

# Traumatic Brain Injuries

EXPLORING THE IMPACT ON SURVIVORS AND THEIR FAMILIES



A WHITE PAPER PRESENTED BY



**MARSH | RICKARD | BRYAN**

*Where your story matters.*

# Traumatic Brain Injuries

EXPLORING THE IMPACT ON SURVIVORS AND THEIR FAMILIES

The human brain is one of the most complex and critical organs in the body. While no metaphors can adequately capture the intricacy and mystery of the brain, in terms of computation power, the brain has nearly 100 billion neurons capable of holding over a petabyte (1,000 terabytes) of data.<sup>1</sup> Each of those neurons acts as a powerful mini-computer. Together, they function like a web, creating vast neural networks that shape all aspects of our physical, mental and emotional functioning.

Traumatic brain injuries (TBIs) affect the brain and the body in myriad ways. Although modern medicine continues to make strides in studying, diagnosing and treating brain injuries, much remains unknown. What is known is that TBIs can have a significant and lasting impact – and that the brain has a remarkable capacity to repair itself.

In this paper, we will break down common types of brain injuries, ranging from concussions to more severe and permanent injuries. We will provide helpful information for family members, including what challenges to expect and prepare for and how to plan for the future in the midst of uncertainty.

## TABLE OF CONTENTS

<b>Part I</b>	<b>Concussions: Causes, Symptoms And Long-Term Impact</b>
1	What Exactly Is A Concussion?
	Sports-Related Concussions
	Signs And Symptoms Of A Concussion
	Diagnosing A Concussion
	Treatment And Recovery
<b>Part II</b>	<b>Moderate To Severe Traumatic Brain Injuries</b>
2	How Do Serious TBIs Happen?
	Quality Of Life For TBI Survivors And Their Loved Ones
	Is Recovery Possible?
	Advancements In TBI Imaging May Lead To More Accurate Prognoses
	Families Of TBI Survivors: What To Expect And How To Prepare For The Future
	The Financial Ramifications Of A TBI
	What Does A Brain Injury Cost?
	Case Study: Leroy's Story
	Communities And Resources For TBI Survivors And Their Loved Ones
	About Our Firm

# 1 Part I – Concussions: Causes, Symptoms And Long-Term Impact

Concussions have a reputation for being mild forms of TBIs. However, that doesn't mean they are not serious. Concussions can result in severe and long-term damage with life-altering – and sometimes life-threatening – repercussions.

## WHAT EXACTLY IS A CONCUSSION?

The brain is surrounded by protective cushioning inside the skull. Yet, that cushioning isn't enough to protect the brain from sudden forceful motion, which can cause shearing and tearing of sensitive brain tissue. A powerful enough force can also cause the brain to slam against the inside of the skull.

Any kind of forceful impact to the head or sudden jarring motion (like whiplash) can result in a concussion. It often happens suddenly, without forewarning. The victim may not remember the events leading up to or after the injury, making it difficult to reconstruct what happened.

### COMMON CAUSES OF CONCUSSIONS



**Falls**



**Sports**



**Motor vehicle accidents**



**Assaults (including domestic violence)**

## SPORTS-RELATED CONCUSSIONS

Sports-related concussions are a major public health issue. There are millions of cases across the United States each year.<sup>2</sup> In fact, one in 10 participants in contact sports will suffer a concussion in any given year.<sup>3</sup> Many of those athletes are young adults and children.

In the last decade, increased public awareness of the danger of sports-related concussions has spurred greater safety protocols in both professional and youth sports. Still, many remain unaware of the risks. Repeat concussions can lead to chronic traumatic encephalopathy (CTE), a fatal degenerative brain condition that has no treatment.<sup>4</sup>

## CONCUSSION RISK: IT'S NOT JUST FOOTBALL

Football often comes to mind as the most high-risk sport for concussions – and the data certainly supports that conclusion.<sup>5</sup> Yet, many other sports also have a high risk of concussions: lacrosse, rugby, hockey, soccer, baseball, softball and basketball, among others.

