Playing With Concussions Has Serious Repercussions: 
Promoting Concussion Awareness in Government and High School Athletes

Written by:

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Summary

Concussions are a serious issue for athletes in high-contact sports. Prevention of concussions has its limitations but treatment can make a world of difference. New Jersey currently has no rules pertaining to how concussions should be handled in high school athletics. In order to gain some legislature requiring that athletes who have sustained concussions not be allowed to return to play too early, we have written to our government representatives. We have also made a video and fliers to raise awareness on the topic. In doing so, we hope to educate young athletes, coaches, and parents about the seriousness of concussions and to gain either laws or rules to be added in the coaches' rulebook that would provide protection from pressures to get back in the game for athletes who have suffered a concussion.

The Issue

According to the Centers for Disease Control and Prevention (CDC), a traumatic brain injury (TBI) is a jolt or blow to the head that disrupts normal brain function. About 75% of TBI's occurring each year are in the form of concussions. (1) A concussion is a mild form of traumatic brain injury. Even though a concussion is 'mild', head trauma can cause physical damage to the central nervous system, altering intelligence, memory storage and even personality. (2) Many times symptoms will not be apparent or immediate. Personality changes can be especially damaging to friends and family members because the individual often does not realize they had changed. Epilepsy and conditions such as Alzheimer’s disease, Parkinson’s disease and other brain disorders that become more prevalent with age are at an increased risk after a TBI.

Interesting facts from the CDC:

- 1.4 million people in the U.S. sustain a TBI each year
- 50,000 die
- 235,000 are hospitalized

- people between the ages of 15 and 19 are in the highest risk category for TBI
- Approximately 2% of the U.S. population (at least 5.3 million Americans) currently have a long-term problem due to a TBI
- individuals with a concussion history are at an increased risk for repeat concussions
- symptoms are highly variable, lasting minutes, days, weeks or longer
- recovery time is longer for children and adolescents
- sports are among the top five causes for concussions
- concussions can occur without loss of consciousness

**Signs and Symptoms:**
- As observed by coaches:
  - athlete appears dazed or stunned
  - confusion and forgetful of sports plays
  - clumsy movements
  - slow
  - loss of consciousness
  - behavior or personality changes
  - can't recall events prior to or after blow

- As reported by athletes:
  - headache or "pressure" in head
  - nausea/vomiting
  - balance problems
  - dizziness
  - double or blurry vision
  - light and noise sensitivity
  - confusion
  - memory/concentration problems
  - sluggish feeling

**symptoms may not be reported for hours or days after the injury. If a concussion is suspected due to any blow to the head, the athlete should be taken out of the game.**

**Research and Case Studies**

The issues surrounding athletes and sports injury, particularly concussions, are well researched due to the serious problems athletes sustain after concussions. Ellen E. Yard and a colleague set out to determine whether or not U.S. concussed high school athletes complied with the recommended return-to-play guidelines during the 2005-2008 school years. Data was gathered through certified athletic trainers who submitted injury reports for concussed athletes in five boys’ sports (football, soccer, basketball, wrestling, baseball) and five girls’ sports (soccer, basketball, volleyball, softball) through High School Reporting Information Online. The study represented 100 U.S. high schools. The study found that 395, 274 concussions were sustained and that at least 40.5% of concussed athletes returned to play before the recommended time of the AAN return-to-play guidelines. Males were more likely...
to return earlier than females. The researchers concluded that too many adolescent athletes are failing to comply with the recommended guidelines, and that sports medicine professionals, parents, coaches, and sports administrators need to work together to ensure that athletes follow the guidelines. (7)

Recent studies have shown that the negative effects of sports concussions on cognitive and motor function can last up to three years after the concussion. Beaumont et al. set out to study the effects of concussions more than 30 years later. In their study, 19 healthy former athletes, averaging age 60, who sustained their last sport-related concussion around age 26, were compared to 21 healthy former athletes of the same age that never had a concussion. The tests administered found that athletes who did suffer from a concussion had lower performances on neuropsychological tests of memory and response inhibition, significantly reduced movement speed, and a prolonged cortical silent period, meaning slower neurological responses. The researchers concluded that detrimental effects from concussions can be chronic for cognitive and motor function in athletes. (1)

