

GPS Prevention Practice: Traumatic Brain Injury



John R. Kasich, Governor
Tracy Plouck, Director

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By Kathryn Coxe, MSW student at The Ohio State University

Overview

Traumatic brain injury (TBI) is an often overlooked and relatively unknown problem to most Americans. TBI is sometimes referred to as the “invisible” condition, with many of the signs and symptoms being too subtle to detect, or the damage occurring to an unseen, but vital and fragile organ. According to the Center for Disease Control and Prevention, 1.7 million people in the United States sustain a traumatic brain injury each year, and of those injuries approximately 53,000 result in death.¹ A recent report compiled by the Brain Injury Association of Ohio totaled 118,760 people living with TBI in Ohio.² Despite the unfamiliarity of this condition, TBI is a serious issue impacting people of all ages, races, and genders. In some cases, TBI results in permanent disability. An estimated 125,000 people each year are rendered permanently disabled as the result of a TBI.³

What is a Traumatic Brain Injury?

A traumatic brain injury can be defined as:

“...damage to brain tissue caused by an external mechanical force as evidenced by medically documented loss of consciousness or post traumatic amnesia (PTA) due to brain trauma or by objective neurological findings that can be reasonably attributed to TBI on physical examination or mental status examination.”⁴

Common Symptoms

Concussions are considered to be mild traumatic brain injuries, but the effects can still be devastating. Concussions and more severe TBI present a wide range of symptom variability, and not all symptoms are apparent at the time of injury. In fact, brain injuries tend to get worse before they get better because brain cell death may continue to occur up to several weeks post-injury⁵. Depending on the amount of neuronal damage, a person may exhibit any or all of the following symptoms⁶:

Mild TBI Symptoms

- Headache
- Confusion
- Lightheadedness
- Dizziness
- Blurred vision or tired eyes
- Ringing in the ears
- Bad taste in the mouth
- Fatigue or lethargy
- Change in sleep patterns
- Behavioral or mood changes
- Trouble with memory, concentration, attention, or thinking

Severe TBI Symptoms

- Headaches that worsen or do not go away
- Repeated vomiting or nausea
- Convulsions or seizures
- Inability to waken from sleep
- Dilation of one or both pupils of eyes
- Slurred speech
- Weakness or numbness in the extremities
- Loss of coordination and/or increased confusion
- Restlessness or agitation

Leading Causes of TBI

According to the CDC, most TBI related incidents are the result of falls (35.2%), followed by motor vehicle and traffic accidents (17.3%), struck by/against events (16.5%), assaults (10%), and other events (21%)⁷. The elderly are especially at risk for falls, while athletes are especially at risk for being struck by/against an object during a practice or game.

Correlation of TBI to Mental Illness, Substance Abuse & Criminal Offense Outcomes

In addition to the extensive cognitive functioning deficits, people who have sustained a TBI often develop neurological disorders such as PTSD, depression, anxiety, mood disorders, personality changes, or increased suicidal ideation or attempts. In a study done by Perron and Howard (2008)⁸, TBI increased the likelihood of developing psychotic symptoms including paranoia, anxiety, depression, and phobias. Furthermore, the study also reported that people with TBI are more likely than those who have not sustained a TBI to develop a lifetime of substance abuse problems. Specifically, Ecstasy use was increased by 16%, crack and powdered cocaine use was increased by 15%, marijuana use was increased by 8%, and heroin use was increased by 6%. Other studies noted that TBI survivors who abuse substances were users prior to injury and that drug use increased post injury^{9, 10}. In addition, alcohol and other drugs typically have an increased effect on TBI survivors, causing drug use to be even more dangerous.

Not only do risks for mental illness and substance abuse disorders increase, but several studies have reported findings for increased delinquent behavior in youth who sustained a mild or severe TBI. Adolescents who sustained a TBI were more likely to commit violent offenses earlier in life than those without any suspected TBI. These adolescents were also more likely to re-offend several more times throughout their lives.

It is important to note the strong correlation between TBI, mental health outcomes, and substance abuse problems since it has significant effect on communities. In the event of a TBI, the person is more likely to develop mental illnesses, long term substance abuse problems, and commit violent crimes. Youths are more likely to perform poorly or drop out of school because of issues with cognition, rendering academic achievement significantly more difficult. TBI has substantial impact on society, and all forms of head injuries should be taken seriously because of the potential negative consequences for communities.

Prevention Practices

Prevention of TBI is possible by following safety protocols and taking precaution with indoor and outdoor activities. Special precautions should be taken during the summer months when outdoor activities and more risky behaviors become popular.