Female athletes face nearly twice the risk of concussions than their male counterparts. They're also more likely to have long-term symptoms and poor outcomes.<sup>6</sup>



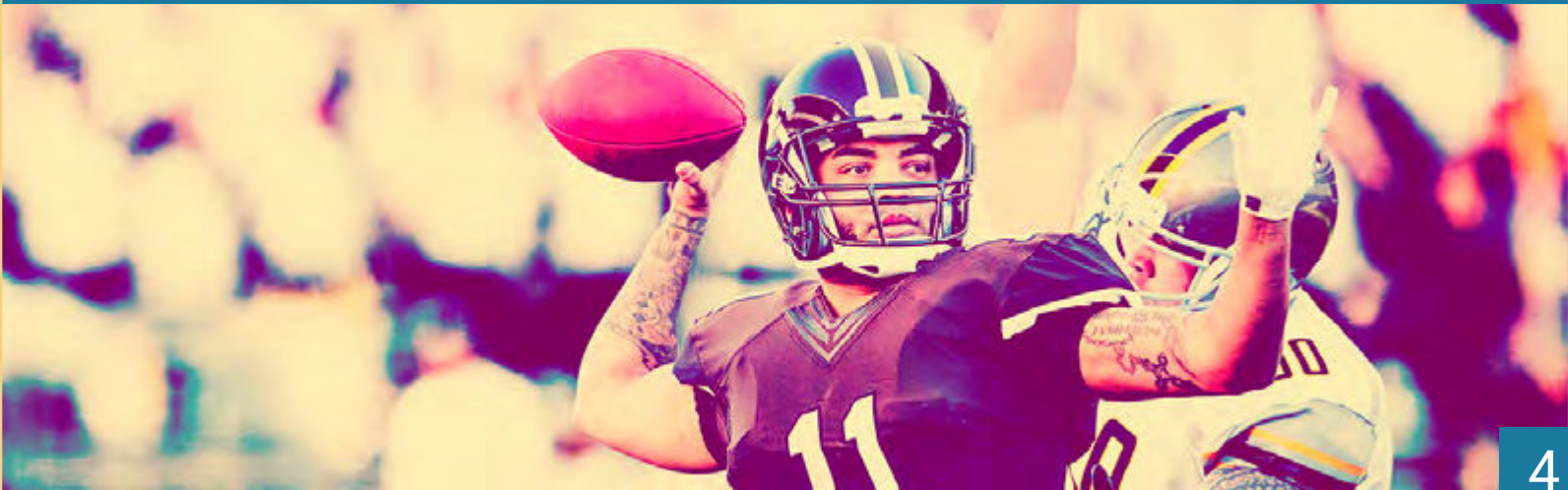
WOMEN ATHLETES HAVE TWICE  
THE RISK OF CONCUSSION THAN MEN



= **2X** > 

## SECOND IMPACT SYNDROME: A SERIOUS RISK IN SPORTS

Rest is critical for recovering from a concussion. When athletes return to the field too soon, they risk second impact syndrome – an often fatal condition that arises when someone suffers a repeat concussion after they haven't fully recovered from a prior impact.



## SIGNS AND SYMPTOMS OF A CONCUSSION

The signs and symptoms can vary widely. For example, it's possible to suffer a concussion without ever losing consciousness. In fact, according to the U.S. Centers for Disease Control and Prevention, most concussions don't involve losing consciousness.<sup>7</sup>

The immediate signs differ from the symptoms that arise in the days and weeks following the injury. With a typical concussion, the symptoms develop within the first week of the injury and clear up within a few months.<sup>8</sup> However, up to 30% of concussion victims suffer persistent long-term symptoms, a condition known as post-concussion syndrome.<sup>9</sup>

### IMMEDIATE SIGNS OF A CONCUSSION



**Loss of consciousness**



**Vomiting and nausea**



**A dazed feeling**



**Poor coordination**



**Blurred vision**



**Disorientation**



**Dizziness**



**Confusion**



**Slow speech**



**Light sensitivity**

### CONCUSSION SYMPTOMS



**Headache**



**Amnesia**



**Forgetfulness and confusion**



**Mental fog**



**Light sensitivity**



**Fatigue**



**Inability to concentrate**



**Sleep disturbances**



**Blurred vision**



**Anxiety and depression**



## DIAGNOSING A CONCUSSION

There are various assessment tools for evaluating whether a concussion has occurred. The simpler tests can be helpful tools for bystanders or coaches to perform.<sup>10</sup> However, only a qualified medical provider can diagnose a concussion. They will do so by performing a physical exam and neuropsychological tests, also taking into account the patient's symptoms and history. They may order a CT scan or MRI to rule out more serious brain injuries.