The major issue with athletes and concussions is their return to the field after sustaining a concussion. Cynthia W. Majerske et al. studied evaluated 95 student athletes at a University-based sports concussion clinic. Verbal memory, visual memory, visual motor speed, and reaction time were all scored up to 33 days after concussion was sustained. The results of the scores were compared based on the activity levels of the athletes after their concussions. For all of the scores, it was found that the activity level was very highly related. The study was able to conclude that activity level after concussion severely affects recovery, and that athletes engaging in high activity levels after their concussion have worse neuro-cognitive performances than those who are moderately active after concussion. (4)

There are different levels of concussions, classified on their severity, and as such, different concussion management guidelines recommend different return-to-play guidelines for each level. There have been some recent guidelines that suggest that athletes with Grade 1 concussions (the mildest) can return to the field if they show no symptoms for 15 minutes. Lovell et al. set out to determine whether or not this guideline was well founded. Forty-three high school athletes underwent neuropsychological tests and symptom ratings prior to the athletic season, and twice more during their first week following a mild (Grade 1) concussion. Results showed that the athletes demonstrated a decline in memory and a severe increase in self-reported symptoms compared to their base line performances (before concussion) even 36 hours after the injury. This study concludes a need for a re-evaluation of some concussion guidelines involving mild concussions and return-to-play. (3)

There are many case studies available of concussed athletes. Even more interesting, is what is learned through case studies. Shannon Logan and colleagues performed a case study on an 18 year old high school football player, who had a clean medical history. While walking toward the sideline during a game, the athlete removed his helmet and appeared confused. He fell, began to vomit, and complained of severed head pain, nausea, and dizziness. The athlete recalled being hit two different times during the game, but did not report the instances to the coach or trainer. The athlete continued to play in the game despite feeling nauseas and having a headache. Once the vomiting began, paramedics arrived to treat the athlete for symptoms associated with concussion. The remarkable finding of this study was that the
athlete remained conscious and aware. In the ambulance, the patient suffered from a seizure and later, tests revealed a coma score of 15, based on the Glasgow coma scale, when the patient never lost consciousness and all motor and sensory reactions were normal. The athlete was not able to return to sports for one year, as he suffered from a subdural hematoma, which is life-threatening. This case study altered the definition of a concussion, which has no universally accepted definition yet, so that the loss of consciousness is not always observed. Logan et al. then mentioned another study which revealed that most sports-related concussions do not result in the loss of consciousness. This finding causes further need to educate athletes, coaches, and parents about concussions. (2)

Real Life Case Studies

Recently, the University of Florida’s starting quarterback Tim Tebow suffered a serious concussion in a game against Kentucky. Tebow’s was hit in the chest and his head flew back and struck another player’s knee. The impact of this hit knocked him clean out then he was taken to a nearby hospital for overnight monitoring(8). Due to recent studies he has been subjected to numerous testing and close monitoring. Every player at the University of Florida has a baseline test in order to make sure they can be closely monitored should the event rise that they suffer head trauma. The test includes balance, memory, holding feet together, and other simple tests to which team doctors measure towards the player’s baseline performance. Tebow needed to be asymptomatic for longer than he had symptoms in order to be eligible to play again. Eventually, he was cleared to play against LSU, however it was clear that Coach Urban Meyer did not want his quarterback to take too many impacts. This was evident with his play calling. Normally Tebow is used as a main carrier of the ball in the offense however for this game he was not. This evidence possibly points to him returning too early, however the world will never know. The University of Florida has one of the most extensive programs in the nation when it comes to player safety, however more are needed. This is not the only incident involving serious head conditions and pro athletes. Former NFL player Merril Hoge had experienced a concussion, then proceeded to play the season without tests or anything. By the middle of the season he suffered a life threatening hit which brought him to the point of where had to be driven to practice because he was not even capable of remember his children’s names(9)

Another case of a famous athlete who took too many blows to the head is with Wayne Chrebet. Chrebet was a famous wide receiver for the New York Jets who played football for 11 years. He was a walk-on to the team and was very undersized. He was well known for his toughness and sure hands. In an interview he said there are good days and bad days. He is capable of reciting plays from his offense, however he cannot navigate highways or remember simple things like dates and times.(10) During his pro career, Chrebet suffered 6 documented concussions and was forced to retire at age 34. However, it is rumored he suffered many more than that in his pro, college, and even high school career. There is a study out that says athletes who suffer 3 or more concussions are more likely to have cognitive problems such as memory lapse. The NFL has denied this statistic and is spending millions of dollars in order to do their own study.(10) These are just a few of the cases involving athletes and concussions, there are many more cases some even worse than these stated above.
Possible Solutions

