SPORTS MEDICINE: EXPERT TREATMENTS FOR OPTIMUM ACTIVITY

Date: Tuesday, February 4, 2014, 7:00 pm – 8:30 pm

Topic: SPORTS CONCUSSION EVALUATION AND TREATMENT

Speaker:

Carlin Senter, MD, Assistant Professor UCSF Department of Orthopaedic Surgery

Dr. Carlin Senter is a Primary Care Sports Medicine physician. Her clinical focus is caring for and preventing sports injuries to help patients of all ages stay active. She practices primary care sports medicine in the UCSF Department of Orthopaedics and primary care internal medicine in the UCSF Division of General Internal Medicine. Senter is particularly interested in sports concussion, exercise counseling and prescription, and stress fractures. She is a former collegiate rower with an avid interest in team sports, and is team physician for Washington High School in San Francisco, Redwood High School in Marin, and University of San Francisco. Her research focuses on musculoskeletal medical education in primary care.

Senter received her undergraduate degree from Harvard University. She completed her medical degree at the David Geffen School of Medicine at UCLA, followed by residency training in Internal Medicine at the University of Washington in Seattle. Senter completed two fellowship training programs, the first in Medical Education from the David Geffen School of Medicine, and the second in Primary Care Sports Medicine from the UCLA Division of Sports Medicine in Los Angeles, CA.
Sports concussion evaluation and treatment
Carlin Senter, MD
Primary Care Sports Medicine
UCSF Department of Medicine and Orthopaedics
February 4, 2014

Primary care sports medicine
Bay Area Concussion and Head Injury Program at UCSF
A collaboration between UCSF Medical Center, Benioff Children’s Hospital, and San Francisco General Hospital

Outline
• Concussions are common
• What is a concussion?
• Concussion evaluation
• Concussion treatment
• Long term effects
• Prevention

Concussions are Common

50% of concussions in high school football players are unreported.

Reasons players not reporting symptoms:
1. Did not think serious enough to need medical attention (66%).
2. Did not want to leave game (41%).
3. Did not know symptoms were concussion (36%).
4. Did not want to let down teammates (22%).

We Miss Concussions

Concussion Legislation

- **49 states have adopted youth concussion laws** (as of 11/2013)

- **California: education code 49475 (effective 1/2012)**
  1. Athletes and guardians sign a concussion information form yearly
  2. Athlete suspected of having concussion removed at time of injury for the rest of the day
  3. Athlete can return only after cleared by healthcare professional trained in evaluation and management of concussion

Put these sports in order of highest to lowest incidence rate of concussion.

A. Soccer (boys)
B. Soccer (girls)
C. Football
D. Lacrosse (boys)
E. Lacrosse (girls)

Which high school sports have highest incidence rates of concussion?

<table>
<thead>
<tr>
<th>Sport</th>
<th>Rate per 1000 athletic exposures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Football</td>
<td>0.60</td>
</tr>
<tr>
<td>Soccer (girls)</td>
<td>0.35</td>
</tr>
<tr>
<td>Lacrosse (boys)</td>
<td>0.30</td>
</tr>
<tr>
<td>Lacrosse (girls)</td>
<td>0.20</td>
</tr>
<tr>
<td>Soccer (boys)</td>
<td>0.17</td>
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</table>


What is a concussion?
Concussion Definition

- Blow to head, neck, body → force to head.
- Neurologic impairment within 48 hours of trauma.
- Symptoms usually resolve in 1-2 weeks spontaneously but in some cases can be prolonged.
- Symptoms represent functional or metabolic change in CNS.
- May or may not include loss of consciousness.
- Standard neuroimaging is normal.

Concussion Symptoms


Case

- 17 y/o high school varsity football player
- Hard hit at end of 2nd quarter
- Slow to get up
- Stumbles to sideline
- Complains of headache and dizziness

Coach looks at you and says, “Doc, is he good to go?”
Does he have a concussion?

- Do you need to lose consciousness to have a concussion?
  
  NO.
  
  Loss of consciousness also does not correspond to severity of concussion.

- Do you need to have amnesia to have a concussion?
  
  NO.

Case: “Doc, is he good to go?”

A. Yep, he’s good! (Football is supposed to hurt, right?)

B. No, he needs head CT. I’m sending him to the ER now.

C. No, I’m admitting him to hospital.

D. No, I’m concerned he might have a concussion. He is out for now.

Concussion evaluation

- On-Field Evaluation
  
  - Call 911
  
  - Sideline Evaluation

  Emergency → Stable

Sideline concussion evaluation

- Remove from play
- Mechanism of injury
- Maddocks questions
  - If unreliable, very disoriented consider ED
- Neck and Neuro exam
  - Rule out CS injury
  - Rule out head bleed

http://laist.com/2006/12/03/troy_in_bruins.php
Our patient

- No h/o prior concussion
- Wearing helmet and mouth guard at time of injury
- (+) headache, dizziness, fogginess
- Mental status exam normal
- Neck exam normal
- Neurologic exam normal