Several new technologies may soon make it easier for medical providers to diagnose concussions more definitively. For example, a cutting-edge saliva test evaluates biological rather than behavioral markers,<sup>11</sup>

and another new technology tracks eye movements to deliver quick results.<sup>12</sup>

## TREATMENT AND RECOVERY

Rest is the top priority when recovering from a concussion. Doctors typically recommend that concussion patients stay home from work or school and get plenty of sleep during at least the first few days. It's important to avoid stimulation such as bright lights, loud sounds and cognitive effort during that initial period. Patients can gradually return to light activity as their symptoms improve. To prevent the risk of second impact syndrome, concussion sufferers should not return to high-contact sports or other high-risk activities until they have fully recovered.


## NEW RESEARCH ON SPEEDIER RECOVERIES

While there's no surefire way to predict how long recovery will take, one study showed that cooling down the head and neck immediately after the injury can result in a faster recovery time – likely due to decreased inflammation.<sup>13</sup> If this research continues to be promising, high-powered cooling technologies may become a standardized treatment on the sidelines in professional and youth sports.

# 2 Part II – Moderate To Severe Traumatic Brain Injuries

Moderate to severe TBIs take a profound toll on the lives of victims and their loved ones. In more moderate cases, the victim can regain some semblance of a normal life, though often with substantial impairments. People with more severe TBIs may be dependent on caregivers to varying degrees. In the worst cases, they may remain in a persistent vegetative state.

## LONG-TERM EFFECTS OF A MODERATE TO SEVERE TBI

 PHYSICAL	 SENSORY	 COGNITIVE	 EMOTIONAL
Inability to walk	Vision loss, blurred vision and blind spots	Partial or total speech loss	Depression
Paralysis	Hearing loss	Personality changes	Anxiety
Loss of fine motor skills	Light sensitivity	Memory loss	Irritability
Loss of muscle tone	Sound sensitivity	Confusion	Anger
Muscle stiffness	Loss or change in taste	Impaired executive functioning	Low energy
Uncontrolled movements	Loss or change in sense of smell	Fatigue	Post-traumatic stress disorder
Poor balance and coordination	Changes to the sense of touch	Difficulty concentrating	Paranoia
Dizziness and vertigo	Problems with spatial perception	Impaired judgement and reasoning	Impulsivity
Seizures		Impaired ability to learn new things	
Chronic pain		Social impairments	
Sleep disruption			
Difficulties eating and swallowing			
Digestive problems			
Loss of bowel and bladder control			

## HOW DO SERIOUS TBIs HAPPEN?

Moderate to severe TBIs result from traumatic, forceful impacts. While closed head injuries (those that don't penetrate the skull) can cause serious damage, severe brain injuries are more likely to result from open head injuries, where the skull is pierced.

### COMMON CAUSES OF MORE SERIOUS HEAD INJURIES INCLUDE:



**Car accidents**



**Falls**



**Motorcycle wrecks**



**Explosions**



**Gunshot wounds**



**Carbon monoxide poisoning**



**Assaults and abuse**

Abuse is a tragic cause of TBIs in both children and adults, including vulnerable adults and elders.







## MEDICAL MALPRACTICE: AN OFTEN-OVERLOOKED CAUSE OF TBIs

While TBIs are often associated with forceful impacts, they can also result from medical negligence. Iatrogenic brain injuries – that is, those caused by medical treatment – can be just as debilitating as other types of TBIs. These injuries typically involve reduced blood flow to the brain (hypoxia) or lack of blood flow (anoxia). Various forms of medical negligence can contribute to iatrogenic TBIs, including:

### MEDICAL NEGLIGENCE THAT CAN CONTRIBUTE TO TBIs



**Surgical and anesthesia errors**, such as negligent monitoring



**Medication errors** that can lead to brain bleeds and hypoxia



**Birth injuries** to either the mother or baby, including negligent assisted deliveries (forceps or vacuum extraction) and negligent Cesarean sections



