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Challenges of Assessing and Rehabilitating the Mild Brain Injury

Chanth Seyone MD., FRCPC

Director
Acquired Brain Injury Clinic,
Toronto Western Hospital, University Health Network
Assistant Professor
University of Toronto

Practical Strategies: Rehabilitation Challenges of the Invisible Injury
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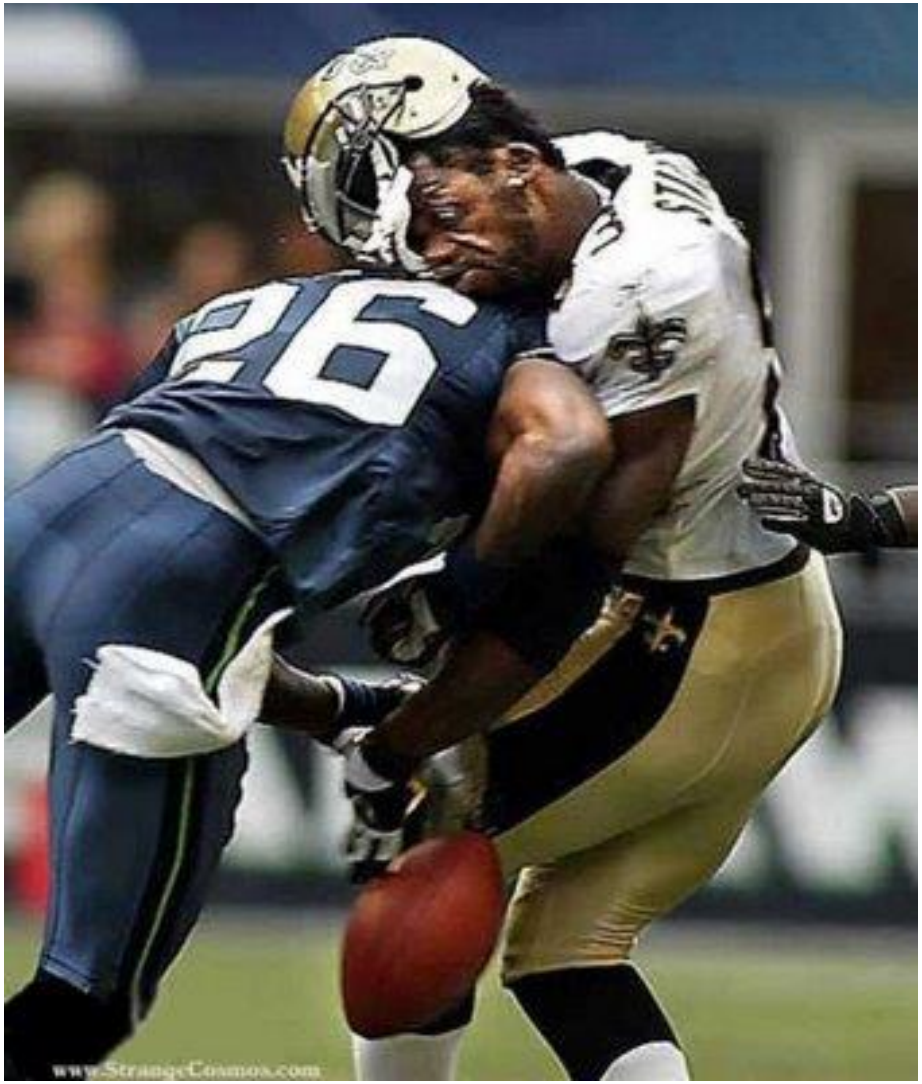
Topics of Discussion

- **Mild Brain Injury**
  - Definition
  - Epidemiology
  - Pathophysiology
  - Symptoms
  - Aetiology
    - Psychiatric disability
    - Organic or non-organic
  - Management
  - Prognosis
  - Mild Brian Injury in Children

Brain Injuries can occur due to …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However, I am not going to talk about such injuries, I am going to talk about …


OUCH!


