion is essential

Physical Therapy
• ROM
• Strengthening
• Stretching
• Proprioception / Balance exercises (i.e. Wobble Board)
Not Always Only a “Sprain”

Ligaments
- Subtalar joint sprain
- Sinus tarsi syndrome
- Syndesmotic sprain
- Deltoid sprain
- Lisfranc injury

Tendons
- Posterior tibial tendon strain
- Peroneal tendon subluxation

Bone
- Osteochondral talus injury
- Lateral talar process fracture
- Posterior impingement (os trigonum)
- Fracture at the base of the fifth metatarsal
- Jones fracture
- Salter fracture (fibula)
- Ankle fractures
“High Ankle” Sprains

Mechanism

• Dorsiflexion, eversion injury
• Disruption of the Syndesmotic ligaments, most commonly the anterior tibiofibular ligament
• R/O Proximal fibular fracture
External Rotation Stress Test

- Fix tibia
- Foot in neutral
- Dorsiflex and externally rotate ankle

No Sens/ Spec Data
Kappa = 0.75

Squeeze test

- Hold leg at mid calf level
- Squeeze tibia and fibula together
- Pain located over anterior tibiofibular ligament area
Treatment for Syndesmosis Injury

Conservative
• Cast or walking boot
• Protected weightbearing with crutches must be painfree
• PT

Surgery
• May needs ORIF if unstable

Maisonneuve Fracture
Ankle Sprain Prevention

- Ankle braces, tape and proprioceptive training help reduce the risk of lateral ankle sprains

- Significant reduction in the number of ankle sprains in people allocated to an external ankle support (RR 0.53, 95% CI 0.40 to 0.69).
  Handoll et al. Cochrane Database Rev, 2005
Acute Hemarthrosis

1) ACL (almost 50% in children, >70% in adults)
2) Fracture (Patella, tibial plateau, Femoral supracondylar, Physeal)
3) Patellar dislocation

- Unlikely meniscal lesions
Emergencies

1. Neurovascular injury
2. Knee Dislocation
   - Associated with multiple ligament injuries (posterolateral)
   - High risk of popliteal artery injury
   - Needs arteriogram
3. Fractures (open, unstable)
4. Septic Arthritis
Urgent Orthopedic Referral

- Fracture
- Patellar Dislocation
- “Locked Joint” - unable to fully extend the knee (OCD or Meniscal tear)
- Tumor
Anterior Cruciate Ligament (ACL) Tear

Mechanism

- Landing from a jump, pivoting or decelerating suddenly
- Foot fixed, valgus stress
Anterior Cruciate Ligament (ACL) Tear

Mechanism
• Landing from a jump, pivoting or decelerating suddenly
• Foot fixed, valgus stress

Symptoms
• Audible pop heard or felt
• Pain and tense swelling in minutes after injury
• Feels unstable (bones shifting or giving way)

Double fist sign
ACL physical exam

LOOK
• Effusion (if acute)

FEEL
• “O’Donaghue’s Unhappy Triad” = Medial meniscus tear, MCL injury, ACL tear
• Lateral meniscus tears more common than medial
• Lateral joint line tender - femoral condyle bone bruise

MOVE
• Maybe limited due to effusion or other internal derangement
Special Tests ACL

- Lachman's test – test at 20°
  Sens 81.8%, Spec 96.8%

- Anterior drawer – test at 90°
  Sens 22 - 41%, Spec 97%*

- Pivot shift
  Sens 35 - 98.4%*, Spec 98%*

Malanga GA, Nadler SF. Musculoskeletal Physical Examination, Mosby, 2006
* - denotes under anesthesia
X-ray

- Usually non-diagnostic
- Can help rule in or out injuries
- Segond fracture – avulsion over lateral tibial plateau
MRI

- Sens 94%, Spec 84% for ACL tear

ACL tear signs
- Fibers not seen in continuity
- Edema on T2 films
- PCL – kinked or Question mark sign
MRI

