Concussions In School Age Children: The Essentials

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On November 1st, 2010, Sports Illustrated awakened the world to the issue of sports-related concussions.

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Since that time, daily headlines and newscasts tell of the complications that can arise from repeat mild Traumatic Brain Injury, or mTBI, as concussions are referred to in the medical world.


4 NEWS Controversy of the week

Football: Is Seau's death 'a tipping point'?

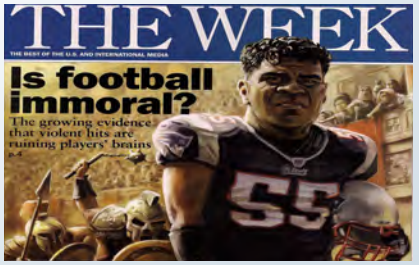
Junior Seau didn't just kill himself last week, said **Joel Mathis** in *PhillyMag.com*, "he probably killed football itself." The NFL legend and future Hall of Famer was found dead at his California home with a gunshot wound—tellingly, to his chest. Though the 43-year-old former linebacker left no suicide note, the speculation is that, like former Chicago Bear Dave Duerson last year, Seau avoided shooting himself in the head so that doctors could study the damage done to his brain by 20 years of high-speed collisions in the NFL. Duerson's brain was found to be ravaged by chronic traumatic encephalopathy, a condition brought on by multiple concussions that causes depression and early-onset dementia. Autopsies on a host of other players who committed suicide or died prematurely in recent years have also revealed CTE, with doctors saying that one player, 44-year-old Andre Waters, had the brain of an 85-year-old suffering from Alzheimer's. How does anyone with a conscience continue to watch a sport that turns men's "minds into mush"? The suicide of the charismatic, widely liked Seau may be "a tipping point," said **Barbara Bruno** in *HuffingtonPost.com*. Fans have been in denial, but it's now obvious that everyone who watches the game is "complicit in these tragedies."

I love the game dearly, said **Ta-Nehisi Coates** in *TheAtlantic.com*, but "I'm out." While players are consenting adults who have a right to do whatever they want with their bodies on a Sunday afternoon, I refuse to participate in their self-destruction. Even the players are starting to rebel, said the *Chicago Tribune* in an editorial. More than 1,500 former players are suing the NFL in dozens of lawsuits for allegedly concealing the impact of repeated concussions on their brains. When both medical science and the courts assess the full human cost of America's favorite spectator sport, football—just like boxing before it—could soon "end up a sport whose best days are past."

Seau: Famed for his hard hits

I'd hate to see that happen, said **Andy Staples** in *SportsIllustrated.com*. Football is a wonderful game, not only for spectators but for amateur players, who learn so much about life by testing themselves in that crucible between the end zones. To save the game, the NFL—and college football, too—has to do whatever it takes to make the sport safer. Yes, "it will require something drastic"—perhaps outlawing the helmets that embolden players to use their heads as weapons—but "football is too great a sport to continue under this cloud."

But how do you take the violence out of football? said **Buzz Bissinger** in *TheDailyBeast.com*. The game is "primal and vicious and visceral," a form of warfare staged on grass. One reason tens of millions of us watch the college game and the NFL is the vicarious thrill we get when one player flattens another with a hit that knocks the snot out of his nose. When auruntz rolls around and we're asked, "Are you ready for some football?" we'll say, "Sure am!"—even if we feel slightly guilty about it. The fans may not turn off the game right away, said **John Kass** in the *Chicago Tribune*, just as it took decades for boxing to wither. But as tragedies like Junior Seau's continue to mount, parents will decide that it's not worth the risks to let their sons play at any level, from Pop Warner to college. When there aren't enough young players to replenish the ranks, we may see the beginning of the end of "the world's most violently glamorous sport."



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While the topic of the effects of concussions on current and former professional athletes gain most of the media's attention, the frequency and side effects of premature Return to Play decisions are even more serious in the most vulnerable population, young athletes from 6-14 years of age – the incompletely myelinated brain.

