

**STATE OF MICHIGAN
IN THE SUPREME COURT**

Appeal from the Court of Appeals
(Sawyer, P.J., and Saad and Meter, JJ.)

Harold Hunter, Jr.,
Plaintiff/Appellant,
v.

Supreme Court Docket 147335
Court of Appeals Docket 306018

David Sisco and
Auto Club Insurance Association,
Defendants,
and

Genesee Circuit 10-094081-NI
Hon. Joseph J. Farah

City of Flint,
Defendant-Appellee

**BRIEF AMICUS CURIAE OF
COALITION PROTECTING AUTO NO-FAULT, BRAIN INJURY ASSOCIATION OF
MICHIGAN, AND MICHIGAN BRAIN INJURY PROVIDER COUNCIL**

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August 19, 2014



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STATEMENT OF QUESTION PRESENTED

I. Are emotional and mental injuries arising out of a motor vehicle accident compensable as “bodily injuries”?

Plaintiff/Appellant answers, “YES.”

Defendant/Appellee answers, “NO.”

The Trial Court answered, “YES.”

The Court of Appeals answered, “NO.”

Amici Curiae Coalition Protecting Auto No-Fault, Brain Injury Association of Michigan, and Michigan Brain Injury Provider Council answer, “YES.”

INTEREST OF AMICI CURIAE

The Coalition Protecting Auto No-Fault is an association of medical provider groups and consumer organizations formed to protect and preserve the vitality of the Michigan auto no-fault insurance system. The Brain Injury Association of Michigan and Michigan Brain Injury Provider Council primarily serve individuals who have suffered brain injuries in automobile accidents. All of these organizations work with or advocate for victims injured in automobile accidents.

These organizations are keenly interested in this case because the interpretation of the phrase “bodily injury” in this case could very likely impact the interpretation of “bodily injury” under the No Fault Act. Thus, a decision in this case could impact a number of accident victims and brain injury patients whom these organizations serve.

STATEMENT OF FACTS

Plaintiff-Appellant Harold Hunter ("Mr. Hunter") was involved in an automobile accident on July 20, 2009, during which he was sideswiped by a dump truck owned by Defendant-Appellee City of Flint ("the City"). *Hunter v Sisco*, 300 Mich App 229, 231; 832 NW2d 753 (2013). Mr. Hunter was driven to the hospital by his mother, and was later discharged with a diagnosis of lower back pain. *Id.*

Mr. Hunter's back pain made it increasingly difficult for him to get out of bed each morning, which resulted in Mr. Hunter returning to the hospital for physical therapy on October 10, 2009. *Id.* at 232. Subsequently, on February 12, 2010, a doctor noted that Mr. Hunter appeared to have bilateral sacroiliac joint inflammation. *Id.* On March 13, 2010, an MRI showed a herniated disc in Mr. Hunter's lumbar spine, and an EMG later showed that Mr. Hunter had a pinched nerve in that same area of his spine. *Id.*

Mr. Hunter claimed that because of the accident, he could no longer work at his job as a custodian at a barber shop, could not perform chores around the house, could not sit or stand for long periods, was unable to drive, bend, and lift more than 5 or 10 pounds, and could no longer play softball or basketball. *Id.* Mr. Hunter claimed he sustained injuries from "shock and emotional damage" as the result of "stress and disappointment that he cannot provide for his son as he had in the past and could not participate in certain activities he did before his injury." *Id.* at 235.

Mr. Hunter sued the City of Flint, and the City filed a motion for summary disposition, claiming governmental immunity. *Id.* at 232. Mr. Hunter argued below that he was entitled to recover not only for his back injury but for the emotional distress that he suffered along

with it because all of these damages were encompassed by the term "bodily injury" under the Governmental Tort Liability Act, MCL 691.1405 ("GTLA"). *Id.* at 233. The City, on the other hand, argued that Mr. Hunter could not recover for his emotional distress because emotional distress is not "bodily injury." *Id.* at 232.

The Trial Court found in Mr. Hunter's favor and denied the City's motion. *Id.* at 233. The Court of Appeals, however, reversed, holding that emotional distress is not "bodily injury." *Id.* at 235-236. This appeal followed.

ARGUMENT

This case poses the question of whether “*pain and suffering and/or emotional distress may qualify as a ‘bodily injury.’*” *Hunter v Sisco*, 495 Mich 960, 960; 843 NW2d 559 (2014). Although this case is specifically regarding what constitutes “bodily injury” under the Governmental Tort Liability Act, MCL 691.1405, the phrase “bodily injury” is used in many other contexts, including the No Fault Act, MCL 500.3105(1). The way in which “bodily injury” is defined in this case will likely influence how courts and insurance companies choose to define the term in other contexts in the future. A decision that emotional or psychological injuries are not “bodily injuries” would negatively impact a number of patients seeking no fault coverage for their injuries, who would be denied the treatment they desperately need in order to recover from their injuries obtained as the result of automobile accidents.

This brief will analyze the question presented based upon the understanding that phrase “emotional distress” as used in the framed issue, is in reality “shorthand” for numerous emotional and psychological disorders, including but not limited to, depression, anxiety, dyscontrol disorder, manic behavior, and so on. With that understanding in mind, amici urge this Court to clearly hold that “bodily injury” encompasses all injuries to the body, including those characterized as “emotional.” Modern medical science tells us that frequently psychological and emotional disorders are manifestations of injury to or changes in the physical brain. They are, thus, bodily injuries, and must be treated as such. Michigan courts have long recognized the connection between mind and body and have long considered damage to the mind to be damage to the body.

First, this amicus brief, in Part I, briefly describes Michigan case law on the connection between the mind and body.

Second, in Part II, this amicus brief goes on to illustrate this point—that mind and body are intertwined—by using the example of brain injury patients. Brain injuries are very commonly suffered as a result of auto accidents,¹ and accident victims who suffer brain injuries experience a variety of emotional and behavioral sequelae of those injuries. These sequelae are clear manifestations of brain injury, even though they are also “emotional” and “mental” injuries. These sequelae are and must be considered “bodily injury” under the No Fault Act. If they are not treated as such, then a number of brain injury patients will not receive the treatment that they need and will not be able to properly recover from their injuries.

Post-accident psychological disorders, however, are not limited to brain injury victims. Thus, in Part III, this amicus brief also discusses a number of psychological complications that accident victims suffer as the result of other types of physical injuries (such as spinal cord injuries and orthopedic injuries), or even when there is not direct physical injury (such as a bystander’s psychological injuries with physical manifestations). All of these psychological problems are the result of physical problems in the brain, and they require treatment in order for these patients to properly recover.

¹ Friedland & Dawson, *Function After Motor Vehicle Accidents: A Prospective Study of Mild Head Injury and Posttraumatic Stress*, 189(7) *Journal of Nervous and Mental Disease* 426, 426 (2001).

I. Michigan Courts have long recognized that mind and body are inextricably linked such that injury to the mind is injury to the body.