• Sens 94%, Spec 84% for ACL tear

ACL tear signs
• Lateral femoral corner bone bruise on T2
• May have meniscal tear (Lateral > medial)
Initial Treatment

• Referral to Orthopaedics/Sports Medicine
• Consider bracing, crutches
• Begin early Physical Therapy
• Analgesia usually NSAIDs
ACL Tear Treatment

Conservative
• No reconstruction
• Physical therapy
  • Hamstring strengthening
  • Proprioceptive training
• ACL bracing controversial
• Patient should be asymptomatic with ADL’s

Surgery
• Reconstruction
• Depends on activity demands
  • Reconstruction allows better return to sports
  • Reduce chance of symptomatic meniscal tear
  • Less giving way symptoms
• Recovery ~ 6 months

Meniscus Tear

Mechanism
• Occurs after twisting injury or deep squat
• Patient may not recall specific injury

Symptoms
• Catching
• Medial or lateral knee pain
• Usually posterior aspects of joint line
• Swelling
# Special Tests: Meniscus


<table>
<thead>
<tr>
<th>Test</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint line tender</td>
<td>85.5%</td>
<td>29.4%</td>
</tr>
<tr>
<td>Hyperflexion</td>
<td>50%</td>
<td>68.2%</td>
</tr>
<tr>
<td>Extension block</td>
<td>84.7%</td>
<td>43.75%</td>
</tr>
<tr>
<td>McMurray Classic (Med Thud)</td>
<td>28.75%</td>
<td>95.3%</td>
</tr>
<tr>
<td>McMurray Classic (Lat pain)</td>
<td>50%</td>
<td>29%</td>
</tr>
<tr>
<td>Appley (Comp/Dist)</td>
<td>16% / 5%</td>
<td></td>
</tr>
</tbody>
</table>
Modified McMurray Testing

- Flex hip to 90 degrees
- Flex knee
- Internally or externally rotate lower leg with rotation of knee
- Fully flex the knee with rotations

Courtesy of Keegan Duchicella MD
X-ray

• May show joint space narrowing and early osteoarthritis changes

• Rule out loose bodies
MRI

- MRI for specific exam
- Look for fluid (linear bright signal on T2) into the meniscus
Arthroscopy Benefit?

• An RCT showed that physical therapy vs arthroscopic partial meniscectomy had similar outcomes at 6 months
• 30% of the patients who were assigned to physical therapy alone, underwent surgery within 6 months.
Meniscal Tear Treatment

Conservative
• Often if degenerative tear in older patient
• Similar treatment to mild knee osteoarthritis
• Analgesia
• Physical therapy
  • General Leg Strengthening

Surgery
• Operate if internal derangement symptoms
• Meniscal repair if possible
Medial Collateral Ligament (MCL) Injury

Mechanism
• Valgus stress to partially flexed knee
• Blow to lateral leg

Symptoms
• Pain medially
• May feel unstable with valgus
Medial Collateral Ligament (MCL) Injury

Physical Exam
• Tender medially over MCL (often proximally)
• May lack ROM “pseudolocking”
• Valgus stress test
MRI

• X-ray non-diagnostic (rarely avulsion)
• MRI not usually necessary
• Rule out meniscal tear
MCL Treatment

Conservative
• Analgesia
• Protected motion
  +/- hinged brace
  +/- crutches
• Early physical therapy

Surgery
• Rarely needs surgery
Posterior Cruciate Ligament (PCL) Injury

Mechanism
- Fall directly on knee with foot plantarflexed
- “Dashboard injury”

Symptoms
- Pain with activities
- “Disability” > “Instability”
Posterior Cruciate Ligament (PCL) Injury

Physical Exam
• Sag sign
  Sens 79%, Spec 100%
• Posterior drawer test
  Sens 90%, Spec 99%


X-ray- often non-diagnostic

MRI is test of choice
PCL Treatment

Conservative
• Acute: hinged post-op brace in extension (0-10° flexion)
• Crutches
• Early physical therapy

