# Forensic Psychiatric Assessment of *mild* Traumatic Brain Injury (mTBI) Claims in Litigation

## National Association of Railroad Trial Counsel Webinar

Wednesday June 13, 2018  1:00– 2:00 pm EDT.


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# Topics To Be Covered

1. **Definitions** – what is a **TBI**?
   - what makes a ***mild*** **TB**I *"mild?"*
2. **3-legged stool assessment:** neurology, neuropsychology & psychiatry.
3. **Neurology - Imaging Studies and Structural Assessment**.
   - MRI.
   - DTI.
   - Tractography.
4. **Problems with correlating imaging studies with mTBI studies.**
5. **Neuropsychology - neurocognitive and psychological functional assessment including symptom validity scales.**
6. **Psychiatry - the integration of data. The rest of the story.**
7. **Factors responsible for continuing post concussive symptoms.**
8. **"Causation" vs. "Convenient Focus" hypothesis.**

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# Neuro-imaging References

**My recent blogpost on www.fpamed.com includes 13 current Neuro-imaging references related to MRI, DTI and mTBI.**

**http://www.fpamed.com/mild-traumatic-brain-injury-mtbi-and-imaging-studies-in-forensic-psychiatry/**

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# Assessing TBI Claims in Litigation

## Cal-Nev-Ari


Neurology Neuropsychology Psychiatry

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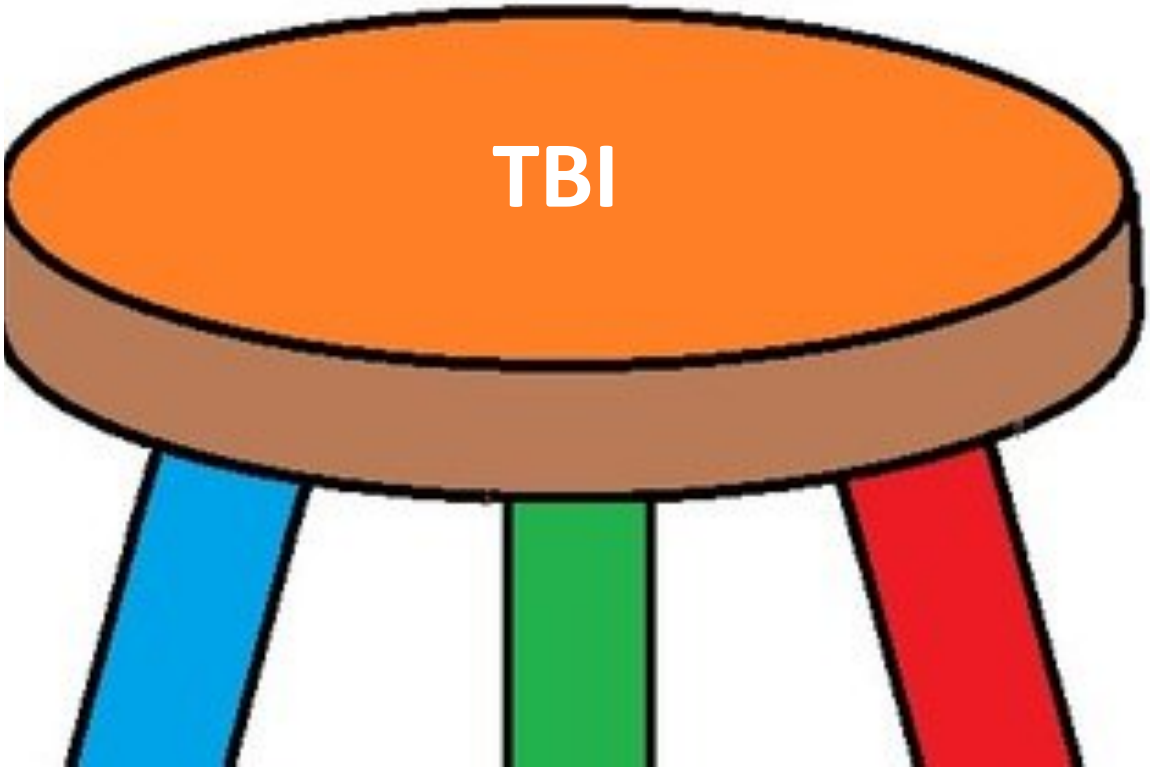
# Assessing TBI Claims in Litigation: Three-Legged Medical Stool




Neurology Neuropsychology Psychiatry

(Brain Structure) (Cognitive Function) (Behavior)

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# Assessing TBI Claims in Litigation: Three-Legged Medical Stool

**Neurology** – structural assessment.

**Neuropsychology** – functional assessment.

**Psychiatry** – behavioral assessment; integration of all 3 perspectives.

# Assessing TBI Claims in Litigation

Natasha Richardson was skiing, fell & hit her head.

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# Liam Neeson's last conversation with Natasha Richardson:

"I spoke to her and she said, 'Oh, darling. I've taken a tumble in the snow.' That's how she described it," Liam, who married Natasha in 1994, told Anderson on *60 Minutes*. He flew immediately to Montreal where he was shown X-rays.

"I was told she was brain dead. And seeing this X-ray it was, like, 'Wow.' You know." he said. "But obviously she was on life support and stuff. And I went in to her and told her I loved her. I said,'Sweetie, you're not coming back from this. You've banged your head. It's– I don't know if you can hear me, but that's– this is what's gone down. And we're bringing ya back to New York. All your family and friends will come.' And that was more or less it."

Cause of Death: **Epidural Hematoma**.

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# Brain Hemorrhage – Epidural Hematomas Can Be Fatal

- **Epidural hematoma** is a type of traumatic brain injury (TBI) in **which a buildup of blood occurs between the dura mater (the tough outer membrane of the central nervous system) and the skull.**
- Often due to trauma, the condition is potentially deadly because **the buildup of blood may increase pressure in the intracranial space, compress delicate brain tissue, and cause brain shift**.
- The condition is present in 1 − 3% of head injuries. Around **15–20% of epidural hematomas are fatal**.