For decades, Michigan courts have rejected the notion that mind and body are distinguishable from one another, holding that injury to the mind is injury to the body and allowing recovery for mental and emotional injuries. To begin with, “compensation for a purely mental component of damages where [a] defendant negligently inflicts an immediate physical injury has always been awarded as ‘parasitic damages.’” *Daley v La Croix*, 384 Mich 4, 8; 179 NW2d 390 (1970). In 1970, however, the Michigan Supreme Court expanded the ability of plaintiffs to recover for emotional injuries, allowing recovery for even those emotional injuries not caused by a direct physical injury—and thus eliminating the outdated requirement of a physical impact to substantiate their claims. *Id.* For example, two plaintiffs were allowed to recover for emotional disturbance resulting from an electrical explosion, caused by the defendant driving his automobile into a utility pole, even though the plaintiffs were not physically injured. *Id.* Similarly, a mother was allowed to recover for her severe depression that resulted from witnessing her daughter being hit by the defendant’s automobile and killed. *Toms v McConnell*, 45 Mich App 647; 207 NW2d 140 (1973). These injuries, emotional rather than physical in nature, were considered both real enough to recover for and attributable to the defendants’ actions.

That same year as the *Toms* decision, the Michigan Auto No-Fault Act, MCL 500.3101, et seq., went into effect. The No-Fault Act had the potential to change what types of injuries a plaintiff could recover following an auto accident because it allows recovery of non-economic damages only if the plaintiff has suffered a “serious impairment

of **body function**.” MCL 500.3135(1).² Indeed, after the Act went into effect, it was argued that recovery for emotional injuries was no longer allowed because impairment of the mind was not impairment of “body function.” *Luce v Gerow*, 89 Mich App 546, 548-549; 280 NW2d 592 (1979). This argument was flatly rejected. *Id.* at 549-551. Were Michigan courts to accept the primitive notion that mind and body are distinct and separate entities, the courts could have held that impairment of the mind was not impairment of “body function.” Instead, Michigan courts have repeatedly held that “serious impairment of body function” includes psychological injuries that are severe enough to constitute “serious impairment.” *See, e.g., Luce, supra* at 549-551.

In *Luce v Gerow, supra* the plaintiff was driving her vehicle when another vehicle struck her vehicle head-on, causing serious head injuries to her husband who was a passenger in her vehicle at that time. *Id.* at 547-548. The plaintiff subsequently filed a law suit alleging that she had suffered serious “emotional shock” as a result of witnessing her husband sustain serious head injuries in the collision. *Id.* at 547-548.

The Michigan Court of Appeals in *Luce* was presented with the opportunity to interpret the phrase “serious impairment of body function”—in particular, whether emotional shock was an impairment of a **body function**. Rather than draw any kind of distinction between mind and body, the Court of Appeals chose to follow pre-no-fault case law, citing *Daley and Toms. Id.* at 548. Even though the plaintiff suffered no physical injuries herself,

² Section 3135 of the No Fault Act applies as a threshold barrier even in governmental immunity cases under the motor vehicle exception of MCL 600.1405. A plaintiff suing the government for a motor vehicle accident injury must show both that he suffered a “bodily injury” under MCL 600.1405, and that he suffered a “serious impairment of body function” under MCL 500.3135. *Hardy v Oakland Co*, 461 Mich 561, 565; 607 NW2d 718 (2000).

the Court of Appeals held that she could recover for her psychological injuries. *Id.* at 547, 549. In so doing, the Court of Appeals made clear that there is no meaningful distinction between injury to the mind and injury to the body:

An injury to mental well being can be as much an injury to a "body function" as an injury to an arm or a leg. Once it is accepted that mental injuries, with physical consequences, are "real" injuries, defendant's position becomes unsupportable either in law or in logic. It is clear that under present medical and legal theory, mental injuries are considered just as real as physical injuries. We therefore hold, as a matter of law, that the Legislature did not intend to exclude the possibility of recovering for mental injuries resulting in physical symptoms by using the term "body function" in § 3135(1).

...

The apparent assumption underlying defendant's argument is that plaintiff's injury is somehow less real, and therefore, not worthy of being compensated for, because none of her bones were broken. We cannot accept this proposition. If plaintiff's allegations are proved and accepted by the jury, it is apparent that she was "injured" in the accident. *Compare Toms v McConnell, supra.* Just as the jury should have been allowed to find that the mother was injured by watching her child being run over in *Toms*, the jury should be allowed to find that Mrs. Luce was injured, in her own right, by invasion of a protected property interest in mental well being, by witnessing and dealing with her husband's condition in this case.

Id. at 549-551.

After *Luce*, in 1980, a standard jury instruction was adopted in Michigan, incorporating the *Luce* holding. This instruction treats mental and emotional injuries as bodily injuries and was only slightly amended in 2001 (to remove the "a"), reaffirming its correctness. M Civ JI 36.02 states as follows:

The operation of the mind and of the nervous system are body functions. Mental or emotional injury which is caused by

physical injury or mental or emotional injury not caused by physical injury but which results in physical symptoms may be a serious impairment of [a] body function.

Such an instruction, used by trial judges to this day, adds further clarity to what has already been the law: that mind and body are inseparable and that mental injuries are just as compensable as physical injuries.

Michigan courts have continued to hold that injuries to the mind may constitute “serious impairment of body function.” In *Garris v Vanderlaan*, 146 Mich App 619, 622; 381 NW2d 412 (1985), the plaintiff suffered back injury as a result of a car accident. After the accident,

She found activities such as walking a couple of miles, driving, sitting and sleeping more difficult than before the accident. Following the accident, plaintiff also experienced psychological problems which were manifested in feelings of anger because of time lost due to her physical injuries.

Id. at 623. A psychiatrist diagnosed the plaintiff’s condition as “post-traumatic neurosis, which is characterized by depression, anxiety, confusion, isolation.” *Id.* The plaintiff sued the defendant, alleging serious impairment of body function based on her back injury and also claiming that she was “psychiatrically disabled” as a result of the accident. *Id.* at 622. Although the Court of Appeals held that the plaintiff’s injuries were not sufficiently severe to qualify as “serious impairment of body function,” it made clear that this was not because they were “mental injuries,” stating, “We have no trouble concluding that the functioning of the mind represents an important body function[.]” *Id.* at 624. This is consistent with *Luce*, which held that whether an impairment of the mind is “serious” enough to constitute a “serious impairment of body function” is a separate question from whether mental injuries

are compensable. *Luce, supra* at 550.

The Michigan Court of Appeals reaffirmed this conclusion in *Shaw v Martin*, 155 Mich App 89; 399 NW2d 450 (1986). In *Shaw*, the plaintiff was taken to the hospital after being struck by a vehicle. *Id.* at 91. He had some cuts on his body, a “banged-up right knee,” and torn muscles, but no broken bones. *Id.* The plaintiff also complained of memory loss after the accident. *Id.* The defendants argued that the plaintiff suffered no serious impairment of body function, and thus the question arose as to whether the plaintiff’s serious memory loss could constitute “serious impairment of body function.” *Id.* at 92. The Court of Appeals had no trouble concluding that memory loss was impairment of a body function:

We further believe that memory is an important body function. Memory is a body function which people use in their everyday life. Memory is essential to a person’s performance at work. Memory is also important in social situations such as meeting people, conversing, engaging in hobbies and recreation, and reminiscing with friends.

The impairment to plaintiff’s memory in the instant case was serious. Plaintiff testified at his deposition that, before the accident, he had an excellent memory. After the accident he could not perform like he used to be able to at work. He could not remember parts, molds, and the proper way to start jobs. He constantly had to ask people. He was always confused, he was reassigned to third shift and, in addition, he could not remember past events in his life, and could not converse with people about these past events. This infirmity interferes with a person’s ability to live a normal life.

Id. at 94. Memory is a process of the mind; thus, by recognizing that its impairment is an impairment of the body, the Court of Appeals again recognized that impairment of the mind is impairment of the body.

