



## **Closed Head Injury: A Common Complication of Vehicular Crashes [\(En Español\)](#)**

### ***Contributors:***

*Dr. Michael Andary*

Physiatrist, Michigan State University Department of Physical Medicine and Rehabilitation,  
East Lansing, Michigan

*Dr. Anthony Gamboa, Jr.*

Vocational Economic Analyst, Vocational Economics, Louisville, Kentucky

*Dr. Madhav Kulkarni*

Assistant Professor, Michigan State University, Department of Physical Medicine and  
Rehabilitation, East Lansing, Michigan

*Charles (Nick) Simpkins*

Trial Lawyer specializing in head injury, Northville, Michigan

*John Stilson*

Consulting Engineer, Grayslake, Illinois

*Dr. Emanuel Tanay*

Forensic Psychiatrist, Detroit, Michigan

*Dr. Donald Vogenthaler*

Vocational Economics Analyst, Vocational Economics of Kansas City, Overland Park, Kansas

[Vehicular Crash Victims](#) | [Medical Aspects](#) | [Financial/Employment Aspects](#) | [Crash Reconstruction](#) | [Selecting an Attorney](#) | [How to Order](#)

Drunk driving crashes are a leading cause of traumatic brain injury, referred to as closed head injury when the skull has not been fractured. A second tragedy of many persons who have sustained traumatic brain injury is the fact that they sometimes are not properly diagnosed and treated. Society in general, including some health care providers, have the mistaken notion that in order for a person to have traumatic brain injury, he or she must suffer coma, skull fracture, lacerations and broken bones, or at least have been "knocked out." This is simply not true.

What has been labeled "mild" closed head injury can be a significant traumatic brain injury which impacts family, personal relationships, employment, and general well-being.

It is not unusual that, immediately after the crash, a head-injured person can discuss what happened with law enforcement officers and emergency medical personnel, and even exchange

drivers' license and insurance information. Later, when the time the consequences of the head injury begin to interfere significantly with the person's life, neither the injured individual nor the family relate the problems back to the crash.

Although different persons have varying problems, common symptoms of head injury include cognitive (thinking) problems such as:

- Difficulty paying attention and concentrating
- Problems making sense of what has been read or seen on television
- Forgetting things
- Finding it difficult to learn new tasks or complete tasks
- Confusion in finding places or following geographical directions
- Unclear thinking
- Inflexibility
- Diminished organizational skills
- Poor decision making, judgement, and reasoning

Brain injury can also cause physical problems such as fatigue, restless sleeping, dizziness, headaches, and speech problems. All of these decrease a person's tolerance for stress. Persons with head injuries are at risk of being overwhelmed by overload. They may be less flexible in problem solving, having exhausted their coping reserves.

Psychological problems can also result from head injury. Sadness and despair, denial of limitations, lack of interest in previous activities, and/or intense or highly changeable emotions bother many persons with head injuries. Some become irritable about many things (and people) in their lives and may even fly into unexpected rages. Other common psychological consequences are acting impulsively without considering the consequences, lack of self-awareness or of their impact on others, increased or decreased sexual interest, and lack of appropriate social behavior. Some people recognize the changes which have occurred; others do not. Few recognize their own inappropriate social interactions. Some resent others who attempt to control or change their behaviors, which can be very frustrating for family members and other caregivers.

Because some of the symptoms of head injury are similar to those of depression, a head injury diagnosis is frequently over-looked.

Families often find the symptoms of head injury easier to bear immediately after the injury than they do later. More attention is paid to other physical injuries than to head injury symptoms in the emergency room or trauma center, unless the head injury is obvious. The family may simply be grateful that their loved one survived the crash.

Even with a recognized head injury, hope is strong at first that full recovery is possible, and unusual statements or behaviors are tolerable. Later, families want their loved one to "behave" or function better, especially when social skills are impaired. With mild to moderate injuries, the symptoms may seem reasonably unimportant at first. Only when a person begins to try to live more "normally" at home, work, or school, do the symptoms become more noticeable and frustrating.

### **Vehicular Crash Victims**

Following are some real stories (names changed) which illustrate the problems commonly associated with closed head injury.