# What Is a Traumatic Brain Injury?

American Congress of Rehabilitation Medicine definition:

- a mechanically induced physiologic disruption of brain ***function*** featuring any of the following:
  - loss of consciousness **(LOC)**;
  - loss of memory for events immediately preceding or following the injury, the phenomenon termed posttraumatic amnesia **(PTA)**;
  - alteration in mental state **(AOC)** (feeling dazed, stunned, confused or disoriented) at the time of injury;
  - and **focal neurological signs** that may or may not be transient.

# What Is a ***mild*** Traumatic Brain Injury?

**Definition:** A **traumatically induced physiological disruption of brain function**, as manifested by **at least one** of the following:

1. loss of consciousness (**LOC**); *duration not greater than 30 minutes,*

2. any loss of memory for events immediately before or after the Accident (**PTA**); *duration not greater than 24 hours.*

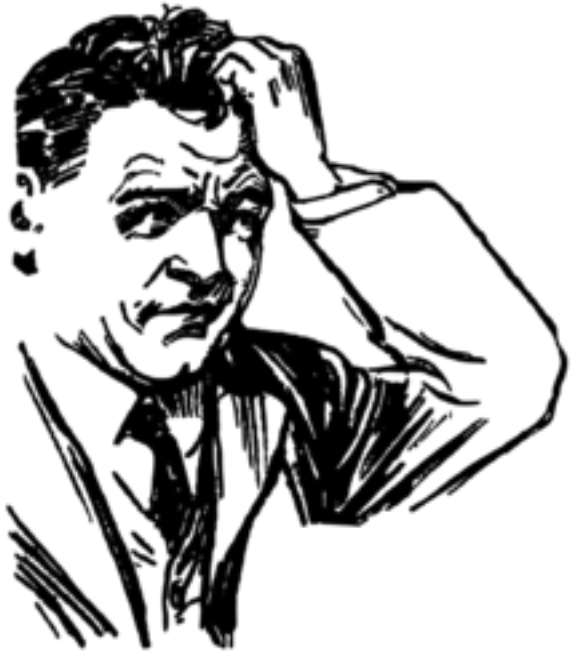
3. Glascow Coma Scale Score (**GCS**); 13 – 15 after 30 minutes (15 – normal).

4. any alteration in mental state **(AOC)** at the time of the accident (eg, feeling dazed, disoriented, or confused).

# What Is a Post-Traumatic Amnesia?

**Post-traumatic amnesia (PTA)** =

**a state of confusion that occurs immediately following a traumatic brain injury (TBI)** in which the injured person is **disoriented** and **unable to remember events that occur after the injury**.



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# Glasgow Coma Scale (GCS)

- **I. Motor Response:**
  6 – Obeys commands fully
  5 – Localizes to noxious stimuli
  4 – Withdraws from noxious stimuli
  3 – Abnormal flexion, i.e. decorticate posturing
  2 – Extensor response, i.e. decerebrate posturing
  1 – No response

- **II. Verbal Response:**
  5 – Alert and Oriented
  4 – Confused, yet coherent, speech
  3 – Inappropriate words and jumbled phrases consisting of words
  2 – Incomprehensible sounds
  1 – No sounds

- **III. Eye Opening Response:**
  4 – Spontaneous eye opening
  3 – Eyes open to speech
  2 – Eyes open to pain
  1 – No eye opening

The final score is determined by adding the values of I+II+III.

# Glasgow Coma Scale (**GCS**) Severity

**Mild (13-15)**:

- LOC < 30 min
- GCS score at 30 min: 13-15
- PTA < 24 hours

**Moderate Disability (9-12):**

- Loss of consciousness greater than 30 minutes
- Physical or cognitive impairments which may or may resolve
- Benefit from Rehabilitation

**Severe Disability (3-8):**

- Coma: unconscious state. No meaningful response, no voluntary activities

**Vegetative State (Less Than 3):**

- Sleep wake cycles
- Arousal, but no interaction with environment
- No localized response to pain

**Persistent Vegetative State:**

- Vegetative state lasting longer than one month

**Brain Death:**

- No brain function
- Specific criteria needed for making this diagnosis

# Classification of TBI

## Severity Rating for TBI

### Traumatic Brain Injury Description

| Severity | GCS | AOC | LOC | PTA |
|---|---|---|---|---|
| Mild | 13-15 | ≤ 24 hrs | 0-30 min | ≤ 24 hrs |
| Moderate | 9-12 | > 24 hrs | > 30min<br>< 24 hrs | > 24hrs<br>< 7 days |
| Severe | 3-8 | > 24hrs | ≥ 24 hrs | ≥ 7 days |

GCS - Glasgow Coma Score

AOC - Alteration of consciousness

LOC - Loss of consciousness

PTA - Post-traumatic amnesia

# Structural Assessment - Neurology

**Forensic Neurologist**:

- Assesses primarily structural integrity of the brain and central nervous system.
- Performs a detailed neurological examination.
- Reviews all imaging studies and medical records.
- Compares data to known data patterns characteristic of Traumatic Brain Injuries.

# The Physics of Brain MRI Imaging

- MRI is based upon the **science of nuclear magnetic resonance (NMR)**. Certain atomic nuclei are able to absorb and emit radio frequency energy (waves) when placed in an external magnetic field.
- The computer program interprets & produces images.
- In clinical and research MRI, **hydrogen atoms are most often used** to generate a detectable radio-frequency signal that is received by antennas in close proximity to the anatomy being examined.
- **Hydrogen atoms exist naturally in people** and other biological organisms in abundance**, particularly in water and fat.**
- For this reason, most **MRI scans essentially map the location of water and fat in the body.**

