

Concussion Management and Update

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Objectives

- Review definition, signs and symptoms
- Discuss the initial evaluation of a patient with concussion
- Understand current recommendations regarding school and physical activity following concussion
- Understand current laws regarding concussions



Recent Developments on Concussions

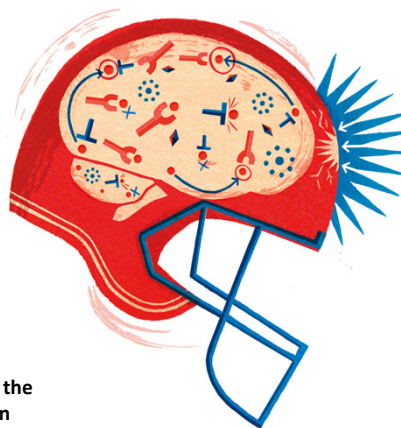
- **Healthy Kids and Safe Sports Concussion Summit held at Whitehouse May 2014**
 - Development of novel ways for parents, trainers, coaches, and physicians to not only prevent, but spot concussions earlier and react with more effective treatments
 - Department of Defense and NCAA
 - Study concussions in youth
 - NFL to donate **25 million dollars** for research over next 3 years

Recent Developments on Concussions



Definition

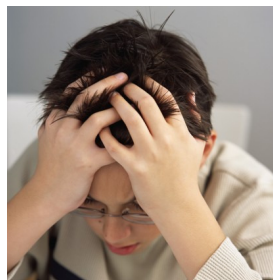
- Concussion is a brain injury and is defined as a complex pathophysiological process affecting the brain, induced by biomechanical forces



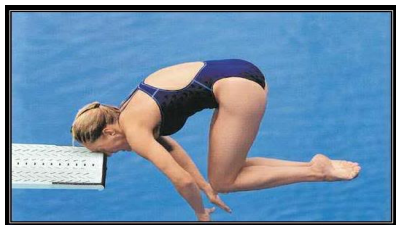
Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012

When parents and patients ask me??

- A concussion is a brain injury that disrupts normal brain function



Definition



- Causes
 - Direct blow to the head, face or neck
 - Elsewhere on the body with an “impulsive” force transmitted to the head

Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012

Definition

- Results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously
- Some cases, symptoms and signs may evolve over a number of minutes to hours.

Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012

Definition

- May result in neuropathological changes
- The acute clinical symptoms largely reflect a functional disturbance rather than a structural injury
- No abnormality is seen on standard structural neuroimaging studies.

Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012



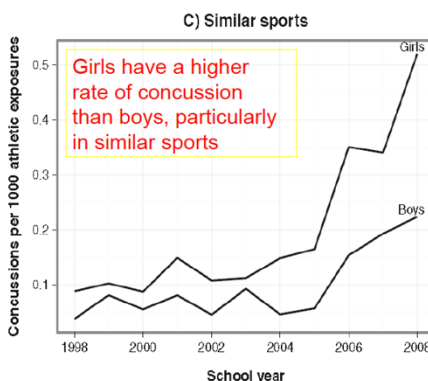
Questions on Definition of Concussion?

- Do we need to have loss of consciousness(LOC)?
 - Most patients do not suffer LOC
- Amnesia?
 - Most patients do not have amnesia
- Imaging studies?
 - Conventional studies normal



Who gets concussions?

- Concussion risk is greatest in certain sports:
 - Males (football, rugby, hockey and soccer)
 - In females (for soccer and basketball)
 - After prior concussions/mTBI



Concussion Modifiers

- Symptoms > 10 days
- Signs
 - LOC > 1 min
 - Amnesia
- Sequelae
 - Convulsions
- Temporal
 - Multiple concussions
 - Cloe together
 - Recent
- Threshold
 - Less impact



Concussion Modifiers



- Age
 - Less than 18
- Comorbidities
 - Migraines
 - Mental health disorders
 - ADHD
 - Learning disabilities
 - Sleep disorders
- Associated Medications
- Dangerous play
- High Risk sport and position

Recognition of Concussions?



Concussion Symptoms

⚙️ THINKING/ REMEMBERING	🦷 PHYSICAL	⚡ EMOTIONAL/ MOOD	👁️ SLEEP DISTURBANCE
<ul style="list-style-type: none"> • Difficulty thinking clearly • Feeling slowed down • Difficulty concentrating • Difficulty remembering new information 	<ul style="list-style-type: none"> • Headache • Nausea or vomiting (early on) • Balance problems • Dizziness • Fuzzy or blurry vision • Feeling tired, having no energy • Sensitivity to noise or light 	<ul style="list-style-type: none"> • Irritability • Sadness • More emotional • Nervousness or anxiety 	<ul style="list-style-type: none"> • Sleeping more than usual • Sleeping less than usual • Trouble falling asleep

