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Kim Hazel
Butler University

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Memory Salad: Part of a Balanced Head Injury Diet

Kim Hazel

Abstract: This article takes an in-depth look at concussions. It explores the medical and emotional experiences those with concussions may experience, addresses the recovery process, and provides information to help overcome the lasting effects from a traumatic brain injury. It intertwines personal anecdotes with scientific research in order to facilitate discussions about head injuries that bring science and personal experience together.

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How often have you misplaced your car keys or forgotten if you left the lights on after leaving for work? How often do you arrive at your destination and not recall anything about the commute? For me and the 1.7 million Americans who sustained a head injury this past year, forgetfulness is part of our daily routine.¹ The phenomenon of remembering select things without knowing many explicit details is what I like to refer to as “memory salad.” Memory salad is when you know something for certain but cannot recall exact details relating to it. For example, I tie my shoes every day, but I cannot pinpoint the last time I did it. Another way to understand this is to think about a time you had trouble remembering what was said in a conversation earlier in the day. For those of us experiencing life after a traumatic brain injury, memory salad is an all too common reality. Traumatic brain injuries, commonly known as concussions, are responsible for over 280,000 hospitalizations and over 50,000 deaths annually.² Additionally, concussions are one of the leading causes for long-term disabilities in individuals under the age of 45.^{3,4} Living with the symptoms and consequences of a head injury can be challenging and cause additional stress. Much like a salad, life events following a concussion can seem mixed up or tossed around. Concussions are injuries within the brain that can lead to deficits in memory, emotions, and other cognitive behaviors. However, there are ways to retrain the brain and fully recover from a traumatic brain injury. So, let’s take a stroll down head injury lane.

MY FIRST CONCUSSION, OR TWO, OR THREE

An overwhelming number of athletes can relate to the story of my first concussion. During a high school soccer game I attempted to block a hard kick with my face. My sports-related concussion was one of the 1.6 to 3.0 million sports-related injuries reported each year.⁵ In fact, head and neck injuries account for roughly 8% of all injuries in youth soccer, and 2% of them are concussions.⁶ These statistics may even be higher since over 50% go unreported; student athletes are either unaware of their symptoms or do not want to be removed from competition.⁷ It is important to note that not all head injuries result in a concussion, and that not all concussions are caused by sports injuries. Head injuries can be caused by a number of non-sports related

circumstances in which the head or neck are struck, such as automobile accidents, explosions, falls, assault, workplace accidents, or even just bad luck.⁷ For example, my third concussion occurred when I was reaching for something on a high shelf in our garage and a crowbar fell, landing on my forehead. In total, I’ve suffered five concussions, three of which happened consecutively in one month.

Formally, a concussion is defined as “a complex pathophysiological process affecting the brain... caused by either a direct blow to the head, face, or neck or via excessive force elsewhere on the body and transmitted to the head.”⁸ Simplified, a concussion is an injury in which your brain rattled inside the skull and potentially became bruised or seriously injured. On average, men are twice as likely to receive a mild traumatic brain injury than women and 15-24 year-olds having the highest risk of any age group.⁹ While concussions are often seen as “just a bonk on the head,” they are much more than that. They go deeper and impact the function of one of the most critical organs in your body.

THE BRAIN, THE BRAIN, THE CENTER OF THE CHAIN

The brain is a complex organ with multiple folds, crevasses, and functions. It is the driving force behind everything that is you. Everything you think, feel, remember, do, and say begins in the brain. Each area within the brain has its own specific function from memory and language to movement and coordination. When the brain is injured, these functions can become compromised, and these adverse effects can last well into late adulthood. In fact, 15% of people with head injuries report that they still suffer from symptoms past the typical recovery time frame of 1 to 3 months.⁴ Approximately 2-6% do not recover from their head injury in the first year and are said to suffer from what is known as persistent post-concussive syndrome (PCS).¹⁰⁻¹² Injuries to your brain can drastically impact your life in a negative way. After being injured, your brain may have trouble with executive functions such as achieving goals, problem-solving, behavior skills, and purposefulness.¹³ Your brain may also have trouble with motor control, resulting in poor posture and imbalance.¹⁴ Each individual head injury has a unique impact

on the brain. For example, many sports-related head injuries primarily impact the frontal lobe, which is the region of the brain responsible for memory. This can explain the prevalence of memory loss in these types of injuries.⁶ Memory loss is one of the most common symptoms patients complain about after they have sustained a traumatic brain injury.¹⁵

MEMORIES LAST FOREVER AND NUMBERS NEVER LIE... OR DO THEY?