#### ***Mary***

On her way home from a PTA meeting, Mary was rear-ended by a drunk driver while she was stopped at a stop sign. The drunk driver was only going about 15 mph when he struck Mary's car, and damage to the vehicles was minimal. No one realized that an impact of 15 mph exerted a force of ten times the force of gravity on Mary's skull and brain. Mary had a momentary feeling of being "out of it" and a sore neck developed on her way home, but she was relieved that her injuries were not more serious.

That night, Mary had difficulty falling asleep, but she and her husband attributed it to anxiety associated with the crash. The next morning, Mary had a bad head-ache, her neck hurt worse, and she could hardly lift her head off the pillow.

After two weeks of difficulties, including an occasional feeling that she was falling over, Mary went to her family doctor who took skull and neck x-rays and told her that nothing was wrong. He prescribed some pain medication and told her to return in a month. As the weeks and months went by, Mary noticed small memory lapses, increased irritability, difficulty falling asleep and staying asleep, and depression. Her relationship with her husband and children became strained. She had difficulty preparing meals and started avoiding cooking or entertaining out of fear of making a mistake. She began to fear that she was losing her mind, but since her doctor had already told her nothing was wrong, neither she nor her husband attributed her difficulties to the crash.

#### ***Jack***

Jack had been his company's top salesman for fifteen years. Whenever a tough sale was coming up or a complicated presentation had to be made, the company turned to Jack. His product knowledge, charm, intelligence, and sense of humor contributed to his success.

Jack seemed to be at his best in difficult situations until one night, while he was jogging, a drunk driver drove off the road, struck Jack at a speed of about 10 mph, and knocked him to the ground.

Jack sat on the ground for a few minutes, saw "stars," and felt a little woozy, but was able to get up. As the police arrested the drunk driver, Jack told them he didn't think he was hurt, just a little shaken up. He walked the remaining mile home, told his wife what had happened, and went to bed thinking about the sales presentation he was to make the following day.

The next morning, Jack had a dull headache and felt fatigued, but, not being a complainer, he went to work and made the sales presentation. During his talk, Jack made a number of mistakes such as forgetting things and not being able to find the right word, but he was able to cover for his mistakes with his sense of humor.

Over the weeks and months, Jack made more and more mistakes, but he resolved to try harder. In time, he was afraid to stand up and speak at sales meetings and made excuse after excuse not to speak in public. He had great difficulty dealing with customers on a one-to-one basis, and he started to tell off-color jokes that had never been a part of his sales strategy before the crash.

Jack began missing appointments and sometimes got lost trying to find a customer's place of business. Rather than admit he was lost, he told his boss that he forgot the appointments.

People noticed that Jack's personality had changed dramatically, that his sense of humor was gone, that he was quite irritable, and that he was becoming more and more depressed. He no longer spoke up at sales meetings, and, after missing his fifth appointment in two months, Jack was fired.

### ***Trish***

Trish was a brilliant college student, looking forward to beginning her second year at a prestigious college. She was on full academic scholarship, majoring in English Literature. She was also an accomplished pianist.

While riding to church one Sunday morning, her car was hit by a drunk driver. Trish suffered a severely broken leg, several broken ribs, and she required seven sutures to close a cut on her head.

Medical attention was focused on Trish's leg and ribs, and after the sutures were removed and the scar began to heal, no one paid further attention to her head.

Four months later, Trish went back to school, albeit with a limp, and noticed that she was having a much harder time with her studies. She was determined to be an excellent student, however, so she devoted most of her time to study. It became more and more difficult for her to keep track of her life. She became distracted by every little noise as she tried to study, and she felt exhausted all the time. She tried to take more and more lecture notes, but they did not make sense when she got home.

Trish also noticed that her piano-playing ability was no longer what it once was, and this, along with the other changes in her life, made her more depressed.

### **Medical Aspects**

Unlike persons with severe brain trauma whose injuries are obvious, people with mild closed head injury may not have obvious medical problems.

What is now called mild traumatic brain injury was referred to by many names throughout the nineteenth century including post-concussion syndrome, minor contusion syndrome, post-traumatic vaso-motor neurosis, post-traumatic nervous instability, and post-traumatic syndrome, to name a few.

