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What is a Brain Injury? What Should I Do About It?

About two months ago, I came across an article titled *Adrian Peterson's Son's Death Should Not Be Just Another Brain Injury Statistic* - the title intrigued me. The statistics towards the end of the article astounded me."Every 40 seconds, another American youth enters an Emergency Department with a new brain injury (over 765,000 ED visits each year); More than 80,000 American youth are hospitalized due to a brain injury each year; More than 11,000 American youth die due to a brain injury each year; Approximately 1,300 American infants suffer a severe or fatal brain injury from child abuse each year (it is estimated about 75-85 percent of all brain injuries are not labeled 'severe' or 'fatal')" (Donohue). I felt inspired to make a change, and soon found out that these numbers relating only to youth, although shocking, were fractional in comparison to the magnitude of the whole issue. As I discovered how common all different severities of brain injuries are, I decided that I needed to do something in regards to preventative measures and raising awareness. I also found that many symptoms that I, a survivor of brain injury, deal with are very common.

Brain injuries, like the brain itself are extremely complex, difficult to diagnose and challenging to treat. "Brain injury is unpredictable in its consequences. Brain injury affects who we are, the way we think, act, and feel….The most important things to remember: No two brain injuries are exactly the same; The effects of a brain injury are complex and vary greatly from person to person; The effects of a brain injury depend on such factors as cause, location, and severity" (Brain Injury Association of America). One individual who encounters a brain injury

may experience vastly different effects than another. The brain controls absolutely everything one does. Any ordinary person doesn't even think about many of the things their brain constantly tells their body what it needs to be doing, like breathing. It would only make sense then, that when this vital organ gets damaged that they would have severe effects, depending of course, on how severely it gets damaged. Another interesting fact about brains is that different areas of your brain have been found to control different areas of one's life. This means that if one's brain is damaged in the temporal lobe, [s]he would probably experience a loss in auditory functioning, whereas if the same person's brain was damaged in the frontal lobe, [s]he would experience a loss in emotional stability. "It is this indefinite nature of brain injury that makes treatment unique for each individual patient" (Lehr). Because everything that makes a person unique derives from the brain, damage to that organ would make the injury, and thus the treatment unique. Depending on one's personality (before and after injury), where the brain was damaged, how severely it was damaged, and other factors, it may be difficult to even recognize one patient's brain injury from another's.

Although the results of a brain injury are extremely unpredictable, the medical field has narrowed ways that you obtain a brain injury into two categories; non-traumatic and traumatic. Non-traumatic brain injuries are stroke, brain aneurysm, brain tumor, hypoxia, anoxia, toxic or metabolic injury, infection and alcohol or drug abuse (*Acquired Brain Injury*). While the definition for a traumatic brain injury (TBI) is a "traumatically induced physiological disruption of brain functioning" (Weinstein and Romesser). A traumatic brain injury "can occur when something outside the body hits the head with significant force" (U.S. Department of Veteran Affairs).

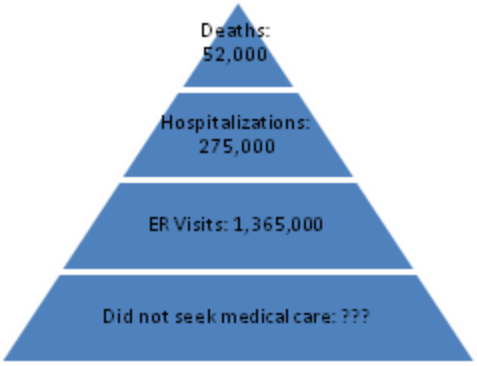
There are numerous ways someone could obtain a traumatic brain injury. However, in order to assess the initial impact on the brain, the medical field uses the Glasgow Coma Scale. "The Glasgow Coma Scale (GCS)4, a clinical tool designed to assess coma and impaired consciousness, is one of the most commonly used severity scoring systems. Persons with GCS scores of 3 to 8 are classified with a severe TBI, those with scores of 9 to 12 are classified with a moderate TBI, and those with scores of 13 to 15 are classified with a mild TBI" (Centers for Disease Control and Prevention). There are 3 things EMTs evaluate when they see a new patient; eye movement, verbal response, and motor response. These categories each range from normal to none. "We're testing how well the brain is working, both at cognition and motor function. That is to say, how well is the patient able to process information and move their body" (Whitehead).

While the Glasgow Coma Scale assesses the initial damage and likelihood of survivability, the GCS cannot tell you what has actually happened inside of the head. MRIs and CAT scans make it possible to observe brain cells, blood, and cerebral spinal fluid inside of the skull. Trained physicians read these scans and are able to determine abnormalities that indicate hemorrhaging, cellular damage, damage to synapses or other structural issues. Two common injuries to the brain are diffuse axonal injury and traumatic subarachnoid hemorrhage.