FENDER BENDER?
MOVE VEHICLES
TO SHOULDER

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Definition

- Minimal Brain Injury ≡ Post-Concussional Syndrome, Post-Concussive Syndrome, Post-Concussional Disorder, Persistent Post-Concussive syndrome (PPCS), Post-traumatic syndrome
- Sir Aubrey Lewis *(1942)* described the Post-Concussional Syndrome as “that common, dubious, psychopathic condition – the bugbear of the clear-minded doctor or lawyer”
- Creating strong opinions since before the turn of the century to now
- …

- TBI can be defined as:
  - *(from the Mild Traumatic Brain Injury Committee of the Head Injury Interdisciplinary Special Interest Group of the American Congress of Rehabilitation Medicine)*

  – A person with MTBI is a person who has had traumatically induced physiological 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. …

3. Any alteration in mental state at the time of the accident (e,g, dazed, disoriented, confused);
4. Local neurological deficit(s) that may or may not be transient; but where the severity of the injury does not exceed the following:
    1. Loss of consciousness of approximately 30 min. or less;
    2. After 30 min., an initial GCS of 13-15;
    3. PTA not greater than 24 hr.

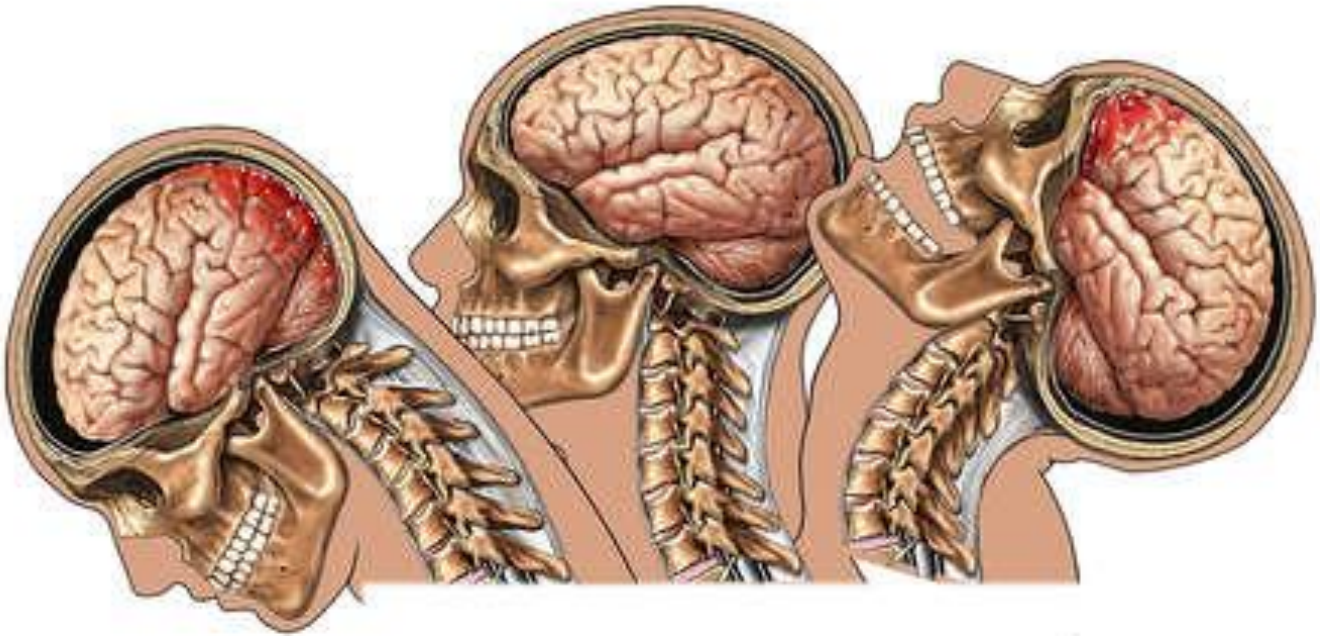
Epidemiology

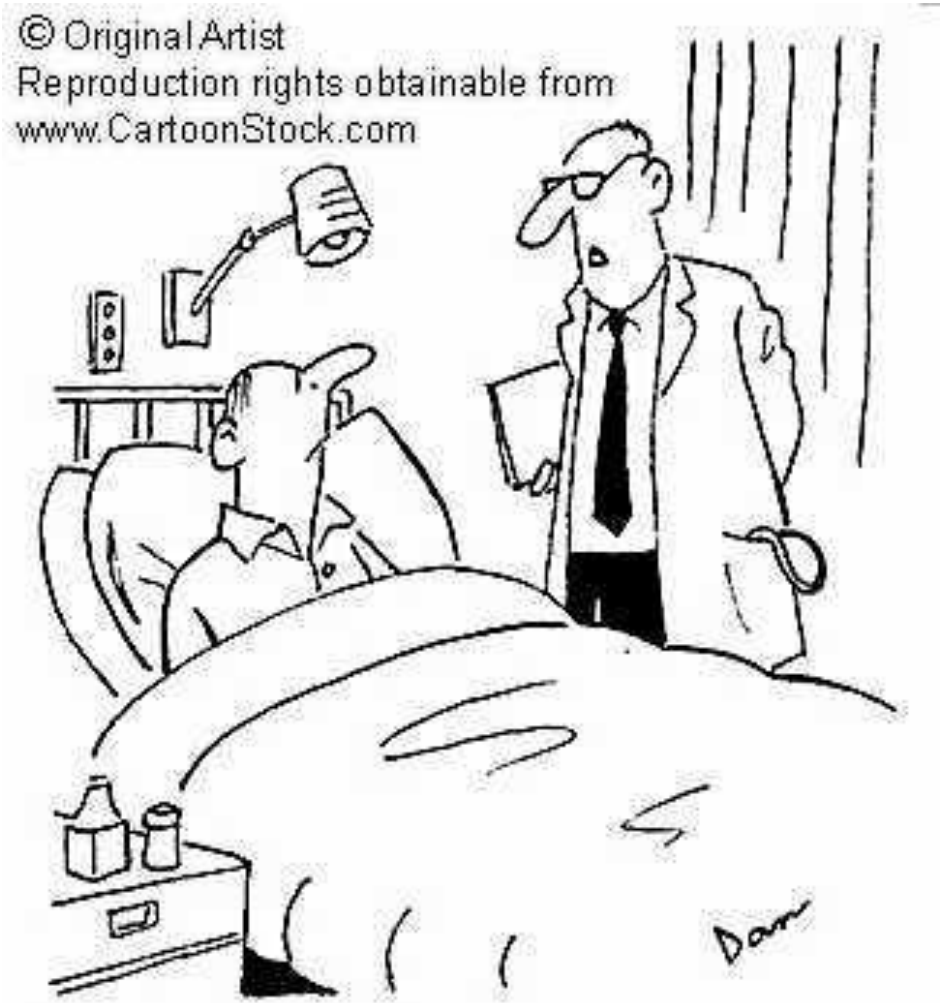
- 3rd leading cause of TBI admissions in Canadian hospitals in 2003-2004 [1]
- Incidence of mTBI presenting to family physicians and examined in hospital 493 to 653/100,000 [2]
- Concern that up to 15% of patients diagnosed with mTBI may have persistent disabling problems [3]
- = annual incidence of Parkinson's disease + multiple sclerosis + Guillain-Barré syndrome + motor neuron disease + myasthenia gravis
- > in males
- Age - 20's to 30's

- [1] Canadian Institute for Health Information. Head Injuries in Canada: A Decade of Change
- [2] Ryan LM, Warden DL. Post concussion syndrome. International Review of Psychiatry. 2003;15:310-316.
- [3] Centre for Disease Control (CDC, p.3)

Pathophysiology

Coup Contrecoup Injuries





"We've given you a brain scan and we can't find anything."