**Excessive blood loss** and failure to perform a timely transfusion



**Improper intubation** and inadequate oxygen monitoring while intubated

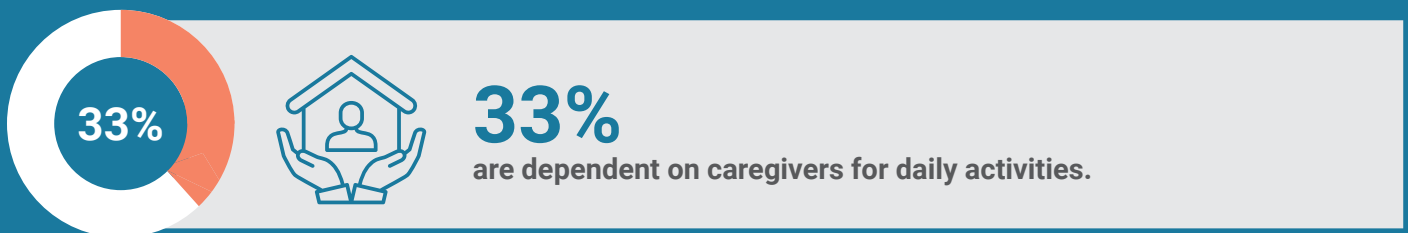
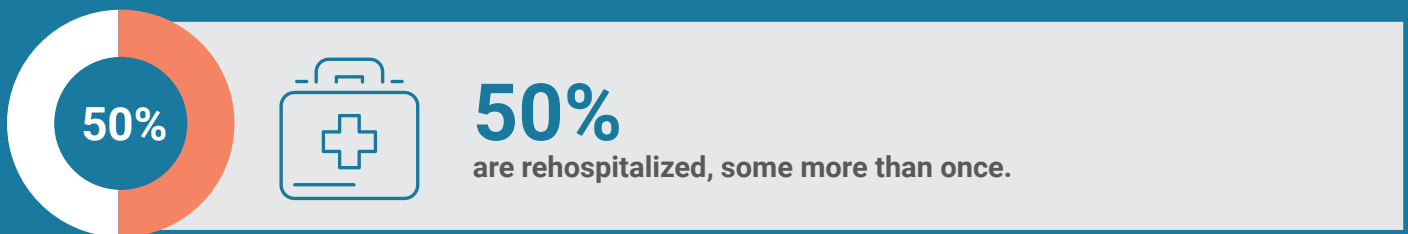


**Errors diagnosing or treating** serious medical conditions such as heart attacks, strokes, pulmonary embolisms and aneurysms

## QUALITY OF LIFE FOR TBI SURVIVORS AND THEIR LOVED ONES

Quality of life is a major concern for those living with moderate to severe TBIs. These injuries take a toll on all areas of functioning, including physical mobility, speech, memory, sleep, sensory processing and more. Survivors may be unable to work and participate in the activities they once loved. They may be partially or totally dependent on caregivers. Adapting to this tremendous upheaval is difficult, affecting every aspect of survivors' lives.

### After A TBI:<sup>14</sup>



## IS RECOVERY POSSIBLE?

Depending on the type and severity of the injury, some degree of recovery may be possible. It is often a long and challenging road. Still, every case is different, and even those with dire prognoses can attain substantial degrees of recovery.

According to one study, many TBI survivors improve within the first 12 months.<sup>15</sup> Further research suggests that the first two years are a critical time period for favorable outcomes. Survivors can still improve even five to 10 years after their injuries.<sup>16</sup>

### FACTORS THAT AFFECT RECOVERY OUTCOMES INCLUDE:



**The location and severity of the injury**



**Any pre-existing medical conditions**



**The duration of the coma**



**The survivor's age**



**The duration of post-traumatic amnesia**

Rehabilitation can also make a significant difference, particularly early intensive rehab.<sup>17</sup> TBI survivors should receive rehab services in the hospital as soon as possible and continue them after moving back home or to an assisted living facility. Occupational therapy, speech therapy, physical therapy and psychiatric support all play roles in promoting recovery.