Our patient

- Diagnosis?
  - Suspected concussion
- Next step?
  - Remove from play
  - When in doubt, sit them out!
  - Take athlete’s helmet
  - Tell athletic trainer and coaching staff player is out
  - Complete evaluation in locker room

Monitor symptoms

- 24-48 hours for complete evolution of symptoms
- On sideline
  - Send athlete home with supervision OR...
  - Repeat exams, check athlete every 10 minutes or so for worsening symptoms and decreased alertness
- Overnight: wake patient up to make sure oriented, check symptoms

• Worsening headache
• Seizure, convulsions
• Increasing drowsiness
• Repeated vomiting
• Slurred speech

- Increasing confusion, irritability
- Weakness or numbness arms or legs
- Loss of consciousness


Parent handout

“Can I play in next week’s game?”

Respond with the #1 sports cliché

“We are going to take it one day at a time.”
How Severe is my Concussion?

- Concussion grading is retrospective
  - Historically concussions were graded on the sideline based on amnesia and LOC at time of injury.
  - American Academy of Neurology, 1997
  - Cantu, 2001
- Studies have shown these factors not to be predictive of recovery.
- Only when the athlete recovers can you tell how severe the concussion was

Computerized Neuropsychological Testing

- 20-30 minute computer testing battery.
- Various tools available.
  - Cog-Sport
  - IMPACT
  - Axon Sports
- Objective measurement of verbal + visual memory and reaction time.

Symptom Resolution after Sport Concussion

- 7-10 days avg. symptom resolution.
- 50% recovered and returned to play in 1 week; 90% in 3 weeks
  (Cullin et al. Neurosurgery, 2006.)
- High schoolers take longer to recover based on neuropsychological testing compared to college athletes.
  (Field et al. J Pediatr, 2003.)

Risks of premature return to play

- Repeat concussions in football season
- 1/15 of players with concussion had repeat concussion in same season
  - 75% within 7 days of first injury
  - 92% within 11 days of first injury

Risks of premature return to play

- Second impact syndrome
  - Cerebral swelling due to cerebral vascular dysregulation
  - Edema → brainstem herniation → death
  - Anecdotal case reports only of SIS
  - Adolescents
  - Evidence not clear that prior head injury actually a risk factor for cerebral edema
  - Need to be aware that cerebral edema is rare result of sports-related head injury


Sports concussion treatment

Concussion Treatment

- Cognitive rest
- Physical rest
- Medication
  - Tylenol
  - Ibuprofen after first 72 hours
- No driving
- No alcohol


Cognitive activity associated with prolonged symptoms

- Prospective study Boston Children’s Hospital
- 335 patients, 62% male, average age 15
- Presented for concussion within 3 weeks of injury
- Patients completed scale measuring their cognitive activity since their last visit
- Symptom duration associated with initial total number of symptoms and cognitive activity level
Cognitive rest

- Limit activities requiring concentration and attention
  - Texting
  - Video games
  - Reading
  - Working online
  - School work

Return to learn

- First return to learn, then return to play
- School note requesting accommodations
- Gradual return to school as symptoms allow

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Return to Learn Progression

No school.
OK to do light reading, little bit TV, drawing, cooking as long as doesn’t worsen symptoms.

15 min cognitive activity at a time.

30 min schoolwork at a time until can do 1-2 hours.

Return to ½ day of school.

Return to full day of school.

http://www.chop.edu/service/concussion-care-for-kids/returning-to-school.html

UCSF concussion clinic school note

<table>
<thead>
<tr>
<th>RETURN TO SCHOOL CONSIDERATIONS (Check all that apply)</th>
</tr>
</thead>
<tbody>
<tr>
<td>___ No return to school</td>
</tr>
<tr>
<td>___ Return to school with restrictions</td>
</tr>
<tr>
<td>___ Return to school with restrictions and medication</td>
</tr>
<tr>
<td>___ Gradual return to school as symptoms allow</td>
</tr>
</tbody>
</table>

- Take rest breaks during the day as needed
- Allow only a time to complete assignments/therapy
- No significant classroom or standardized testing at this time
- Full return to school with restrictions
Physical rest

- Evidence sparse on benefit of rest
- Management largely guided by expert opinion
- No same-day return to play
- Once concussion symptoms have resolved gradually return to play

Return to Play Progression

- Asymptomatic
- Light aerobic activity
- Sport specific activity
- Non-contact training
- Full contact practice
- Clinician clearance
- Game play

“Should my son/daughter keep playing football/soccer/lacrosse?”