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"If I could tell youth athletes one thing, it would be to take care of your health. If you're suspected of having a concussion, don't go back into the game, no matter how you feel when the adrenaline is flowing.
It makes me feel proud when I hear about Lystedt Laws being passed in other states. Sharing my story is important—I don't want anyone else to live through what I've had to live through every day.
I take it one day at a time and feel better most days. I'm motivated by the friends and family who believe in me."

- ZACKERY LYSTEDT

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DEFINITION OF CONCUSSION

- A complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces including:
  - Direct blow to body or head
  - Rapid onset of short lived impairment of neurological function that usually resolves spontaneously
  - Traditional imaging (CT and MRI 1.5T)

    - usually normal
  - May or may not involve Loss of Consciousness (LOC)*

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The Problem

- **1.6 - 3.8 million** sports and recreational related concussions per year
- **Players:** 34% with 1 concussion, 20% with multiple concussions
- **Individual Risk**· 19% per year of play in contact sports
- 1 concussion per team per 3 games

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Perhaps the most difficult decision

that must be made by Team Physicians, coaches, managers, parents, Certified Athletic Trainers (ATCs) and the athletes themselves is when it is safe and prudent to *Return to Play (RTP)*.

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The commonly accepted methods for determining whether an athlete of any age has suffered a concussion during practice or in a game include…

A Physical Examination, with special attention to neurological signs and symptoms

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Computerized Neurocognitive Testing

ImPACT: A computer-based neurocognitive test - preseason "Baseline" for comparison after a concussion occurs and to follow the results of treatment and confirmation of recovery

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Neurocognitive (ImPACT) Testing

- Traditionally administered on Days 2, 5, 7, and 10 following mTBI
- Results compared to ***baseline*** testing
- College/Professional recovery curves indicate about 5 days on average
- High School recovery curves about 7-8 days

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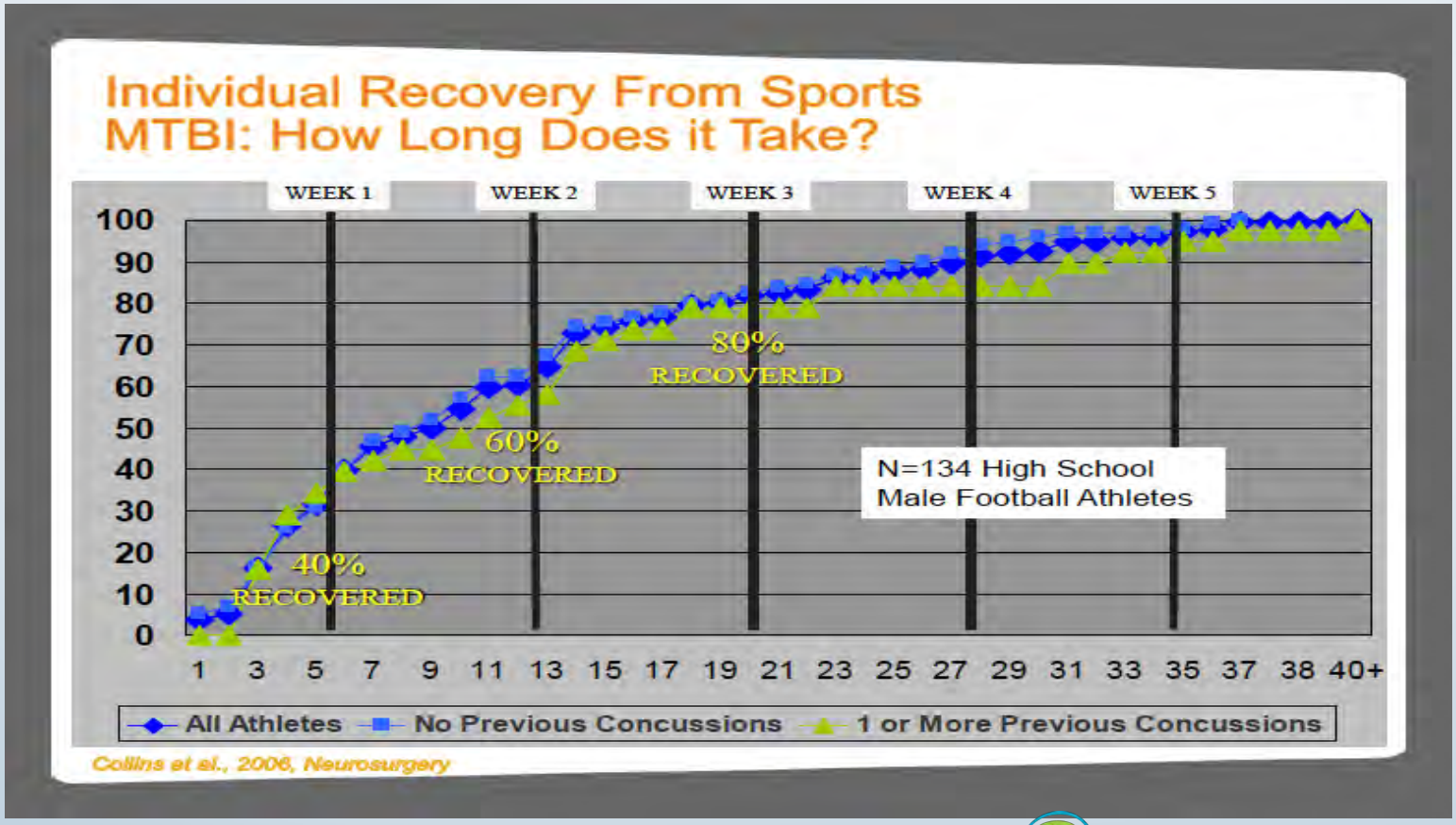