- When riding a bicycle or motorcycle it is important to wear a helmet, regardless of where you are riding or your riding proficiency. Helmets provide a safety barrier by allowing the impact energy to transfer through the helmet, rather than your head.
- It is particularly important to wear a helmet and use proper safety equipment, such as mats, when performing contact and other sports such as hockey, cheerleading, baseball, softball, skiing, snowboarding, skateboarding, or rollerblading. TBI's resulting from sports injuries are 100% preventable when proper equipment is utilized.
- Take precaution when doing common outdoor sports such as soccer, various water sports, or neighborhood pick-up games.
- Always wear a seatbelt when driving or riding in a motorized vehicle. If a seat belt is provided, wear it! Seat belts can stop a person from being thrust forward or sideways in the event of a sudden break or accident, decreasing the possibility of head injury by being struck by or against mechanisms.
- For seniors, it is important to make sure the home is safe and free of accident-prone hazards. Make sure rugs lie flat and common walk areas are free of clutter to avoid tripping. Use nonslip mats in the shower and install hand rails in the bathroom and along stairways. If necessary, carry an emergency button around the home at all times in case of a sudden fall.
- For young children, it is important to make sure stair gates are tightly secured and windows remain closed or blocked with a secure screen to avoid children falling down the stairs or out of a window.
- Avoid risky behaviors such as car surfing, excessive alcohol use, engaging in fights, or experimenting with flammable or explosive materials.

The Importance of Having an Emergency Plan

Having an emergency plan in place in the event of an accident can help save a life. Below is a list of safety protocols anyone can follow in the event of an accident where TBI or spinal injury is suspected, adopted from the National Cheer Safety Foundation's widely used Catastrophic Emergency Plan¹¹:

- If a head injury of any severity is suspected, dial 911 immediately. The time directly following a TBI is the most crucial in determining a patient's outcome. Calling a certified professional who knows how to properly handle a trauma incident will greatly improve a person's chances for optimal recovery. It is unsafe to try to have the person stand or move from his or her current position because the present health state is unknown until further tests are conducted. Moving or transporting a person yourself may only result in further damage.
- Communication between you and the emergency personnel is crucial. It is important that the emergency team knows exactly what happened so the person may be assessed and handled properly. Staying calm in the event of any emergency will aid in direct, accurate communication.
- When possible, always be prepared with a first aid kit, splint kit, and automated external defibrillator (AED). This is particularly important for coaches and sports teams, but is also valuable for healthcare providers, day care providers, parents, and teachers. Knowledge on using these safety tools is also very important and could mean the difference between life and death.

Important Resources for Healthcare Providers, Prevention Specialists, Coaches, Athletes, and Community Members

- <http://www.Brainline.org>
- <http://www.Sportsconcussions.org>
- Brain Injury Association of Ohio
<http://biaoh.org>
- Center for Disease Control and Prevention
<http://www.cdc.gov/TraumaticBrainInjury/index.html>
- Catastrophic Emergency Plan – National Cheer Safety Foundation,
<http://www.nationalcheersafety.com/emergencyplan.pdf>
- Suicide Prevention Hotline (Ohio) – 614-221-5445
<http://www.ohiospf.org>

Endnotes

- ¹ Coronado, V., Xu, L., & Basavaraju, S. (2011). Surveillance for Traumatic Brain Injury—Related Deaths—United States, 1997-2007. *Centers for Disease Control and Prevention*. Accessed on January 18, 2013.
- ² Will, D. (2011). Ohio TBI Prevalence Estimates. *Brain Injury Association of Ohio*.
- ³ *Brainline.org*. (2012). Retrieved January 18, 2013 from http://www.brainline.org/landing_pages/categories/abouttbi.html.
- ⁴ *The Traumatic Brain Injury Model Systems Care*. (2012). [PDF document]. Retrieved January 18, 2013 from <https://www.tbindsc.org/Documents/2012%20TBIMS%20Slide%20Presentation.pdf>.
- ⁵ *Sportsconcussions.org*. (2012). Retrieved January 25, 2013, from <http://www.sportsconcussions.org/ibase/line/home/q-a-a.html?id=87>.
- ⁶ *National Institute for Neurological Disorders and Stroke*. (2012). Retrieved January 18, 2013 from http://www.ninds.nih.gov/disorders/tbi/detail_tbi.htm#193613218.
- ⁷ *Brainline.org* (2012). Retrieved January 25, 2013, from http://www.brainline.org/landing_pages/categories/prevention.html.
- ⁸ Perron, B. E., & Howard, M. O. (2008). Prevalence and correlates of traumatic brain injury among delinquent youth. *Criminal behavior and mental health*, 18, 243-255. doi: 10.1002/cbm. Accessed from <http://deepblue.lib.umich.edu/bitstream/handle/2027.42/60997/fulltext-1.pdf?sequence=1> on January 22, 2013.
- ⁹ Kreutzer, J. S., Witol, A. D., & Marwitz, J. H. (1996). Alcohol and drug use among young persons with traumatic brain injury. *Journal of Learning Disabilities*, 29 (6), 643-651.
- ¹⁰ Corrigan, J. D., Rust, E., & Lamb-Hart, G. L. (1995). The nature and extent of substance abuse problems among persons with traumatic brain injuries. *Journal of Head Trauma Rehabilitation*, 10 (3), 29-45.
- ¹¹ <http://www.nationalcheersafety.com/emergencyplan.pdf>. (2009-2010). Accessed on January 25, 2013.