Losing your memory after sustaining a head injury can feel a lot like playing the game "Where's Waldo," while in a snowstorm, hanging upside down, and wearing a blindfold. Much like head injuries themselves, the degree of memory loss can range from mild to severe. Several studies have looked at types of memory loss. One study used digital span measurements to assess working memory.¹⁶ In this study, volunteers were presented with a series of numbers, such as "62748", that got progressively longer. They were then asked to recall the numbers. A variety of errors occurred, such as leaving numbers out entirely, transposing numbers in the sequence, and adding extra numbers. The investigators concluded that errors resulting from transposing numbers suggest verbal memory deficits from clinical syndromes such as head injuries.¹⁶ Verbal memory deficits are evident by struggling to repeat something back once it has been read or said aloud. Verbal memory requires the longest amount of recovery time,¹⁷ which may explain why it is something I continue to struggle with even today. Two years following my initial injuries, I still transpose numbers when they are said aloud to me. If someone verbally tells me their phone number, I may only remember two or three numbers in the correct order.

Concussions can cause a wide variety of symptoms that can be infuriating, discouraging, and unexpected. Things you swore you'd always remember are now beyond reach and feel as if they may never come back. No one wants to forget things. When the effects of concussion related memory loss kicks in, you may start to feel hopeless, alone, embarrassed, and a burden to those around you. Individuals with memory impairment from a brain injury may experience a loss of independence, increased costs for long-term care, trouble returning to work, decreased quality of life, and isolation from social participation with family and friends.^{18,19} Life following any type of memory loss is difficult, not only for the individual, but also for those around them. Memory loss frequently impacts more than the person suffering from the injury; it often affects caregivers, family, and friends as well. No one wants to feel like a burden to family and friends, and no one should have to live with these daily struggles.

DO YOU BELIEVE IN LIFE AFTER UMM?

Evidence suggests that many individuals with mild concussions can fully recover with no remaining post-concussive symptoms.²⁰ While it may feel like an eternity, most residual

symptoms of mild head injuries resolve within the typical recovery time frame of 1-3 months.²¹⁻²³ However, if an individual continues to suffer from post-concussive symptoms after the expected recovery time frame, they may benefit from mental health services.²⁴ There are a variety of ways to recover from a head injury. Doctors may suggest a variety of strategies based on the type of injury, how it occurred, and how soon one is expected to recover. Ultimately, a person struggling with post-concussive symptoms can retrain their brain. It sounds a bit gimmicky and slightly strange, but studies on mild traumatic brain injuries have identified tricks, tools, tips and treatments to get an injured brain back into tip-top shape.

There are many common treatments that end up being the "go to" for certain types of concussions. For example, cognitive and physical rest is recommended for anyone who sustained a head injury from sports.⁸ Cognitive rest is essentially avoiding anything that may require higher thought processes which includes reading, watching movies, playing video games, driving, and social visits. The Center for Disease Control and Prevention recommends that following a sports concussion, an individual should rest for 24-48 hours and return to average cognitive activity through a gradual stepwise process.²⁶ Some physicians may even suggest a longer rest period. Cognitive and physical rest for head injuries is a widely accepted method, but it is not the only method. A study from the University of California suggests that rest is a standard practice for treating sports-related head injury because it has been around for a long time. However, there is a major difference between a sports-related head injury and other types of head injuries. Usually, sports injuries do not cause changes to the structure of the brain, but tend to alter the function of brain tissue.²⁵ Therefore, the cognitive rest recommendation falls flat when it comes to patients experiencing head injuries through non-sports related events such as car accidents or hard falls. Cognitive rest is not typically recommended for patients with off the field traumas.¹ Instead, active rehabilitation is the most frequently suggested course of treatment following non-sports-related head injuries. The process of active rehab allows not only rest, but also engagement in multiple types of cognitive tasks. Active rehabilitation may sound a little counter-intuitive; however, rest-dominated plans prevent those suffering from a head injury from "getting back on the horse" and doing everyday tasks such as driving, talking, and reading. Active rehab puts these tasks at the forefront and suggests that those with "bad luck concussions" get up, get active, and get thinking. The treatment of a head injury by active rehab is gaining traction as it is more focused on helping those who have been injured jump back into normal routines, rather than letting them rest for extended periods.