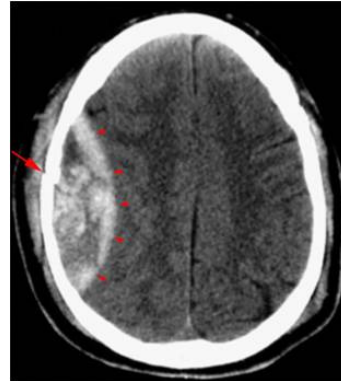
Concussion Signs



- Poor coordination
- unsteady gait
- Slow to answer questions or follow commands
- Poor concentration
- Behavior or personality changes
- Inappropriate play
- Diminished ability

Patient Red Flags

- Repeated emesis
- Severe headache or worsening symptoms
- Very drowsy or lethargic
- Prolonged LOC > 1 min
- Focal neurologic deficit
- Seizures
- Slurred speech
- Weakness
- Abnormal behavior, combative, or irritable



Initial Management

- ABC's
- History and Physical
- Remember Neck!!
 - Distracting injury
- Complete Neurologic Evaluation
- Sideline Assessment Tools
 - SCAT 3 or Childhood SCAT

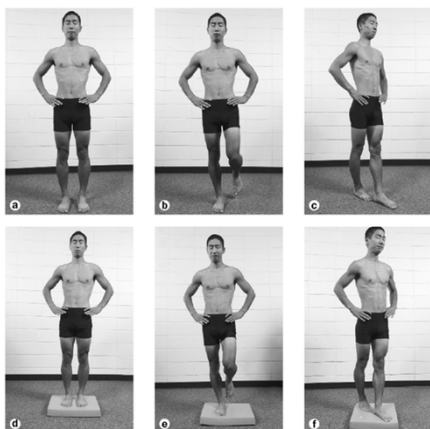


SCAT 3

- Symptomatology Score
- Cognitive Assessment
 - Orientation
 - Immediate Memory
 - Concentration
 - Delayed Recall
- Neck Examination
- BESS Score
- Coordination Score



BESS Score



- 3 stances
 - Double leg
 - Single leg (non dominant)
 - Tandem stance
- 20 seconds
- Eyes closed
- Foam and hard surfaces

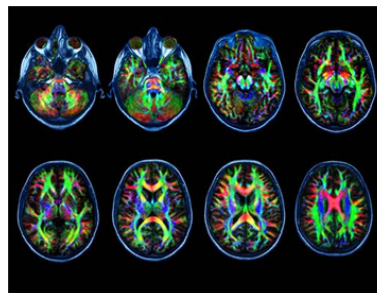
Childhood SCAT

- **Less Data**
- 5-12 yrs
- Changes in Symptom Score questionnaire
- Parent questionnaire
- Modified BESS
 - No single leg
- Modified Maddock



Neuroimaging

- Usually normal not necessary for diagnosis
- CT scan most common
 - Emergency Situations
 - Exclude severe injuries
- MRI
 - Cerebral contusion
 - White matter injury
- Functional MR and PET scan
 - Research promising
 - Not easily available



Neuropsychological Exams



ImPACT testing

- 30 minute test
 - Attention span
 - Working Memory
 - Sustained and selective attention time
 - Response variability
 - Non Verbal problem solving
 - Reaction time

ImPACT

- Additional tool
- Baseline testing
- Not clinically necessary but very helpful
- Widely used and growing data
- **Does not substitute full neuropsychological testing**

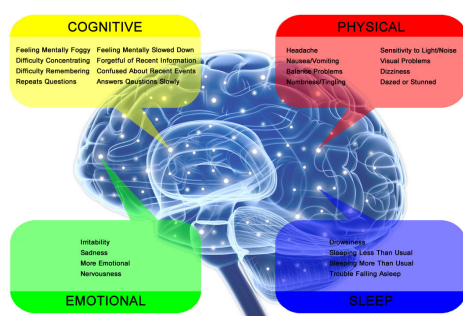


Caution with ImPACT

- Baseline testing
 - Performed in mass
 - Unsure of reliability
- If patient symptomatic
 - Scores not reliable
- Should be performed once patient asymptomatic



Neuropsychology



- Referral
 - Complex concussion
 - Learning disabilities
 - Repeated concussions
 - Psychiatric disorders
 - ADHD
 - Children?
 - Data still limited

Return to Play

- No athlete with signs or symptoms of concussion either at rest or with exertion should be allowed RTP.
- **Individualized**
 - Graduated
- Prolonged
 - Younger patients
 - Risk Factor/modifiers
- Guidance
- Education
- Reassurance



