



# Concussions

A general approach to management as recommended by the CDC, the American Academy of Neurology and others

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# What is a concussion?

- ▶ A “mild” type of brain injury
  - ▶ Acceleration/deceleration injuries
  - ▶ Direct blow to head
- ▶ Numerous definitions:
  - ▶ Clinical symptoms
  - ▶ Mechanism of injury
  - ▶ Changes in brain function
  - ▶ Damage to brain cells

# How do I recognize a concussion?

- ▶ Most common **symptoms** reported by athlete:
  - ▶ Headache
  - ▶ Dizziness
  - ▶ Balance difficulty
  - ▶ Confusion
  - ▶ Cognitive “slowing down”
- ▶ Other reported symptoms:
  - ▶ Nausea/vomiting
  - ▶ Blurry or double vision
  - ▶ Issues with concentration
  - ▶ Sensitive to light and noise

# Additional symptoms

- ▶ Observed symptoms:
  - ▶ Dazed appearance
  - ▶ Memory change (often regarding injury occurrence)
  - ▶ Mood or behavior change
  - ▶ Brief loss of consciousness (rare)
  - ▶ Clumsy
- ▶ SYMPTOMS CAN ARISE ANYWHERE FROM RIGHT AFTER THE INJURY TO HOURS OR DAYS LATER

# How do I know an injury isn't more severe?

- ▶ Symptoms that require immediate medical attention:
  - ▶ Inability to be woken up
  - ▶ Unequal pupils
  - ▶ Weakness or numbness
  - ▶ Seizures
  - ▶ Increasing confusion
- ▶ Rarely, a head injury can lead to bleeding around the brain which can cause a dangerous increase in pressure

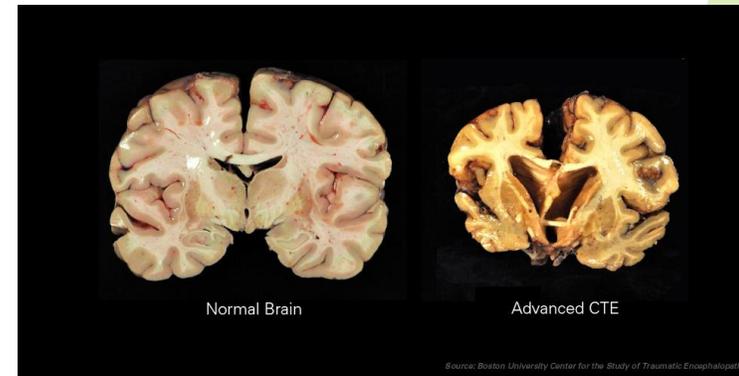
# Why is this important?

- ▶ 1.6-3.8 million concussions occur annually
- ▶ Healthcare costs for the 3 months post mild traumatic brain injuries were \$695 million
- ▶ 53% of high school athletes have experienced a concussion before beginning high school sports
- ▶ The human brain continues to develop into the mid-20s
- ▶ Baseball isn't considered a high risk sport, however...
  - ▶ Common mechanisms of concussion = hit by pitch and while fielding a ball
  - ▶ Properly fitting headgear can reduce risk of concussion
- ▶ Lots of kids play more than 1 sport!



# Not convinced this is relevant yet?

- ▶ Concussion symptoms last longer in younger athletes
  - ▶ Need more conservative management
  - ▶ Continued cognitive impairment ->
    - ▶ Increased risk of additional concussion
    - ▶ Difficulties in school
  - ▶ Athletes younger than high school age aren't well studied
- ▶ A history of concussions increases likelihood of additional concussions
  - ▶ Each successive concussion increases risk for another
  - ▶ Length of recovery also increases
- ▶ Negative long term consequences
  - ▶ Post concussion syndrome
  - ▶ Chronic cognitive impairment
  - ▶ Chronic traumatic encephalopathy



# Management for Coaches

- ▶ CDC “Heads Up” recommends a 4 step action plan:
  - ▶ Remove athlete from play
    - ▶ If there is ANY concern of concussion
  - ▶ Seek medical attention (PCP)
    - ▶ If there is concern of concussion, athlete should be cleared by medical professional before returning to play
    - ▶ Record any symptoms that occur at time of injury
  - ▶ Communicate information about concussions to athlete’s parents
  - ▶ Follow medical provider’s instructions regarding athlete’s return to play
- ▶ **REST** is key for recovery

# General Guidelines for Return to Play

- ▶ Follow instructions from a healthcare provider!
- ▶ Before returning to play:
  - ▶ Athlete should be symptom free without use of medication
  - ▶ Athlete should be in school
- ▶ Gradual return to play:
  - ▶ After athlete is in school & symptom free
  - ▶ Light aerobic activity (10-15 mins)
  - ▶ Gradually increase intensity
  - ▶ Heavy intensity non-contact activity
  - ▶ Full practice
  - ▶ Participation in games
    - ▶ Athlete needs to remain symptom free to progress to the next step

# More about school...

- ▶ Adjustments need to be individualized for each athlete
- ▶ Depends on symptoms and severity
  - ▶ Eg. Issues with light/noise, difficulty concentrating
  - ▶ May need “rest breaks” throughout the day
  - ▶ May need additional time for homework/testing
- ▶ Good communication between athlete, parents, school and medical providers is important!