The University of North Carolina has been on the cutting edge of research when it comes to head trauma. Recently, head football coach Butch Davis has ordered that the team cut back on full contact practices. The reason for this was a few weeks prior the team had fitted their players' helmets with a HITS sensor, a sensor that is used to measure the amount of force a player takes to the head. The results measured, "82gs, 79gs, 75gs, 79gs, 67gs, 60gs, 57gs, and 53gs for a non full contact practice" (11). To put things into perspective if you were to drive your car 25mph into a wall with no seatbelt on, the impact of your head hitting the windshield would be about 100gs (11). This prompted the university to test new helmets and see if a new state of the art helmet would help reduce impacts. These studies are still up in the air but it is hypothesized that the helmet cannot further reduce the impact, only close monitoring and reduction in the amount of impacts will help reduce head trauma.

Community Service Project

Our group's goal is to address post-concussion treatment in our communities. We hope to bring more light to this serious problem that has gone undetected in our society for so long. Recently concussions have received a lot of press in the National Hockey League and National Football League due to the tragic situations of their athletes who did not receive proper treatment for their concussions. We will make a difference in our community by targeting two different audiences: officials with authority to push laws and the athletes themselves. We believe lawmakers and athletes are the most effective targets for a number of reasons. Laws or guidelines instated on post-concussion treatment will protect the athletes' health. They will also alleviate the pressure from fellow teammates, coaches and parents for the athlete to return to the game too soon. By educating the athletes on the symptoms of concussions they are able to take their health into their own hands. Our hope in the future is to have a system in place that eliminates long-term effects of concussions because of careless choices to keep the athlete in play.

To target the lawmakers, we will write to our state representatives. Currently, New Jersey has no laws in place pertaining to post-concussion treatment in public school athletics. We are urging the representatives to understand the seriousness of proper concussion treatment and consequences of returning too early. The policies in handling of concussions vary from school to school and coach to coach. We are encouraging law makers to seek standardization of these policies. We have prepared letters and pamphlets for the representatives. One letter has been written and sent to Senator Bob Smith, who represents the 17th district, which includes New Brunswick. By doing so, we are more likely to get his attention due to the recent media coverage of the Rutgers football team. Letters will also be written to different sports associations addressing the same concerns over high school football players. They are attached below.

To reach the athletes, we have developed a short video that will be posted on youtube, distributed to local school districts and submitted to TV stations like RUTV and PBS. Our goal is to reach as many athletes as possible. It is important they understand the health consequences they may have to live with for the rest of their lives as result of a mistreated concussion. The video is an entertaining public service announcement and contains information and facts about concussions, what to do if you think you have a concussion and the dangers of playing with a concussion. It encourages athletes to stay out of the game until
In an effort to reach the parents and coaches of athletes and the community and bring to light the consequences of mistreated concussions, we have also written editorials to a number of local newspapers. Attached below.

**Letters to Representatives**

*The following is our letter to Senator Bob Smith:*

Anonymous  
22 Maple Street  
Hope NJ, 12345

The Honorable Senator Bob Smith  
New Jersey Senate  
State House  
P.O. Box 099  
Trenton, NJ 08625-0099

November 3, 2009  

Dear Senator Smith,

The purpose of this letter is to request your support for the following issue that is of great concern to me. I have been a resident of this state for over 21 years and am a registered voter.

A concussion is defined as an impact to the head that causes a change in mental status. The changes in mental status include memory problems, dizziness, confusion, and loss of consciousness, all of which can be temporary or permanent. College and high school football players suffer from many concussions each year. A study done over a 20 year period determined that 15-20% (200,000-250,000 players) of high school football players suffer concussions each year. Furthermore, players who sustain multiple concussions in a season have more severe effects after sustaining their second concussion.