# Human Brain - MRI Image

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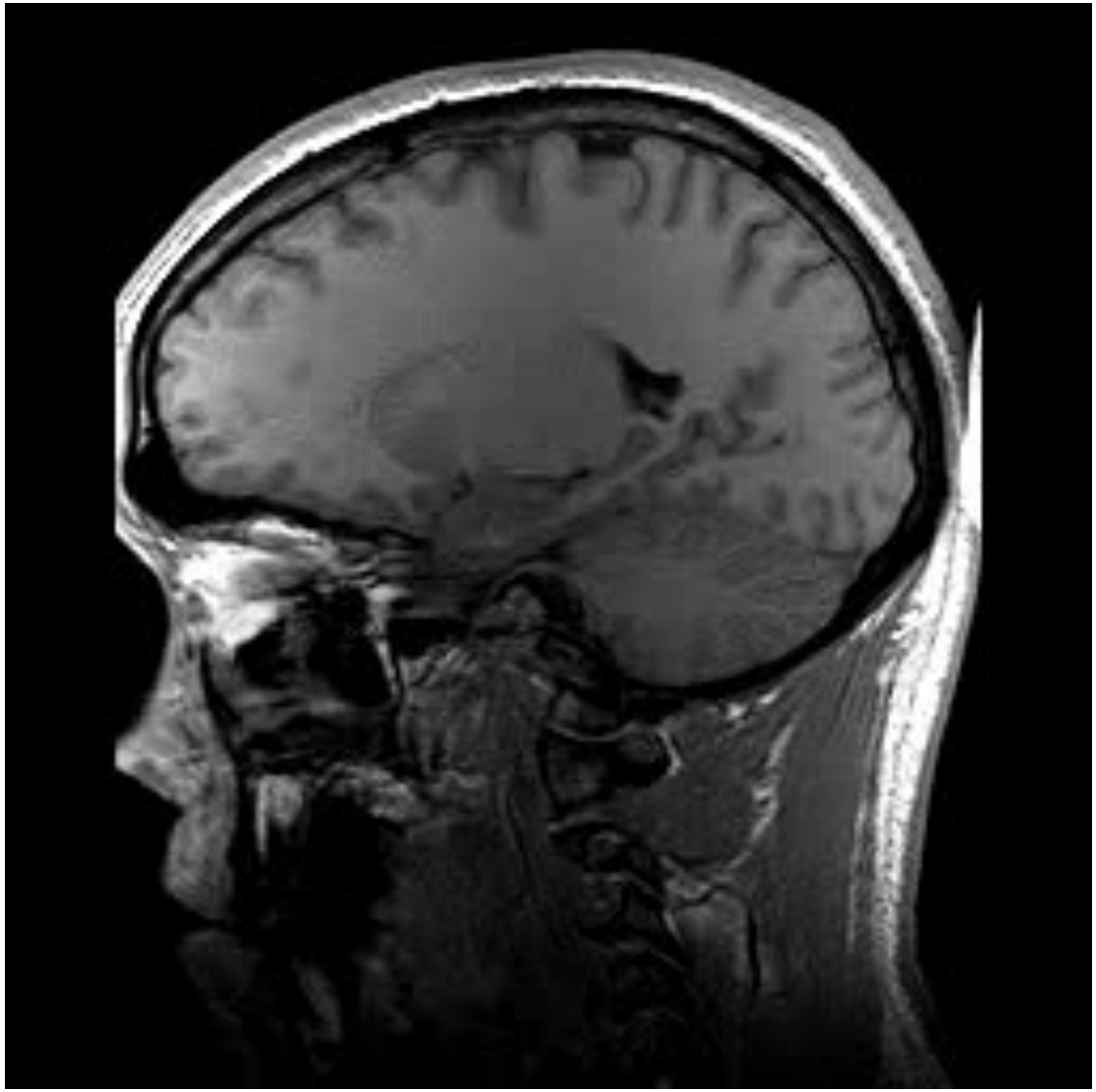
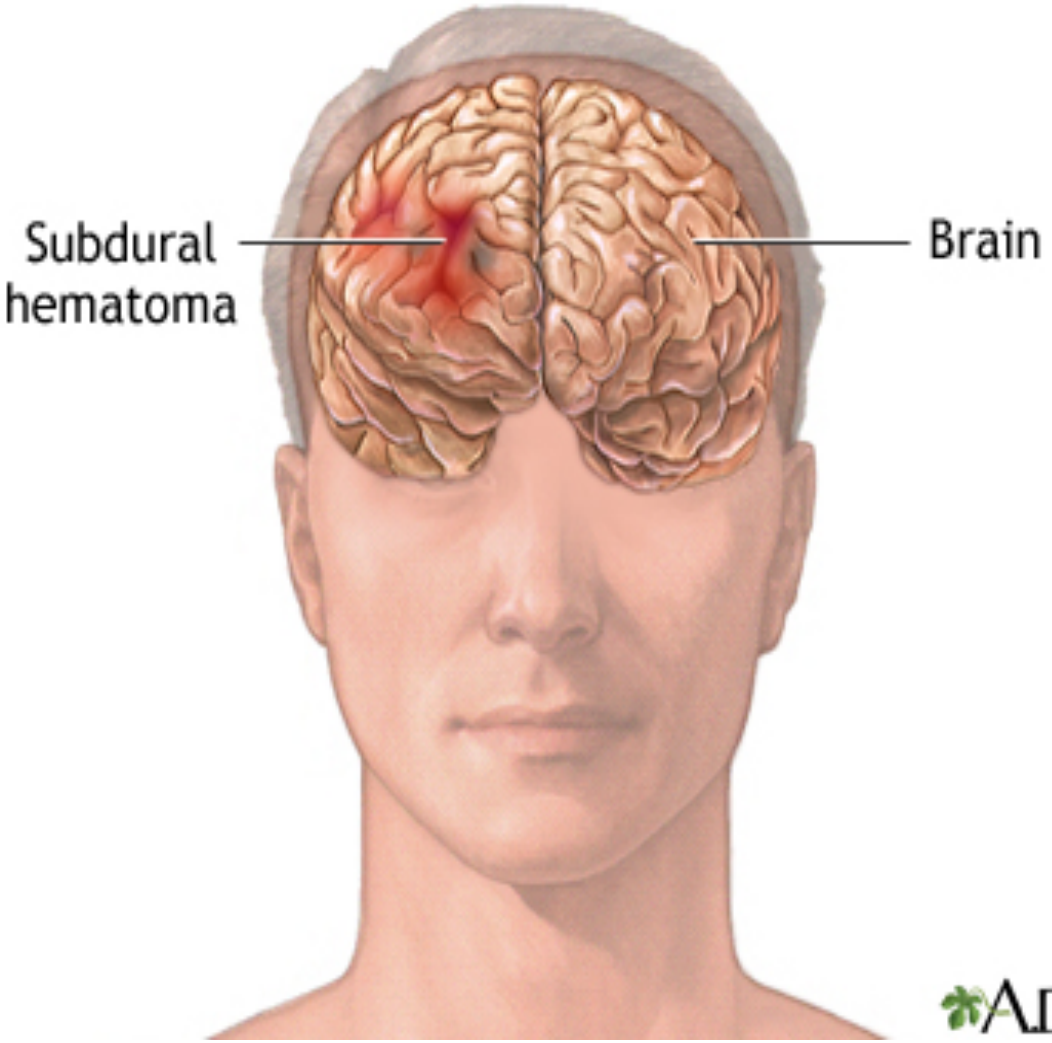