Diffuse axonal injury (DAI) is a shearing and stretching of the nerve cells at the cellular level.... Axons connect one nerve cell to another throughout the brain, like telephone wires. Widespread axonal injury disrupts the brain's normal transmission of information and can result in substantial changes in a person's wakefulness. **Traumatic Subarachnoid Hemorrhage** (tSAH) is bleeding into the space that surrounds the brain.… The blood spreads over the surface of the brain causing widespread effects. (Mayfield Clinic and Spine Institute, emphasis original)

(Weinstein and Romesser).

Although I just mentioned two types of traumatic brain injuries, there are hundreds of thousands who suffer traumatic brain injuries. In the article on Adrian Peterson's Son, 765,000 looks like a huge number. But, in the grand scheme of things, 765,000 is about a million short. "1.7 million cases of TBI in the U.S. every year… 52,000 deaths from TBI every year" (Constantino). In the United States there are at least 275,000 hospitalizations every year, there are at least 1,375,000 ER visits and no one knows how many people did not seek medical care, as indicated by the chart on the side. "TBI is a contributing factor to a third (30.5%) of all injury-related deaths in the United States" (Centers for Disease Control and Prevention).



The magnitude of brain injuries is extreme when compared to health issues with more visibility and public awareness, such as HIV/AIDS and breast cancer. "More people are diagnosed with traumatic brain injury in the course of a year than with breast cancer and HIV/AIDS combined: an estimated 1.7 million. Over 56,000 face long-term disability as a result of a TBI in the state of Utah alone" (Brain Injury Alliance of Utah). This statistic intrigued me to find out just how many people are diagnosed with HIV/AIDS and breast cancer in the United States each year. After doing some research I found that *combined* HIV/AIDS and breast cancer cases each year approximate 288,000. That is only 1/6 of TBIs diagnosed every year in the United States, yet everyone has heard of HIV/AIDS, everyone has heard of breast cancer, but practically no one has heard of Traumatic Brain Injury. It's shocking that something that is 6

times more common is overlooked in its impact and severity this often. “The estimated economic cost of TBI in 2010 is estimated to be approximately $76.5 billion” (Centers for Disease Control and Prevention).

This economic impact would suggest the obvious need for greater focus and attention towards research and prevention.

> With these staggering numbers, you would think our federal government would be doing everything it could to prevent, identify and treat brain injuries. However, less than $10 million is directed in research for brain injury in youth by our federal government while over $4 billion is directed to HIV/AIDS research. The NFL has spent three times more money on research than our federal government. We have a national plan for HIV/AIDS, we have a national plan for autism, we have a national plan for obesity, we have a national plan for cancer. Where is our national plan for brain injury? (Donohue)

So again, I ask the question, how does something 6 times more likely than 2 types of diseases **combined** get less than 1/400th amount of money in research?

Along with next to no money being directed in research, there is billions and billions of dollars being lost because of brain injuries. These brain injuries are not all just unavoidable accidents. Approximately half of brain injuries that require hospitalization and over 1/3 of brain injuries that cause death occur via motor-vehicle accidents. Many of these accidents occur with a motorcyclist without a helmet. “Wearing a bike helmet can reduce the risk of head and brain injuries by 85-88%.2. In 2007 in the U.S., 92% of bicyclists killed in crashes were not wearing a helmet. The loss of over $18 million in health care costs each year” in Utah alone (Utah.gov).

Yet, only “19 states… have a universal helmet law, requiring helmets for all riders” (Governors Highway Safety Association). These are only statistics regarding helmet requirements.

The biggest argument against helmet laws is that the decision to wear a helmet “only affects the person riding the vehicle.” Please explain who pays for your medical bills when you get in an accident. Please explain how it only affects you when you end up in the hospital for an indefinite amount of time, constantly needing someone by your side. Please explain who pays into your new-disability income. So if you ever think that you don’t need to wear a helmet, stop and think.

Studies indicate that the risk of brain injury in hospitalized motorcyclists is nearly twice that for unhelmeted motorcyclists and unhelmeted drivers had acute care costs **three times** ($30,365) that of helmeted drivers. In California, the first year's implementation of the 1992 helmet law resulted in a **37.5% decrease** in statewide motorcycle crash fatalities over the previous year; those likely to sustain TBI-related impairments decreased 34%. California has demonstrated a more than 99% compliance rate in helmet use. This suggests that, with adequate enforcement, unrestricted helmet laws can achieve nearly 100% compliance. (Family Caregiver Alliance, emphasis added)

With these kinds of statistics, the lack of a helmet law in over 30 states, Utah included, is outrageous. Without helmet laws, there are more brain injuries acquired, and the cost is phenomenal because the brain cannot repair itself.