New Jersey has no laws concerning the well-being of college and high school football players who sustain a concussion. Concussions are very serious and can have detrimental effects (dementia, permanent amnesia, paralysis) if not properly treated. The effects of a concussion cannot always be seen, since loss of consciousness does not always occur, and so concussions are often overlooked or misunderstood as not being particularly serious. Young athletes at the college and high school level need to be protected from the pressures to return to the field too early after sustaining a concussion. Therefore, a law should be created that obligates college and high school football coaches to pull players from a game if they have suffered a concussion, and cannot be allowed to return to the game. Proper rest is essential in treating concussions, and athletes should not push themselves due to pressure from peers or coaches to play.
Football is a high-contact sport with a high risk for concussions to occur. Athletes have lives beyond their sports careers, and it would be a shame to see young, promising athletes suffer later on in life. Former President Theodore Roosevelt even considered outlawing football after 19 college football players were killed or paralyzed from brain and spinal cord injuries in 1904. Outlawing football is not necessary and extreme. Our young athletes simply need more rules and regulations that protect them from pressures to play while injured.

I would greatly appreciate your consideration and action on the above issue. This issue is extremely important to me, and upon reflection I feel certain that it will be important to you. Thank you for taking the time to read this letter.

Respectfully,

Anonymous
Concerned Citizen

*Our second letter that has been sent to a number of different representatives:*

To Representative,

We are writing to you to raise awareness about the seriousness of concussions an athlete might sustain during a game and the importance of post-concussion treatment. A concussion is a traumatic brain injury (TBI) caused by a jolt or blow to the head. People between the ages of 15-19 are at the highest risk for a concussion. Concussions range in severity from major to minor; even minor concussions interfere with brain function and affect memory, judgment, reflexes, speech, coordination, and balance. In some cases, symptoms may not appear until hours or days after the injury. For this reason individuals need to be removed from the game and receive proper treatment immediately when sustaining a blow to the head.

Even though a concussion is a common injury, there are many reasons an athlete may not be removed from the game promptly. First, many symptoms associated with concussions are subtle and are easy to miss by an untrained individual. Concussions are not a 'visible' injuries such as a broken leg or sprained ankle. For this reason pressure may come from team mates or coaches for the injured athlete to return to the game prematurely. Also, the injured athlete may not recognize or want to admit they are injured because they do not want to leave the game. Proper post-concussion care is essential in preserving brain function and preventing.

We hope this letter will be of use to athletes, coaches, and parents.

When a concussion is suspected, look for the following symptoms:

- momentary confusion
- inability to recall incident (and sometimes retrograde/anterograde amnesia)
- irritability
- nausea/vomiting
- dizziness
- ringing in the ears
• headache

Symptoms that may appear hours or days after the injury:
• memory/concentration problems
• sensitivity to light/ noise
• sleep disturbances
• irritability
• depression

Post-concussion treatment should not be taken lightly. People who sustain a concussion are more likely to sustain repeated concussions. If anyone suffers the above symptoms resulting from a blow to the head for longer than 15 minutes they should not be allowed to return to play for 1 week. A person who suffers multiple concussions can accumulate neurological damage from each incident. Rest is the best treatment for a concussion. Drugs that thin the blood, like ibuprofen, should be avoided to prevent bleeding in the brain. We want to raise awareness to the life long risks associated with improper post-concussion treatment.

The consequences of not properly treating concussions are great. Athletes that return to the field early after suffering from a concussion suffer more consequences. Studies have shown that returning to high activity levels shortly after concussion leads to slower recovery times, and often aggravates already existing symptoms. The short and long-term visual and verbal memories in athletes are also worsened. In addition, visual motor speed and overall reaction times are significantly more reduced if an athlete does not rest long enough after suffering from a concussion. Cognitive function also declines after having a concussion, but it declines at a faster rate if a player returns to the sport too early. The effects of a concussion are immediate, and unavoidable, but because the effects can be chronic, any athlete who returns to play early, suffers from more extensive damage that can be chronic. In more serious cases, if an athlete immediately returns to the field, subdural hematomas can result, and are life-threatening. Although immediate effects are not avoidable, long-term damage can be significantly reduced if athletes take the proper time to recover after suffering from a concussion. This is important to realize, as sports careers are not long-lived and retired athletes already deal with many physical issues as a result of their sports careers.

