Sport-Related Concussions in Youth Ice Hockey Players
Concussion Bombardment

- Concussions are in the media
  - ESPN
  - Wall Street Journal
  - CNN

- Concussion Protocols
  - NHL
  - NFL
  - NCAA
  - NFHS
Objectives

- Better understanding of concussions
- Identification & Management
- Neurocognitive Testing
- Return to activity protocol & Protective equipment
What is a concussion

・ *Concussion* Latin word: means to shake violently

・ “A transient alteration in brain function caused by trauma”
  - Direct or Indirect
    - Direct Trauma - a blow to the head, face or neck
    - Indirect Trauma – a blow to the body that sends a force up to the head (i.e. whiplash)
Concussion affects brain function…

- Injury to brain cells…
- Results in problems with brain functioning…
...and is not a structural injury

Concussions are not “bruises” of the brain, and do not result in injury to the structure of the brain.

CT & MRI identify bleeding or other injury in the brain.
Clinical Signs

Things you will observe

- Confused about position or assignment
- Forgets instructions
- Appears dazed or stunned
- Answers questions slowly
- Shows mood or personality changes
- Can’t recall events after hit or fall
Clinical Symptoms

Things your players will report

- Headache/pressure
- Nausea/vomiting
- Dizziness/balance problems
- Blurry/double vision
- Sensitivity to light or noise
- Feeling sluggish/foggy
- Concentration/memory problems
- Just not “feeling right”
Acute Management

- **Remove from activity immediately!**

- No return to physical activity until symptoms resolve & the individual has been evaluated medically.

- **Remember:** Sometimes symptoms may not be present for 24-48 hours after injury.
Initial Management

• “The cornerstone of concussion management is physical and cognitive rest until symptoms resolve”

• Protect and Rest
  – Reduce potential for a second hit to the head
    • Takes only a minimal impact to cause a catastrophic injury
  – Reduce physical and cognitive demands
    • Brain is responsible for managing physical and cognitive functions of the body
Recovery from Concussion

All concussions are different

Concussion treatment should be individualized

Everyone recovers in a different time frame
Adolescents Recovery from a Concussion

Studies have shown that adolescent and pre-adolescent athletes take longer to recover from concussion than adults.

Lovell MR, et al. 2003

Not uncommon for adolescents to take 3 weeks to 3 months to recover.
Protracted Recovery

- Adequate rest not implemented
- Athlete pushes through injury

- Previous Medical History
  - Concussion History
  - ADD/ADHA
  - Migraines
  - Hormone
  - Learning Disabilities
  - Gender?
Best Practice Models

- Our brain is responsible for all facets of our life
- Concussion evaluation must be multi-faceted

Symptom Free at Rest → Return of Normal Cognitive Function → Graded Return Back to Physical Activity

Personality → Grades
Sleeping Patterns → Easy of Learning
ImPACT → Controlled Progression
Return to Activity Following Concussion

Low Aerobic, Non-Pounding Activities
  Walking, Stationary bike

Low Aerobic, Pounding Activities
  Jogging, Elliptical, Skating

Practice, No Contact
  Skills/Drills & Conditioning

Practice, Contact
  Controlled Situations / Scrimmages

Full Competition
Neurocognitive Testing (NCT)

- One more tool in measuring recovery

- Is NOT a standalone tool!

- Objective measure vs. athlete’s self-report of symptoms or a random timeline

- Has become a standard of care in sport-related concussion management
<table>
<thead>
<tr>
<th>Exam Type</th>
<th>Baseline</th>
<th>Post-Injury 1</th>
<th>Post-Injury 2</th>
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<tr>
<td>Date Tested</td>
<td>06/09/2009</td>
<td>10/14/2009</td>
<td>11/16/2009</td>
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<td>Last Concussion</td>
<td>11/05/2006</td>
<td>10/02/2009</td>
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<td>Test Version</td>
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### Composite Scores

<table>
<thead>
<tr>
<th>Composite Score</th>
<th>Baseline</th>
<th>Post-Injury 1</th>
<th>Post-Injury 2</th>
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<tbody>
<tr>
<td>Memory composite (verbal)</td>
<td>74</td>
<td>56</td>
<td>85</td>
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<tr>
<td></td>
<td>16%</td>
<td>&lt;1%</td>
<td>52%</td>
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<tr>
<td>Memory composite (visual)</td>
<td>70</td>
<td>59</td>
<td>63</td>
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<td></td>
<td>32%</td>
<td>11%</td>
<td>15%</td>
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<tr>
<td>Visual motor speed composite</td>
<td>40.55</td>
<td>31.63</td>
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<td></td>
<td>57%</td>
<td>12%</td>
<td>80%</td>
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<td>Reaction time composite</td>
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<td>0.73</td>
<td>0.59</td>
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<td></td>
<td>69%</td>
<td>7%</td>
<td>44%</td>
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<tr>
<td>Impulse control composite</td>
<td>7</td>
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<td>2</td>
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<tr>
<td>Total Symptom Score</td>
<td>4</td>
<td>45</td>
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Protective Equipment

Helmets are designed to prevent skull fractures. They will NOT prevent concussions.

- Remember: A concussion is the brain “shaking” inside the skull.

The BEST helmet on the market... A helmet that is FIT AND WORN PROPERLY.
Protective Equipment: Helmets

Helmets

- Millions of dollars go into helmet research and design
- Yet helmeted sports, football and ice hockey, have the highest number of diagnosed concussion
  - Is it because athletes feel invincible?

Look Like  

But Feel Like
Prevention

EDUCATION & RECOGNITION

A concussion can occur in any sport

Centers for Disease Control

http://www.cdc.gov/concussion/HeadsUp/youth.html

PROPER MANAGEMENT

Follow a Concussion Protocol prescribed by a doctor for safe return to play
Prevention

- Talk about concussions with your athletes
- Proper understanding of the game
- Being prepared for unexpected hits
Summary

- Concussion is a functional injury to the brain
- REST best treatment
  - Physically and cognitively
  - Decrease change of serious injury
- Incorporate large safety net to prove athlete’s cognitive function is normal
- Recovery time is different with every athlete