CONCUSSION AND SPORTS

THOMAS B SCULLY MD
NORTHWEST NEURO SPECIALISTS
TUCSON, ARIZONA
SPORTS MEDICINE ADVISORY COUNCIL
NORTHWEST MEDICAL CENTER

American Association of Neurological Surgeons
ThinkFirst
National Injury Prevention Foundation
QUESTIONS

• What is a concussion?
• What factors increase/decrease risk?
• What diagnostic tools are useful to identify concussion?
• Why is there increased focus recently on sports concussions?
• How are sports concussions treated?
• What programs are available to prevent youth concussions?
• Where can I go for further information?
WHAT is a CONCUSSION

• Definition: “Complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces”
• Usually defined as any change in neurologic function
• Often referred to as mild traumatic brain injury
• Only about 10% of concussions involve loss of consciousness
• 80-90% resolve in 7-10 days
• CT and MRI often normal
• 15% may have symptoms lasting >1 year

Defined as the result of the forceful motion of the head causing a brief change in mental status for less than 30 minutes.
Why the increased focus recently on sports-related concussions?

- Evolving definition of concussion
- Concussion is common in sports and increasing
- Potential for catastrophic outcomes
- Development of tools to describe post-concussive dysfunction
All Traumatic Brain Injuries in Sports: 2010

- Cycling: 85,389
- Football: 46,948
- Baseball/softball: 38,394
- Basketball: 34,692
- Water sports: 28,716
- Powered recreational vehicles: 26,606
- Soccer: 24,184
- Skateboards/scooters: 23,114
- Winter sports: 16,948
- Horseback riding: 14,466

AANS 2011 study, using data from 2009 U.S. Consumer Product Safety Commission and National Electronic Injury Surveillance System Data
FACTS

• During last decade, ED visits for concussion among children increased 60%
• 31% occurred in a sports facility, 20% in a school facility
• Birth-9 years of age: concussion is from bicycling or playground injury
• 71% of sports related ED concussion visits are males
WHY INCREASED FOCUS?

- EVOLVING DEFINITION of concussion to reflect alteration in brain function, even without loss of consciousness
- Pre-participation counseling, testing PRIOR to the athlete’s season
- Checklists and screening tools now available
- Recent media reports highlight the potential for rare but catastrophic outcomes in young healthy individuals
- Legislative efforts, such as Lystedt Laws, to prevent repeat injuries and tragic consequences
- iPhone APPS!!!


Why increased focus on sports concussion?

• All sports and recreation-related concussion in U.S. 1.6-3.8 million/year
• Concussion is COMMON in youth sports: 8.9% of high school athletes
• Concussions appear to be increasing, especially among high school athletes


Why increased focus?

- Development of tools to describe post-concussive dysfunction

SIGNS AND SYMPTOMS OF ACUTE CONCUSSION

- Symptoms-somatic, cognitive or emotional
- Physical signs-LOC, amnesia
- Behavioral changes-irritability, anxiety
- Cognitive impairment- slowed reaction times
- Sleep disturbance-insomnia,
Concussion Symptoms

Various symptoms may occur, may be intermittent and may not be noticed immediately. Common symptoms include:

- Confusion
- Headache
- Difficulty remembering or paying attention
- Balance problems or dizziness
- Feeling sluggish, hazy, foggy or groggy
- Feeling irritable, more emotional or “down”
- Nausea or vomiting
- Bothered by light or noise
- Double or blurry vision
- Slowed reaction time
- Sleep problems
- Loss of consciousness

www.cdc.gov/concussioninyouthsports
SIDELINE EVALUATION

• Standard emergency management, especially with C-spine
• Removed from practice or play, referred to specialist
• Assessment of the concussion with sideline management tool such as SCAT3
• Player should not be left alone and should have serial monitoring over initial few hours
• NEVER return to play on day of injury
ED or OFFICE EVALUATION

- Comprehensive history and neurological exam
- Clinical status determination-getting better or deteriorating?
- Determination of need for neuroimaging
  - CT or MRI....CT to rule out structural lesion such as SDH, EDH, fracture
  - MRI, fMRI utility is still unclear
CONCUSSION ASSESSMENT

- Sideline assessment tools
- Team personnel remove the athlete from play
- No athlete should return to play until assessed by appropriate LHCP
- Imaging not helpful for sports related concussion
  - CT used to R/O more serious TBI if LOC, amnesia, persistently altered mental status, focal neuro deficit, or clinical deterioration
TREATMENT

- Physical rest: refrain from strenuous aerobic activities
- Cognitive rest: minimize activities that require concentration and attention
- Recommendations are based on best available science and consensus

RETURN TO PLAY??