A study conducted in Australia focused on recovery aided by handheld computers. The study sought to determine whether handheld computers (smartphones without the phone aspect in use) benefitted those who were struggling with a head injury. Researchers found those using a handheld computer completed a larger number of tasks and experienced less

memory loss.²⁷ The results of their study revealed that using personal digital assistants/smartphones after a head injury for memory training was more beneficial than the standard practice of memory training with pen and paper. Another study, conducted by Mayo Clinic's School of Medicine, suggested that internet-based cognitive rehabilitation could not only benefit a person with a mild concussion, but also an individual with severe memory impairments.²⁸ There are a number of websites dedicated to brain training such as Lumosity and NeuroNation. Using on-line programs may provide benefits much like the use of handheld computers. These methods can be particularly useful for those living in rural communities as they may find it difficult to obtain quality treatment following their traumatic brain injury, and handheld or internet-based methods could potentially be the key to providing them with effective treatment options. However, as with the other treatment methods, using the internet or a handheld computer is not a one-size-fits-all approach. Specific technologies may need to be tailored to individual needs for optimal benefit.²⁸

IT CAN ONLY GET BETTER FROM HERE, I PROMISE

Having a head injury makes life feel unpredictable and can make a person forgetful, stressed, short-tempered, and isolated.²⁹ After my fifth concussion, I was so engrossed by the negative side of having another head injury that I almost let myself fall apart. I had trouble concentrating, and I always felt so sluggish that I just wanted to give up. Once I realized having a concussion does not need to change who I am as a person, I started focusing on getting better. I took advantage of a variety of recovery options to regain focus, memory, and drive. My symptoms have improved significantly and I continue to move forward. I may not be able to repeat a sequence of numbers in the correct order, but I can tell you what I ate for dinner last night, that hilarious joke my friend told me after class today, and the twenty fundamental amino acids that make up proteins. Above all, I can tell you that I will always do my best to remember, and things can only get better from here.

References

1. Wylie GR, Freeman K, Thomas A, et al. Cognitive improvement after mild traumatic brain injury measured with functional neuroimaging during the acute period. *PLoS One*. 2015;10(5):e0126110. doi:10.1371/journal.pone.0126110.
2. National center for injury prevention and control, division of unintentional injury prevention. CDC's report to congress on traumatic brain injury epidemiology and rehabilitation: recommendations for addressing critical gaps. Centers for Disease Control and Prevention website. https://www.cdc.gov/traumaticbraininjury/pdf/tbi_report_to_congress_epi_and_rehab_snapshot-a.pdf. Accessed October 25, 2016.
3. Alexander MP. Mild traumatic brain injury: pathophysiology, natural history, and clinical management. *Neurology*. 1995;45:1253–1260.
4. Ashman TA, Gordon WA, Cantor JB, Hibbard MR. Neurobehavioral consequences of traumatic brain injury. *Mt Sinai J Med*. 2006;73(7):999–1005.
5. Björkdahl A, Akerlund E, Svensson S, Esbjörnsson E. A randomized study of computerized working memory training and effects on functioning in everyday life for patients with brain injury. *Brain Inj*. 2013;27(13-14):1658–1665. doi:10.3109/02699052.2013.830196.
6. Leininger RE, Knox CL, Comstock RD. Epidemiology of 1.6 million pediatric soccer-related injuries presenting to US emergency departments from 1990 to 2003. *Am J of Sports Med*. 2007;35(2):288–293. doi:10.1177/0363546506294060.
7. McCrea M, Hammke T, Olsen G, Leo P, Guskiewicz K. Unreported concussion in high school football players – implications for prevention. *Clin J Sport Med*. 2004;14(1):13–17.
8. McCrory P, Meeuwisse W, Johnston K, Dvorak, et al. Consensus statement on concussion in sport 3rd international conference on concussion in sport held in Zurich. *Clin J Sport Med*. 2009; 19(3):185–200.
9. Maillard-Wermelinger A, Yeates KO, Gerry Taylor H, et al. Mild traumatic brain injury and executive functions in school-aged children. *Dev Neurorehabil*. 2009;12(5):330–341. doi:10.3109/17518420903087251.
10. Alves W, Macciochi SN, Barth JT. Post concussive symptoms after uncomplicated mild head injury. *J Head Trauma Rehab*. 1993;8:48–59.
11. Belanger HG, Curtiss G, Demery JA, Lebowitz BK, Vanderploeg RD. Factors moderating neuropsychological outcomes following mild traumatic brain injury: a meta-analysis. *J Clin Exp Neuropsychol*. 2005;11:215–227.
12. Frencham KA, Fox AM, Mayberry MT. Neuropsychological studies of mild traumatic brain injury: a meta-analytic review of research since 1995. *J Clin Exp Neuropsychol*. 2005;27:334–351. doi:10.1080/12803390490520328.
13. Gioia GA, Isquith PK. Ecological assessment of executive function in traumatic brain injury. *Dev Neuropsychol*. 2004;25:135–158. doi:10.1080/87565641.2004.9651925.
14. Sosnoff JJ, Broglio SP, Ferrara MS. Cognitive and motor function are associated following mild traumatic brain injury. *Exp Brain Res*. 2008;187(4):563–571. doi:10.1007/s00221-008-1324-x.
15. Bruce JM, Echemendia RJ. Delayed-onset deficits in verbal encoding strategies among patients with mild traumatic brain injury. *Neuropsychology*. 2003;17(4):622–629. doi:10.1037/0894-4105.17.4.622.
16. Woods DL, Herron TJ, Yund EW, Hink RF, Kishiyama MM, Reed B. Computerized analysis of error patterns in digit span recall. *J Clin Exp Neuropsychol*. 2011;33(7):721–734. doi:10.1080/13803395.2010.550602.
17. McClincy MP, Lovell MR, Pardini J, Collins MW, Spore MK. Recovery from sports concussion in high school and collegiate athletes. *Brain Inj*. 2006;20(1):33–39. doi:10.1080/02699050500309817.