Sincerely,
Anonymous

Our third letter to Frank Palone:

Dear Congressman Frank Palone, Jr.,

Hoping this letter reaches you, I am an anonymous, concerned citizen and I am writing to you out of concern for the numerous incoming football players of New Jersey and perhaps the entire country. If you are a football fan and even if you were not, you would have
noticed the many concussions that are being sustained around the National Football League and also within the college football world. Concussions are becoming more of a problem for football players on all levels and are a very serious matter that even though have gained national recognition, are still showing up consistently more on the level of high school athletes. Even as the precaution levels are high as ever on the college and pro fields, the point has not seemed to cross high school athletes seeing as they are showing to be at more of a risk than college and pro players. A big reason for this is that players are being pushed into continuing to return to the game of play by players and coaches who feel that even if they show signs of a concussion they should still play if they seem to still be able to stand. Truth is that concussions are brain injuries that cannot really be looked into unless it’s by a professional who know what signs and symptoms to look for. I myself was a high school athlete and I know first hand how players can be pushed into returning to a game regardless of showing signs of a major injury. If myself or other players where still able to walk and see straight then we would be talked into going back out to perform by coaches and players who feel that you can make a difference in the outcome of a game without paying more concern to your well-being as a player and person. This act of selfishness is shown to still be going on today in the world of high school athletics as a result of surveys given to high school athletes. On the pro and college level more steps are being taken to carefully treat a player who is showing signs of a concussion but I believe the only reason was because of laws and policies that were implemented into the level of play. Such policies however have not found their way down to high school athletes. Maybe it is because of the many high schools around the country or the not so high interest in the risk of concussions just because it is high school students we are talking about. But whatever the reason is for lack of interest or a show in lacking interest, there needs to be something done to ensure the safety and well-being of future athletes seeing as concussions is a serious matter and once someone shows signs of having one, they need to immediately be attended to by a professional and not be forced into returning to the playing field. If a person suffers a concussion and returns to play and ends up suffering from another injury the results could be severe and even fatal. In two similar instances, two high school football players received concussions during a game. After both players were not carefully looked at they returned to continue playing and continued to hit players and be hit themselves. As a result of the continuous blows to the players, one at the end of the game couldn’t stand up straight and had to be rushed to the hospital and later went into a coma and the other unfortunately passed away from the continuous play after his concussion. I am bringing this issue to your attention with hopes of finding a solution that can be implemented into high schools that will not allow this to go on any further. Just as there are policies for NFL and college players to be looked at by a professional after sustaining a possible concussion, high school teams should have to follow the same guidelines which will serve as a better outcome for players in the future. Your help is greatly needed not only in New Jersey but around the country as well because high school athletes are our future regardless if it is in sports or the business world and we have to fight for them to be able to see this future. Thank you for your time and I hope that you take this matter into consideration and help put a stop to this issue.

Sincerely,

A very concerned citizen and ex-player
Included with each letter to the state representative will be an accompanying flier:

**Athletes and Concussions**

Protect the health of school-aged athletes by demanding proper post-concussion treatment through implementing new laws and standards.

If any of the following symptoms are present, seek medical attention:

- Prolonged headache or dizziness
- Vision or eye disturbances, including pupils that are bigger than normal (dilated pupils) or pupils of unequal sizes
- Nausea or vomiting
- Impaired balance
- Prolonged memory loss
- Ringing in the ears
- Loss of smell or taste

Returning to the game too soon means:

- Slower recovery and further aggravated symptoms.
- Significantly reduced short and long-term verbal and visual memory.
- Visual motor speed and reaction time are reduced.
- Overall cognitive function declines at a more significant rate.
- In more serious cases of concussions, subdural and epidural hematomas occur.
- Athletes develop forms of amnesia that can be chronic.

**Signs and Symptoms**

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<thead>
<tr>
<th>Immediate</th>
<th>Hours or Days After</th>
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<tbody>
<tr>
<td>Confusion</td>
<td>Memory or concentration problems</td>
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<td>Amnesia</td>
<td>Sensitivity to light and noise</td>
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<td>Headache</td>
<td>Sleep disturbances</td>
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<td>Dizziness</td>
<td>Irritability</td>
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<td>Ringing in the ears</td>
<td>Depression</td>
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<td>Nausea or vomiting</td>
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<td>Shurred speech</td>
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<td>Fatigue</td>
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Flier targeting athletes:
Editorials Targeting the Community:

Editorial 1:

Sent to:
To the editor,

I am writing to express my concern about athletes and concussions; particularly the treatment of concussions. This is a buzzing topic that has been in the news a lot recently. A congressional hearing was held in the last week to investigate how the NFL and union handles disability claims on its players. I would like to see standards and education implemented to prevent athletes from returning to play before fully recovering from a concussion.