Surgery
• May require surgery if complete Grade 3 tear and symptomatic
• Needs urgent surgery if lateral side is unstable → postero-lateral corner injury

Early and urgent referral!!
Patellofemoral Pain

Mechanism
• Excessive compressive forces over articulating surfaces of PFP joint
• Too loose/hypermobile
• Too tight – XS pressure

Symptoms
• Anterior knee pain
• Worse with bending (5x body wt), stairs (3x body wt)
• Crepitus under kneecap
• May sublux if loose
PFP Syndrome

- Tender over facets of patella
- Apprehension sign suggests possible instability
- X-rays may show lateral deviation or tilt
Treatment Options

Too Loose/Weak
• Strengthen quads (Vastus Medialis Obliquus)
• Correct alignment (+/-orthotics)
• Support (McConnell Taping, Bracing)

Too Tight
• Stretch hamstring, quadriceps, hip flexor
• Strengthen quads, hip abductors
• Correct alignment (+/-orthotics)

Surgical (RARE)
• Last resort
• Lateral release
• Patellar realignment
What’s Hip?
Shoulder Impingement Syndrome

Mechanism
• Impingement under acromion with flexion and internal rotation of the shoulder
• Rotator cuff, subacromial bursa and biceps tendon

Symptoms
• Pain with
  – Overhead activities
  – Sleep (Internal rotation)
  – Putting on a jacket
Shoulder Pain Differential Diagnosis

- Rotator cuff tendinopathy
- Rotator cuff tears
- SLAP Lesion
- Calcific tendinopathy
- “Frozen” shoulder (adhesive capsulitis)
- Acromioclavicular joint problems
- Scapular weakness
- Cervical radiculopathy
Shoulder Impingement Syndrome

LOOK

• May have posterior shoulder atrophy if chronic or RC tear
• Poor posture

FEEL

• Tender over anterolateral shoulder structures

MOVE

• May lack full active ROM
Shoulder Impingement Syndrome

LOOK

• May have posterior shoulder atrophy if chronic or RC tear
• Poor posture

FEEL

• Tender over anterolateral shoulder structures

MOVE

• May lack full active ROM
Rotator Cuff strength testing

Supraspinatus
• Empty can
• Thumbs down abducted to 90°
• Horizontally adduct to 30°

For tendonitis
Sens = 77 %
Spec = 38 %
For tears,
Sens = 19 %
Spec = 100 %

Rotator Cuff strength testing

Infraspinatus/teres minor - External rotation
- Keep elbows at 90°
- Patte’s test at 90° shoulder abduction

For tendonitis,
Sens = 57 %
Spec = 71 %

For tears,
Sens = 36 %
Spec = 95 %

Rotator Cuff strength testing

Subscapularis – Internal rotation / Lift-off test

For lesions,
Sens = 50 %
Spec = 84 %
For tears,
Sens = 50 %
Spec = 95 %

Impingement Signs

Neer

- Passive full flexion
- Positive is reproduction of shoulder pain

Sens = 83 %
Spec = 51 %
PPV = 40 %
NPV = 89 %

Impingement Signs

Hawkin’s test
- Flex shoulder to 90°
- Flex elbow to 90°
- Internally rotate
- Positive - reproduce shoulder pain

Sens = 88 %
Spec = 43 %
PPV = 38 %
NPV = 90 %

Impingement Signs

- Spurling’s test for cervical radiculopathy

Sens = 64%
Spec = 95%
PPV = 58%
NPV = 96%
X-ray AP Scapula

- Avulsion
- Calcific tendinosis
- Enthesopathy (traction spurs)
- Alignment
X-ray Lateral Scapula

Normal

Large acromial spur
Ultrasound

- Dynamic test
- Operator dependent
- Areas of tendinosis hypoechoic
- Tears
MRI

- MRI not needed for conservative treatment
- Use it to rule out significant pathology

How good for full thickness tears?
- 69 to 100 percent sensitive
- 88 to 100 percent specific
SIS Treatment