Unlike other organs in the body, the brain cannot regenerate brain cells called neurons; however the brain is a fascinating machine. When it gets severely injured, it begins

working overtime trying to reroute pathways that the ordinary person wouldn't ever think of. If you were to receive a brain injury, even years down the road, you may still be trying to learn how to filter out things that you had done forever. For example, an average person does not notice the sound of their own breathing, the sound of the clicking of a keyboard, the sound of the air conditioner, the sound of people talking in a nearby room, the sound of thoughts inside their head, etc. But with a severely brain injured person, often times, can't block those noises out. These things are called filters. Your brain has learned what things are or are not important and can shut out the things (sounds, lights, etc) which are not important. However, with certain brain injuries, the brain forgets how to filter.

Along with filtering, a damaged brain must learn to reroute many things. Depending on the severity of the injury, the brain may have to learn a different way to walk, talk, swallow, open the person's eyes, etc. Because of all of this retraining that the brain has to do, physical difficulties play a large toll but is not as severe as the cognitive struggles.

In the longer term, most people with ABI report **changes in learning, thinking, and behavior,** while only 25% of people with a severe ABI will experience ongoing physical difficulties. These changes in learning, thinking and behavior are hard for other people to recognize. People who do not understand the difficulties associated with acquired brain injury may believe the **person is being lazy or being difficult**. (State of Queensland, emphasis added)

The cognitive fatigue associated with attempting to do something you've always done the same way you've always done it, and failing every time is exhausting and painful. Before long, a driven, motivated personality is likely to give up and just start making up answers to get the

work done so that [s]he can just go back to bed. “Although physical difficulties can present problems, it is the **cognitive difficulties** and **personality changes** that are the most distressing, since these have a greater impact on social, work and family life” (Acquired Brain Injury, emphasis added).

For some individuals, specifically teenagers, the social impact is the most difficult to deal with. Why friends don’t stick around, I’m not really sure. I know that initially after the injury however, it is very likely to become much more negative. This is part of the healing of the brain. It will pass, it may seem to take a very long time, but it will pass. The reason why friends don’t stand by a brain injured individual might be a difference between the person they remember and the person they see now, it may be if they notice an increased agitation, it may be that the length of healing is unknown. “Survivors of a severe brain injury are likely to experience prolonged anxiety and depression, and are at a high risk for **loss of friendships and social support**” (Family Caregiver Alliance, emphasis added).

These may seem like just words that doctors say, nothing personal, nothing real. But, I wasn’t looking for personal research because I have the most personal research you can get; myself. My junior year of high school, I was on a motorcycle and the throttle stuck. This means the bike was going as fast as the bike could go and I was heading straight into a stationary backhoe. The only chance I had of survival would be to try to make it under the arm of the backhoe. Unfortunately, the motorbike ran into a stability wheel which propelled me up and forward, straight into the arm. This cracked my skull in at least 6 different places. They ended up performing 6 ½ hour surgery, removing my skull, and placed me in a coma for two weeks. I stayed in the hospital for 7 weeks. My parents created a blog to inform family and friends who

continued to ask how I was doing. Two years after the accident, when I had taken over writing my blog, as the lack of social support still troubled me, I wrote a blog-post explaining. The following is a small excerpt from that post,

> I thought I had a lot of real good friends before, but when I came back, they expected me to be all better - and when I wasn't, they fled. It's hard enough to live up to your own expectations. And when I had doctors telling me that things were going to be extremely different, and I probably wouldn't be able to do it, I needed you. And when I needed you to understand that things would be a little different, you proved that my life would become extremely different – but not for the better. When my accident forced you to be a little less naïve about life, and things got scary and hard, you bailed. You're not the one who had to lie in the hospital bed for nearly two months, realizing the whole time that your life was completely contradictory to all of your once-upon-a-time dreams. It was hard enough when professionals told me that I would no longer be able to accomplish all of my life long dreams, but I tried to prove them wrong. What made it even harder was when all of my best friends (or all that I thought I had left) went and proved them right. (Blackham)

Now that we understand more about brain injuries, their impact on individuals and society, what can be done? From a societal level, we can lobby for a mandatory, universal helmet law for all riders. We can also lobby for increased funding for brain injury research. On the individual level, recognize the challenges and struggles someone with a brain injury has. Be patient and supportive with them and realize that the time required for recovery can be extensive. "**Stand by them when life hits them hard**; because as human beings, we often overestimate everyone else.

We think that if we disappear, they'll have so many others, but take it from firsthand experience. That is not the case! **Do whatever you can to prove to them that you will be there for them no matter what**" (Blackham, emphasis added).

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