TACKLING CONCUSSIONS

Sponsored by:

Midwest Orthopaedics at RUSH

STOP SPORTS INJURIES

POSITIVE COACHING ALLIANCE

ILLINOIS ATHLETIC TRAINDERS ASSOCIATION

Better Healthcare with Athletic Trainers
TACKLING CONCUSSIONS

Jeffrey M. Mjaanes, MD, FAAP, FACSM
Sports Medicine Physician, Midwest Orthopaedics at Rush
Director, Chicago Sports Concussion Clinic at Rush

Mike Overturf, ATC, PES
President – Illinois Athletic Trainers Association

Jim Osborne, M.Ed CBIS
PCA Trainer
Brain Injury Specialist, Council on Brain Injury
WATCH IT HAPPEN

You Tube Search:

• Big Football Hit 5 yr Old
• Hardest Pop Warner Football Hit Ever
CONCUSSION LAWS

In 39 states, including Illinois

- Parents/athletes must sign concussion agreement
- Student-athletes must be removed from play if suspected of having a concussion.
- Athletes must obtain written medical clearance before returning to competition

*Only licensed physicians and certified athletic trainers give clearance*
DEFINITION

Concussion may be caused either...

- by a *direct blow* to the head, face, neck

*or*

- Indirectly elsewhere on the body with an “*impulsive*” *force* transmitted to the head (whiplash, blast, etc)
DEFINITION

Concussion typically results in *impaired brain function*

- Not structural (MRI, CT normal)
- Results in a set of clinical symptoms
  - Rapid onset (<24 hrs)
  - May or may not involve loss of consciousness
- Symptoms resolve spontaneously and sequentially
- A process, not an event
YOUTH CONCUSSION

- Estimated up to 1 million sports-related head injuries in high school athletes yearly
- One fifth HS football players get concussion each year
- 40% have one or more in HS and college
- Estimated that 85% of concussions go unreported!!

Langlois et al, Journal Head Trauma Rehab, 2006
Are number of concussions increasing?

ER visits for concussion, 2001-2006

For ages 8-13, number doubled
For ages 14-19, number increased >200%

Or are we just diagnosing more?

Increased general awareness
Clinicians up-to-date
CHILD VS. ADULT

1. Brain still developing & more sensitive
2. Weak necks
3. Weak torsos
4. Increased head/body ratio
5. Poor equipment
6. Poor at communicating symptoms
7. Poor access to medical resources
8. Coaches with various levels of training
9. NO INFORMED CONSENT
Injury rate per 1000 exposures

- Football (0.60)
- Girls soccer (0.35)
- Boys lacrosse (0.30)
- Girls lacrosse (0.20)
- Boys soccer, wrestling (0.22)
- Girls basketball (0.16)

Lincoln, et al. AJSM. Jan 2011

- Ice hockey – highest rate boys (3.6/1000 AE’s)
- Tae Kwon Do – highest rate girls (8.8/1000 AE’s)

Tommasone and Valovich, Journal Athletic Training, 2006
NOT JUST BOYS

Girls Soccer
• 68% higher than boys
  • In 2003 study, *women’s soccer* had highest concussion rate of any sport (soccer, lacrosse, basketball, softball, baseball and gymnastics)

Girls Lacrosse

Girls Basketball
3x higher than boys
WHAT HAPPENS IN A CONCUSSION?
Linear force to the brain is measured in g’s, which is a multiple of the force of gravity.

We think concussions may occur around 100g force, but a true minimal threshold is not known.
PATHOPHYSIOLOGY

CASCADE/ PROCESS:

Trauma induces changes in the brain:

• **Mechanical**
  Shearing forces on axons

• **Biochemical**
  Changes in electrolyte and chemical levels in axons and synapses

• **Metabolic**
  Energy crisis
MOST COMMON SYMPTOMS

○ Headaches
○ Dizziness
○ Depression/Anxiety
○ Insomnia
○ Impaired concentration memory
HOW DO I KNOW IF I HAD A CONCUSSION?

**HIT + SYMPTOMS = CONCUSSION**

Any athlete who suffers:

- A forceful bump, blow, or jolt to the head or body that results in rapid movement of the head.

**AND**

- Any change in the athlete’s behavior, thinking, or physical functioning.
# DIAGNOSIS

## SIDELINES EVALUATION
- Brief testing (memory, balance, neuro)
- Usually by Athletic Trainer or Team Physician

## PHYSICIAN’S OFFICE
- SCAT2 (symptoms, balance, thinking)
- NEUROLOGIC EXAM
- NEUROPSYCH TESTING
  Compare to baseline or norms

## OTHER:
- Neurology, neurosurgery
- Neuropsychology
- MRI is not necessary-used to rule out brain bleed
YOU CAN’T SEE A CONCUSSION

THAT’S GOTTA HURT ...
Pittsburgh Steelers running back Destry Wight lies injured on the field Sunday night after he dislocated his right ankle and broke his right leg.
## WHY PLAYERS DON’T REPORT CONCUSSIONS

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not think it was serious enough</td>
<td>66%</td>
</tr>
<tr>
<td>Did not want to leave the game</td>
<td>41%</td>
</tr>
<tr>
<td>Did not know it was a concussion</td>
<td>36%</td>
</tr>
<tr>
<td>Did not want to let down teammates</td>
<td>22%</td>
</tr>
</tbody>
</table>

POST-CONCUSSIVE SYNDROME

Persistent concussion symptoms lasting weeks to months after injury
SECOND IMPACT SYNDROME

1st concussion
- Brain in fragile state of healing
- Auto-regulation of blood flow may be impaired

Second trauma → swelling, herniation and death within minutes
- Rare, but deadly
- Mortality 50%
- Morbidity 100%
- More common in teenagers

LESSON: Don’t return athletes too soon!