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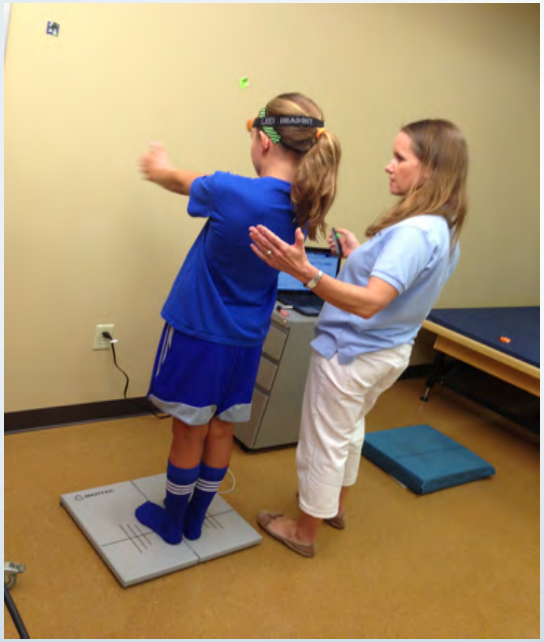
Balance Testing



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Contemporary Eye Movement detection devices combine the latest in electronic and computer technology to evaluate the three critical eye movements which have been reported to become abnormal immediately after concussions.

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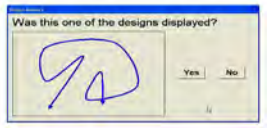
The Concussion Puzzle

Physical Examination

Neurocognitive Testing



Eye Movement Assessment

Balance Testing

Return To Play Guidelines

- Asymptomatic at rest
- Asymptomatic with exertion
- Neurocognitive Testing at or above baseline
- Resolution of vestibular dysfunction
- Normal CT/MRI if done

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Multiple Concussions

Following the first episode of an mTBI, an athlete is 4X more likely to experience another mTBI and 3X more likely to experience an mTBI in the same season

