Concussion in the Classroom: Recognizing and Managing the Academic Consequences of Concussion

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Sports Concussion—A hot topic

- Growing awareness of problems due to unrecognized or mismanaged concussion
- Growing evidence of possible long-term problems due to concussion
- Increased media attention to concussion
- Growing attention to academic effects
- Congressional hearings on concussion, forcing the NFL to change its policies
- Over 30 states have passed sports concussion laws, including NY
Concussion—What are the risks?

- Athletes who return to play while still symptomatic from a concussion may be at increased risk of . . .
  - Another concussion
  - Death or severe disability
  - Aggravation of symptoms
  - Prolonged recovery, with associated medical, psychological, and academic difficulties
Concussion—What are the risks?

- Athletes who suffer multiple concussions may be at increased risk of . . .
  - Another concussion (increasing concussability)
  - More severe symptoms or prolonged recovery
  - Permanent problems
    - Headache
    - Dementia
    - Depression
Concussion in the Classroom

- Concussion can cause academic problems for days, weeks, or months
- Physical and mental over-exertion can aggravate symptoms and complicate recovery
- Academic stress and failure can increase risk of depression and anxiety, which in turn can hamper recovery
Concussion in the Classroom

- Return-to-Learn is just as important as Return-to-Play
- Academic supports and accommodations can aid recovery
- School staff may have little understanding of concussion-related academic problems and how to help
What is a concussion?

- Mild traumatic brain injury
- A disruption in normal brain function due to a blow or jolt to the head
- CT or MRI is almost always normal
- Invisible injury
Epidemiology of Concussion

- Falls, motor-vehicle accidents, and assaults are the most common causes
- 20% are sports-related (with a higher percentage among adolescents)
- Only 10% of sports concussions involve loss of consciousness
- Risk of TBI is 4-6 times greater after one, and 8 times greater after two
Epidemiology

- 1.6 to 3.8 million sports concussions each year in the United States
- Football, hockey, and soccer are the riskiest male team sports
- Soccer and lacrosse are the riskiest female team sports
- Concussion can occur in any sport
Mechanisms of Injury

- Complex physiological process
  - sudden chemical changes
  - traumatic axonal injury
Neurometabolic Cascade
(Giza and Hovda 2001)

- Abrupt neuronal depolarization
- Release of excitatory neurotransmitters
- Changes in glucose metabolism
- Altered cerebral blood flow
- The brain goes into an **ENERGY CRISIS** that usually last up to 7 – 10 days

*symptoms often get worse before they get better*
Traumatic Axonal Injury

- Brain is shaken and rotated inside the skull
- Stretching and tearing of axons
Common Physical Symptoms

- Headache
- Nausea and vomiting
- Fatigue and lack of energy
- Clumsiness and poor balance
- Dizziness and lightheadedness
- Sleep problems
Vision Problems

- Blurred or double vision
- Bothered by bright or fluorescent light
- Eyes tire more easily
- Trouble reading (e.g., words move on the page, skipping words or lines)

*Standard eye exam usually shows normal ocular health and acuity*
Common Emotional Symptoms

- Irritability
- Anxiety or depression
- Extreme moods
- Easily overwhelmed
- Personality change
- Lack of motivation
- Emotional outbursts
Common Cognitive Symptoms

- Feeling ‘dazed’ or ‘foggy’ or ‘fuzzy’
- Easily confused
- Slowed processing
- Easily distracted
- Memory problems
- Trouble reading
- *Poor mental stamina*
Exertion effects

- Symptoms are worsened by . . .
  - mental effort
  - environmental stimulation
  - emotional stress
  - physical activity
Concussion in the Classroom

- Striking a balance . . .
  - Medical need for rest and reduced exertion or stimulation
  - Academic need to maintain progress and avoid falling too far behind

*Parents, school staff and medical professionals need to work together!*
Recovery from Concussion

- Full recovery in 7-10 days. ... *in most cases*
- Symptoms can last weeks or months
- Symptoms can significantly disrupt academic functioning
- Risk of depression and anxiety

A ‘miserable minority’ experience persistent symptoms
Post-concussion syndrome

Risk factors for complicated recovery

- Re-injury before complete recovery
- Over-exertion, especially early after injury
- Significant stress
  - Unable to participate in sports or exercise
  - Medical uncertainty
  - Academic difficulties
- Prior condition
  - TBI or migraine
  - Anxiety
  - ADHD
Principles of Concussion Management