Conservative
• Education
• Modify Activities
• Alter Biomechanics / Decrease tendon load
• Ice/NSAIDs (no evidence)
• Eccentric exercise programs
• Steroid injection
  – slightly better than placebo (Cochrane Database, 2004)

Surgery
• If patient fails conservative treatment for > 6-12 months
• If rotator cuff tear > 1 cm
  • Subacromial decompression
  +/- bursectomy
  +/- rotator cuff repair
Adhesive Capsulitis
“Frozen Shoulder”

- Women greater than men (70%)
- Age > 40 years
- Affects 2-5% of population
- 20-30% develop symptoms in opposite shoulder
Frozen Shoulder

- Gradual loss of range of motion
- May have had initial trauma
- Pain at the extremes of motion
- May have history of diabetes, hypothyroidism, rheumatoid arthritis
Diagnosis

• Limited range of motion (usually lose external rotation, abduction and flexion)

• Investigations (X-ray, Ultrasound) usually negative
Natural History

- 0-3 months “gradual onset” - painful
- 2-9 months “freezing”
- 4-12 months “frozen”
- 5-26 months “thawing”

- Usually self-limited

Treatment

- Pain management (+/- sling)
- Education and reassurance
- Active home stretching program

- Physiotherapy
- Oral NSAIDs (or steroids)
- Glenohumeral injection capsular distension
- Rarely needs surgery (examination under anesthesia or Arthroscopic release)
Shoulder Dislocation

Mechanism
Anterior (>95%)
• Force applied with shoulder in external rotation/abduction
Shoulder Dislocation

Mechanism
Anterior (>95%)
• Force applied with shoulder in external rotation/ abduction

Posterior (<5%)
• Posterior force with shoulder in internal rotation/ adduction
  • EtOH (alcohol), Electrocution, Epilepsy
Diagnosis

Physical Exam
- Tender anterior shoulder
- May have decreased sensation to army patch (axillary nerve)
- Apprehension test
- Sulcus sign (MDI)
X-ray and MRI

Hill Sachs Lesion – compression fracture of posterior humerus

Bankart Lesion – Avulsion of capsular attachment to the glenoid
Complications after Dislocation

Acute rotator cuff tear
• 40 to 60% incidence of in patients > 40 years old

Frozen shoulder
• Older the patient the stiffer they get
  →mobilize early within 2-3 weeks

Recurrent dislocation
• >90% recurrence < 20 years; 14% > 40 yrs
• Early surgical stabilization still controversial
Initial Treatment

• Sling x 2-4 weeks with pendulum exercises
• Early physical therapy
• Modification of activities
Treatment for Shoulder Instability

- **T** – Traumatic
- **U** – Unilateral
- **B** – Bankart lesion
- **S** – Surgical treatment (refer for consultation)

- **A** – Atraumatic
- **M** – Multidirectional
- **B** – Bilateral
- **R** – Rehabilitation
- **I** – Inferior capsular shift
Acromioclavicular Joint  
“Separation”

**Mechanism**
- Direct fall on the shoulder
- Common biking, contact sports (hockey, football etc.)
- May tear #1 acromioclavicular ligament; #2 coracoclavicular ligament

**Symptoms**
- Pain directly over AC joint
- Difficulty lifting weights
- Difficulty reaching overhead and across body
Diagnosis

Physical Exam

• Swelling, tenderness +/- step deformity over AC joint
• Early limited motion actively due to pain
• Cross over sign +
Investigations

- AC joint views
- Weighted views rarely ordered
## Classifying AC Separations

<table>
<thead>
<tr>
<th>Type</th>
<th>Ligaments affected</th>
<th>Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Acromioclavicular (AC) lig strain;</td>
<td>Tender over AC joint, no step</td>
</tr>
<tr>
<td></td>
<td>Coracoclavicular (CC) lig OK</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>AC lig torn</td>
<td>Mild step &lt; width of clavicle</td>
</tr>
<tr>
<td></td>
<td>CC lig partially torn</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>AC and CC ligs torn</td>
<td>Obvious step =&gt; width of clavicle</td>
</tr>
</tbody>
</table>
Treatment