Although the term "mild" is used to describe the medical aspects of this problem, the difficulties of head injury can be permanent and devastating.

Even when consciousness has been lost for up to twenty or thirty minutes, victims are often sent home from the hospital within twenty-four hours. The family is instructed to awaken the victim every two hours. Reflexes, strength, and other gross measures of the neurological examination may have fallen within normal range at the hospital. Magnetic resonance imaging (MRI), CT scanning of the head, x-rays, and EEG's may have revealed nothing. However, the test results do not mean that the brain has not been injured. These tests have significant limitations and are unable to detect subtle changes in brain function.

Deep areas of the brain are commonly injured in crashes. These sections are called the subcortical areas and are very important for processing information and for communication between different parts of the brain. Since the outer portion of the brain may be working normally, deficits in brain function may not be noticed until complex tasks are undertaken. Complicated tasks are usually not required when one is hospitalized, so deficits may not be noticed until the injured person returns home.

Complex tasks are those which require several portions of the brain to work together simultaneously. Examples are balancing activities, complex hand activities, recognition and

drawing of pictures, engaging in conversation without forgetting what the other person said, discriminating sizes and shapes, interpreting touches and feelings, and making judgments.

The diagnosis of mild closed head injury is best made by an experienced physician or neuropsychologist skilled in cognitive perceptual motor testing. Neuropsychological tests are standardized tests which take six to ten hours to complete. They evaluate the function of many different areas of the brain and can show abnormalities that other medical tests cannot detect. *The most important evaluation to detect mild traumatic brain injury is neuropsychological testing.* This testing should be given several times to obtain accurate findings because many factors, including distraction, illness, or depression, can affect the outcome of testing.

Even though such injury has permanent components, many of the problems can be improved upon with comprehensive interdisciplinary rehabilitation. This includes cognitive rehabilitation and cognitive perceptual motor remediation. Improving these competencies improves confidence, relieves anxiety, and eventually improves function. As rehabilitation helps the victim gain better control over behavior through learning compensatory techniques, higher functioning is accomplished, and sometimes a return to gainful employment becomes possible.

Comprehensive rehabilitation ideally includes treatment from a number of health care providers experienced in treating head injury. These may include a physician (usually a psychiatrist), a physical therapist, an occupational therapist, a speech pathologist, a neuropsychologist, a social worker, a vocational counselor, a recreational therapist, a nutritionist, and a case manager.

This list of professionals indicates the complexity of problems associated with head injury. These professionals will work together with the injured person and the family to identify and achieve rehabilitation goals. The sooner treatment is begun, the greater the likelihood of a successful outcome.

It is crucial that people understand that not all physicians are qualified by education, expertise, or training to diagnose and treat mild closed head injury. A physician or neuropsychologist with specific expertise in head injury should be sought.

Before the first appointment, it would be helpful to prepare a written list of problems noticed since the crash. The injured individual may have little insight into the problems, so family observations are critical.

Recovery, even without treatment, is most rapid during the first weeks to months after head injury, unless the brain stem was damaged. While rehabilitation is usually of maximum assistance soon after injury, rehabilitation specialists can still help regain function months or even years after

injury. Don't assume it is now too late for you to be helped. Instead, let a professional decide what is still possible for you.

### **Financial/Employment Aspects**

Mild traumatic head injury can not only fool medical technology, but it can also fool people close to the injured person. In casual contact, the person might appear completely competent and normal, but when asked to perform to a pre-determined standard such as examinations, written work, or job performance, he may be incapable.

Cognitive skill impairments are sometimes quite obvious to family members or others knowledgeable about traumatic brain injury, but they may seem subtle to employers.

Living in the information age as we do, when the ability to analyze and understand a stream of data is critical to success, head injury problems can cause real trouble.

The student who cannot understand the lecture or focus on reading assignments, the parent at home who cannot organize the day, or the salesperson who cannot communicate the intricacies of a sales presentation, is condemned to failure.

To add to these complications, the person may appear to be psychiatrically normal, and doctors may even have told the family that nothing is wrong, Yet the injured individual knows that things are not right and feels a certain sense of disintegration of his or her personality.

It must be understood that in most tasks, various parts of the brain function together. Injury or impairment in any one part may have what is called a synergistic affect on functioning of the entire brain. Following are some examples.