# Different Types of Brain MRI Imaging

- ***MRSI*** - Magnetic Resonance Spectroscopic Imaging
- ***DTI*** – Diffusion Tensor Imaging
- ***Tractography***

# Brain Hemorrhage - Subdural Hematoma

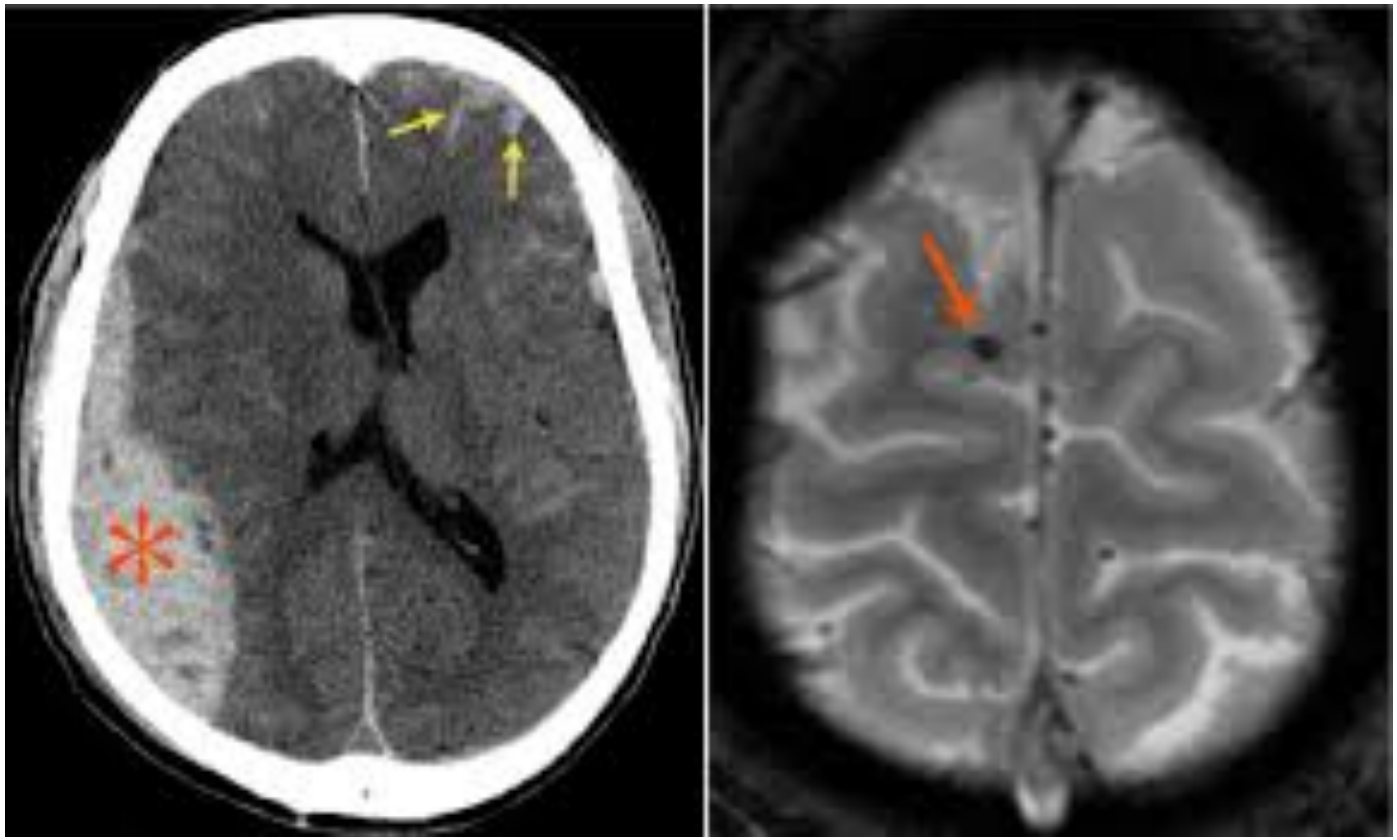
Subdural hematoma:



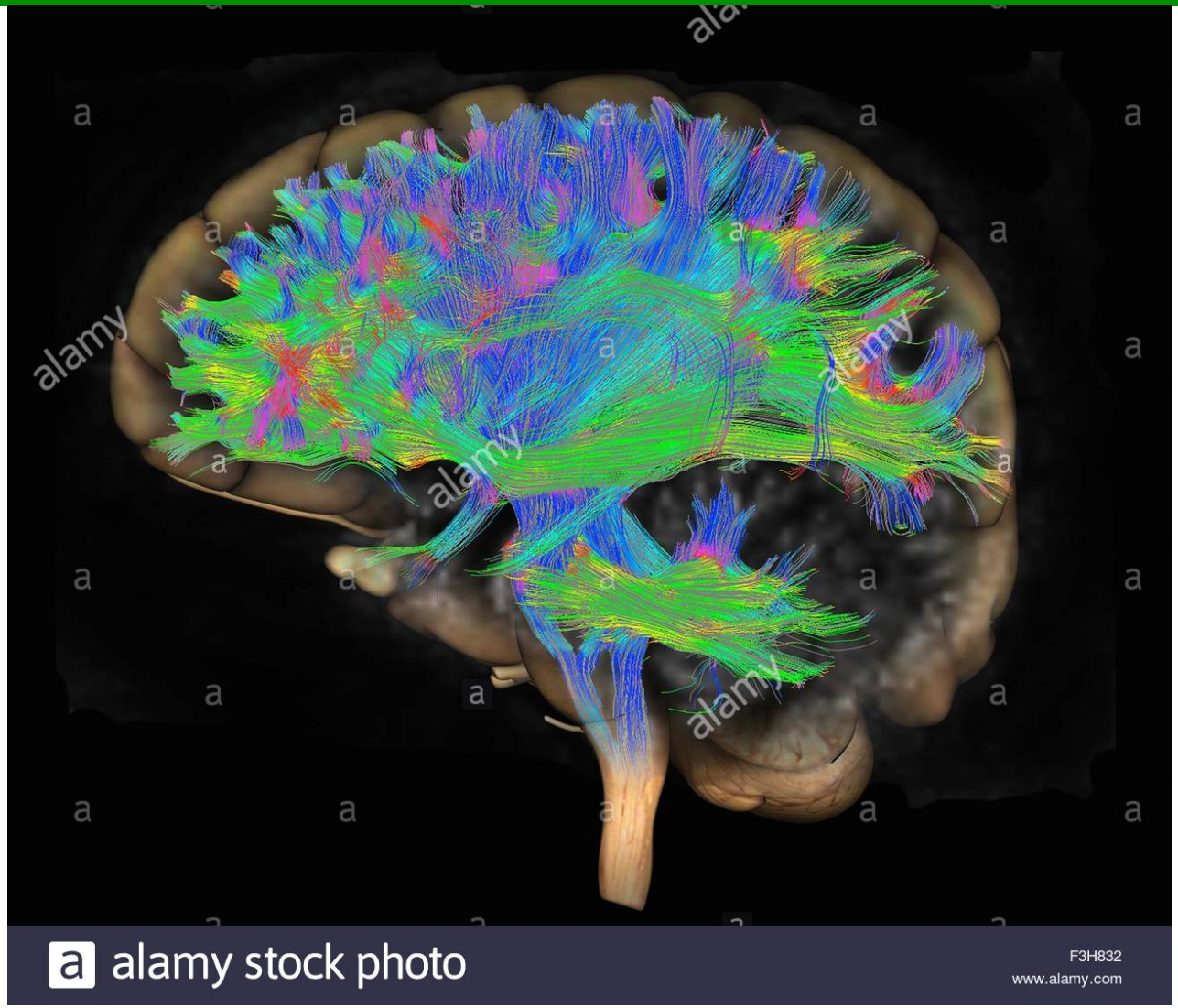
# Brain Hemorrhage MRI

Subdural hematoma

focal subarachnoid hemorrhage



# Diffusion Tensor Imaging (DTI)



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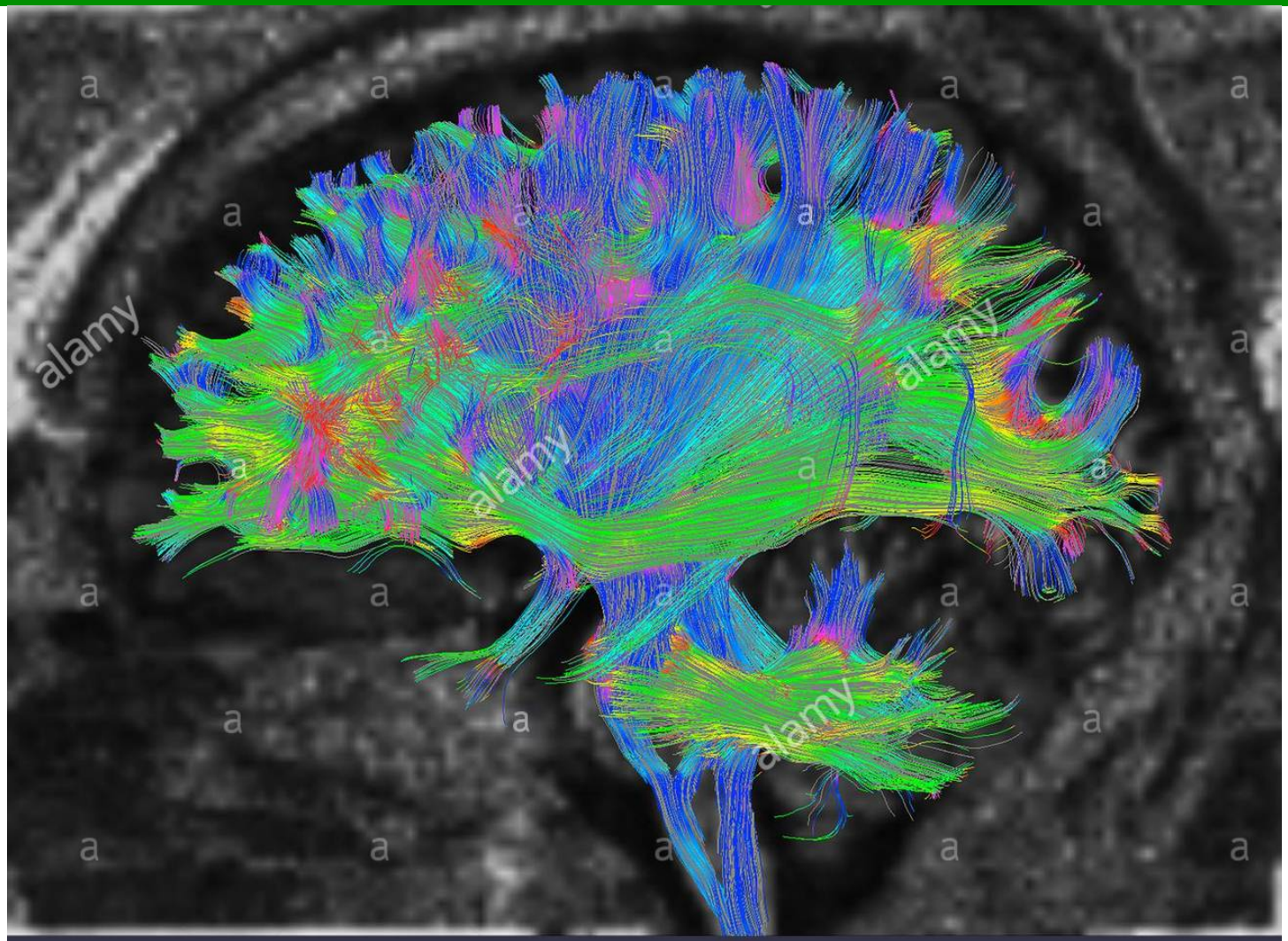