COGNITIVE EFFECTS

Post-concussion:

3 months after concussion, children ages 8-16 had persistent deficits in processing complex visual stimuli

Brosseau-Lachaine et al, BRAIN INJURY, 2008

2+ concussions:

Athletes with 2+ concussions had statistically significant decreased GPA compared to controls

Moser et al, NEUROSURGERY, 2005
Long-term Cognitive Changes

Research suggests repeat concussions maybe associated with depression and progressive neurocognitive decline.

Chronic Traumatic Encephalopathy

- Degenerative condition, buildup of abnormal tau protein in brain
- As of 2009, 52 described cases
- Diagnosed on autopsy
- BU Brain Bank
CTE

Austin Trenum

Owen Thomas
CTE in an 18 Year-Old
CONCUSSION

Look on the Bright side. For one brief, glorious moment, you forgot you were on the Cubs.
MANAGEMENT

CONCUSSION
# COMPLETE REST

## Physical Rest
- No sports of ANY kind
- Avoid physical activity

## Mental Rest
- Consider time off school or shorten day
- Reduce work load
- Avoid tests, especially standardized
- KEY to communicate with school

## Cognitive Rest
- Limit screen time
  - Avoid texting, videogames
  - Limit TV and computer
- Avoid loud music
- Use sunglasses
- Avoid driving
NEUROPSYCHOLOGICAL TESTING

Objective measurement of thinking processes and cognition

Two modes:

Pen and Paper

Computerized:

• ImPACT (Immediate Post-concussion Assessment and Cognitive Testing)
• CogState
• Headminder
• ANAM (Automated Neuropsychologic Assessment Metrics)
RETURN TO PLAY

• No symptoms *at rest*
• No symptoms *with exercise*
• No symptoms with sport
• Normal neurologic exam
• Off medications
• Neuropsychologic testing back to baseline

GRADED RETURN PROTOCOL
RETURN TO PLAY

- Takes a minimum **4 days** to progress through all steps
- If symptoms at one stage, then **rest 24 hrs and repeat** step.
- Always be **more conservative with younger athletes (<18)**
- Children <10 especially – difficult to assess severity
PREVENTION?

Helmets

- Studies show newer helmets decrease impact forces on brain
- Have not shown decrease in concussion incidence
  
  Although helmets in skiing and biking have shown to decrease head injuries in those sports

Mouthguards

Neck/shoulder strengthening

One in college FB players showed reduction in concussion incidence
KEY TO PREVENTION

Education!!

www.cdc.gov/concussion/headsup
www.stopsportsinjuries.org
www.positivecoach.org

Download a Stop Sports Injuries handy signs/symptoms brochure:
www.rushortho.com
WHY ATHLETIC TRAINERS

2010 Study
- Showed 2/3 of parents of middle and high school supported a requirement to have an AT on site
- Yet only 42% of nation’s high schools have access to one

AT’s trained in concussions
- Recognize signs/symptoms
- Evaluate and diagnose head injuries
- Identify subtle signs of concussive symptoms through regular work/interaction with team members.
ATHLETIC TRAINER’S ROLE

Testing
- Baseline benchmark testing (ImPACT)
- Injury Screening Tools (SAC, BESS, GSC)

Referral to appropriate physician

Vestibular rehabilitation

Closely monitor and initiate return to play protocol

Ensure safe equipment and conditions
RESOURCES

- National Athletic Trainers Association (www.nata.org)
- Illinois High School Association (www.ihsa.org)
- National Collegiate Athletic Association (www.ncaa.org)
- Center for Disease Control and Prevention (www.cdc.gov)
- Any Certified Athletic Trainer
Jim Osborne
PCA Trainer
Brain Injury Specialist, Council on Brain Injury
EDUCATION

Parents

Coaches

Athletes

School Personnel

Health Professionals
PREVENTION

• Proper equipment and proper fit
• Safe & appropriate practice drills
• Appropriate practice techniques
  • Tackling in football
  • Feet first in soccer
• Reinforce rules meant to prevent injury
• Survey practice field for safety
IDENTIFYING SYMPTOMS

Dr. Juliet Haarbauer-Krupa’s survey
Children’s Health Care of Atlanta

- 91% of coaches could ID Symptoms of a concussion
- 72% of athletes could ID Symptoms of a concussion
- 91% of athletes told parents they had symptoms of a concussion, but not their coach.
COMMUNICATION

• Be observant during the recovery phase.

• Ask the right questions. Questions should be specific and based upon what you see. You know your child best.

• Include school staff in concussion education and understanding the recovery process.
Your player suffered a mild concussion a week ago playing soccer for a club team, and can’t play until cleared by a doctor.

He tells you he is symptom-free. He appears recovered and wants to play in a showcase this weekend being attended by college coaches. Should you let him play?
Free Concussion Guide at www.rushortho.com
(click on the CONCUSSION GUIDE on home page)

Upcoming Chicago Area Seminars:

Youth Sports Injury Prevention is the Name of the Game
Featuring former Chicago Bear Hunter Hillenmeyer and Midwest Orthopaedics at Rush sports medicine injury specialists.

Tues 9/18 - 7 pm, Oak Park River Forest H.S.
Wed 9/26 - 7 pm, Naperville North H.S.
Tues 10/2 - 7 pm, Hinsdale Central H.S.
QUESTIONS