- Ongoing symptoms should preclude return to play
- Includes practice!
- Gradual return to activity ONLY after symptoms have resolved
- 10-15 minutes first time back
- Increase as tolerated as long as player remains symptom free
RETURN TO PLAY

- No single diagnostic test to determine concussion resolution
- Clinical determination based on history, exam etc
- Pre-injury baseline neurocognitive testing is helpful for a post-injury comparison
- Progressive physical activity may be an option for return
Youth Sports are Inspired by Collegiate and National Leagues, Example: Football
Concussion Data on Girls’ Soccer

- Among high school soccer players, concussions are more commonly reported in girls than boys.

- Girls competing in soccer and basketball are more susceptible to concussions than boys are in the same sports.

- According to a study in the Journal of Athletic Training, in high school soccer, girls sustained concussions 68 percent more often than boys did.

- Female concussion rates in high school basketball were almost three times higher than among boys.

WebMD Health News, October 2, 2007
The New York Times, October 2, 2007
http://www.nytimes.com/2007/10/02/sports/othersports/02concussions.html
Increase in reported concussions leads in 2010 to new NFL Concussion Policy

"Once removed for the duration of a practice or game, the player should not be considered for return-to-football activities until he is fully asymptomatic, both at rest and after exertion, has a normal neurological examination, normal neuropsychological testing and has been cleared to return by both his team physician(s) and the independent neurological consultant."

Additional NFL Directives

- Neuropsychological testing has been expanded for all NFL players. NFL players who have been removed from a game due to a concussion will be re-tested during the season as part of the medical staff's treatment of the player and to assist in determining when players can return to practice and play. Each club will select the neuropsychological testing provider of its choice.

- Player safety rules relating to the use of the helmet will continue to be closely enforced. This will include strict enforcement of the requirement that chin straps on helmets be completely and properly buckled so that the helmet provides the maximum protection.

- The NFL will continue to research and study all elements of concussions with a particular focus on long-term effects.

National Football League, November 18, 2008
Locker room poster encouraging recognition and reporting of sports concussions

CONCUSSION
A Must Read for Young Athletes  Let's Take Brain Injuries Out of Play

CONCUSSION FACTS
- A concussion is a brain injury that affects how your brain works.
- A concussion is caused by a blow to the head or body.
- It can happen if head or neck hits something hard or is hit by something hard.
- It can also happen if the head moves suddenly.
- A concussion happens even if you haven't been knocked unconscious.
- If you think you have a concussion, you should not return to play on the day of the injury, and a health care professional says you are OK to return to play.

CONCUSSION SYMPTOMS
- Concussion symptoms usually start within the first 24 hours after the injury and may not last for more than 24 hours.

- Common symptoms include:
  - Dizziness
  - Headache
  - Nausea
  - Irritability
  - Fatigue
  - Disorientation
  - Balance problems
  - Sensitivity to light or noise
  - Problems with memory or concentration

WHY SHOULD I REPORT MY SYMPTOMS?
- Unlike with some other injuries, playing or practicing with a concussion can be dangerous and can lead to a longer recovery and a risk of future head injuries.
- Even early return to play after concussion can result in brain swelling or permanent changes to your brain. They can even be deadly.

DON’T HIDE IT. REPORT IT.
- Playing your symptoms or saying “I’m tough” can make symptoms worse. Tell your coach, parents, and teachers if you think you or one of your teammates may have a concussion. Don’t let anyone convince you into continuing to participate in or play after a concussion.

GET CHECKED-OUT:
- A health care professional can tell if you have a concussion and when it’s O.K. to return to play. Sports have injury forms and player education so that you can get checked out and then get checked in. If you get checked out, the sooner you may be able to safely return to play.

TAKE CARE OF YOUR BRAIN:
- All concussions are serious. Don’t hide it, report it. Take time to recover.
- It’s better to miss one game than the whole season.
How You Can Help Minimize Risk Factors in Sports Concussions

• Teach safe techniques in practice and play
• Encourage recognition and reporting of concussion symptoms
• Be aware that injuries are more common in younger athletes
• Use available assessment tools
• Monitor developments at advanced levels of play and legislative efforts
• Head and spine injury prevention programs
Teach Safe Techniques

• Greater emphasis needs to be placed on teaching fundamentals and techniques, such as proper and safe blocking and tackling
Encourage Recognition and Reporting of Symptoms

Concussion NFL Locker Room Posters

ThinkFirst
National Injury Prevention Foundation
Be extra vigilant with younger players, who are more likely to be injured
Use Available Tools

HEADS UP CONCUSSION IN FOOTBALL

SIGNS AND SYMPTOMS

Athletes who experience any of the signs and symptoms listed below after a bump, blow, or jolt to the head or body may have a concussion.

- Appears dazed or stunned
- Confused about assignment or position
- Forgets an instruction
- In unsure of game, name, or opponent
- Movies clausula
- Answers questions slowly
- Loses consciousness (even briefly)
- Shows mood, behavior, or personality changes
- Can't recall events prior to hit or fall
- Can't recall events after hit or fall

For information and safety resources, visit:
www.cdc.gov/Concussion or www.usfootball.com

HEADS UP CONCUSSION IN BASEBALL

SIGNS AND SYMPTOMS

Athletes who experience any of the signs and symptoms listed below after a bump, blow, or jolt to the head or body may have a concussion.