This same conclusion was reiterated in a more recent case, *Guerrero v Smith*, 280 Mich App 647; 761 NW2d 723 (2008). Plaintiff's suit sought damages for the auto accident injuries, including muscle spasms, loss of normal cervical lordotic curve, and memory loss. *Id.* at 664. In *Guerrero*, the plaintiff requested and was denied a jury instruction providing that "[m]emory is an important body function, and neuropsychological testing may suffice as an objective manifestation of an important body function." *Id.* at 663. The Court of Appeals relied on its decision in *Shaw* that "memory is an important body function" and thus agreed that such a jury instruction would be appropriate. *Id.* at 664. However, it held that failure to give a jury instruction to that effect when M Civ JI 36.02 had already been given to the jury was not error. *Id.* at 663-665.

Finally, in another 2008 case, the Court of Appeals made clear that mental injuries are still compensable. In *Flood v Sbraccia*, the plaintiff was a passenger in an ambulance working as an obstetrical nurse when the ambulance went off the road and rolled over. *Flood v Sbraccia*, unpublished opinion per curiam of the Court of Appeals, issued May 29, 2008 (Docket No. 277579), at 1. The plaintiff suffered injuries to her back, neck, and hand, and also complained of emotional stress. *Id.* The Court of Appeals confirmed again that "[a]ctionable injuries may include psychological injuries with physical consequences." *Id.* at 2. However, the Court of Appeals held that the plaintiff had not suffered a "serious impairment" because she had not demonstrated that "the course or trajectory of the plaintiff's normal life" had been affected. *Id.* at 2-3. The Court of Appeals's decision was thus against the plaintiff, but not because her injuries were mental or emotional injuries.

All of this legal history evidences the acknowledgment by Michigan courts that the

mind and body are inseparable and that mental injuries are as damaging as physical injuries.

II. Brain Injury victims provide a clear example of the direct connection between mind and body and the necessity for mental injuries to be properly regarded as “bodily injuries.”

A. Accident victims who suffer traumatic brain injuries often additionally suffer from a variety of emotional and behavioral sequelae of those injuries, all of which are rooted in the physical brain and all of which require treatment in order to achieve a proper recovery.

The effects of traumatic brain injury are numerous and can be devastating to the life of a brain injury victim. From the time of the injury, each victim suffers from a number of physical, mental, and emotional problems, many of which can be debilitating. A typical auto accident case contains the following scenario:

The soon-to-be brain injury victim is driving along the highway with no idea of the turn her life is about to take. There is a collision, and the auto accident victim sustains head trauma. Another driver calls 9-1-1. Emergency vehicles arrive and rush the victim to the hospital. She is unconscious and does not wake immediately.

The doctors rush the victim to the emergency room and begin running tests. They are most concerned about the head trauma that the accident victim sustained, so they perform a CT scan of her brain. The scan reveals that the auto accident victim has sustained damage primarily to the left side of her brain. They begin to treat her injuries the best they can.

Eventually, the patient wakes up. Her body and head ache, but the pain she is feeling is only the beginning. In addition to the pain, the patient notices that her vision has

worsened. She cannot remember exactly what happened and feels somewhat confused and disoriented. Once she is stable enough to have visitors, her family comes to see her. They soon notice that she now gets agitated easily and that her ability to recall new events is poor.³ The patient is on a number of medications and begins to undergo various types of rehabilitation. Eventually, she is released from the hospital; however, she must continue to take her medications and must continue to attend rehabilitation programs. She is told these are absolutely vital to her recovery.

At home, the patient feels miserable. She is suffering from depression and it is difficult to get herself out of bed in the morning. Her family notices that she does not seem to enjoy the activities she once loved, does not want to eat, and is always tired. The patient begins to take a new medication, an antidepressant, to treat her depression.

Two years later, the patient continues to suffer from depression. She cannot go off her medication without suffering from immense changes in mood. She also continues to experience cognitive deficits, which she is told will probably be permanent. Her memory is not what it once was—she cannot recall new things very well, she has difficulty paying attention, and her mind works more slowly than it used to—which is called “dementia due to head trauma.”⁴ She is taking medication for this dementia, which is necessary for her to function. She is also attending rehabilitation programs and therapy.

Ten years later, these problems continue. The patient’s medications remain

³ Confusion, disorientation, agitation, and poor memory are all associated with traumatic brain injury. Rao & Lyketsos, *Neuropsychiatric Sequelae of Traumatic Brain Injury*, 41(2) *Psychosomatics* 95, 97 (2000).

⁴ *Id.*

necessary, and she still struggles with memory loss, attention deficits, and depression. This patient is only one of many brain injury victims who suffer from a variety of problems after their injuries, all of which require treatment in order for the auto accident victim to recover.

There is much literature documenting the variety of problems that patients experience as a result of traumatic brain injury. Such injury, which is clearly physical in nature, generally results in not only physical problems, but also a range of emotional and behavioral problems, all of which are rooted in the physical brain, and all of which require treatment. This Court's phrasing of the issue presented in this case, "whether damages for pain and suffering and/or emotional distress may qualify as a 'bodily injury,'" asks whether emotional damage is bodily injury. *Hunter v Sisco*, 495 Mich 960, 960; 843 NW2d 559 (2014). The answer to this question could determine whether or not these brain injury patients, and other patients as discussed in Part III, receive the treatments that they require.

Modern medical science answers this question with a resounding "yes." As one medical article noted,

A distinction between mental and physical illness is still made, both by the lay public and by many doctors, and the terms 'mental disorder' and 'mental and behavioural disorder' are still used in the two most widely used official nomenclatures, the World Health Organization's *International Classification of Diseases* (ICD) and the American Psychiatric Association's *Diagnostic and Statistical Manual* (DSM). **This has the unfortunate effect of helping to perpetuate two assumptions that have long since been abandoned by all thinking physicians, namely that mental disorders are**

disorders of the mind rather than the body, and that they are fundamentally different from other illnesses.⁵

There is a clear medical link between physical injury to the brain and resulting emotional and behavioral problems, as evidenced by much research.

Brain injury patients provide an excellent example of the way in which the physical brain influences the emotions and behavior of a patient. Accident victims who suffer from traumatic brain injury often suffer from problems such as depression, anxiety, mania, psychosis, behavior dyscontrol disorder, and other symptoms or disturbances.⁶ These mental and emotional disorders are the result of an injured brain or altered brain chemistry, and they are often treated with medications designed to affect those physical parts of the brain that are causing the problems. The rates at which these problems occur are disturbingly high, such that the medical community has expressed much concern about them and has called for greater treatment of these psychological conditions after traumatic brain injury.⁷ Each of these problems has its own symptoms, prevalence, recovery rate, and treatments, and each can be tied to particular regions of the brain, as discussed below.