Symptoms

- Note: Symptoms as opposed to the more common usage “signs and symptoms” as signs usually sparse, if any
- Quasi organic and subjective symptoms
- NO or minimal LOC, PTA, RA
- Dynamic, not static

Common Symptoms of Concussion
Physical Headache Nausea Vomiting Blurred or double vision Seeing stars or lights Balance problems Dizziness Sensitivity to light or noise Tinnitus
Behavioural/Emotional Drowsiness Fatigue/lethargy Irritability Depression Anxiety Sleeping more than usual Difficulty falling asleep
Cognitive Feeling “slowed down” Feeling “in a fog” or “dazed” Difficulty concentrating Difficulty remembering

Notwithstanding …

- More longer term and disabling neuropsychiatric symptomatology can occur, including…

Psychiatric Sequelae of Minimal ABI

- Maladaptive Coping
- Cognitive Difficulties – difficult and slowed processing
- Attention Disorders – Secondary ADHD
- Affective Disorders - Depression
- Anxiety Disorders – Generalized Anxiety
- Sleep Disorders – leading to chronic disabling fatigue
- Personality Disorders – BPD, NPD, ASPD
- Substance use / misuse / dependence
- Behavioral Sequelae especially Apathy
- Effects on Community functioning
- Effects on Vocation
- Effects on the family

Thus, effective management has to address most of these factors at varying times

Aetiology

- No easy answer
- Evidence contradictory

- ? Physiological
- ? Psychological
- ? Both
- ? Neither

- *Symmonds (1937) "the kind of head that is injured"*

Psychiatric Disability

- Pre-traumatic
- Peri-traumatic
- Post-traumatic

From Lishman WA: British Journal of Psychiatry (1988)

Pre-traumatic

- Age
  - Aging brain less resilient to organic insult
  - Aging person less adaptable to its effects
- Cerebral arteriosclerosis
- Alcoholism
  - High prevalence in head injured
  - 58% of drivers, 47% of passengers, 36% of pedestrians suffering MVA related death *(Waller, 1968)*
  - Chronic high alcohol delays reparative processes within the CNS *(West et al, 1982)*

- …

- Mental Constitution
  - Genetic vulnerability
    - To neuroses, anxiety, depression, psychoses
  - Previous psychiatric illness
  - Personality (including being prone to accidents)
- Pre-existing psychosocial difficulties
  - Domestic
  - Financial
  - Occupational

- Recent life events
  - 20% had an acutely disturbing event within the preceding 6 hours of a fatal MVA *(Selzer et al, 1968)*
  - Other events found to be hazardous to ones health insofar as leading to post-concussional syndrome:
    - Moving house, marital separation, serious discord, changes of work *(Whitlock et al, 1977)*

Peri-traumatic

- Brain damage
  - Minimal structural as evidenced by MRI
  - Think also in terms not only of structural disruption but of changes in circulation, brain metabolism, neurotransmitter function …
- Evidence:
  - Oppenheim, *1989* - “molecular disturbances of neuronal function”
  - Robinson et al, *1984* – widespread noradrenergic dysfunction following CVA linked strongly to post-CVA depression

- … Brain damage
  - Transient
    - Contusion, edema, hypoxia, raised ICP, circulation
  - Permanent
    - Amount, location
- Other physical damage
  - Skull, scalp, vestibular apparatus

- Emotional impact
  - Destruction of the “myth of personal invulnerability”
  - Type of accident leading to
    - PTSD
- Meaning of accident
  - Fear the consequences of a “concussion”
  - Fear of other accidents
  - Fear the long-term impact of early symptoms
- …

- Circumstances of accident
  - Setting
    - Fear, anger, resentment
  - Significance
  - Type
    - MVA, industrial, domestic, sport
- Iatrogenic
  - Early information
  - Excessive investigations
  - Excessive or ineffective treatment

Post-traumatic

- Intellectual impairments
  - Marked or subtle (easily overlooked)
  - "Changed organism" *(Goldstein, 1942, 1952)* leading to problems coping
- Other impairments
  - Physical disabilities, deformities, scars
- Epilepsy
- Emotional repercussions of accident
  - including depression – indirect as well as direct
  - Guilt

- Ensuing psychosocial difficulties
  - Domestic *(Tarsh and Royston, 1985)*
    - Overprotection from family members leading to child-like dependence
    - Upheaval in family hierarchies and roles
    - Separation and loneliness
  - Financial
  - Occupational
- …