## ADVANCEMENTS IN TBI IMAGING

Doctors rely on many types of imaging to make TBI diagnoses, including ultrasounds, MRIs and molecular imaging. Enhancements to these imaging techniques may soon give doctors a more detailed view of the brain and a better understanding of the injury.<sup>18</sup>

## RACIAL INEQUALITIES IN TBI OUTCOMES

Racial and ethnic minorities face much worse outcomes when it comes to recovering from TBIs.<sup>19</sup> American Indians have the highest mortality rates, followed by African Americans. Economic and insurance disparities likely play a role in contributing to these tragic inequalities.



## FAMILIES OF TBI SURVIVORS: WHAT TO EXPECT AND HOW TO PREPARE FOR THE FUTURE

Brain injuries affect the quality of life of not only survivors but also their loved ones. A TBI can drastically change the family dynamics. Often, a spouse or adult child becomes the primary caregiver – a role that comes with numerous challenges. And, when a TBI survivor has a prolonged hospital stay or ends up in a long-term care facility, the separation from loved ones can be heart-wrenching.

Family members of TBI survivors must go through their own grieving processes. Loved ones often feel that they've lost the person they knew so deeply. Feelings of sadness, anger and despair are normal responses to an exceedingly tragic event. Family caregivers may also experience resentment, anger and guilt for being thrust into a demanding, around-the-clock role that they didn't expect or have any preparation for. It's important for family members – especially caregivers – to get the support they need, both in their caregiving duties and in navigating the many layers of grief, loss and trauma.



## THE FINANCIAL RAMIFICATIONS OF A TBI

TBIs result in tremendous financial burdens for survivors and their families. The medical bills, rehabilitation expenses, medical equipment, home modifications and ongoing treatments place enormous financial strain on family members. If the TBI survivor was the primary breadwinner, loss of their income adds another layer of stress to an already tragic situation. The financial ramifications are even more significant when long-term care in a nursing home or assisted living facility is necessary.

When a TBI results from an accident, assault or someone else's negligence, it's important to seek legal guidance on options for pursuing compensation. Financial recovery through a personal injury claim can provide compensation for not only the medical bills and other injury-related expenses but also the survivor's lost quality of life. Survivors and their families deserve high-caliber legal teams with attorneys who understand the lifelong ramifications of traumatic brain injuries.

## WHAT DOES A BRAIN INJURY COST?

The lifetime financial toll of an individual brain injury is staggering. In addition to the costs of the initial period of treatment and hospitalization – which is often lengthy – survivors and their families face significant financial burdens due to:

- |  |   |
|--|---|
| • Ongoing treatment and rehabilitation         | • In-house care or residence in an assisted living facility |
| • Living accommodations and home modifications | • Lost income when the survivor was a breadwinner           |

Accounting for these costs in a personal injury case involves a complex analysis, often requiring experts to prepare projections for future medical expenses and lost future income.

**\$100  
BILLION**

Estimated total medical costs of TBIs nationwide<sup>20</sup>



**\$100K to  
\$4 MILLION**

Estimated lifetime medical cost of an average TBI<sup>21</sup>



## LEROY'S STORY



Leroy was 38 years old when a catastrophic accident nearly took his life. He was riding in a work truck when the nightmare unfolded: An 18-wheeler traveling at high speed slammed into the work truck. The semi-truck driver was speeding and not paying attention to the road.

Leroy suffered a massive brain injury. He spent weeks in the hospital, clinging to life. He then spent many months in a brain injury rehabilitation center where he had to learn to talk and walk all over again. He resided in a care facility before eventually returning home to live with a caregiver.

The brain injury has taken a devastating toll on Leroy's life. He still relies on a wheelchair and walker. His personality has changed.

He will require lifelong professional care.

Leroy will never again be the same. On that day the accident happened, Leroy's family lost the person they once knew.

Our legal team at Marsh, Rickard & Bryan, P.C., represented Leroy in a personal injury lawsuit against the negligent semi-truck driver and the trucking company. Our lawyers secured a settlement that will help Leroy get the best care possible for the rest of his life. While nothing can reverse the nightmare that he and his family have endured, they now have the financial resources to help Leroy live a more fulfilling life.