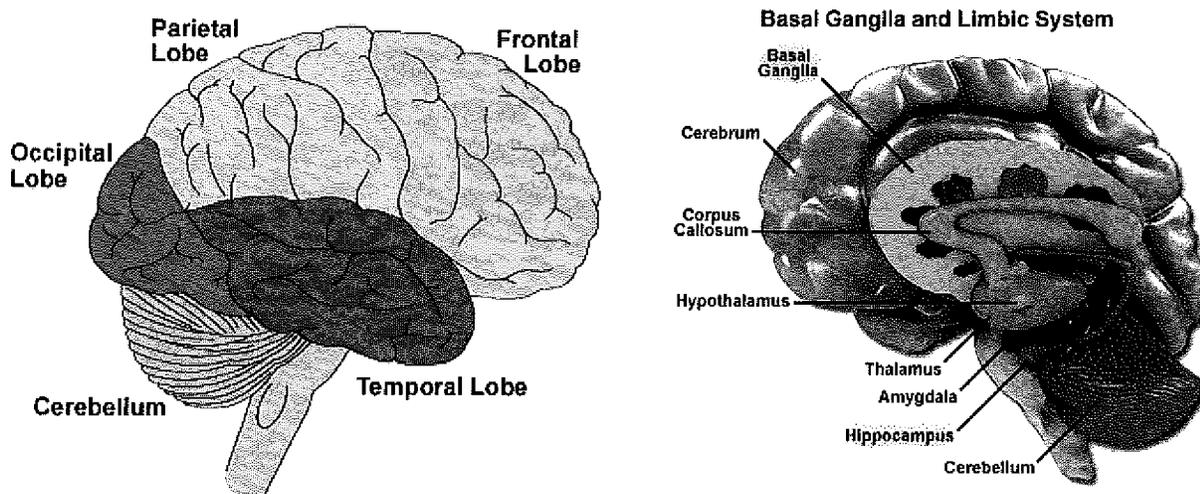
To understand the connection between the brain and psychological disorders, the following is a brief primer on the composition of the brain. The brain is divided into four

⁵ Kendell, *The Distinction Between Mental and Physical Illness*, 178 *British Journal of Psychiatry* 490, 491 (2001) (emphasis added).

⁶ Rao & Lyketsos, *Neuropsychiatric Sequelae of Traumatic Brain Injury*, 41(2) *Psychosomatics* 95, 97-99 (2000).

⁷ Perino, Rago, Cicolin, Torta & Monaco, *Mood and Behavioural Disorders Following Traumatic Brain Injury: Clinical Evaluation and Pharmacological Management*, 15(2) *Brain Injury* 139, 139-140 (2001).

regions: the cerebrum, cerebellum, limbic system, and brain stem.⁸ The cerebrum is further divided into four lobes: frontal, parietal, occipital, and temporal.⁹ The limbic system consists of the thalamus, hypothalamus, amygdala, and hippocampus.¹⁰ The diagrams below indicate where these different areas are located.



11

Depression

Depression is a major problem among brain injury patients. It is a mood disorder characterized by symptoms such as depressed mood, loss of interest, feelings of

⁸ *Parts of the Brain and Their Functions*, MDHealth.com, <http://www.md-health.com/Parts-Of-The-Brain-And-Function.html> (last updated July 31, 2014).

⁹ *Id.*

¹⁰ *Id.*

¹¹ These images are from <http://www.braininjury.com/symptoms.html> and <http://www.magnet.fsu.edu/education/tutorials/magnetacademy/mriresearch/page5.html>.

worthlessness, weight change, sleep disturbance, psychomotor agitation or retardation, decreased energy, diminished thinking ability, and recurrent thoughts of death.¹² Research has shown that depression is a significant long-term health issue for many patients with brain injury.¹³ One study found that 42% of brain injury patients suffer from depression.¹⁴ Other studies have found that the incidence of depression in brain injury patients is as high as 77%.¹⁵

Additionally, research has demonstrated that patients who suffer from depression post-head injury often suffer from the condition for a long period of time. For example, 61% of the patients with brain injury surveyed in one study suffered from depression an average of 8 years after the injury occurred.¹⁶ Another study found that depression can continue to exist decades after the head trauma in some patients.¹⁷

Depression in brain injury patients both decreases those patients' quality of life and

¹² Kreutzer, Seel & Gourley, *The Prevalence and Symptom Rates of Depression After Traumatic Brain Injury: A Comprehensive Examination*, 15(7) *Brain Injury* 563, 565 (2001).

¹³ *Id.* at 574.

¹⁴ *Id.* at 572.

¹⁵ Varney, Martzke & Roberts, *Major Depression in Patients with Closed Head Injury*, 1 *Neuropsychology* 7, 7-8 (1987).

¹⁶ Hoofien, Gilboa, Vakil & Donovan, *Traumatic Brain Injury 10-20 Years Later: A Comprehensive Outcome Study of Psychiatric Symptomatology, Cognitive Abilities and Psychosocial Functioning*, 15(3) *Brain Injury* 189, 201 (2001).

¹⁷ Holsinger, Steffens, Phillips, Helms, Havlik, Breitner, Guralnik & Plassman, *Head Injury in Early Adulthood and the Lifetime Risk of Depression*, 59 *Arch Gen Psychiatry* 17, 21 (2002).

negatively impacts the patients' overall recovery rates for their brain injuries.¹⁸ Depressive episodes can lead to poor compliance with rehabilitation programs, for example, which slows recovery.¹⁹ For these reasons, it is very important that the problem be addressed and treated early on.²⁰

Research has shown a significant connection between depression and the physical brain. For example, there is a strong association between depression and damage to the left dorsolateral frontal lobe or left basal ganglia.²¹ Moreover, a more severe injury causes more severe depression.²² Two researchers concluded that traumatic brain injury can trigger a set of pathophysiological changes, and that those physical changes to the brain then can cause a depressive episode.²³

Moreover, research has demonstrated that even when the brain is not directly injured, depression results from changes in the brain and brain chemistry. That is, there is a direct link between the physical brain and the mental and emotional experiences of patients.

Three areas of the brain are associated with depression: the hippocampus, the

¹⁸ Perino, Rago, Cicolin, Torta & Monaco, *supra*, at 139-140.

¹⁹ *Id.*

²⁰ *Id.*

²¹ Busch & Herbert, *Depression After Mild Traumatic Brain Injury: A Review Current Research*, 8(2) *Neuropsychology Review* 95, 103 (1998).

²² *Id.* at 101.

²³ *Id.* at 105.

thalamus, and the amygdala.²⁴ Studies have shown that the hippocampus, for example, is often smaller in depressed patients. One study found that the hippocampus was 9% to 11% smaller in depressed women than in non-depressed women.²⁵ Moreover, it was even smaller, the more bouts of depression the women had.²⁶ It is believed that stress can suppress the production of neurons in the hippocampus, which leads to a smaller hippocampus, which then leads to depression.²⁷

In addition, neural chemistry can affect mood. Neurons use neurotransmitters to communicate with one another.²⁸ Neurotransmitters are released by one neuron, bind to the next neuron to transmit their signal, and then the remaining neurotransmitters are reuptaken by the first neuron.²⁹ Depression is often caused by neural receptors either being oversensitive to neurotransmitters, overly insensitive to them, producing too few neurotransmitters, or reuptaking too many neurotransmitters before they have a chance to signal another neuron.³⁰

Hormone levels, which can be increased due to stress, can also lead to depression. Specifically, the hypothalamus produces corticotropin-releasing hormone (CRH), which

²⁴ Harvard Medical School, *What Causes Depression?*, Understanding Depression (2013), available at <http://www.health.harvard.edu/newsweek/what-causes-depression.htm>.

²⁵ *Id.*

²⁶ *Id.*

²⁷ *Id.*

²⁸ *Id.*

²⁹ *Id.*

³⁰ *Id.*

signals the pituitary gland to release adrenocorticotrophic hormone (ACTH), which signals the adrenal gland to release cortisol.³¹ Cortisol is what causes the “stress response” (increased heart rate, breathing, etc.).³² CRH also affects several different areas of the brain, including the amygdala.³³ Studies have shown that people who suffer from depression often have increased CRH.³⁴ All of this indicates that the source of the disorder is physical.

