Persistent neurobehavioral problems following mild traumatic brain injury


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This article has 87 references.

FROM ABSTRACT

Accumulating research documents typical rates in the range of 85% of mild traumatic brain injury (MTBI) showing prompt, complete resolution with 15% suffering from persistent neurobehavioral impairments.

Studies of neurobehavioral symptoms of MTBI have not separated these two populations, resulting in either inconclusive or contradictory conclusions concerning the relationship of MTBI with residual behavioral problems.

This project studied 70 MTBI patients with persistent neurobehavioral problems at two time intervals post-injury to determine whether there are consistent neurobehavioral patterns considered to be sequelae of MTBI. A matched group of 40 normal subjects provided control data.

While most behavioral problems showed improvement, 21% tended to show significant behavioral impairment compared to controls at 12 or more months post-injury.

Neurochemical bases of neuronal degeneration may account for some of the behavioral deterioration following MTBI.

THESE AUTHORS ALSO NOTE:

“The scientific literature is replete with reports of behavioral abnormalities following traumatic brain injury.”

Evidence suggests that some suffer from neurocognitive sequelae and behavior abnormality following traumatic brain injury.

These phenomena have been recognized for more than a century.

Explanations of the behavioral abnormalities following traumatic brain injury are traditionally related to the severity of brain injury.
The behavioral abnormalities are “attributed to deficits in cortical (mainly frontal) processing combined with reactions to loss of neurocognitive abilities.”

The “proposition that severity of injury is directly related to severity of outcome has been refuted or at least attenuated by a number of reports concluding that loss of consciousness or even blows to the head are not required for the production of measurable neuropsychological sequelae.”

Approximately 90% of brain injury is classified as MTBI, meaning there are millions of new cases each year in the United States.

“Litigation status has also been proposed as a factor influencing reports of behavioral abnormalities following MTBI,” but “a number of researchers have concluded that this does not appear to be salient.”

Approximately 85% of MTBI cases resolve within 1-3 months without any sequelae, while the remaining approximately 15% may have persistent symptoms of potentially disabling severity.

“No study has specifically addressed the pattern of neurobehavioral changes among individuals with persistent behavioral abnormalities following MTBI; rather, data from those with persistent neurobehavioral sequelae have been commingled with data from those making good recovery.”

“It has been argued that any behavioral abnormalities of purely neurologic etiology should be manifested immediately following the injury, with abnormal behaviors not manifested (or reported) until some period following injury likely of psychogenic nature. However, emerging research has suggested mechanisms involved in progressive neuronal loss from traumatic brain injury, raising the issue of possible neurogenic substrates of chronic behavioral problems in those patients with MTBI with persistent symptoms.”

Recent research has demonstrated that some individuals have a genetic unique sensitivity to brain injury and vulnerability to Alzheimer's disease.

“This project assessed behavioral changes from pre-injury baseline with 70 consecutive patients referred for neuropsychological examination following minor brain injury with persistent neurobehavioral problems.”

All patients were involved in litigation at some point, and 62% in pending litigation.

No patients had pre-injury history of psychiatric diseases or treatment.
Behavior change data was collected as part of a comprehensive neuropsychological examination with the standard Behavior Change Inventory. Assessments were gathered for both pre-injury and post-injury behavior status.

RESULTS

The following behaviors were identified by patients and significant others as changing within 6 months following MTBI.

Patients were more:

Absent-minded, agitated, angry, complaining, concerned, confused, cross/irritable, depressed, distractible, easily upset, fearful, forgetful, gloomy, irritable, impatient, quarrelsome, sad, shakey, short-tempered, slow, temperamental, tense, tired, unhappy, worrisome.

Patients were less:

Calm, carefree, cheerful, energetic, enthusiastic, friendly, good-natured, happy, patient, pleasant, polite, strong, understanding.

The behaviors “more distractible,” “less cheerful,” and “more afraid,” increased in the injury group v. the control group between 6 and 12 months.

DISCUSSION

“Differences found between MTBI patients and controls are compatible with prior studies.”

The findings provide clear support for the concept of some long-term neurobehavioral sequelae of MTBI.

“Comparison of behavior changes reported by individuals with potential litigation pending with those with litigation concluded revealed no difference, although there was a slight improvement on anxiety for those whose cases had settled.”

“Thus, pending litigation was not found to be a factor in reports of behavior change, a finding also reported by other investigators.”