## COMMUNITIES AND RESOURCES FOR TBI SURVIVORS AND THEIR LOVED ONES

While TBIs have a tragic and far-reaching impact on survivors and their families, there is hope. There are many organizations dedicated to providing support, resources and services for those affected by TBIs. They also offer a way to connect with other survivors and caregivers. You're not alone.



**The Alabama Head Injury Foundation**, a local nonprofit, provides care coordination, support groups, counseling services, respite care and TBI camps. The organization also provides [detailed infographics](#) on all aspects of TBIs, including tips for caregivers.



**The Brain Injury Association Of America** is a national nonprofit dedicated to improving the lives of everyone impacted by TBIs. There is an [Alabama chapter](#).



**The Brain Trauma Foundation** [offers TBI support groups](#) throughout Alabama.



**The Alabama Department of Rehabilitation Services** offers [programs and services](#) to connect TBI survivors with the support they need.



**The Alabama Disability Advocates Program** provides [services and advocacy](#) for people with disabilities, including TBI-related impairments .

## ABOUT OUR FIRM

Marsh, Rickard & Bryan, P.C., is one of Alabama's leading personal injury firms. Since 1996, we have served as dedicated advocates for injury victims and their loved ones, including those affected by TBIs. Our attorneys have obtained multimillion-dollar results for clients statewide.

Our lawyers are committed to providing high-quality legal services that address not only the financial repercussions of the injury but also the many challenges that TBI survivors and their loved ones face. They take action to help survivors in concrete and innovative ways. For example, they created a wallet-sized card that TBI survivors can show police or others explaining why they may need accommodations

and may not be able to communicate in a typical manner. In everything our attorneys do, their goal is helping TBI survivors and their families attain the highest quality of life possible.

Our firm is a proud supporter of the Alabama Head Injury Foundation. Several of our attorneys have volunteered with the organization, including in leadership positions. Partner D. Ty Brown previously served as president of the foundation.

Many of our attorneys have been selected for inclusion in Alabama Super Lawyers and/or Alabama Rising Stars for multiple years, reflecting their skill, dedication and proven success in the personal injury field.

## Super Lawyers®



**David H. Marsh**  
Super Lawyers  
2008-2022



**Jeffrey C. Rickard**  
Super Lawyers  
2011-2022



**Derrick A. Mills**  
Rising Stars | Super Lawyers  
2011-2013 | 2014-2022



**Rip Andrews**  
Rising Stars | Super Lawyers  
2011-2013 | 2014-2022



**D. Ty Brown**  
Rising Stars | Super Lawyers  
2016-2019 | 2020-2022



**Michael K. Beard**  
Super Lawyers  
2008, 2011-2022



**Rhonda Pitts Chambers**  
Super Lawyers  
2009-2017



**Dylan H. Marsh**  
Rising Stars  
2019-2022



**J. Ben Ford**  
Rising Stars  
2022



**Jane F. Mauzy**  
Rising Stars  
2021

**SUPER LAWYERS • 2022**

Super Lawyers is a patented rating service of outstanding lawyers who have attained a high-degree of peer recognition and professional achievement. This exclusive honor is awarded to only the top 5 percent of attorneys per state.