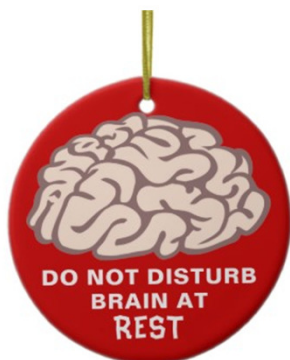
Return to Play Factors

- Second Impact Syndrome
 - High mortality/morbidity
 - Reported in youth
 - State Laws
- Risk of other concussions
- Neurocognitive impairment

Graduated Return to Play Protocols

Rehabilitation stage	Functional exercise at each stage of rehabilitation	Objective of each stage
1. No activity	Complete physical and cognitive rest	Recovery
2. Light aerobic exercise	Walking, swimming or stationary cycling keeping intensity <70% maximum predicted heart rate No resistance training	Increase heart rate
3. Sport-specific exercise	Skating drills in ice hockey, running drills in soccer. No head impact activities	Add movement
4. Non-contact training drills	Progression to more complex training drills, eg passing drills in football and ice hockey May start progressive resistance training)	Exercise, coordination, and cognitive load
5. Full contact practice	Following medical clearance participate in normal training activities	Restore confidence and assess functional skills by coaching staff
6. Return to play	Normal game play	

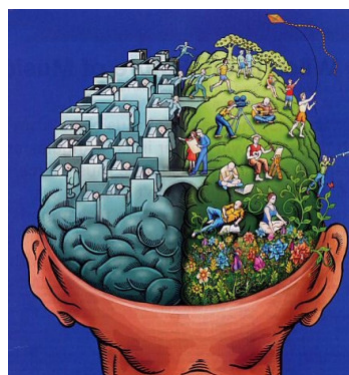
Treatment/Management of Concussions



- Brain rest(cognitive)
 - 48-72 hrs
- Physical rest
- Sleep
- Hydration
- Nutrition
- Must be Individualized
 - Younger patients
- Academic accommodation

Brain Rest

- No television
- No extensive reading
- Video games
- Texting
- Electronic Gadgets
 - I pads, I pod
- No caffeine or stimulants



School Accommodations

- Individualized
- Neurocognitive testing helpful
- Stay at home
 - Usually first days
- If symptoms persistent
 - Exclude tests
 - Half days
 - Reduce work overload
 - Modify classes

Pharmacological

- Headaches
 - Acetaminophen
 - NSAID's
- Nausea
 - Zofran
- Prolonged symptoms
 - Sleep
 - Melatonin
 - Amitriptyline
 - Amantadine



Texas Law

- HB 2038
- Effective June 2011
- “Natasha’s Law”



Natasha’s Law

- Creation of a concussion oversight team by each school district
 - Must include a **physician**
 - ATC, NP, PA, neuropsychologist
 - Outline concussion management and return to play policies
- All **students and their parent/guardian** must review concussion information and sign form acknowledging this prior to participation each year

Natasha's Law

- Training course every 2 years for coaches and members of concussion oversight team
- Immediate removal from play for any athlete believed to have a concussion
 - Coach
 - Parent
 - Health professional



Natasha's Law

- Progressive return-to-play once completely asymptomatic following guidelines
- Signed clearance by physician for RTP
 - Requires MD/DO signature
 - Prevents other individuals from faster return



Prevention



- Education
- Violent behavior increases risk
 - Immediate elimination
 - Sanctions
- Modification of Sports
 - Spearing
- Fair Play

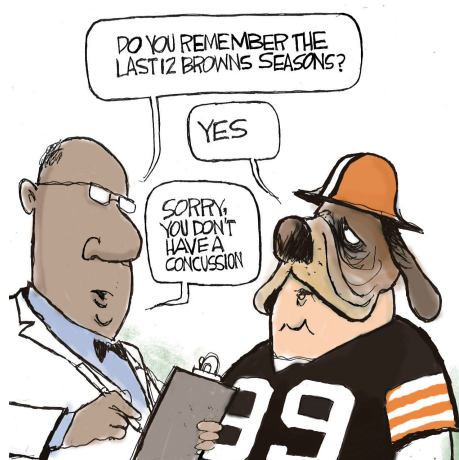
Concussions and Head Gear?

- **NO evidence** that these alter concussion risk
 - Soccer headgear
 - Position
 - Particular helmet
 - Mouth guards
- Decreased risk
 - Fractures
 - Intracranial injuries
 - Oral injuries



Summary

- Definition includes impairment in brain function
- All athletes at risk for concussion
- Concussion Modifiers
 - Young age
 - Previous disorders
- Testing helpful for complete clinical assessment
- Treatment is multidisciplinary
- RTP graduated after treatment
- Natasha's Law



NFL CONCUSSION TEST

References

- McCrory P, et al. Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012 *Br J Sports Med* 2013;47:250-258
- Halstead M, Walter K. Sport-Related Concussion in Children and Adolescents, *Pediatrics* Vol. 126, No. 3 September 2010, pp. 597-615
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- SCAT 3 SCAT3™ - British Journal of Sports Medicine