

Defining Mild Traumatic Brain Injury

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I INTRODUCTION

The purpose of this article is to acquaint lawyers whose clients may be suffering from unfamiliar symptoms neither they nor their current doctors can explain. The erraticness of head injury was summarized by Hippocrates: “No head injury is too serious to despair of, nor too trivial to ignore.” Hopefully this article will provide clarification of the symptoms, and their cause, for those who have sustained Mild Traumatic Brain Injury.

II BRIEF HISTORY

Mild Traumatic Brain has been controversial for over a century. *Strauss and Savitsky 1934; Trimble 1981*. Dr. Randolph W. Evans states in his book *Neurology and Trauma* at page 93,

The Post-concussion syndrome follows head injury that is usually mild and compromises one or more of the following systems and signs:

headaches, dizziness, vertigo, tinnitus, hearing loss, blurred vision, diplopia, convergence insufficiency, light and noise sensitivity, diminished taste and smell, irritability, anxiety, depression, personality change, fatigue, sleep disturbance, decreased libido, decreased appetite, memory dysfunction, impaired concentration and attention, slowing of reaction time, and slowing of information processing speed. ... The most common complaints are the headaches, dizziness, fatigue, irritability,

anxiety, insomnia, loss of concentration and memory, and noise sensitivity. Loss of consciousness does not have to occur for the post-concussive syndrome to develop.

At page 94, under the heading of “Historical Aspects”, Dr. Evans writes:

The post-concussion syndrome has been recognized for at least the last few hundred years. One interesting historical case involved a 26 year old maid servant who had been hit over the head with a stick and complained of retrograde amnesia. Six months later, she was still complaining of headaches, dizziness, tinnitus and tiredness. A judge requested the opinion of Swiss physician J.J. Wepfer and two other surgeons, who stated, ‘We can’t say anything definite, but it is certain that this will leave its mark in the form of an impediment.’ This statement was made in 1694.

Brain injuries date into biblical times such as when Joel slew King Sisera by driving a metal tent stake through his temples while he slept”. And of course Giant Goliath who suffered a concussion and, presumably, a depressed skull fracture, as a result of young David’s sling shot stone. (Corville CB: some notes on the history to the skull and brain. Bull LA Neurol Soc 9:1-16, 1944.)

III DEFINING CLOSED HEAD INJURY

In his article *Terminology of Post-Concussion Syndrome*, Seldon Berrol, M.D. states:

The mild traumatic brain injury subcommittee of the Head Injury Interdisciplinary Special Interest Group of the American Congress of Rehabilitation medicine has designated **mild traumatic brain injury** (mild TBI) as the preferred term for persons who sustain a traumatically

induced physiologic disruption of *brain* function, as manifested by at least one of the following:

1. Any period of loss of consciousness.
2. Any loss of memory for events immediately before or after the accident.
3. Any alteration in mental state at the time of the accident (eg. feeling dazed, disorientated or confused.)
4. Focal neurological deficits, which may or may not be transient, but when the severity of the injury does not exceed the following:
 - a. Loss of consciousness approximately 30 minutes or less.
 - b. After 30 minutes an initial Glasgow Coma Scale score of 13-15.
 - c. Post traumatic amnesia not greater than 24 hours.

This definition includes: (a) the head being struck, (b) the head striking an object, and (c) the brain undergoing an acceleration/deceleration movement (ie., whiplash) without direct external trauma to the head. It excludes stroke, anoxia, tumor, encephalitis, etc. CT, MRI, EEG, and routine neurologic evaluations may be normal. Due to the lack of medical emergency, or the realities of certain medical systems, some patients may not have the above factors medically documented in the acute stage. In such cases, it is appropriate to consider a symptom complex that, when linked to a traumatic head injury, can suggest the existence of mild TBI.”

Alexander defines Mild TBI as follows:

The severity of TBI must be defined by the acute injury characteristics and not by the severity of symptoms at random points after trauma. Mild TBI is characterized by the following: (1) Head trauma may be due to contact forces or to

acceleration/deceleration trauma. (2) The duration of unconsciousness is brief, usually seconds to minutes, and in some cases there is no loss of consciousness (LOC) but simply a brief period of dazed consciousness. (3) When the patient is evaluated in the emergency room or at the scene, the Glasgow coma scale (GCS) must be 13 to 15, by common definition . . . only a score of 15 probably represents true Mild TBI. (4) Whether the patient is briefly unconscious or not, confusion with amnesia . . . is present, by definition for less than 24 hours but usually for minutes to a few hours . . . (b) by common clinical agreement, neuroimaging studies are negative, but this defining characteristic may be more complex than just positive or negative findings on CT.