Conservative

- Sling as good as figure eight
- Physiotherapy – taping, restore ROM, maintain strength
- Modify activities
Refer to Surgery

- Type 4 – Posterior dislocation
- Type 5 – High riding distal clavicle (tenting the skin)
- Type 6 – Posterior-inferior dislocation
Lateral and Medial Epicondylitis

**Mechanism**
- Repetitive overuse causing microtrauma at the tendon insertion
  - **Lateral** epicondylitis → wrist extensors
  - **Medial** epicondylitis → wrist flexors and pronator teres

**Symptoms**
- Pain shaking hands, lifting objects
  - **Lateral**
    - Tennis, using “computer mouse”
  - **Medial**
    - Golf, turning hand over
Clinical Diagnosis

Physical Exam
• Tender almost directly over the epicondyle
• Lateral – pain reproduced with resisted wrist extension and third digit extension
• Medial – pain reproduced with resisted wrist flexion and wrist pronation
• Check ulnar nerve (posteromedial elbow)

Investigations usually unnecessary
Epicondylitis Treatment

Conservative
Step 1
• Education
• Activity modification!
• Stretching and strengthening exercises
• Counterforce brace (no evidence)

Step 2
• Physiotherapy in persistent cases
• Steroid injection

Aggressive (Step 3)
• Extracorporeal Shockwave therapy (no clear evidence)
• Surgical debridement
# Causes of Back Pain


<table>
<thead>
<tr>
<th>Lesion</th>
<th>Youth</th>
<th>Adult</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discogenic</td>
<td>11</td>
<td>48</td>
<td>0.05</td>
</tr>
<tr>
<td>Spondylolytic lesion</td>
<td>47</td>
<td>5</td>
<td>0.05</td>
</tr>
<tr>
<td>Lumbosacral strain</td>
<td>6</td>
<td>27</td>
<td>0.05</td>
</tr>
<tr>
<td>Hyperlordotic mechanical back pain</td>
<td>26</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>0</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
Disk Herniation

Mechanism
• L5-S1 most common 90%
• Compression of neural structures such as sciatic nerve causes radicular pain
• Compression of cauda equina = EMERGENCY

Symptoms
• Acute herniation usually 30-50 years
• Pain worse with flexion
• May have “Sciatica”
  – Pain with sitting too long (i.e. driving)
• Rule out bowel or bladder symptoms
Treatment

• Education
• Activity modifications
• Physical Therapy
• Medications
  – NSAIDs should be recommended (Strength: Strong)
  – Opioids may be considered but should be avoided if possible (Strength: Weak)
  – Antidepressants should not be routinely used (Strength: Strong)

White et al. Spine, 2011
Treatment Mean differences Reported

• Medications
  
  – Corticosteroids pooled results of two trials (overall and leg pain -12.2, 95% C.I. -20.9 to -3.4)
  – Single trial of gabapentin (pain -26.6, -38.3 to -14.9) but only short term benefits

    Pinto et al. BMJ, 2012

  – Epidural corticosteroid injections vs placebo for leg pain (mean difference, -6.2 [95% CI, -9.4 to -3.0]) and also for disability (-3.1 [CI, -5.0 to -1.2]) in the short term

Surgery better than Non-operative (SPORT) – Disk (SE: A)

• In patients with a herniated disk confirmed by imaging and leg symptoms persisting for at least six weeks, surgery was superior to non-operative treatment in relieving symptoms (15.0 (95% C.I.’s, 11.8 - 18.1)) and improving function (14.9 (95% C.I.’s, 12.0 - 17.8))

• 4-year rate of reoperation was 10%

Spinal Stenosis

Mechanism
• Osteoarthritis causes narrowing of spinal canal
• Large disk herniation can also cause stenosis
• Can compress neural structures
• Can cause compression of spinal artery