Long term effects of concussion

- Postconcussion syndrome

Table 2: International Classification of Diseases, 10th Revision, Criteria for Postconcussion Syndrome (Code 115.5):

- Interval between head trauma with loss of consciousness and development of symptoms, ≤4 wk
- Symptoms in at least three of the following categories:
  - Headache, dizziness, fatigue, noise intolerance
  - Irritability, depression, anxiety, emotional lability
  - Subjective concentration, memory, or intellectual difficulties without neuropsychological evidence of masked impairment
  - Insomnia
  - Reduced alcohol tolerance
  - Preoccupation with above symptoms and fear of brain damage, with hypochondriacal concern and adoption of sick role

Long term effects of concussion

- History of concussion associated with prolonged recovery from later concussions

<table>
<thead>
<tr>
<th>Table 4. Length of Symptom Recovery in Players With Concussion by History of Concussion*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Symptom Recovery (d)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Prolonged (&gt;1)</td>
</tr>
<tr>
<td>Inherited (≥7)</td>
</tr>
</tbody>
</table>

*All concussions as in No. 1. †No previous head concussions. P < 0.05 by Fisher exact test.


Chronic traumatic encephalopathy

- Athletes and military personnel
- Chronic, progressive depression, cognitive impairment, aggression
- Diagnosed at autopsy: tau protein deposition
- Difficult to draw causality – no prospective data yet
- Concerning association between elite sports participation and long term neurologic/psychological problems


How many concussions is too many?

- Individualized to athlete
- Concussion hx
  - Number
  - Less force
  - More frequent
  - Increased severity of sx
  - Increased duration of sx
  - Age: possibly more consequences if younger at time of concussion

Corrigan JD, Concussion webinar 10/18/2011.

Sports concussion prevention
Research: Understand mechanism and consequences of head impact

- Quantify types of head impact in sport and by position
- What types of impact lead to concussion?
- Cumulative effects of head impact in sport

Behavior modification

- Fair Play program in Minnesota youth ice hockey
  - Fair Play Points
    - Awarded if team does not use all penalty minutes
    - Subtracted if team uses more than allotted penalty minutes
    - Factor in standings and advancing to post season play
  - Fewer major penalties, fewer injuries, fewer concussions


Rule changes

- Football
  - NFL: no same-day return to play, $$$ if hit to the head, # contact practices
  - Ivy league: limit teams to 2 contact practices/week, emphasize proper tackling and blocking technique
  - NCAA: targeting and hitting defenseless player above shoulders → 15 yd penalty and ejection from game
- Hockey
  - No body checking in Pee-Wee ice hockey


Education → early recognition

- Know the symptoms
- If in doubt sit out
- Student athletes: Have responsibility for your teammates
- Know the athletes
  - Certified athletic trainers
  - Team physicians

### Identifying Concussions:  
**A Team Approach**

<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibilities</th>
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</table>
| Officials/ Coaches | • During competition concussion recognition.  
                     • Communication with medical staff. |
| Athletes    | • Monitor fellow teammates for injury / erratic behavior.  
                     • Notify coach if you have concerns about an injury. |
| ATCs        | • During competition concussion recognition.  
                     • Concussion evaluation.  
                     • Status update to coach / officials. |
| MDs         | • Injury diagnosis.  
                     • Parent notification. |

### UCSF sports concussion care 2013

- **UCSF Playsafe**  
  - Athletic trainer at high school  
  - M.D. on sideline and in clinic
- **Preparticipation exam**  
  - Concussion hs  
  - Baseline testing
- **Sideline: early recognition**  
  - If in doubt sit out
- **Concussion clinic**

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### PlaySafe High Schools

**SAN FRANCISCO**
- Balboa
- Burton
- Galileo
- I.S.A
- Jordan
- Lincoln
- Lowell
- Marshall
- Mission
- O’Connell
- SF Int’l
- Wallenberg
- Washington

**SAN FRANCISCO**  
(Private/Charter)
- St Ignatius
- Riordan
- Stuart Hall

**MARIN**  
(Turmeric)
- Redwood
- Sir Francis Drake
- Tamalpais

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### Bay Area Concussion and Head Injury Program at UCSF

A collaboration between UCSF Medical Center, Benioff Children’s Hospital, and San Francisco General Hospital
Bay Area Concussion and Head Injury Program at UCSF

- Acute concussion clinic
  - Evaluation and treatment
  - Return to school
  - Return to play
- Multidisciplinary head injury clinic for complicated cases
  - Patient can see multiple doctors at one visit
  - Post-concussion syndrome

Bay Area Concussion and Head Injury Program: Location

- UCSF Orthopaedic Institute at Mission Bay
- P: (415) 353-1915
- F: (415) 514-6075
- Concussion@ucsf.edu

Online concussion resources

- Consensus statement on concussion in sport
  - http://bjsm.bmj.com/content/47/5/250.full
- American Medical Society for Sports Medicine
  - Find A Doc: find a concussion doctor in your area
  - http://www.amssm.org/Find-a-Doc.html
- CDC sports concussion toolkit

Concussion pearls

1. High index of suspicion
2. If in doubt sit them out
3. Symptoms usually resolve in 7-10 days
4. Treatment = cognitive and physical rest
5. Step-wise return to school and play