Anxiety

Anxiety is another common problem among brain injury patients. Anxiety disorders can take a number of different forms, including generalized anxiety disorder, panic disorder, phobic disorders, posttraumatic stress disorder (PTSD), and obsessive-compulsive disorder (OCD).³⁵ These disorders are characterized by different symptoms, depending on the disorder. For example, PTSD is characterized by the re-experiencing of an extremely traumatic event, as well as heightened arousal and avoidance of stimuli associated with the traumatic event.¹⁶ OCD, on the other hand, is characterized by

³¹ *Id.*

³² *Id.*

³³ *Id.*

³⁴ *Id.*

³⁵ Rao & Lyketsos, *supra*, at 98.

¹⁶ Moore, Terryberry-Spohr & Hope, *Mild Traumatic Brain Injury and Anxiety Sequelae: A Review of the Literature* (2006), Faculty Publications, Department of Psychology, Paper 592, at 121.

recurrent obsessions and compulsions that impair functioning and waste time.¹⁷ Individuals with panic disorders experience recurrent panic attacks, whereas individuals with generalized anxiety disorder excessively worry about a number of activities or events in their lives.¹⁸ Finally, phobic disorders are characterized by significant anxiety brought on by a specific feared object or situation.¹⁹

Like depression, anxiety disorders are common in patients with traumatic brain injury. Studies have found frequencies of 26%,²⁰ 57%,²¹ and as high as 70%.²² Anxiety disorders can also be long lasting after they are acquired as a result of brain trauma. For instance, at least half of the patients in one study who had anxiety 6 months after their injuries showed no improvement 4 years post-injury.²³

According to one study, problems such as anxiety can lead a brain injury patient into a "cycle of failure, fear, avoidance, anxiety, depression, loss of self-esteem, isolation, and alienation."²⁴ Anxiety can cause cognitive deficits beyond those experienced as a direct

¹⁷ *Id.* at 124.

¹⁸ *Id.* at 125.

¹⁹ *Id.* at 126.

²⁰ Schoenhuber & Gentilini, *Anxiety and Depression After Mild Head Injury: A Case Control Study*, 51 *Journal of Neurology, Neurosurgery, and Psychiatry* 722, 723 (1988).

²¹ Brooks, Campsie, Symington, Beattie & McKinlay, *The Five Year Outcome of Severe Blunt Head Injury: A Relative's View*, 49 *Journal of Neurology, Neurosurgery, and Psychiatry* 764, 765 (1986).

²² Klonoff, *Head Injuries in Children: Predisposing Factors Accident Conditions, Accident Proneness and Sequelae*, 61(12) *AJPH* 2405, 2413 (1971).

²³ Moore, Terryberry-Spohr & Hope, *supra*, at 128.

²⁴ Kay, *Neuropsychological Treatment of Mild Traumatic Brain Injury*, 8(3) *J Head Trauma Rehabilitation* 74, 75 (1993).

result of the brain injury, which can greatly impair functioning and make matters even worse.²⁵

Anxiety disorders, like depression, have been shown to have physical causes. Such disorders are associated with right-hemispheric lesions.²⁶ Anxiety disorders are also caused by the increased activity of the aminergic system and decreased activity of the GABA inhibitory network.²⁷ Because these disorders result from a chemical imbalance in the brain, several medications, such as selective serotonin reuptake inhibitors (SSRIs), opioid antagonists, and buspirone, assist in treatment.²⁸

Mania

A less common mood disorder suffered by brain injury patients is mania. Mania is a mood disorder, like depression, but is characterized by changes in mood, sleep, and activation, which manifest as irritability, euphoria, insomnia, agitation, aggression, impulsivity, and violent behavior.²⁹ One study found mania in 9% of brain injury patients.³⁰ Not enough research has been conducted, however, to determine how long this condition

²⁵ *Id.* at 77-78.

²⁶ Rao & Lyketsos, *supra*, at 98.

²⁷ *Id.*

²⁸ *Id.*

²⁹ *Id.*

³⁰ Jorge et al, *Secondary Mania Following Traumatic Brain Injury*, 150(6) *Am J Psychiatry* 916, 919 (1993).

typically lasts.³¹ Mania, like depression and anxiety, may reduce the quality of life of brain injury patients and negatively impact their recovery.³²

Patients suffering from mania, like those suffering from other disorders, tend to have damage to a particular area of the brain. Mania is most common in patients with right-hemispheric limbic structure lesions.³³ Certain anticonvulsants, which are specific to the neuropathology of traumatic brain injury, are the most effective treatments for mania.³⁴

Psychosis

Some brain trauma patients also experience schizophrenia-like psychosis after their injuries. Psychotic symptoms often manifest as delusions, hallucinations, illogical thinking, agitation, ideas of reference, grimacing, silly giggling, expression of odd ideas, regression, and impulsive aggressiveness.³⁵ Psychosis develops in 0.7 to 9.8% of brain injury patients.³⁶ Psychosis may also negatively impact patient recovery.³⁷

Psychosis is not associated with any particular area of the brain, but is treated based upon which area is damaged. For example, if there is left-temporal damage, an

³¹ Kim et al, *Neuropsychiatric Complications of Traumatic Brain Injury: A Critical Review of the Literature*, 19(2) J Neuropsychiatry Clinical Neurosciences 106, 115-119 (2007).

³² Rogers & Read, *Psychiatric Comorbidity Following Traumatic Brain Injury*, 21(13-14) Brain Injury 1321, 1321-1322 (2007).

³³ Rao & Lyketsos, *supra*, at 98.

³⁴ *Id.*

³⁵ *Id.*

³⁶ *Id.*

³⁷ Rogers & Read, *supra*, at 1321-1322.

anticonvulsant may be used.³⁸ However, delusional symptoms often indicate that there is frontal lobe dysfunction, which can be treated with dopaminergics.³⁹

Behavior Dyscontrol Disorder

Another disorder that affects brain injury patients is Behavior Dyscontrol Disorder. The major variant of this disorder is characterized by dyscontrol of emotion, behavior, and cognition.⁴⁰ Its prevalence in brain injury patients is 5% to 70%.⁴¹ The minor variant is referred to as post-concussion syndrome and is the most commonly diagnosed disorder following traumatic brain injury.⁴² Its symptoms include irritability, rage, anger, impaired attention, impaired memory, poor executive function, impaired judgment, distractability, conceptual disorganization, impulsivity, aggressivity, hyperactivity, hyperphagia⁴³, and pica^{44,45}. Although most patients with post-concussion syndrome recover within 3 to 6 months, 15% of patients experience these symptoms for over a year.⁴⁶

³⁸ Rao & Lyketsos, *supra*, at 98.

³⁹ *Id.*

⁴⁰ *Id.* at 99.

⁴¹ *Id.*

⁴² *Id.*

⁴³ "Hyperphagia" is an abnormally increased appetite for food. Merriam-Webster Dictionary.

⁴⁴ "Pica" is an abnormal desire to eat non-food substances like chalk, ashes, and bone. Merriam-Webster Dictionary.

⁴⁵ *Id.*

⁴⁶ *Id.*

Behavior dyscontrol disorder, major variant, may be due to the effects of both focal and diffuse brain injury.⁴⁷ The injury causes a disruption of the neuronal network, creating lapses in cognitive functioning and coarsening of behavior (insensitivity, rudeness, etc.).⁴⁸ Damage to different areas of the brain causes different problems. For example, damage to the orbital-frontal area causes disinhibition, damage to the dorsal convexity of the frontal lobe causes dysexecutive symptoms, and damage to the temporal lobes causes emotional lability and memory problems.⁴⁹ The minor variant of this disorder is thought to be caused by diffuse axonal injury from acceleration and deceleration forces.⁵⁰ PET and SPECT studies have shown abnormalities with respect to glucose uptake and regional cerebral blood flow.⁵¹

Other Symptoms and Disturbances

Finally, traumatic brain injury can cause a variety of other symptoms, including cognitive deficits, apathy, sleep disturbances, and headaches. Cognitive deficits that brain injury patients experience include impairment of arousal, attention, concentration, memory, language, and executive function.⁵² Impairment of executive function can result in poor planning, organizing, and sequencing, and impaired judgment and impulse control.⁵³ Some

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *Id.* at 97.