### ***Problems with Learning and Memory***

While pre-injury learning and memory usually remain unaffected, learning new material and new procedures may prove extremely difficult. The injured person may begin to lose things such as car keys and important documents. Sometimes even moving office furniture can be quite unsettling.

Many people are able to return to work at their old jobs, but problems develop when they are transferred or promoted.

### ***Problems with Attention and Concentration***

Problems of attention and concentration create the largest barriers to successful vocational rehabilitation. The inability to focus on an exam question because a bird is singing outside the

classroom, or the inability to follow the boss's instructions at work because of machines running in the background are serious problems.

These kinds of problems usually stem from injury to the front part of the brain referred to as the frontal lobes. They are the largest portion of the brain, just behind the forehead and very vulnerable to injury.

People with frontal lobe injury have difficulty holding well-focused conversations, which tends to unnerve friends, co-workers, and supervisors. Such a person may lose track of time and find herself unable to shift attention when interruptions occur. People with frontal lobe injuries may also become emotionally fragile, which further complicates matters.

### ***Problems with Information Processing, Speed, and Capacity***

With closed head injury, one's ability to think and react quickly may be impaired.

This causes the person to feel over-whelmed with tasks that were simple before the crash. This not only stresses the injured person but the employer. The frustration makes the cognitive problems worse which can lead to more stress and depression.

### ***Problems with Executive Functions***

Planning, identifying priorities, sequencing steps to complete a task, and monitoring one's own behavior are referred to as the executive functions of the brain. Impairment of these functions can be one of the most disabling aspects of the injury because the injured individual is unaware of his or her own shortcomings, such as with Jack.

### ***Problems with Emotions***

When the thinking centers of the brain are not able to control the emotional centers, the individual becomes impulsive, disinhibited, and irritable with mood swings and emotional outbursts. Lowered tolerance to frustration can have a devastating impact on human relationships and employment.

The sometimes subtle, negative changes caused by head injury conspire against a person's chances for success on the job. This means a marked decrease in lifetime earnings. The U.S. Department of Labor has defined worker characteristics for successful performance in more than 12,000 occupations. They include:

- Intelligence
- Learning ability
- Reasoning ability

Mathematical ability  
Language development  
Spatial perception  
Form perception

A mild traumatic brain injury may not affect a victim's overall level of intelligence as measured by I.Q. tests, but impairment in any of the above traits can seriously impact one's ability to work and earn money.

When Jack was injured, he was earning \$41,250 per year. Even with successful treatment, he will require a much less demanding job and may make no more than \$20,000. Assuming that Jack works continuously through age sixty-five, loss of income for him and his family will be about \$851,000 in today's dollars.

Many times, persons with traumatic brain injury are told that since they only have three or four mildly impaired cognitive problems, that they should be able to return to work or get a new job without any problems. This advice is usually not correct.

### **Crash Reconstruction**

Most victims of vehicular crashes do not know exactly how they were injured in the crash. This can be understood when one realizes that crashes take only a second or less to happen. During this short time period, the human body and brain are exposed to what is called dynamic and impact impulses which produce high level, short duration forces.

As the human body attempts to stop during a crash, opposing forces or inertia forces cause a second collision of the human body with objects or a part of the vehicle. A third collision involves the brain crashing against the inside of the skull when the body hits an object or the head suddenly stops.

The head is subject to the same dynamic forces as the rest of the body, and when the skull stops by hitting an object, the brain keeps going and collides with the inside of the skull. Thus, a head can be injured at the spot where it is directly hit.

Additionally, when the skull stops suddenly (as in hitting the ground or dashboard), the soft brain tissue inside may ricochet off the skull on the opposite side or may suffer stretching or tearing injuries. Any of these motions can cause injuries to other parts of the brain.

Some injuries harm only a specific part of the brain which controls particular functions. For example, injury in the area above the ear primarily affects physical movement or sensation on the opposite side of the body. Thus, an injury can particularly impair vision, movement, or thinking if it

is localized in particular areas. Or it can harm much more of the brain and hinder several kinds of functioning.

From the study of occupant kinematics, it is clear that during a crash, forces over thirty times the victim's weight are involved.