The authors discuss the issue of whether the neurobehavioral sequelae of MTBI are of neurogenic or psychogenic origin.
They comment that for patients with MTBI, “neurogenic factors must be considered” because:

(1) Progressive worsening of neurogenic origin is compatible with mechanisms documented in mild brain injury.

(2) It is also documented that some individuals have a special genetic sensitivity to brain insult.

Psychological reactions to the cumulative recognition of impaired function can occur.

“The likelihood of complete recovery from MTBI is in the range of 85%,” and for the remaining 15%, “the neurobehavioral residue may be persistent, severe, and even disabling.”

“Given an annual incidence in the range of 10 million TBI cases in the US each year, with the very large majority involving MTBI, residual neurobehavioral problems involving 15% make this a phenomenon deserving of recognition.”

\[10,000,000 \times 0.15 = 1,500,000 \text{ MTBI patients with residual neurobehavioral problems / yr}].

KEY POINTS FROM DAN MURPHY

(1) 90% of all brain injury is classified as mild traumatic brain injury (MTBI).

(2) 85% of MTBI cases resolve within 1-3 months without any sequelae.

(3) 15% of MTBI cases have persistent symptoms of potentially disabling severity.

(4) There are 10 million cases of mild traumatic brain injury (MTBI) per year in the USA [most from whiplash].

(5) Of these 10 million MTBI cases per year, 1.5 million will suffer from persistent neurobehavioral impairments that may be severe and disabling.

(6) In this study of 70 patients, 21% showed significant behavioral impairment compared to controls at 12 months post-injury.

(7) The severity of brain injury is not directly related to outcome or to the neuropsychological sequelae.
(8) Litigation status is not a factor that influences behavioral abnormalities following MTBI.

(9) Some individuals have a genetic unique sensitivity to brain injury and its neurobehavioral residuals.

(10) The findings provide clear support for the concept of some long-term neurobehavioral sequelae of MTBI.

EXTRAS:

**HEADS UP! PARENTS, COACHES WARNED OF SOCCER INJURIES**

Learn To Spot Concussions, Group Suggests
Associated Press, May 2, 2002 (SF Chronicle)
by Jennifer Hoyt

“Parents who worry about the dangers of football sometimes encourage their children to play soccer. But in terms of serious head injuries, it's no safer, researchers say.”

“Players can get concussions from heading the ball, colliding, running into goal posts or hitting their heads on the ground.”

“A player who sustains a second concussion before recovering from the first may suffer brain swelling that could lead to brain damage and death.”

The Institute of Medicine is part of the National Academy of Sciences, a private organization chartered by Congress to advise the government on scientific matters. The Institute of Medicine is warning of the dangers of concussions.

“Because young people’s brains are still developing, they may be more at risk for serious injury from concussions than adults.”

“Coaches frequently depend on athletes to speak up when they think they have a concussion, but players are no more aware of how to diagnose the condition than adults and may ignore symptoms so they can keep playing.”

“Coaches often may not think a player has a concussion unless she loses consciousness. But a player may lose and regain consciousness within seconds - before anyone realizes she is hurt.”
Symptoms such as headaches, disorientation, and memory problems may not show up for days after the injury occurs.

The National Soccer Coaches Association of America (NSCAA), recommends not to stress heading drills among children 10 or younger.

**SPORTS-RELATED CONCUSSIONS AMONG KIDS MAY POSE LONG-TERM RISK**

*USA Today, April 30, 2002*

by Marilyn Elias

“Concussions suffered during youth soccer games are potentially far more harmful than many parents and coaches realize, suggests a report released today by the Institute of Medicine (IOM).”

“These injuries can impair the learning ability of kids for days or weeks, and the common practice of sending youngsters with concussions back out to play invites more serious, long-term brain injury, experts say.”

“No published US study confirms any brain injury from properly heading soccer balls - tightening neck muscles and hitting the ball with the forehead near the hairline. But nobody knows how many youngsters head properly.”

Youngsters who get concussions may be at higher risk for brain damage because their brains are still developing.

One can suffer a concussion without losing consciousness.

Concussion symptoms can be delayed for days or weeks.

Symptoms include mental slowness, fatigue, stumbling, headaches, slurred speech or blurred vision.

Concussions can impair mental performance for 2 to 30 days, with a 7 to 10 days the average.

The injury can affect short-term memory, concentration, ability to learn information, and speed at problem solving.

“Athletes who suffer repeat concussion when they're still recovering from the first one are at particularly high risk for long-term brain damage.”

The National Athletic Trainers' Association estimates about 6,900 high school students get concussions from playing soccer each year.