⁵³ *Id.*

of these symptoms last from a few days to a month after the injury.⁵⁴ Others last 6 to 24 months.⁵⁵ Some of these problems, however, are permanent.⁵⁶ Cognitive deficits are associated with focal and diffuse brain damage.⁵⁷

70% of traumatic brain injury patients also suffer from apathy, which refers to disinterest, disengagement, inertia, lack of motivation, and absence of emotional responsivity⁵⁸ and is associated with damage to the mesial frontal lobe.⁵⁹ Finally, some patients suffer from sleep disturbances and headaches.⁶⁰

All of these disorders and emotional and cognitive disturbances can have “a deleterious effect on the recovery process and psychosocial outcome” for a brain injury patient.⁶¹ Such syndromes cause “impairment in social, occupational and interpersonal functioning and are likely to require specialist mental health treatment.”⁶² Moreover, advances in medical research have discovered more about the connection between mind and body and have demonstrated that these emotional disorders are merely manifestations of abnormalities in the brain. Thus, these disorders are clearly “bodily injuries” and should be treated as such.

⁵⁴ *Id.*

⁵⁵ *Id.*

⁵⁶ *Id.*

⁵⁷ *Id.* at 97-98.

⁵⁸ *Id.* at 98.

⁵⁹ *Id.* at 97-98.

⁶⁰ *Id.* at 99.

⁶¹ Rogers & Read, *supra*, at 1321-1322.

⁶² *Id.*

B. Distinguishing between the mind and body would result in many brain injury victims not receiving the treatment that they need.

Emotional and behavioral sequelae of a brain injury are a major hurdle for auto accident victims attempting to recover from traumatic brain injury. Often, these disorders are *the* major challenge for patients attempting to rehabilitate and reenter the community, leading to poor recovery and low quality of life for years to come.⁶³ It is well-recognized that in order for traumatic brain injury patients to properly recover, they require treatment for these emotional and behavioral disorders, in addition to other treatments for their brain injury. Without such treatment, their chances of a full recovery are low.

Much research has been conducted regarding how to treat these patients, and both therapies and medications have been proven to be helpful to recovery. For example, depression after traumatic brain injury can be very long lasting. However, patients have responded positively to various medications. In one study, patients treated with sertraline showed improvement within 8 weeks.⁶⁴ Another study found that patients who took fluoxetine showed improvement after an 8 month period.⁶⁵ A combination of citalopram and carbamazepine, likewise, significantly improved patients within a 12 week period.⁶⁶

⁶³ Perino, Rago, Cicolin, Torta & Monaco, *supra*, at 139; Warden et al, *Guidelines for the Pharmacological Treatment of Neurobehavioral Sequelae of Traumatic Brain Injury*, 23(10) *Journal of Neurotrauma* 1468, 1469 (2006).

⁶⁴ Fann, Uomoto & Katon, *Sertraline in the Treatment of Major Depression Following Mild Traumatic Brain Injury*, 12(2) *J Neuropsychiatry Clin Neurosci* 226 (2000).

⁶⁵ Alderfer, Arciniegas & Silver, *Treatment of Depression Following Traumatic Brain Injury*, 20(6) *Journal of Head Trauma Rehabilitation* 544, 550 (2005).

⁶⁶ Perino, Rago, Cicolin, Torta & Monaco, *supra*.

Patients suffering from depression after traumatic brain injury have also responded well to various psychosocial interventions. One study found that peer support programs improved traumatic brain injury patients' quality of life and ability to cope with depression.⁶⁷

Those who suffer from anxiety after traumatic brain injury also respond positively to both medicine and therapy. Medications such as SSRIs, naltrexone, and buspirone have been shown to be promising for the treatment of anxiety disorders.⁶⁸ In addition, studies have shown that cognitive behavioral therapy is effective at treating acute stress disorder, a common precursor to PTSD.⁶⁹ Cognitive behavioral therapy has also successfully been used in combination with neurorehabilitation to treat general anxiety after traumatic brain injury.⁷⁰

Not much is known about the treatment of mania; however, anticonvulsants may be effective.⁷¹ Psychosis, on the other hand, can be treated with anticonvulsants or dopaminergics.⁷²

Behavior dyscontrol disorder can be treated by a combination of therapy and medications, like anxiety and depression. Patients with this disorder benefit from environmental modification strategies, behavioral therapy, vocational training,

⁶⁷ Hibbard et al, *Peer Support in the Community: Initial Findings of a Mentoring Program for Individuals with Traumatic Brain Injury and Their Families*, 17(2) J Head Trauma Rehabil 112, 121-122 (2002).

⁶⁸ Rao & Lyketsos, *supra*, at 98.

⁶⁹ Bryant, Moulds, Guthrie & Nixon, *Treating Acute Stress Disorder Following Mild Traumatic Brain Injury*, 160(3) Am J Psychiatry 585, 587 (2003); Soo & Tate, *Psychological Treatment for Anxiety in People with Traumatic Brain Injury* (2012), at 8.

⁷⁰ Soo & Tate, *supra*, at 8.

⁷¹ Rao & Lyketsos, *supra*, at 98.

⁷² *Id.*

psychotherapy, and family therapy.⁷³ They can also be treated with medications such as dopaminergic agents, psychostimulants, opioid antagonists, SSRIs, high-dose beta-blockers, buspirone, trazodone, and anticonvulsants.⁷⁴

Finally, cognitive deficits that accompany brain damage are treated with medications such as dopaminergics, psychostimulants, and cholinergic agents.⁷⁵ Patients suffering from cognitive deficits also benefit from physical therapy, occupational therapy, recreation therapy, speech therapy, and vocational rehabilitation.⁷⁶ Cognitive rehabilitation, in particular, is very important to recovery.⁷⁷

Patients with traumatic brain injury require a variety of treatments designed to address their emotional and psychological problems in order to achieve a more functional recovery. Without these treatments, their emotional, behavioral, and cognitive disorders can be debilitating and can prevent effective rehabilitation. Rehabilitation and community support programs are vital; yet, these programs are focused on treating the lasting emotional and psychological deficits of brain injury patients. If “bodily injury” is held to not include emotional and psychological sequelae, then a large number of brain injury patients will not be able to receive the treatment that they need. These patients will not only suffer a poor quality of life due to their disorders but will be unable to fully rehabilitate from the other injuries and disabilities suffered as a result of their auto accident.

⁷³ *Id.* at 99.

⁷⁴ *Id.*

⁷⁵ *Id.* at 97.

⁷⁶ *Id.*

⁷⁷ *Id.*

III. Mental, psychological, and emotional disorders manifest in not only brain injury patients but also in auto accident victims who suffer other various physical injuries, or no physical injuries at all; all of these psychological problems are nonetheless “bodily injuries.”