# Other tidbits worth knowing...

- ▶ Concussions occur more frequently during games compared to practice
- ▶ Imaging (CT/MRI) isn't very useful for diagnosis
- ▶ Diagnosis:
  - ▶ Baseline neurophysiological testing
  - ▶ Screening tools/checklists
    - ▶ (many not studied in athletes younger than high school age)
- ▶ Reported rates of recurrent concussions have decreased
  - ▶ Highest risk of additional concussion within 10 days of original one
  - ▶ Due to increased awareness of concussions
  - ▶ Athletes minimizing/not reporting symptoms still an issue

# Resources for additional information

- ▶ CDC “Heads UP” (<https://www.cdc.gov/headsup/>)
  - ▶ Information for coaches, parents, healthcare providers, athletes, schools
  - ▶ Numerous helpful printable sheets
- ▶ Sports Concussion Institute (<http://www.concussiontreatment.com/concussionfacts.html>)
  - ▶ “Concussion Facts” for athletes, parents, coaches, teachers
- ▶ American Academy of Neurology
  - ▶ <https://www.aan.com/concussion>

# Work Cited

- ▶ American Academy of Neurology. 2013.
  - ▶ Summary of Evidence-based Guideline for Clinicians
  - ▶ Summary of Evidence-based Guideline for Sports Coaches and Athletic Trainers
- ▶ Centers for Disease Control and Prevention. HEADS UP. 2017
- ▶ Concussion Legacy Foundation. Learning Center
- ▶ Graves JM, Rivara FP, Vavilala MS. Healthcare Costs 1 Year After Pediatric Traumatic Brain Injury. American Journal of Public Health. 2015
- ▶ Guskiewicz KM, McCrea M, Marshall SW et al. Cumulative Effects Associated With Recurrent Concussion in Collegiate Football Players. JAMA. 2003.
- ▶ Sports Concussion Institute. Concussion Facts. 2012

# Additional Info: Screening tools

- ▶ Post-Concussion Symptom Scale/Graded Symptom Checklist (GSC)
  - ▶ List of symptoms and whether athlete experiences any (scale from 0-6)
  - ▶ Establish a baseline
  - ▶ Recheck after head injury
  - ▶ To be used with SAC or BESS
- ▶ Standardized Assessment of Concussion (SAC)
  - ▶ Evaluates athletes in 6 domains
    - ▶ Orientation, immediate and delayed memory, concentration, neurologic function, exertional maneuvers
  - ▶ Establish a baseline
  - ▶ Re-evaluate after head injury
- ▶ Balance Error Scoring System (BESS)
  - ▶ Evaluate balance in 3 positions on hard ground and a foam pad
  - ▶ Establish a baseline
  - ▶ Recheck after head injury
- ▶ Thorough neuropsychological examination may follow

# Return to play Protocol



<p><b>1. NO ACTIVITY</b> (RECOVERY)</p> <p><i>Complete Physical and Cognitive Rest until Medical Clearance</i></p>	<p><b>2. LIGHT AEROBIC EXERCISE</b> (INCREASE HEART RATE)</p> <p><i>Walking, Swimming, Stationary Cycling,</i></p> <p><b>Heart Rate &lt;70% - 15 min</b></p>	<p><b>3. SPORT SPECIFIC EXERCISE</b> (ADD MOVEMENT)</p> <p><i>Skating Drills (Ice Hockey), Running Drills (Soccer, etc)</i></p> <p><i>NO Head Impact Activities</i></p> <p><b>Heart Rate &lt;80% - 45 min</b></p>	<p><b>4. NON-CONTACT TRAINING DRILLS</b> (INCREASED EXERCISE, COORDINATION &amp; ATTENTION)</p> <p><i>Progress to Complex Training Drills (e.g., Passing Drills, etc)</i></p> <p><i>May Start Resistance Training</i></p> <p><b>Heart Rate &lt;90% - 60 min</b></p>	<p><b>5. FULL CONTACT PRACTICE</b> (RESTORE CONFIDENCE &amp; ASSESS FUNCTIONAL SKILLS)</p> <p><i>If Symptom Free, Return to Normal Training Activities</i></p>
<p><i>Symptom Free for 24 Hours?</i></p> <p><b>Yes:</b> Begin Step 2</p> <p><b>No:</b> Continue Resting</p>	<p><i>Symptom Free for Next 24 hours?</i></p> <p><b>Yes:</b> Move to Step 3</p> <p><b>No:</b> Rest Further until Symptom Free</p>	<p><i>Symptom Free for Next 24 Hours?</i></p> <p><b>Yes:</b> Move to Step 4</p> <p><b>No:</b> Return to Step 2 until Symptom Free</p>	<p><i>Symptom Free for Next 24 Hours?</i></p> <p><b>Yes:</b> Move to Step 5</p> <p><b>No:</b> Return to Step 3 until Symptom Free</p>	<p><i>Symptom Free Next 24 Hours?</i></p> <p><b>Yes:</b> Return to Play</p> <p><b>No:</b> Return to Step 4 until Symptom Free</p>
<p>Date Attained:</p>	<p>Date Attained:</p>	<p>Date Attained:</p>	<p>Date Attained:</p>	<p>Date Attained:</p>