Concussions are a serious matter, but often overlooked. A concussion is a brain injury that is a result of trauma or jarring. A NFL study claims that players aged 30-45 are 19 times more likely to develop dementia and related brain disorders from repeated concussions than the average population. Retired athletes from a variety of sports suffer similar consequences, headaches, dizziness, and depression, as a result of the repeated concussions. Some people may claim the chance of a concussion is a risk an athlete takes when they sign the contract. This may be true, but it is the treatment of the concussion that is of concern. Frequently athletes are taken out of the game longer for a sprained ankle than a blow to the head. Once an athlete suffers one concussion they are more likely to sustain concussions in the future. Furthermore, the brain damage resulting from multiple incidents can be additive. Organizations like the NFL implementing standards and education on how concusion are treated will have a trickle down effect to the high school athletes.

Sincerely,

Anonymous

Editorial 2:

Diane Radwanski
Ethics in Science
Editorial

Sent to: The Star Ledger

Mailing Address: The Star-Ledger
1 Star-Ledger Plaza
Newark, NJ 07102-1200
Editorial (cannot exceed 200 words):

With the recent success of the Rutgers Football Team, it is important to bring to light the physical issues that young athletes inevitably face in their careers. High contact sports like football, lead to numerous injuries. Some injuries, such as broken bones, are obvious and coaches know that it is time to pull a player from the field. However, there are other injuries that are not so obvious, and have been mistreated in the past. Concussions are a problem among high school football teams. Zack Lystedt was a teenage football player who suffered a concussion during one of his games, and was put right back into play, taking more hits. After the game, he collapsed and needed brain surgery. This happened in 2006, and today, Zack is still in a wheelchair. New Jersey has no laws requiring coaches to pull players from the field and not allowing them to return to the field if they have suffered a concussion. A law needs to be made to protect young athletes from the pressure of having to return to the field too early if they are showing signs of a concussion or have not rested enough for a full recovery.

Editorial 3:

Greater Media Newspapers
P.O. Box 5001
3499 Route 9 North, Suite 18, Freehold NJ 07728

ebsent@gmnews.com

To the editor,

I am writing to you in hopes of raising awareness about the serious effects of a concussion that an athlete may suffer during a game, but more importantly, to stress the importance of post-concussion treatment.

A concussion is a traumatic brain injury caused by a blow to the head. It is difficult to tell exactly when an athlete is suffering a concussion. Some of the immediate symptoms include confusion, anterograde and retrograde memory loss, dizziness. Since diagnosing a concussion is tricky, being that symptoms are not always there, athletes who receive a jolt to the head during a game should be taken out right away and observed just to be on the safe side. Brain damage due to a concussion can be life-long.

Post-concussion treatment is essential. Rest is key. Though a concussion itself may not be preventable, its lifetime effects can be avoided or at the least less severe. An athlete must not participate in the game until full recovery. Blood-thinning drugs such as Ibuprofen should not be taken, as they will ease bleeding into the brain.

Unlike some other states, New Jersey does not have laws enacted for high-school or college athletes who have suffered a concussion. A law should obligate the coach to remove the player from the game if a hit to the head is witnessed. Without proper laws, some athletes feel pressured to get back into the game and therefore do not give the concussion the proper healing time.
Sincerely,
Anonymous

References


(9) http://www.sun-sentinel.com/sports/other/sfl-br-tebow-s100109sboct01,0,2220378.story


ON CBS, 60 MINUTES DID A SHOW LAST NIGHT(10/11/09) ABOUT CONCUSSIONS AND THE AFFECTS ON PLAYERS LATER DOWN THE ROAD. IM SURE THERE IS THE FULL SHOW SOMEWHERE ON-LINE BUT I HAVE POSTED A LINK BELOW THAT LEADS TO A PREVIEW OF THE SHOW.