Although brain injury victims are a prime example of patients who suffer from psychological injuries after auto accidents, these types of injuries are by no means limited to brain injury victims. Indeed, a number of auto accident victims suffer severe psychological sequelae as the result of a variety of catastrophic injuries, including spinal cord injury, amputation, severe scarring and disfigurement, major orthopaedic musculoskeletal damage, post-traumatic stress disorder (PTSD). As one psychiatric journal article explained,

Road trauma is becoming a major health problem, accounting for 2.1% of all deaths globally. Psychiatric complications of physical injury are a public health concern. The high prevalence of physical injury along with advances in trauma care that have resulted in greater number of individuals surviving traumatic injury underscore why psychiatric complications of physical injury are a major public health concern. After trauma, recovery depends on the outcome of mental health. Poor mental health, development of symptoms of PTSD (Post Traumatic Stress Disorder), depression and increased substance abuse leads to poor recovery.⁷⁸

These “psychiatric complications” decrease the quality of life of all accident victims who suffer from them, regardless of whether they suffer physical injury to the brain, and treatment is needed for these patients to properly recover from these problems.

⁷⁸ Malik et al, *Psychiatric Morbidity in Post Traumatic Orthopedically Handicapped Patients*, 15(1) Delhi Psychiatry Journal 130, 130 (2012).

Spinal Cord Injury Patients

Although spinal cord injury victims may suffer no direct damage to their brain, research has shown that spinal cord injury frequently leads to psychological problems, such as anxiety and depression. This is easily understandable given the fact that such patients have often lost the use of some or all of their extremities and are forced to spend the rest of their lives in wheelchairs or connected to ventilators. Spinal cord injury patients may suffer pain, fatigue, shame, change of body image, and loss of independence as a result of their injury, all of which can increase the risk of depression.⁷⁹ Such patients often can no longer participate in the activities they once enjoyed, no longer go where they wish to go, and no longer perform daily activities on their own that are necessary for living, such as eating. As one quadriplegic put it, "Just imagine having your arms and legs strapped down 24 hours a day, seven days a week and not being able to do anything about it and not going anywhere. I have no education. No education prospects. No job prospects. I have no love prospects."⁸⁰

The medical literature is replete with references to the serious emotional difficulties that these spinal cord injury victims experience. "[T]he prevalence of depression, anxiety and PTSD is elevated in people with chronic [spinal cord injury], and [] their average life satisfaction is substantially below that of the general population."⁸¹ Studies have found that

⁷⁹ Christopher & Dana Reeve Foundation, *Depression*, Paralysis Resource Center, <http://www.christopherreeve.org/site/c.mtKZKgMWKwG/b.5016279/k.1FD9/Depression.htm>.

⁸⁰ Susan James, *Quadriplegic Begs to Die, but Hospital Refuses*, ABC News (Nov. 30, 2010).

⁸¹ Post & van Leeuwen, *Psychosocial Issues in Spinal Cord Injury: A Review*, 50 *Spinal Cord* 382, 382 (2012).

the incidence of depression in spinal cord injury patients is as high as 60%.⁸² Moreover, 18% of spinal cord injury patients continue to suffer from depression 5 years after their injury,⁸³ and approximately 12% still suffer from depression 25 years post-injury.⁸⁴ Studies have shown that anxiety is prevalent in spinal cord injury patients, as well, some demonstrating that its prevalence in spinal cord injury patients is as high at 40%.⁸⁵ Relatedly, spinal cord injury “is associated with abnormal levels of psychological morbidity, substance abuse and risk of suicide.”⁸⁶

Depression, in particular, can be a major obstacle to a spinal cord injury patient’s recovery. It is associated with “longer rehabilitation lengths of stay and fewer functional improvements, as well as less functional independence and mobility at discharge.”⁸⁷ It has also been associated with “greater pressure ulcer occurrence, poorer self-appraised health, more days in bed and greater use of paid personal care, and poorer role functioning.”⁸⁸

⁸² *Id.* at 383.

⁸³ Hoffman et al., *A Longitudinal Study of Depression From 1 to 5 Years After Spinal Cord Injury*, 92 *Arch Phys Med Rehabil* 411 (2011).

⁸⁴ Richardson & Richards, *Factor Structure of the PHQ-9 Screen for Depression Across Time Since Injury Among Persons with Spinal Cord Injury*, 53 *Rehabil Psychol* 243 (2008).

⁸⁵ Post & van Leeuwen, *supra*, at 384.

⁸⁶ *Id.* at 382.

⁸⁷ Fann et al., *Depression After Spinal Cord Injury: Comorbidities, Mental Health Service Use, and Adequacy of Treatment*, 92 *Archives of Physical Medicine & Rehabilitation* 352, 352 (2011).

⁸⁸ *Id.*

To avoid the negative effects depression and anxiety may have on a patient's life, proper treatment is necessary.⁸⁹ Thus, spinal cord injury patients, much like brain injury patients, must be able to obtain the required medications and therapies in order to achieve a proper recovery.

Amputees

Like spinal cord injury victims, amputees often suffer from psychological disorders as a result of their amputation. These problems sometimes first manifest when a person is told that amputation is required. Amputees go through changing mental states pre-amputation, often alternating between anxiety and depression, which can result in social withdrawal, jitteriness, inability to sleep, and excessive thinking, among other things.⁹⁰ Many amputees also suffer from fear of limb removal pre-amputation and fear of the prospect of phantom limb pain, as well as "[i]ntense sensitivity to the perceived negative attitudes of others toward people with disabilities."⁹¹

After amputation, amputees often experience pain and phantom limb sensations.⁹² 55 to 85% of amputees experience phantom limb pain, and this pain often continues to persist years after the amputation.⁹³ Moreover, amputees experience changes in body image and loss of function and mobility, which frequently lead to greater depression.⁹⁴

⁸⁹ See generally Fann et al., *supra*.

⁹⁰ Bhuvaneshwar et al., *Reactions to Amputation: Recognition and Treatment*, 9(4) Primary Care Companion J Clinical Psychiatry 303 (2007).

⁹¹ *Id.*

⁹² *Id.*

⁹³ *Id.*

⁹⁴ *Id.*

In one study, 67.6% of orthopedically handicapped patients (patients with amputations or shortening of limb due to muscle deviation) suffered from psychiatric symptoms.⁹⁵ In that same study, 38% of the patients suffered from depression, 26.8% suffered from PTSD, 15.5% suffered from phobic anxiety disorder, and 30.9% suffered from other psychiatric disorders.⁹⁶ These problems continue to exist after the physical injury has healed and continue to impact a patient's recovery.⁹⁷

Like psychiatric disorders in any other patients, proper treatment is necessary to address these problems.

Pharmacological and psychological interventions have a positive impact on psychiatric symptoms in handicapped patients. Treatments of problems in social areas include cognitive behavior therapy, social skill training and community interventions. So, the symptoms of anxiety and mood should be the subject of screening in the post-burn phase and treated if indicated.⁹⁸

Such treatment will improve both the quality of life and course of recovery for amputees.

Post-traumatic Stress Disorder Patients

Post-traumatic Stress Disorder is often a complication of injuries, as discussed above. However, PTSD does not require any direct physical injury at all to manifest. Some PTSD victims are present at the scene of an accident and observe the accident, but are not directly injured themselves; nonetheless, they show a variety of symptoms, including physical symptoms, which greatly impact their lives. Post-traumatic stress disorder has

⁹⁵ Malik et al., *supra*, at 132.

⁹⁶ *Id.*

⁹⁷ *See id.* at 130.

⁹⁸ *Id.* at 133.

come to the forefront of our country's collective conscience due to the plight of combat veterans returning from Iraq and Afghanistan. The experience of these combat veterans has resulted in an increased understanding, acceptance, and treatment of this disorder.

