

## Concussion: A spiral out of control

While this article has been written to help educate about the severe implications of multiple concussions it is important to note that the story focuses on professional athletes. While young athletes tend to heal more rapidly from physical injuries than the adult athlete the brain of a young athlete is still developing and therefore requires a longer time to heal after sustaining a concussion.

A concussion is a traumatic brain injury (TBI). In fact, concussion is the most common type of traumatic brain injury. Unfortunately, concussions that are not evaluated and treated properly can be just as devastating to student athletes and their family as are more serious brain injuries. Concussions can also result in later problems with severe depression and anxiety, substance abuse disorders, difficulty with anger and aggression, and/or suicidal thoughts and attempts. These developing disorders, as a direct result of a concussion or repeated concussions without proper treatment, can spiral a young person's life out of control.

Over the past few months national and local periodicals, both online and print, have been uncovering another faction of the silent epidemic that is traumatic brain injury. Last November the tragic death of Andre Waters, former NFL defensive back, has recently brought to life the devastating connection between sustaining multiple concussions and permanent brain damage. Waters, 44, was found dead after he perished from a self-inflicted gunshot wound, the tragic result of clinical depression brought on by the repeated trauma inflicted to his brain.

A January story in The New York Times spoke of how former Harvard football player and professional wrestler Chris Nowinski, convinced Waters' family to have samples of his brain tissue examined by a neuropathologist. Multiple concussions had ended Nowinski's career and he feared Waters' death may have been the result of a similar self-punishing career. The condition, in which Nowinski believed Waters' brain was in, could not properly be determined by doing a scan of a living person, it could only be accurately examined closely under a microscope.

Dr. Bennet Omalu of the University of Pittsburgh, a leading expert in forensic pathology who also examined the brains of two former Pittsburgh Steelers who were found to have brain trauma resulting from multiple concussions, examined four pieces of Waters' brain and found devastating results. Dr. Omalu determined from his results that if Mr. Waters had lived for 10-15 more years, "Andre Waters would have been fully incapacitated." The results showed Waters' brain tissue had degenerated into that of an 85 year-old man and showed that Waters' brain resembled characteristics of the early stages of Alzheimer's disease.

"It strikes me as pretty reasonable," Dr. Brent Masel, board member for the Brain Injury Association of America, said referring to Omalu's analysis. "When you look at boxers

and the problems they've had, it makes sense that you might find this in a football player, based on what we know."

According to the Center for the Study of Retired Athletes (CSRA), in a 2001 survey of over 2,500 former NFL players, 24% of retired NFL players reported sustaining three or more concussions during their professional careers. Retired NFL players who sustained three or more concussions during their professional playing years, had a nearly three-fold risk of being diagnosed with Mild Cognitive Impairment (one precursor to Alzheimer's disease). In a new study to be published later this year, the CSRA found a similar relationship between sustaining three or more concussions and clinical depression.

Dr. Omalu discovered postconcussive brain dysfunction as a result of sustaining multiple concussions in two former Pittsburgh Steelers Mike Webster and Terry Long. Webster had suffered brain damage and became homeless before dying in 2002 and Terry Long killed himself in 2005. Nowinski, now a published author of "Head Games: Football's Concussion Crisis," wants to alert families and players about the devastating effects multiple concussions can have, especially if they go untreated or unrecognized, even some 20 years down the line.

The devastating effects of sustaining multiple concussions are not limited to the hard hitting world of professional sports. Second impact syndrome (S.I.S), the sometimes deadly result of an athlete returning to play and sustaining another brain injury before the first injury has had adequate time to heal, is a problem that can affect every age group in nearly every sport. When an unhealthy athlete is sent back into the game, the risk of sustaining another injury is substantially greater. S.I.S is characterized by brain swelling caused from intracranial pressure, permanent neurological damage and even death. The immediate identification and proper management of concussions can protect athletes from the negative consequences of additional concussions or "second impact syndrome."

Most recently Ted Johnson, 34, won three Super Bowls with the New England Patriots before multiple concussions forced him to retire in 2005. Depression and cognitive impairments have led to Johnson's addiction to amphetamines. "Ted already shows the mild cognitive impairment that is characteristic of early Alzheimer's disease," said Johnson's neurologist Dr. Robert Cantu. Dr. Cantu said Johnson's depression and cognitive problems "are related to his previous head injuries, as they are all rather classic postconcussion symptoms."

The Center for Disease Control, in an article by Wes Brown and Jean Langlois in the Journal of Head Trauma, estimated the number of concussions in sports is between 1.6 and 3.4 million annually in the United States. There are approximately 300,000 with loss of consciousness and 3 million with out loss of consciousness.