- Appears dazed or stunned
- Confused about assignment or position
- Forgets an instruction
- In unsure of game, name, or opponent
- Movies clausula
- Answers questions slowly
- Loses consciousness (even briefly)
- Shows mood, behavior, or personality changes
- Can't recall events prior to hit or fall
- Can't recall events after hit or fall

For more information and safety resources, visit:
www.cdc.gov/Concussion and www.usa lacrosse.org/safety

HEADS UP CONCUSSION FACTS FOR COACHES

THE FACTS

- All concussions are serious.
- Most concussions occur without loss of consciousness.
- Recognition and proper response to concussions within hours that occur can help prevent further injury or even death.

A bump, blow, or jolt to the head can cause a concussion, a type of traumatic brain injury (TBI). Concussions can also occur from a blow to the body that causes the head to move rapidly back and forth, or even a "ding," "rattling your ball," or what seems to be a mild bump or blow to the head can be serious.

On the lacrosse field, concussions can result from a fall, being struck in the head by the stick or ball, or from players colliding with each other or with obstacles.

RECOGNIZING A POSSIBLE CONCUSSION

To help identify a concussion, watch for or ask others to report the following two things among your athletes:

1. A forceful bump, blow, or jolt to the head or body that results in rapid movement of the head.
   
2. Any change in the athlete's behavior, thinking, or physical functioning, or any other signs or symptoms of concussion. (See the Signs and Symptoms chart)

For more information and safety resources, visit:
www.cdc.gov/Concussion or www.usa lacrosse.org/safety

HEADS UP CONCUSSION IN BASEBALL

SIGNS AND SYMPTOMS

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For more information and safety resources, visit:
www.cdc.gov/Concussion
Encourage passage of Lystedt Laws

Named in honor of 13 yo Zachery Lystedt, injured in October, 2006, when he returned to a football game after a concussion and was permanently injured.

**Coaches** are required to sign a statement indicating that they have been educated as to the nature and risk of head injuries. If a coach suspects that a player has a head injury, (s)he is required to immediately remove that player from the practice or game: "When in doubt, sit them out." A player that has been removed from competition cannot return to play until (s)he has been evaluated by a licensed health care provider trained in the evaluation and management of concussion and has received written clearance to return to play from that health care provider. Finally, coaches are responsible for educating their athletes regarding the nature and risk of head injuries, and encouraging athletes to notify a coach if they notice signs of a head injury in themselves or their teammates.

**Parents/Guardians** are required to review and sign an annual concussion and head injury information sheet prior to their children's participation in athletic events.

**Athletes** are required to review and sign an annual concussion and head injury information sheet prior to their participation in athletic events. If they suspect a head injury in themselves or a teammate, they are encouraged to tell their coach.

http://www.discnw.org/youth/lystedt.html
Use of a helmet while biking could prevent 1 injury every 4 minutes in the U.S.

www.thinkfirst.org/teens/BicycleSafety
Facts on Helmets

Bicycle helmets are 85% effective in reducing traumatic brain injuries

Only 40% of cyclists wear helmets

www.thinkfirst.org
What Programs are Available to Prevent Youth Concussions?

• ThinkFirst National Injury Prevention Foundation
• 135 U.S. chapters offering evidence-based presentations
• Programs discuss the dynamics of brain and spinal cord injuries and the importance of making safe choices

www.thinkfirst.org
ThinkFirst

- Founded in 1986 by AANS/CNS
- Decrease neurological trauma by prevention, education and advocacy
- The premier neurotrauma prevention organization
Elementary School Education Program

Brain and spine anatomy
Vehicle safety
Bicycle safety
Playground safety
Water safety
Violence prevention
ThinkFirst For Teens Education Program

Distracted driving

Drinking and driving

Violence prevention

Appropriate helmet use during sports
Future Directions

• New game rules?
• New return to play directives?
• New equipment?
• Genetic and biomarkers?
All Concussions Are Serious

• Don’t hide it
• Report it
• Take time to recover
• It’s better to miss one game than the whole season
Conclusion

Traumatic injuries affect more patients than all other neurological conditions COMBINED.

At present, the best treatment is PREVENTION.

Neurosurgeons are experts in treatment and prevention of concussion and traumatic brain injury.
Where can I go for further information?

General Information:
www.aans.org
www.cns.org
www.thinkfirst.org
www.cdc.gov/concussioninyouthsports

Bulk orders of information sheets: 1-800-CDC-INFO or CDC-INFO@cdc.gov

For Athletes: www.cdc.gov/concussion/pdf/athletes_Eng.pdf
For Parents: www.cdc.gov/concussion/pdf/parents_Eng.pdf
For School Nurses: www.cdc.gov/concussion/HeadsUp/schols.html
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AANS/CNS Section on Neurotrauma and Critical Care
Congress of Neurological Surgeons
Council of State Neurosurgical Societies
ThinkFirst Foundation

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