## Contact

www.mrblaw.com

205-879-1981

Share the white paper



**MARSH | RICKARD | BRYAN**

*Where your story matters.*

## Source

- <sup>1</sup> Clare Wilson, "Your brain is like 100 billion mini-computers all working together," *New Scientist* (Oct. 18, 2018), <https://www.newscientist.com/article/2182987-your-brain-is-like-100-billion-mini-computers-all-working-together/>
- <sup>2</sup> "What is a Concussion?," Brain Research Institute, <http://www.protectthebrain.org/Brain-Injury-Research/What-is-a-Concussion.aspx>
- <sup>3</sup> "Concussion Care Should Top Every Youth Sports Playbook," National Safety Council, <https://www.nsc.org/community-safety/safety-topics/child-safety/concussions?>
- <sup>4</sup> "Chronic traumatic encephalopathy," Mayo Clinic, <https://www.mayoclinic.org/diseases-conditions/chronic-traumatic-encephalopathy/symptoms-causes/syc-20370921>
- <sup>5</sup> "Which Youth Sports Cause the Most Concussions?," Medstar Health (Jan. 26, 2015), <https://www.medstarhealth.org/news-and-publications/articles-and-research-reports/which-youth-sports-cause-the-most-concussions>
- <sup>6</sup> Neil K. McGroarty, Symone M. Brown and Mary K. Mulcahey, "Sport-Related Concussion in Female Athletes: A Systematic Review," *Orthopaedic Journal of Sports Medicine* (July 2020), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7366411/>
- <sup>7</sup> "Facts about Concussion and Brain Injury," p.2, [https://www.cdc.gov/headsup/pdfs/providers/facts\\_about\\_concussion\\_tbi-a.pdf](https://www.cdc.gov/headsup/pdfs/providers/facts_about_concussion_tbi-a.pdf)
- <sup>8</sup> "Persistent post-concussive symptoms (Post-concussion syndrome)," Mayo Clinic, <https://www.mayoclinic.org/diseases-conditions/post-concussion-syndrome/symptoms-causes/syc-20353352>
- <sup>9</sup> "What is Post-Concussion Syndrome?," Concussion Legacy Foundation, [https://concussionfoundation.org/sites/default/files/2021-03/What\\_Is\\_PCS.pdf](https://concussionfoundation.org/sites/default/files/2021-03/What_Is_PCS.pdf)
- <sup>10</sup> "Concussion Test," Cleveland Clinic, <https://my.clevelandclinic.org/health/diagnostics/22267-concussion-test>
- <sup>11</sup> <https://www.psu.edu/news/research/story/patent-first-saliva-based-concussion-test-awarded-penn-state-and-partners/>
- <sup>12</sup> Oculogica EyeBOX Concussion Assessment, <https://oculogica.com/>
- <sup>13</sup> Dustin W. Ballard, "The Latest in Concussion Treatment and Recovery," *Psychology Today* (Dec. 7, 2022), <https://www.psychologytoday.com/us/blog/standing-strong/202212/the-latest-in-concussion-treatment-and-recovery>
- <sup>14</sup> "Moderate to Severe Traumatic Brain Injury is a Lifelong Condition," Centers for Disease Control and Prevention, [https://www.cdc.gov/traumaticbraininjury/pdf/moderate\\_to\\_severe\\_tbi\\_lifelong-a.pdf](https://www.cdc.gov/traumaticbraininjury/pdf/moderate_to_severe_tbi_lifelong-a.pdf)
- <sup>15</sup> Tim Sullivan, "Recovery May Take Time," *Harvard Medical School News & Research* (Aug. 12, 2021), <https://hms.harvard.edu/news/recovery-may-take-time>
- <sup>16</sup> Simon Fleminger, "Long term outcome after traumatic brain injury," *BMJ* (Dec. 17, 2005), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1315633/>
- <sup>17</sup> X. L. Zhu, W. S. Poon et al., "Does intensive rehabilitation improve the functional outcome of patients with traumatic brain injury (TBI)? A randomized controlled trial," *Brain Injury* (June 2007), <https://pubmed.ncbi.nlm.nih.gov/17653942/>
- <sup>18</sup> Ling Hu, Siyu Yang et al., "Advanced Neuroimaging Role in Traumatic Brain Injury: A Narrative Review," *Frontiers in Neuroscience* (Apr. 13, 2022), <https://www.frontiersin.org/articles/10.3389/fnins.2022.872609/full>
- <sup>19</sup> Shiyao Gao, Raj G Kumar et al., "Disparities in health care utilization of adults with traumatic brain injuries are related to insurance, race and ethnicity: A systematic review," *Journal of Head Trauma Rehabilitation* (May 1, 2019), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5857393/>
- <sup>20</sup> "Moderate and Severe TBI," Centers for Disease Control and Prevention, <https://www.cdc.gov/traumaticbraininjury/moderate-severe/> (adjusted for inflation to 2022 dollars)
- <sup>21</sup> Chandni Edmonds, "The Steep Cost of Brain Injury Recovery," *Next Avenue* (Dec. 28, 2015), <https://www.nextavenue.org/the-steep-cost-of-brain-injury-recovery/> (adjusted for inflation to 2022 dollars)