Mild Traumatic Brain Injury, Neurology 1995; 45:1253-1260.

The term mild traumatic brain injury is still undergoing refinement however does incorporate criteria that have been widely accepted by physicians in sports medicine to assess the degree of cerebral dysfunction.

“A closed head injury occurs when the soft tissue of the brain is forced into contact with the hard, boney, outer covering of the brain, the skull. Along with the head injury, the average patient usually experiences, neck and back injuries as well. Mild closed head injuries can occur after a severe neck injury without the head actually striking any surface. ...Mild head injuries should no way be considered ‘minor.’ The long-term sequela of this type of injury and its poor prognosis often make it a very major problem. Neck and back injury frequently occur, and soft tissue manifestations are inevitable, at least for short time, after mild to moderate closed head injury.”

Closed Head Injury: A Clinical Source Book 2nd
Ed. Dr. Peter Bernad 1998, Lexis Law
Publishing.

IV THE HOLLYWOOD MYTH

Mild traumatic brain injury will occur when the soft tissues of the brain are pushed against the bony structures of the skull in whiplash type, acceleration/deceleration movements. The problem with most of us is described well in Randolph Evans' chapter entitled *The Post Concussion Syndrome in Prognosis of Neurological Disorders*, Evans, Baskins and Yatsu, Oxford University Press 1992, at page 99:

Most people's knowledge of the sequela of mild head injuries is largely the product of movie magic. Some of the funniest scenes in slap stick comedies and cartoons depict the character sustaining a single or multiple head injuries, looking dazed and then recovering immediately. In cowboy movies, detective and action stories, and boxing and kung fu films, seemingly serious head trauma is often inflicted by blows from guns and heavy objects, falls, motor vehicle injuries, fists, and kicks, all without lasting sequela. Our experience is minuscule compared to the thousands of simulated head injuries witnessed in the movies and on television. Because of the compelling mythology, the physician has a difficult job educating patients, their families, and others in the realities of mild head injuries. However, when one looks at examples of two successful boxers, Joe Lewis and Muhammad Ali, they have witnessed powerful punches resulting in dazed, disorientated boxers or knock outs.

AMemory loss and dementia have been a frequent finding in ex fighters." *Sports and Head Injuries*, Chapter 10 of Neurology and Trauma, Polin Alves and Jane.

"Mild head injury typified by transient amnesia, brief loss of consciousness, and persistent headache or mild neurological signs is more difficult to document than severe or moderate head injuries. In an analysis of 1,165 bouts: Sercl and Jaros found that 79% of boxers had momentary neurological signs, whereas 21% demonstrated deficits for at least 24 hours."

IV ANATOMY OF BRAIN INJURY

Brain injuries are produced by displacement and distortion of the neuronal tissues at the moment of impact. The brain, which is incompressible, may be likened to a water-soaked log floating submerged in water. The brain is floating in the cerebrospinal fluid in the subarachnoid space and is capable of a certain amount . . . of gliding movement.

It follows from these anatomical facts that blows on the front or back of the head lead to displacement of the brain, which may produce severe cerebral damage, stretching and distortion of the brainstem, and stretching and even tearing of the commissures of the brain . . . furthermore, it is important to remember that glancing blows to the head may cause considerable rotation of the brain, with shearing strains and distortion of the brain, particularly in areas where further rotation is prevented by bony prominence . . . brain lacerations are very likely to occur when the brain is forcibly thrown against the sharp edges of bone within the skull

A sudden severe blow to the head, as in an automobile accident, may result in damage to the brain . . .

Richard S. Snell, M.D., Ph.D. Clinical Neuroanatomy for Medical Students, 4th ed., p. 27-28.

V CONCLUSION

Traumatic Brain Injury significantly impacts the lives of those it touches. Mild Traumatic Brain Injury should not be equated with a minor injury. Mild Brain Injury is the temporary disruption of brain functioning due to trauma to the head. A Mild Brain Injury is one where it is not judged serious enough to require formal rehabilitation. Usually the individual is sent directly home from the hospital. However if enough brain cells are damaged a person can experience permanent changes in the way they think, feel and act.

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