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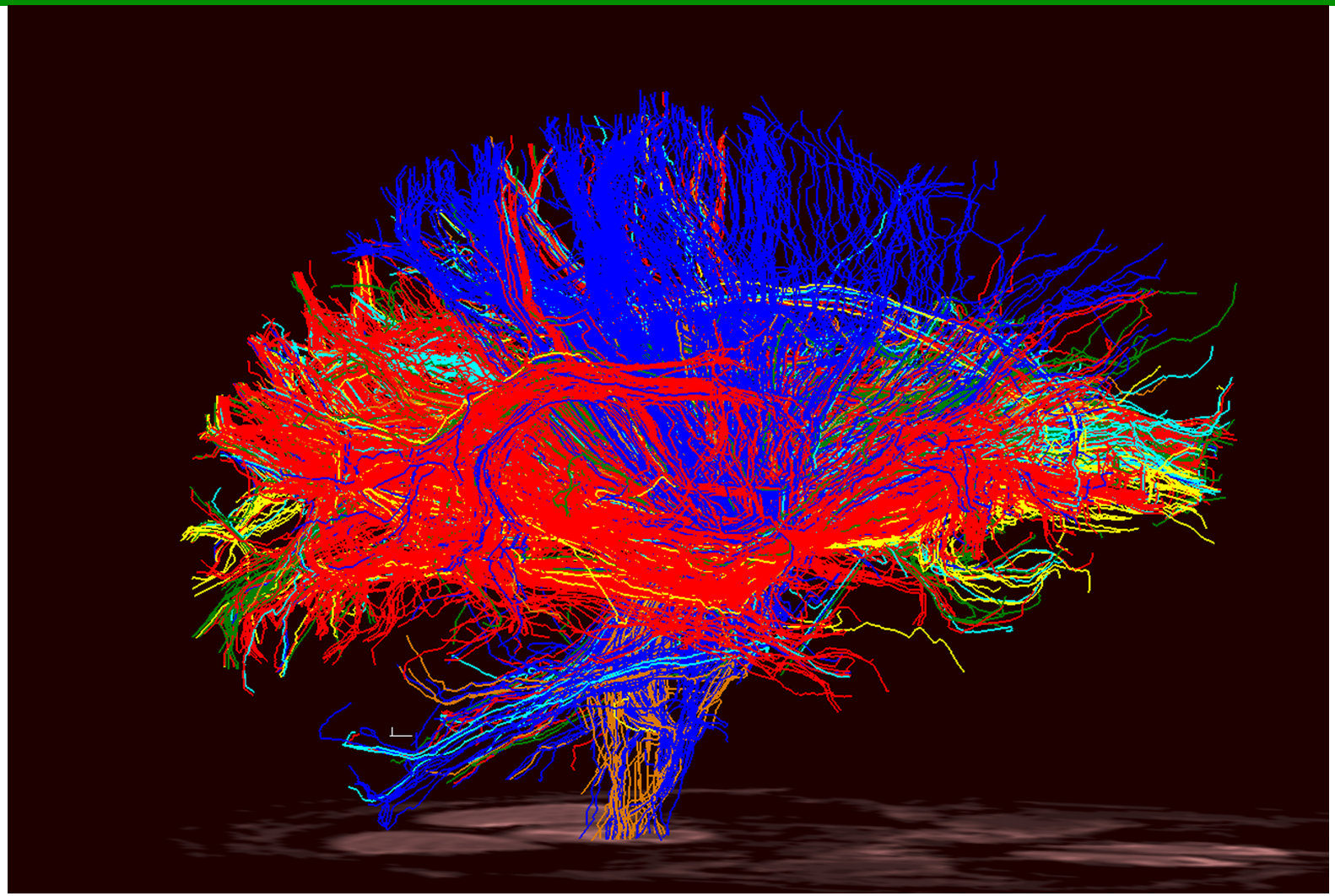


# Imaging Findings in Mild Traumatic Brain Injury (mTBI)

- **MRI *may*** show**:**
  - Brain tissue contusion (bruising).
  - focal subarachnoid hemorrhage.
  - traumatic micro bleeding.

- In order to relate these MRI imaging findings to cognitive symptoms **requires 4 or more traumatic micro bleeds**.