- Avoid re-injury until recovered
- Avoid over-exertion during recovery
- Early education and reassurance improves outcome
- Return to school gradually with accommodations as needed
- Return to play must follow a medically supervised process
Rehabilitation of Complicated Cases

- Little research to guide treatment
- Education and reassurance are often the most helpful
- Sub-symptom threshold exercise may promote recovery
- Medication can help sleep, headache, mood, nausea, and other symptoms
- Vision problems often respond well to treatment
Zurich 2008 Guidelines

- No grading of injury
- Treat every concussion seriously
- Recovery may take longer in children and adolescents

3rd International Conference on Concussion in Sport

FIFA IOC IIHF
Any athlete who show **ANY** symptoms or signs of a concussion:

- athlete should **not** return-to-play in the current game or practice
- Athlete should be monitored for deterioration for 24 hours
- return-to-play must follow a medically supervised stepwise process
- athlete must be symptom-free at rest **and** after exertion

*When in doubt – sit 'em out*
Zurich Return to Play Progression

1. No activity, complete rest
2. Light aerobic exercise but no resistance training
3. Sport specific exercise and progressive addition of resistance training
4. Non-contact training drills
5. Full contact training and scrimmage after medical clearance
6. Game play

Also should be symptom-free after mental exertion and have normal neuropsychological test results
The concept of ‘cognitive rest’ was introduced with special reference to a child’s need to limit exertion with activities of daily living and to limit scholastic activities while still symptomatic.
Concussion in the Classroom

- Tires easily in class and over the course of the day
- Bothered by noise, light, and commotion (hallways, cafeteria)
- Trouble doing more than one thing at a time (e.g., listening to the teacher and taking notes)
- Easily overloaded and ‘shuts down’
Concussion in the Classroom

- Takes longer and more effort to accomplish the same work
- Concentration aggravates symptoms, especially headache
- Clumsy in hallways or stairwells
- Frequent visits to the nurse’s office
- Late or incomplete homework
Invisible Injury

- Student looks normal and *sometimes* feels normal
- Standard medical and neurocognitive testing may not show significant impairment
- Expectation from self and others to ‘get over it’ and ‘get back in the game’
Secondary Problems

- Depression or anxiety can emerge (or increase) due to . . .
  - Medical distress and uncertainty
  - Inability to participate in sports or other usual activities
  - Academic stress
  - Social isolation
Guidelines for Return to School after Concussion

- Out of school at first if necessary, and then gradual re-entry as tolerated
- Avoid re-injury in sports, gym class and crowded hallways or stairwells
- Provide academic accommodations
- Communicate
- Educate
Academic Accommodations

- **Rest breaks** during school in a quiet location (not always the nurse’s office)
- **Reduced course and work load**
  - If needed, drop unnecessary classes
  - Focus on essential material
  - Decrease homework
- **Avoid over-stimulation,** (e.g., cafeteria or noisy hallways)
Academic Accommodations

- Extra time and a quiet location for tests
- Provide student with class notes or allow student to audiotape classes
- Allow student to wear sunglasses or a baseball cap to help with light sensitivity
- Preferential seating
P.E. Accommodations

- Avoid re-injury
- Avoid physical and mental over-exertion
- Avoid over-stimulation (noise and light)
- Minimize exertion at first, then increase activity gradually, as tolerated
- In complicated cases, some physical activity may promote recovery
- Don’t substitute mental activity for physical activity!

*Physical education must be adapted to the physical needs of the student*
Academic Accommodations

- Home tutoring, 504 plan, or IEP
- Wide variation in how schools respond to requests for accommodations
- Resistance may be due to . . .
  - Lack of knowledge
  - Concern that student is faking
  - Grades are not that bad
  - Poor communication within school or between school and student/parents
Neuropsychological Testing

- Objective assessment of cognitive and emotional variables
- Test results can assist in return-to-play decisions
- Test results can also assist in return-to-learn decisions
- May not detect subtle cognitive problems or poor stamina
Recommendations for schools

- Form a concussion team that can be a resource to families and staff
  - Athletic administrator and coach
  - School physician, nurse and ATC
  - Teacher and guidance counselor
- Implement an education program for sports, medical, and academic staff
- Develop and implement RTP and RTL policies
Resources

- upstate.edu/concussion
  - *Concussion in the Classroom* brochure & video
- *REAP* Program
  - www.rockymountainhospitalforchildren.com
- bianys.org
- CDC *Heads up in High School Sports* kits
- sportsconcussion.org
Thanks!

upstate.edu/concussion

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