Symptoms
• Usually older patients
• Pain worse with extension
• “Neurogenic claudication”
  – Reproducible leg symptoms worse with walking
  – Relieved by sitting
• Rule out bowel or bladder symptoms
Physical Exam

- Assess if pain reproduced by flexion vs extension
- Perform neurological exam

Criteria for Acute Disk herniation
1. Leg symptoms dominant (Leg > back)
2. Pain in dermatomal distribution
3. Positive straight leg raise
4. Neurologic signs
Diagnosis

X-ray
- Assess alignment (scoliosis, lordosis)
- Disk space narrowing
- Osteoarthritis
- Spondylolisthesis (translation of vertebral bodies)

CT Scan
- Can assess disk and bony structures

MRI
- Can assess soft tissue structures, bone and nerves
Conservative Treatment

• Modified activities
• NSAID and other analgesics
• Physical therapy – core stabilization exercises, McKenzie exercises
• Others: Traction, braces

• Consider spinal injections
Surgical Treatment

• Cauda equina needs emergency decompression

Surgical Indications
• Sufficient morbidity
• Failure of conservative treatment
• Anatomic lesion that can be corrected
• Complications usually neurologic
Concussion Update
Concussion Definition

- Type of mild traumatic, transient brain injury
- Blow to head, neck, body → force to head.
- Neurologic impairment within 48 hours of trauma.
- Symptoms usually resolve in 1-2 weeks spontaneously but in some cases can be prolonged.
- May or may not include loss of consciousness.

Concussion Symptoms

Physical
Sleep
Cognitive
Emotional

Symptoms & Signs

1. Symptoms - somatic (e.g. headache), cognitive (e.g. feeling like in a fog) and/or emotional symptoms (e.g. lability)
2. Physical signs (e.g. loss of consciousness, amnesia)
3. Behavioural changes (e.g. irritability)
4. Cognitive impairment (e.g. slowed reaction times)
5. Sleep disturbance (e.g. drowsiness)
Physical Examination

- Use the SCAT3 card (free on the web)
- Clear C-spine
- Rule out soft tissue and bony injury to head
- Balance Error Scoring System
- Mental status testing
  - Orientation
  - Concentration (numbers backwards)
  - Short and long term memory
Concussion evaluation:
physical exam

- Normal neck exam
- Normal neurologic exam
Concussion Treatment

• Cognitive rest
• Physical rest
• Medication
  – Tylenol
  – Ibuprofen after first 72 hours
• No driving
• No Etoh
Diagnostic Imaging

Neuroimaging (CT, MRI)

• Most patients do not require imaging

• Use when suspicion of intracerebral structural lesion exists:
  – prolonged loss of consciousness
  – focal neurologic deficit
  – worsening symptoms
  – Deterioration in conscious state
Symptom resolution after sport concussion

- 50% recovered and returned to play in 1 week; 90% in 3 weeks (Collins et al. Neurosurgery, 2006.)
- High schoolers take longer to recover based on neuropsychological testing compared to college athletes (Field et al, J Pediatr, 2003.)
Return to Learn Progression

No school. OK to do light reading, little bit TV, drawing, cooking as long as doesn't worsen symptoms.

15 min cognitive activity at a time.

30 min schoolwork at a time until can do 1-2 hours.

Return to ½ day of school.

Return to full day of school.

http://www.chop.edu/service/concussion-care-for-kids/returning-to-school.html
Return to Play Progression

- Asymptomatic
- Light aerobic activity
- Sport specific activity
- Non-contact training
- Full contact practice
- Game play

Tuesday

Wednesday

Thursday

Friday

Saturday

Management

• All student athletes need to have an MD or qualified health professional to clear to play
• School-aged athletes will be out at least 1 week most likely 2 (check your area for legal requirements)
Can the Athlete Play Safely?

- Make a working diagnosis
- Is there potential for worsening injury? A new secondary injury?
- MD or trainer decides: CAN THE ATHLETE PLAY SAFELY?
- Coach and MD decide: Can the athlete play effectively?
- Player, coach and MD decide: Can the athlete play pain free?