PTSD is a disorder that was first observed in combat veterans. During World War I, it was noticed that a number of soldiers suffered from a variety of symptoms, physical and mental, despite suffering no direct physical wounds.⁹⁹ At the time, this was referred to as "shell shock," and after the Vietnam War, it became known as "post-Vietnam syndrome"; however, it eventually was added to the *Diagnostic and Statistical Manual of Mental Disorders* as "post-traumatic stress disorder."¹⁰⁰

As noted above, PTSD has continued to be a problem in combat veterans serving in Iraq and Afghanistan. One out of every five Iraq and Afghanistan veterans is diagnosed with post-traumatic stress disorder.¹⁰¹ With it, rates of "marital stress, substance abuse, and suicide are all increasing" in combat veterans.¹⁰² Moreover, almost 2,000 veterans have been seen in the Department of Veterans Affairs' homeless outreach program as a result of their psychological problems.¹⁰³ The Department of Defense has worked to

⁹⁹ McCormick-Goodhart, *Leaving No Veteran Behind: Policies and Perspectives on Combat Trauma, Veterans Courts, and the Rehabilitative Approach to Criminal Behavior*, 117 Penn State Law Review 895, 900 (2013) (reviewing the history of post-traumatic stress disorder and citing various sources).

¹⁰⁰ *Id.* at 900-902.

¹⁰¹ George Washington University, *Shocking PTSD, Suicide Rates for Vets, Face the Facts USA* (June 5, 2013), <http://www.facethefactsusa.org/facts/the-true-price-of-war-in-human-terms>.

¹⁰² Williamson and Mulhall, *Iraq and Afghanistan Veterans of America, Invisible Wounds: Psychological and Neurological Injuries Confront a New Generation of Veterans* (2009), at 1, available at http://iava.org/files/IAVA_invisible_wounds_0.pdf.

¹⁰³ *Id.*

increase research into these types of psychological injuries, resulting in much more knowledge regarding PTSD.¹⁰⁴ However, the country continues to struggle with adequately treating all of these veterans.¹⁰⁵

The same psychological dynamic experienced by combat veterans, even ones who do not sustain direct physical impact, can be experienced by auto accident victims. One study was conducted of mothers whose children had been involved in motor vehicle accidents.¹⁰⁶ The study found that 20% of the mothers showed significant PTSD symptoms.¹⁰⁷ Moreover, almost 22% of parents who participated in the follow-up showed evidence of PTSD.¹⁰⁸ Other studies conducted regarding witnesses of traumatic events have found similar results.¹⁰⁹

These PTSD patients who witnessed traumatic events did not sustain direct physical injury in an accident. Yet, they suffer psychologically and also display a number of physical symptoms as the result of their disorder.

To illustrate, one physical effect of PTSD is an increased “startle response”—a muscular reaction to frightening events.¹¹⁰ Accident victims suffering from PTSD had higher

¹⁰⁴ *Id.* at 2.

¹⁰⁵ *Id.*

¹⁰⁶ Allenou et al., *Symptoms of Traumatic Stress in Mothers of Children Victims of a Motor Vehicle Accident*, 27(7) *Depression and Anxiety* 652 (2010).

¹⁰⁷ *Id.*

¹⁰⁸ *Id.* at 654-655.

¹⁰⁹ See, e.g., Compton et al., *Post-Traumatic Stress Disorder Symptomatology Associated with Witnessing Unsuccessful out-of-Hospital Cardiopulmonary Resuscitation*, 16(3) *Academic Emergency Medicine* 226, 228-229 (2009).

¹¹⁰ Siegelaar et al., *The Auditory Startle Response in Post-Traumatic Stress Disorder*, 174 *Experimental Brain Research* 1 (2006).

startle responses than non-PTSD subjects when shown accident-related content.¹¹¹ PTSD is also associated with structural changes in the brain. As noted previously in Part II.A, the hippocampus can shrink in response to stress. Thus, it is unsurprising that PTSD patients were found to have a smaller hippocampus than non-PTSD subjects.¹¹² Differences in activity in the amygdala have also been observed in PTSD patients,¹¹³ and the prefrontal cortex has been found to be reduced.¹¹⁴ Finally, hormonal changes have been observed. For example, PTSD patients were found to have increased cortisol levels.¹¹⁵

All of these physical changes help to demonstrate just how intertwined the mind and body are and to prove that damage to the mind is damage to the body. Post-traumatic stress disorder, like every other psychological disorder described above in this brief, has physical roots and requires treatment in order for accident victims to achieve proper recoveries.

The psychological problems that have been described in not only brain injury patients, but spinal cord injury patients, amputees, and post-traumatic stress disorder

¹¹¹ Wessa et al., *Central and Peripheral Psychophysiological Responses to Trauma-Related Cues in Subclinical Post-Traumatic Stress Disorder: A Pilot Study*, 167(1) *Experimental Brain Research* 56 (2005).

¹¹² Karl et al., *A Meta-Analysis of Structural Brain Abnormalities in PTSD*, 30 *Neuroscience and Biobehavioral Reviews* 1004 (2006).

¹¹³ Grossman et al., *Neuroimaging Studies in Post-Traumatic Stress Disorder*, 25(2) *Psychiatric Clinics of North America* 317, 329 (2002).

¹¹⁴ Eckart et al., *Structural Alterations in Lateral Prefrontal, Parietal and Posterior Midline Regions of Men with Chronic Post-Traumatic Stress Disorder*, 36(3) *J Psychiatry & Neuroscience* (2011).

¹¹⁵ Morris et al., *Relations Among Post-Traumatic Stress Disorder, Comorbid Major Depression, and HPA Function: A Systematic Review and Meta-Analysis*, 32(4) *Clinical Psychology Review* 301, 302 (2012).

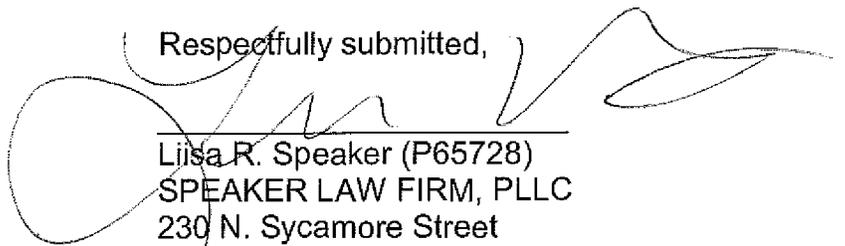
patients are "bodily injury." Emotional and mental problems are manifestations of abnormalities in the brain, whether those abnormalities are the result of physical injury, stress, or something else. Such abnormalities can be treated; patients can recover from these disorders. But in order for that to happen, these disorders must be recognized for what they are: bodily injuries.

RELIEF REQUESTED

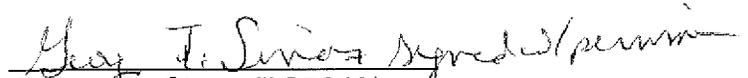
Amici curiae Coalition Protecting Auto No-Fault, Brain Injury Association of Michigan, and Michigan Brain Injury Provider Council respectfully ask that this Court reverse the April 2, 2013 opinion of the Court of Appeals and hold that emotional, psychological, and mental disorders and conditions as those discussed in this brief clearly fall within the definitional ambit of "bodily injury" and should be treated exactly the same as any observable physical wound or injury to any other part of the human body.

Date: August 19, 2014

Respectfully submitted,



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