Occupant protection such as seat belts and air bags cannot fully protect a person's head and neck. A side impact against a door, even at speeds as low as 10mph, can have significant force impact on the head. Head-on collisions pose an extremely high risk of injury because the body is moving back away from seat belts and air bags. The head is snapped backwards and then forward, causing the brain to smash against the back of the skull and then the front of the skull.

### **Selecting an Attorney**

Some people have the mistaken impression that a lawyer is a lawyer. Every person who files a law suit deserves a competent and well qualified lawyer with specialized expertise to handle their particular problem, whether it be real estate, corporate and tax planning, or traumatic brain injury.

When victims are injured in drunk driving cases, the State appoints an attorney, commonly called the prosecutor, to handle the criminal case. Victims do not pay for this service.

Additionally, crash victims may want to civilly sue the drunk driver, the driver's employer if he was driving on the job, the bar who knowingly served the drunk driver, or sometimes the insurance company. While recovery in the criminal case is jail or prison for the drunk driver and sometimes court-ordered restitution to the victim, recovery in a civil suit is always money - something many head-injured persons desperately need.

*If the offending person or group has recoverable income or assets*, it may be in the injured person's interest to pursue a civil suit. Attorney fees are required for this type of suit, and they will be addressed later in this brochure.

Unfortunately, when people are living within crisis, they may not be as careful about hiring an attorney as they should be. At a minimum, victims should ask the following questions:

- Do you have specialized expertise in head injury cases?
- How many closed head injury cases have you handled?

An attorney should accept serious responsibility when representing a client suffering from head injury. He or she must not only thoroughly understand this type of injury, but also be able to expose defense attorneys who will attempt to decrease the value of the victim's claim.

A competent attorney should know and believe:

- that many head injuries are not diagnosed in the emergency room, and that it may take months or even years before a proper diagnosis is made;
- that head injury symptoms such as memory problems, emotional problems, concentration problems or others noted above are not voluntary or psychological, but are caused by real physical injury to the brain;
- that a person may have walked and talked at the scene of the crash and still have closed head injury;
- that even though a brain injury may be described as mild or moderate, impact to the victim, the family, social relationships, and employment may be far-reaching and severe;
- that a direct blow to the head is not necessary to cause a traumatic brain injury;
- that a skull fracture, cuts on the head, or coma are not necessary for a person to be brain injured;
- that a defense witness neurologist is likely to testify that the person is neurologically sound based on MRI's, CT scans, and skull x-rays, tests that do not detect many components of head injury;
- that head injured individuals are at risk for seizure disorders that may not begin for months or years;
- that defense witnesses will testify that the injured should be able to work, although they will likely not specify a particular job, requiring knowledge and skill of the intricacies of head injury for cross-examination;
- that understanding neuropsychology reports and developing neuropsychological testimony so that a jury can understand it are crucial.

A good attorney should be willing to take the time to gain a full understanding of how the crash has affected the victim's life. This might include looking at photos or videotapes of pre-crash life and talking with those who can describe that life in detail. It might mean spending a day with the injured person to assess problems and deficits first hand. The attorney will have to make both the pre- and post-crash personalities and life-styles come alive for the jury.

A good attorney should answer the client's questions in writing, even if they were verbally answered in person or on the phone. This prevents unnecessary confusion for the head-injured client.

A good attorney should maintain an office staff knowledgeable about head injury and committed to being friendly, polite, and patient with the injured.

A good attorney will be able to provide credible expert witnesses such as crash reconstructionists, forensic psychiatrists, vocational economics analysts, neuropsychologists, and others to fully and completely present the case. Otherwise, the victim may be not be compensated fairly.

The injured are sometimes more comfortable with an attorney who is committed to head injury prevention and who is actively involved with the State Head Injury Alliance, the National Head Injury Foundation, or Mothers Against Drunk Driving. By affiliating with these organizations, the attorney becomes a true advocate for the injured.

In most states, personal injury civil attorneys will consult with clients about their case for no fee or an hourly fee. If the attorney believes the case has merit, and if the person decides to hire the attorney, then a contingency fee arrangement is usually preferable. This means that attorney fees are not payable until the case has concluded, and the fee will be a percentage of the settlement or judgment.