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Second Impact Syndrome

- Occurs in athletes or patients with a prior concussion and then a relatively minor second impact
  - Can occur up to 14 days post-injury
  - Athlete returns to risky situation/competition before symptoms have resolved
- Catastrophic increase in intracranial pressure
  - Massive swelling, herniation and death
- Most often occurs in athletes < 21 years old
  - Developing (unmyelinated) brain at higher risk

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YOUTH CONCUSSION STATISTICS

- Traumatic Brain Injury (TBI) is the leading cause of death an disability for America's youth
- Concussions are one of the most common injuries in many amateur and professional sports
- Approximately 3.8 Million sports and recreation-related concussions occur in the US each year (figure only includes athletes who lost consciousness)
- Likelihood of a contact sport athlete experiencing a concussion may be as high as 19% per athlete per season
- Over 767,000 American youth annually visit emergency room because of TBI
  - 80,000 are hospitalized
  - 11,000 die

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Recent Publications and Data

Epidemiology, trends, assessment and management of sport-related concussion in United States high schools.

- The number of high school athletes being diagnosed with sport-related concussions is rising.

- An estimated 2.5 reported concussions occur for every 10,000 athletic exposures, in which an athletic exposure is defined as one athlete participating in one game or practice.

Curr Opin Pediatr. 2012 Dec;24(6):696-701.

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Recent Publications and Data

Concussion in the adolescent athlete.

In the school-aged athlete, new concepts, such as complete brain rest, have made school management decisions as important as sport Return-to-Play decisions

Cur Probl Pediatr Adolesc Health Care 2010 Aug;40(7):154-69

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Recent Publications and Data

Premature return to play and return to learn after a sport-related concussion

- In 43.5% of concussion cases, the patient returned to sport too soon and in 44.7% of concussion cases, the patient returned to school too soon.
- Patients with a history of previous concussion required more days of rest before being permitted to participate in any physical activity than those patients without a previous history of concussion.
- Many students with sport-related concussions experience a recurrence or worsening of symptoms after premature RTP or RTL, suggesting that they have not adequately recovered.

Can Fam Physician. 2014 Jun; 60(6): e310–e315

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Recent Publications and Data

American Medical Society for Sports Medicine - Position Statement: concussion in sport.

- Students will require cognitive rest and may require academic accommodations such as reduced workload and extended time for tests while recovering from a concussion.
- The primary concern with early RTP is decreased reaction time leading to an increased risk of a repeat concussion or other injury and prolongation of symptoms.
- Long-Term Effects:
  - There is an increasing concern that head impact exposure and recurrent concussions contribute to long-term neurological sequelae.
  - Some studies have suggested an association between prior concussions and chronic cognitive dysfunction.
- Greater efforts are needed to educate involved parties, including athletes, parents, coaches, officials, school administrators and healthcare providers to improve concussion recognition, management and prevention.

Br J Sports Med 2013 Jan;47(1):15-26

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Recent Publications and Data

Supporting the Student-Athlete's Return to the Classroom After a Sport-Related Concussion

• Educators should understand that recovering students may not be able to meet the usual expectations for class participation and homework completion until symptoms have cleared and neurocognitive function has returned to normal.

• Post-concussion symptoms often interfere with a student-athlete's ability to do academic work, participate in the classroom setting, and function interpersonally with peers and parents. Fatigue and sleep disruption may leave the student-athlete without the mental energy to participate in a full day of class work and evening studies. Cognitive deficits, which can exist even when student---athletes claim they are symptom free, may further undermine school participation.

• In more severe cases, the student-athlete may have to drop classes or even an entire semester of studies if all attempts at accommodation fail and if disabling symptoms continue even

J Athl Train 2010 Sep-Oct; 45(5):492–498

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Just as there are no two grains of sand on the beach that are the same,
there are no two concussions which are alike.