18. Thöne-Otto, Walther K. How to design an electronic memory aid for brain-injured patients: considerations on the basis of a model of prospective memory. *Int J Psychol*. 2003;38:236-244.
19. Fleming J, Shum D, Strong J and Lightbody S. Prospective memory rehabilitation for adults with traumatic brain injury: a compensatory training programme. *Brain Inj*. 2005;19:1-10.
20. Arciniegas DB, Anderson CA, Topkoff J, McAllister TW. Mild traumatic brain injury: a neuropsychiatric approach to diagnosis, evaluation, and treatment. *Neuropsychiatr Dis Treat*. 2005;1(4):311-27.
21. Belanger HG, Curtiss G, Demery JA, Lebowitz BK, Vanderploeg RD. Factors moderating neuropsychological outcomes following mild traumatic brain injury: a meta-analysis. *J Int Neuropsychol Soc*. 2005;11(3):215-227. doi:10.1017/S1355617705050277.
22. Schretlen DJ, Shapiro AM. A quantitative review of the effects of traumatic brain injury on cognitive functioning. *Int Rev Psychiatry*. 2003;15(4):341-349. doi:10.1080/09540260310001606728.
23. Vanderploeg RD, Curtiss G, Belanger HG. Long-term neuropsychological outcomes following mild traumatic brain injury. *J Int Neuropsychol Soc*. 2005;11(3):228-236. doi:10.1017/S1355617705050289.
24. Larson E, Zollman F, Kondiles B, Starr C. Memory deficits, postconcussive complaints, and posttraumatic stress disorder in a volunteer sample of veterans. *Rehabil Psychol*. 2013;58(3):245-252. doi:10.1037/a0032953.
25. Aubry M, Cantu R, Dvorak J, et al. Summary and agreement statement of the west international conference on concussion in sport, Vienna 2001. *Br J Sports Med*. 36:6-7.
26. Sports concussion. Centers for Disease Control and Prevention website. <http://www.cdc.gov/concussion/sports/>. Accessed October 25th, 2016.
27. Lannin N, Carr B, Allaous J, Mackenzie B, Falcon A, Tate R. A randomized controlled trial of the effectiveness of handheld computers for improving everyday memory functioning in patients with memory impairments after acquired brain injury. *Clin Rehabil*. 2014;28(5):470-81. doi:10.1177/0269215513512216.
28. Bergquist T, Gehl C, Lepore S, Holzworth N, Beaulieu W. Internet-based cognitive rehabilitation in individuals with acquired brain injury: a pilot feasibility study. *Brain Inj*. 2008;22(11):891-7. doi:10.1080/02699050802405487.
29. Trontel HG, Hall S, Ashendorf L, O'Connor MK. Impact of diagnosis threat on academic self-efficacy in mild traumatic brain injury. *J Clin Exp Neuropsychol*. 2013;35(9):960-70. doi:10.1080/13803395.2013.844770.