- Compensation and litigation
  - Hopes, doubts, conflicting advise from doctors, lawyers, family …
  - Chronic conflict
  - Repeated rehearsal of symptoms
  - “Compensation neurosis” may not resolve once litigation ended *(Steadman & Graham, 1970; Kelly & Smith, 1981)*

Evidence for organicity

- “Clustered symptom complex”
- Early otological symptoms lead to greater dizziness
- Early headache, diplopia and anosmia increases risk
- Increased PTA lead to increased risk
- Worse intellectual impairments
- Slowed cerebral circulation times
- Delayed brain-stem auditory evoked potentials
- Lowered threshold for tolerance to light / sound
- Slowed information processing
- Diffuse axonal injury

Evidence for Non-organicity

- “Stress” antedating and surrounding injury
- Increased anxiety due to accident itself
- “Neuroticism”
- Premorbid psychiatric illness
- Sex
- Marital status
- Absence of external validation of symptoms
  - Cycle of “failure, fear, avoidance, anxiety, depression, loss of self-esteem, isolation and alienation”
- Blame towards employer
- Twin studies

What This Means

- Assessment has to be thorough
- LOC, PTA, RA, or GCS are not the end-all in predicting subsequent difficulties
- Information from as many sources as possible; family, friends, relatives, co-workers, employer, …
- Psychiatric problems especially depression occur later (after 6 months) and therefore patients should be followed up

Management

- Dependent on time when patient first seen
- “Do no harm” as iatrogenic causation is quite problematic
- Avoid unnecessary investigations
  - Especially neuropsychological tests
- “There is not yet any reliable biologic measure of physiologicalness” *Alexander, 1995*
- “Studies that apply external measures to selected groups of the persistently symptomatic are doomed to find interesting correlations that shed no light on causation and thus no light on treatment” *Alexander, 1995*

...

- Questions to ask? *(From Alexander, 1995)*
  - What is the mechanism of injury?
  - What was the duration of Coma?
  - What was the duration of PTA?
    - These three questions will give some hint to the severity of the injury (Diffuse Axonal Injury) and suggest further questions which should include:
  - …