# Neurocognitive & Psychological Assessment: Neuropsychologist

**Forensic Neuropsychologist:**

- **All medical testing answers "a membership question."**
- **Administers, scores and interprets a set of neuroopsychological and robust psychological tests.**
- **Test instruments include "effort" or "malingering" tests and symptom validity scales and tests.**

# Neurocognitive & Psychological Assessment: Neuropsychologist

**Forensic Neuropsychologist:**

- **Employs multiple tests and different test modalities to seek cross correlation among tests.**
- **Recognizes patterns of test data that are either characteristic of mTBI, or suggest symptom embellishment, exaggeration and even malingering.**
- **The probability of corroborated test data being reliable is 95% or better ($p < 0.05$).**

# Behavioral Assessment: Psychiatrist

## Forensic Psychiatrist:

- **Reviews all available medical, psychiatric and legal record, including**
  - **Past and current medical records from all treaters.**
  - **Complaint and all relevant deposition transcripts.**
- **Reviews all written and deposition testimony opinions of medical experts, especially Neurologists and Neuropsychologists, including their interpretations of imaging studies and neuropsychological and psychological test data.**
- **Conducts a detailed forensic psychiatric history interview examination of Plaintiff.**
- **Integrates all the Data.**

# Challenges to Accurate Data Integration:

## 1. MRI abnormalities *may or may not* be relevant to allegations of mTBI:

- When **abnormalities** are noted **on MRI**, they **often do not explain the patient's symptoms.**
- Just because **an anatomical abnormality** appears **on an imaging study does not prove** that **the patient's symptoms were caused by that abnormality**.
- There can be **much chicanery** when imaging studies are offered as "proof" of TBI.

# Challenges to Accurate Data Integration:

**2. Post-Concussive (mTBI) Symptoms are *Non-Specific* - They are Seen In Many Different Medical Conditions, e.g.,**

**Common Post-Concussive Symptoms:**

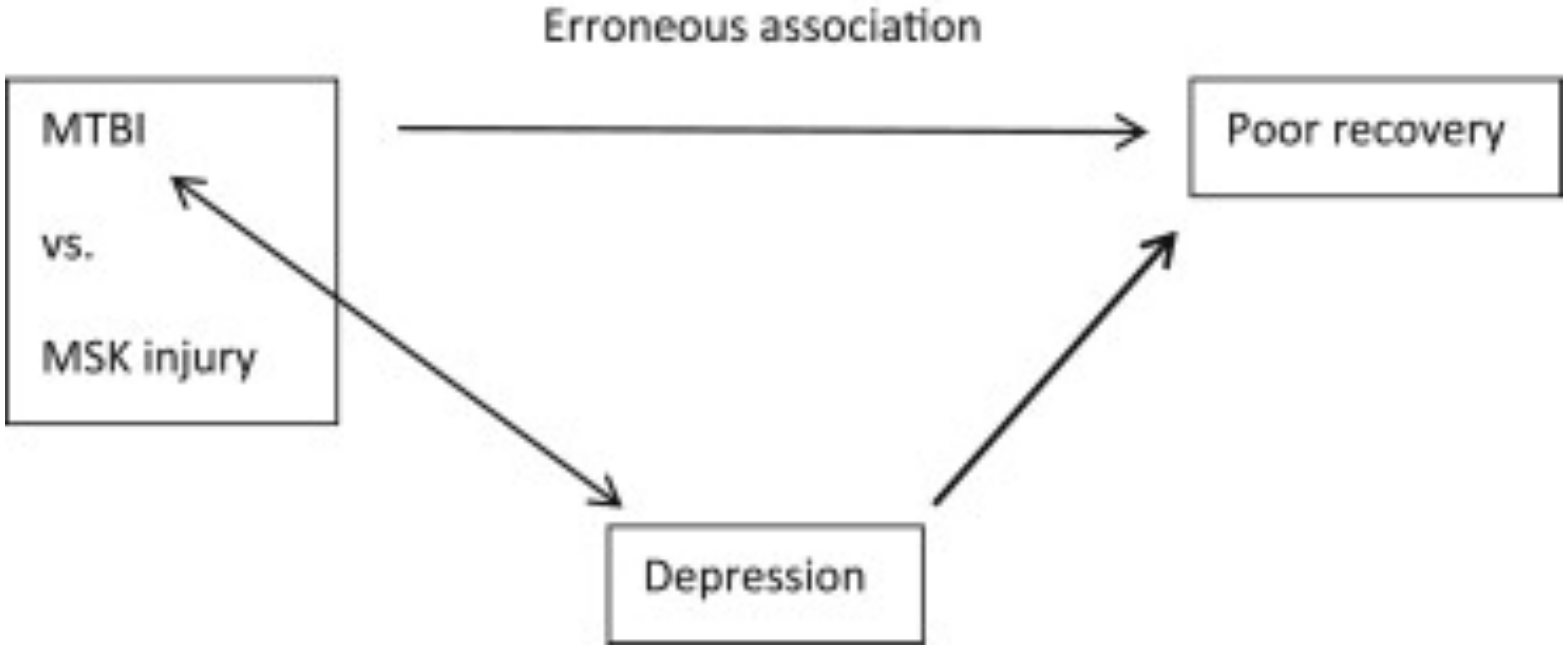
- Headache.
- Depression.
- Difficulty Concentrating.
- Fatigue.

**Post-Concussive Syndrome** = persistence of symptoms > 3 months

# Post-Concussive (mTBI) Symptoms Are Non-Specific – They Are Seen In Many Different Conditions

Post-concussive symptoms do not necessarily mean that subjective symptoms have an organic cause.

# Biases & Post-Concussive (mTBI) Symptoms: The "**Confounding Bias**" Effect




if cases of mTBI are more likely than a comparison group of musculoskeletal (MSK) injuries to be depressed, and those with depression are more likely to report poor recovery 5 days post injury, then the MTBI may erroneously be considered the cause of poor recovery. This illustrates a **confounding bias effect** due to depression.

# Biases & Post-Concussive (mTBI) Symptoms: the "Good-Old-Days" Bias *

- Patients who are **currently in litigation** reported **more post injury symptoms**.
- Litigation status not associated with self-reported retrospective pre-injury ratings.
- Consistent with **"Good Old Days" bias**, patients with **mTBI tend to misperceive their pre-injury functioning as better** than the average person.

*RT Lange, GL Iverson, A Rose, Archives of Clinical Neuropsychology, Volume 25, Issue 5, 1 August 2010, Pages 442–450

# Other Biases & Studies of mTBI Symptoms:

- **Informational Bias:**
  varying accuracy of information.
- **Selection Bias:**
  the **selection** of individuals, groups or data for analysis so that proper randomization is not achieved; HA x2 d vs.  2 yrs.; dementia.
- **Attrition Bias:**
  Those who drop out of study vs. those who do not.