A Grain of Sand - Nature's Secret Wonder
The Amazing Microphotography of Dr. Gary Greenberg

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State of the Art

If you've seen one concussion,

you've seen

one concussion…

Expected opening: September 1, 2015

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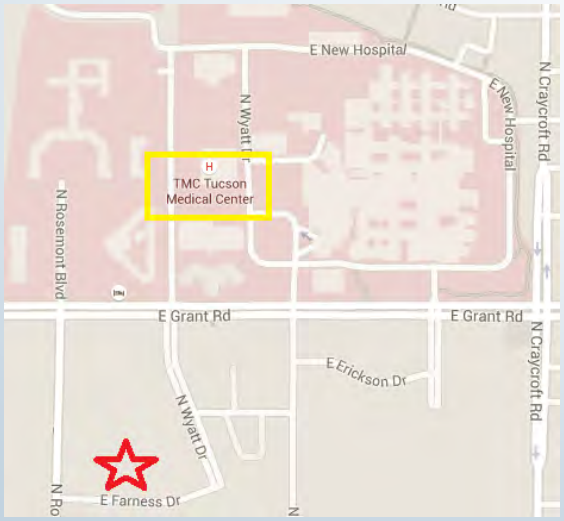
INTERIM CONTACT INFORMATION

TUCSON CONCUSSION CENTER



CONCUSSION PROFESSIONALS

- **Michael Hamant, MD**
  - Family Practice / Sports Medicine Physician
  - 520-298-2313
- **Tanya Polec, OD, FCOVD**
  - Neuro-Optometrist
  - 520-299-4100
- **Patricia Beldotti, PysD**
  - Neuropsychologist
  - 520-404-7553
- **Tom Sanderson, PT, GPS**
  - Physical Therapist
  - 520-733-6227

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TAKEAWAYS

- Concussions Will Happen
- Baseline Testing – A Standard of Care
- Sideline ATCs have a critically important role to play here
- Return To Play and Return To Learn Decisions
  - Made by qualified professionals trained in concussion diagnosis and management
- Short and Long-Term Risks Decrease When Patients Fully Recover From Concussions
- Legal Implications

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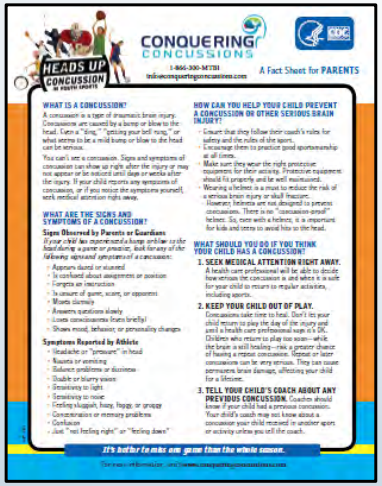
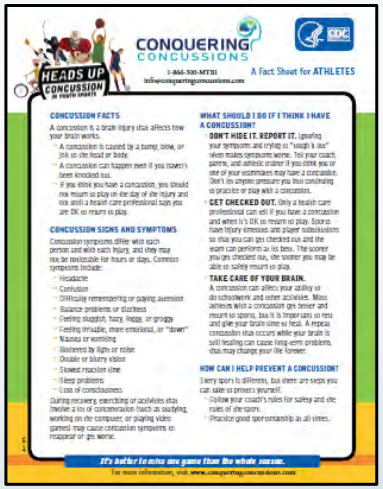
CDC FACT SHEETS

School Professionals

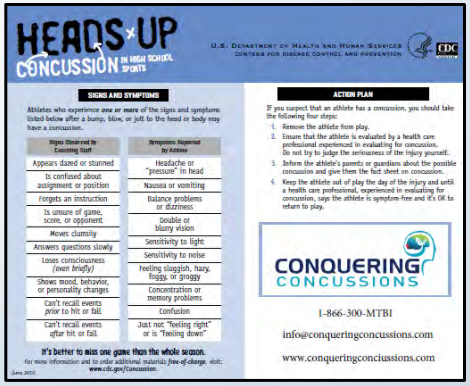
Parents



Athletes



Coaches



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"When in doubt, sit 'em out!"

www.conqueringconcussions.com

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