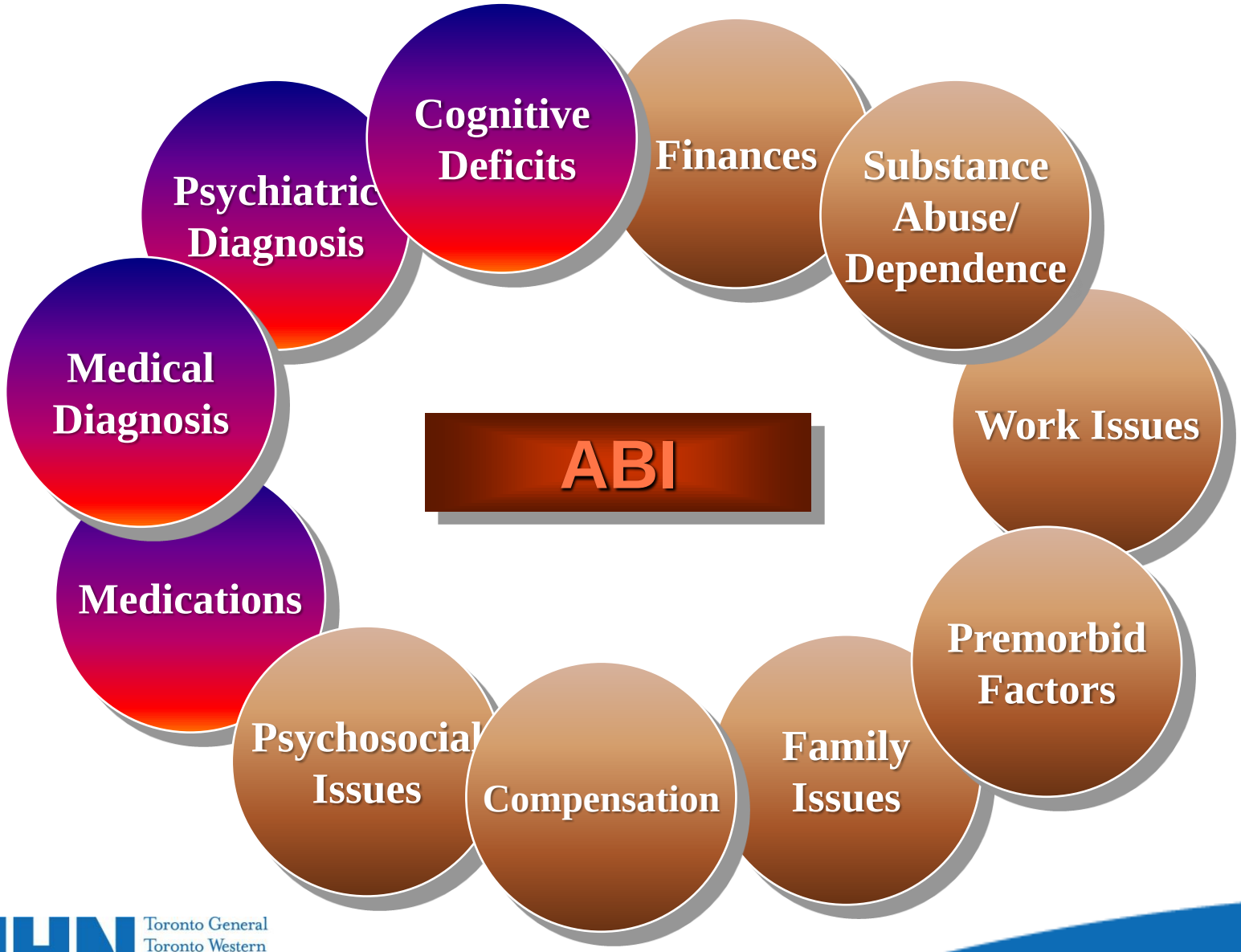
- What is the patients place in the natural history of recovery?
  - Early patient - Do little
    - Establish baseline
    - Determine there are no focal neurological signs
    - Treat somatic symptoms
    - Establish recovery plans – provide more than a few days off
    - Educate patient and others and inform of expected “full” recovery

- Later stage
  - Is PPCS present?
  - Is family involved with patient in justifying patients “disability”?
    - » No role for extended inpatient assessments
    - » Manage in the context of real-life
    - » Treat identifiable components essentially with pharmacological strategies
    - » Avoid “cognitive therapies”
    - » Pragmatic occupational interventions and vocational support

Long Term Management

- Psychopharmacological Management by itself is generally futile. It needs to be part of a:
  - Team Approach
  - Patient is at the center of coordinated care
  - Individualized

Why?



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Therapies

- Behavior therapy to identify triggers and modify responses
- Cognitive therapy to identify and modify thoughts and feelings
- Supportive and individual therapy to identify environmental and social needs

Prognosis

- Early stages with appropriate and finite management – **Fair**
- Later stages with established “disability” and enmeshment of family who have taken on roles of caretaker – **Poor**
- **Note:**
  - Only 15% of mild TBI develop PCS
  - Only 10-15% of those with PCS go on to develop PPCS at 1 year

Mild Brain Injury in Children

- Does it Occur?
  - Yes
- Is it the same as in adults?
  - Yes and No
  - Dependent on age of child
- Often associated with:
  - Marital separation of the parents
  - Increase in arguments between parents
  - Death of a close friend
  - Change in father's occupation with increased absence from home
  - Suspension from school
  - Acquisition of a visible deformity

- Often presents with:
  - Learning disabilities
    - “Failure to learn despite adequate general intelligence”
  - Behavioral dysfunction
  - Attention / Hyperactivity problems
  - Speech or language difficulties
  - Impulse control disorders
  - Conduct / Pervasive Developmental disorders
  - Psychosis
  - Atypical anxiety and depression

- **Thank you.**
- **Any Questions?**