# Persistent Post-Concussive (mTBI) Symptoms & Litigation

One of the most prominent factors prolonging symptoms after a concussion is…

**LITIGATION**

# Persistent Post-Concussive (mTBI) Symptoms & Litigation:

"The **potential for compensation-seeking strongly predicts persistent symptoms and poorer functional outcome** (i.e., return to work), independent of mild traumatic brain injury severity based on acute injury characteristics.*"

*Paniak, C: *Journal of Clinical Experimental Neuropsychology 24:187-193,* 2002; Paniak, C: *Journal of Musculoskeletal Pain* 8:193-200, 2000

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# Persistent Post-Concussive Symptoms And Symptom Validity Testing (SVT)

Persistent Post-Concussive Symptoms (PPCS) are **substantially higher in patients involved in litigation:**

- 5-15% PPCS plaintiffs **fail effort testing (SVT – symptom validity testing)** during neuropsychological evaluations.

# What is a “Somatic Symptom Disorder?”

- A **Somatic Symptom Disorder (*DSM-5**)**, is **any mental disorder which manifests as physical symptoms that suggest illness or injury, but which cannot be explained fully or at all by a general medical condition** or by the direct effect of a substance, and are not attributable to another mental disorder.*

- A **Somatic Symptom Disorder is Emotional Dysphoria, experienced as Physical Dysphoria, often pain.**

**DSM-5*

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# Comparison of Premorbid and Post-injury MMPI-2 Profiles in (LPCS) Late Post-Concussion Claimants *

- **An abnormal somatoform MMPI-2 profile is the most frequently encountered in LPCS* claims**.
- In a study of premorbid and post-injury MMPI-2 profiles in 23 patients with **mild** cranial/cervical injuries…
- **All claimants,** during the course of compensation-related neuropsychological examinations, **attributed major personality change to their injuries**.

*MF Greiffenstein, WJ Baker, *The Clinical Neuropsychologist,* 2001, Vol. 15 No. 2, pp. 162-170.

# Comparison of Premorbid and Postinjury MMPI-2 Profiles in Late Post-concussion Claimants (LPCS)*

- However, their ***premorbid*** **MMPI-2 profiles *were all abnormal*** and **indicated prior somatoform psychopathology**.
- Their **post-accident MMPI-2 profiles showed continuous somatization trends**, although they unexpectedly showed (a) increased defensiveness and (b) a general decrease in global psychopathology.
- **The findings did not support an "eggshell plaintiff" theory of chronic post-concussive complaints.**

*MF Greiffenstein, WJ Baker, *The Clinical Neuropsychologist,* 2001, Vol. 15 162-170

# MMPI-2 & Symptom Validity FBS Scale *

- **FBS** scale raw scores **above 22** should **raise concerns about the validity** of self-reported symptoms.

- **FBS** scale raw scores **above 28** should **raise significant concerns about validity**.

- Scores **above 28** are **associated with very low false-positive rates**.

*Statement by: YS Ben-Porath, A Tellegen, *MMPI-2 Symptom Validity Scale (FBS)*, University of Minnesota.

# Psychiatric Factors in mTBI

Factors responsible for continuing post concussive symptoms:

- Litigation.
- Pre-existing bio-psycho-social factors.

# Psychiatric Factors in mTBI

**Bio-psycho-social factors that impact the small percentage of people with PPCS:**

- Pre-existing personality factors;
- Mood disorders;
- Lack of resilience;
- Mal-adaptive coping styles;

# Pre-existing Psychiatric ***Resiliency*** Factors in mTBI: Bio-Psycho-Social Model

**People who want to take charge, who want to initiate, and who empower themselves to recover, see themselves in that light**:

- They will recover.
- They are different from people with mal-adaptive coping styles.

# Pre-existing Psychiatric *Vulnerability* Factors in mTBI: Bio-Psycho-Social Model

## Mal-adaptive coping styles & factors:

- Passive personalities - see themselves in a negative/pessimistic light.
- Complain of decreased concentration &/or Memory;
- Anxiety symptoms;
- Headache & Non-Specific Somatic Symptoms (pain, GI, vague neuro sxs).

# Pre-existing Psychiatric Factors in mTBI: Bio-Psycho-Social Model

What is the base rate of these adaptive vs. mal-adaptive coping styles?

(Neuropsychologist Grant Iverson PhD*):

- Benign course post-concussion, (benign self-limited condition) linked back to early education (resiliency factor).
- Somatization Disorders predispose to poorer outcome (vulnerability factor).

**Harvard Medical School, MGH - PM&R Dept.*

# Pre-existing Psychiatric Factors in mTBI: Bio-Psycho-Social Model

**Additional Factors:**

- Incidence of post-traumatic depression higher in people with pre-traumatic depression

vs.

- Head trauma *itself* can cause depression and anxiety, however, it is generally self-limited.

# "Convenient Focus"

Key Final "Take-Away" point:

- **The Index Accident is only one of many events and conditions in a Plaintiff's life.**
- In litigation, it may become "**a convenient focus" for *everything* that the Plaintiff believes is wrong with his life.**

# Subsequence vs. Consequence: *Samuel Johnson's* Wise Admonition

*"of all men,* ***the medical man is most likely to confuse subsequence with consequence****"*

*-- Samuel Johnson*

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# *Nicholas St. John Green* (1870) on "Proximate and Remote Cause":

"The **chain of causation" is only a metaphor**:

- In reality every event has a multiplicity of interdependent causes.
- **The "proximate cause" is just the antecedent event people choose** to pick out in order **to serve whatever interest they happen to have** in the case at hand.
- Similarly, labeling a cause "**remote**" is just a way of announcing **a decision not to attach liability to it.**
- **Independent of someone's interests, *one cause is not more "proximate" or "remote" than any number of other causes.***

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