

Sports Medicine Monthly

Editor: Darren H. Lunow, M.Ed, ATC, LAT • Certified Athletic Trainer

MANAGEMENT OF CONCUSSION:

Complications and Long-Term Conditions



Concussions are mild forms of traumatic brain injury (mTBI) and demonstrate deficiencies and difficulties in almost every aspect of life. From remembering where the car keys are to trying to perform physics homework, there is no

turning off the switch to the brain; it is vital in every aspect of conscious and unconscious life. Much like any other injury or condition, complications and long-term concerns occur with concussions.

Mismanagement, therefore, will not only affect activities of daily living, but can also lead to long-term concerns and challenges that can be temporary or last a lifetime.

The phrase, "mild traumatic brain injury" has been used a lot recently and the condition of concussion has been seen in such prevalence in the athletic setting, that the true definition of this condition is often lost because the phrase has become so commonly used. Traumatic brain injury is classified as either mild, moderate, or severe based on the following classification structure:

Traumatic Brain Injury Classification System:

- Mild: Temporary Neurological Deficit
- Moderate: Permanent Neurological Deficit
- Severe: Death

The temporary neurological deficits seen in patients with mTBI can last for days, weeks, and sometimes even months based on severity of impact and on the effectiveness of the management. Therefore, to reduce the likelihood of long-term complications, proper concussion management requires the utilization of accurate neurological assessments, effective care, and sound policies to ensure for a successful return to academics, athletics, and daily living.

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Second Impact Syndrome



Second Impact Syndrome results from a subsequent blow to the brain during a time where the brain is already in a fragile and non-resilient capacity due to the lingering effects from a previous concussive injury. According to an article published by the American Journal of Sports Medicine in 2007:

"A study of American high school and college football players demonstrated 94 catastrophic head injuries (significant intracranial bleeding or edema) over a 13 year period. Of these, only two occurred at the college level. Seventy-one percent of high school players suffering such injuries had a previous concussion in the same season, with thirty-nine percent playing with residual symptoms. (Cifu, et. al, 2008)"



This study parallels what is most common in the research today; Secondary Impact Syndrome is much more common in the adolescent athlete than the collegiate athlete. Likewise, it also underscores the necessity of recognizing a student athlete who demonstrates the effects and residual symptoms of concussion.

When an individual sustains a concussion, *"the brain's auto regulatory mechanisms compensate for this mechanical and physiological stress and protect against massive swelling. This is thought to be accomplished by acutely limiting cerebral blood flow. (Bey, 2009)"* As a result of decreased blood flow, the brain's ability to regulate its own metabolism and ionic balances, which are necessary to re-establishing proper function, can be grossly limited for a period of up to 10 days.

continued on page 2



R. Clio Robertson, MD
 Don L. Hawkins, MD
 David R. Hicks, MD
 Michael W. Tanner, MD
 James D. Cash, MD
 David E. Nonweiler, MD

Randall L. Hendricks, MD
 David K. Wong, MD
 Bryan J. Hawkins, MD
 Perry D. Inhofe, MD
 Thomas G. Craven, MD
 Jeffrey R. Morris, DO

Ronald S. LaButti, DO
 Jeff A. Fox, MD
 Kathleen M. Sisler, MD
 Troy A. Glaser, DO
 Bradley J. Lawson, MD

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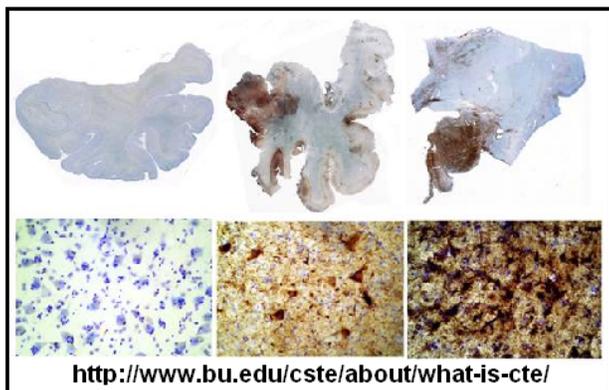
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Chronic Traumatic Encephalopathy

Information obtained from the websites for
The Center for the Study of Traumatic Encephalopathy
&
The Brain Injury Research Institute

Chronic Traumatic Encephalopathy, or CTE, is “a progressive degenerative disease” of the brain tissue of individuals who have sustained multiple head injuries. As expected, CTE has long been associated with the sport of boxing, but recent studies and research over the last 10 years, have begun to demonstrate its prevalence in athletics; mainly in football.

Up until 2009, there were only 49 cases of CTE that had been studied and published in medical research. So to say that medical science is just beginning to inspect a very large house while just arriving at the front door could be an understatement. What we do know is that as a result of repetitive trauma, there is a progressive degeneration of affective brain tissue and a progressive increase in the concentration of tau protein, which stains darker on a slide. As a result, the brain gradually deteriorates from its normal structure to that of the images seen below.



As the structure of the brain tissue begins to deteriorate, so likewise does its corresponding functions. Patients with CTE usually suffer from memory loss, confusion, difficulty in judgment, and depression. Furthermore, these changes and difficulties can initially present months or even many years after the last traumatic episode.

Second Impact Syndrome Cont...

During this window of time, affected areas of the brain tissue are left basically incapacitated and thereby unable to accurately regulate their own physiological functioning. When a second impact occurs during this time frame, even though it may be much less severe than the previous blow, the injured brain tissue subsequently loses all capability to further regulate itself in regard to blood flow and intracranial pressure and gross, rapid cerebral edema occurs. At this point in time, death has been documented to occur as fast as 2 to 5 minutes. Therefore the likelihood of arrival at an emergency room or survival is rare.



In general, any athlete who shows signs and symptoms of a concussion should always be evaluated by a health care provider who has specific training and education in concussion management. Asking to have a Certified Athletic Trainer or a Sports Fellowship-Trained Physician evaluate your athlete makes all the difference between a tragic story or a successful return to play.

Works Cited:

Tareg Bey, MD and Brian Ostick, MD. Second Impact Syndrome. *Western Journal of Emergency Medicine*. 2009 February 10.

Cifu D, Steinmetz BD, Drake DF. Repetitive head injury syndrome. *eMedicine*. 2008 March 24.

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