

Defining the problem: Are we at a tipping point?



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"I don't think it's a concussion ... although the smoke has me a little concerned."

What's the Problem?



- Estimates elusive – ER data, ATC data, consistent definition
- Reporting inconsistent = inconsistent data (1 in 2 – 1 in 10)
- Short-term – PCSS definition
- Long-term – Deficits?
- Transient symptoms
- Evaluation
- Media
- Follow-up care
- Parents
- Teachers
- Athletes
- Healthcare providers
- What responsibilities do we have?



Recent History



- Traditional Grading scales implemented
 - (gr. 1, gr. 2 & gr. 3)
- 2004 international conference recommended scales for simple vs. complex
- 2006 article in *Practical Neurology* identified 41 different definitions
- 2008 recommended abandoning simple vs. complex
- 2012 recommended recognized the complexity of a concussion or mTBI

Definition of a concussion



In 2012, leading medical experts from around the world gathered in Zurich, Switzerland to provide management guidelines for sport-related concussions. Below was the proposed definition:

”Concussion is a **brain injury** and is defined as a complex pathophysiological (physical, cognitive and emotional) process affecting the brain, induced by biomechanical forces. Several common features that incorporate clinical, pathologic and biomechanical injury constructs that may be utilized in defining the nature of a concussive head injury include”

PCS Diagnosis – Symptom and Duration



- American College of Sports Medicine
 - *symptoms and signs of a concussion that persist for weeks to months*
- Diagnostic and Statistical Manual of Mental Disorders-4th Ed (DSM-IV)
 - *memory or attention difficulties, at least three other symptoms that interfere with social or occupational functioning and persistence of symptoms for at least 3 months*
- International Classification of Diseases (ICD-10)
 - *at least three symptoms, but do not specify symptom duration*

PCS



- 2106 ACSM physicians surveyed
- Asked how long symptoms should persist to meet diagnostic criteria for PCS
 - <2 weeks (26.6%);
 - 2 weeks to 1 month (20.4%);
 - 1–3 months (33%); and
 - <3 months (11.1%)
- When asked the minimum number of symptoms required to diagnose PCS, responses varied:
 - one symptom (55.9%);
 - two symptoms (17.6%);
 - three symptoms (14.6%); or
 - four or more symptoms (3.2%)

What's the Solution?



- **Pass Laws!**
 - AB 25 (1/1/2012) – Head injury letter & removal from play until evaluated by licensed healthcare provider
 - AB 1451 (1/1/2013) – Coaches education
 - AB 2127 (7/21/2014) – amended AB 25
 - ✦ Contact restrictions for football – (2) 90-min sessions/wk
 - ✦ Gradual RTP protocol
 - ✦ Evaluation by a licensed healthcare provider, trained in the management of concussions and cleared for return to activity

Liability and Ethical Considerations



- Doctor shopping
- Pressure from coach/parent/players/teachers
- Waivers to share medical information between coaches, administrators and teachers
- Ulterior motives regarding postconcussion symptoms and academic considerations – ACT, SAT, AP's
- Athlete/parent autonomy vs. protection from harm?

Identifying the Problem



- Concussion rates per sport/position
- Concussion rate exposures
 - Practice vs. games
 - Frequency of hits
 - ✦ Dr. Cantu – Hit count initiative
 - Magnitude of hits
- Concussion by gender
- Concussion rates by age



Dr. Cantu Hit Count Threshold



- There is no single acceleration threshold for concussion.
- A growing body of literature indicates that subconcussive impacts, which do not cause clinical symptoms apparent to the athlete or to a medical professional during a sideline examination, may still change the way that the brain functions and may cause structural damage.
- There is not yet evidence of a minimum threshold for subconcussive damage to occur.
- 20 g's is the ideal threshold because it is the lowest level that will capture abnormal acceleration

Frequency/Magnitude/Games vs. Practice



- Football

- Mean linear head acceleration –
 - ✦ 24.76g games (± 15.72)
 - ✦ 23.26g practice (± 14.48)
- Threshold from previous research 98 g (NFL)
- >8000k total hits; only 3 diagnosed concussions
- 271 impacts >70g's (1.4%); 78 impacts >98g's (0.4%)
- Offensive/defensive lineman greatest # of subconcussive hits
- Highest number of impacts - top of head (44%)



2014-2015 San Mateo Grand Jury Report



Three recommendations were provided based off the report.

1. Require neurocognitive testing on all high school student athletes (pre- and post-injury) and provide full-time certified athletic trainers at all high school sporting events.
2. Seek all funding sources in order to provide for the neurocognitive testing of athletes and for the hiring of full-time certified athletic trainers at all high schools.
3. Collect and maintain data on head injuries sustained by high school athletes at the district level; report such data to PAL for summary and analysis.

MOORE
11-30



“Voila! ... Concussion-proof!”