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Psychological problem in pediatric TBI

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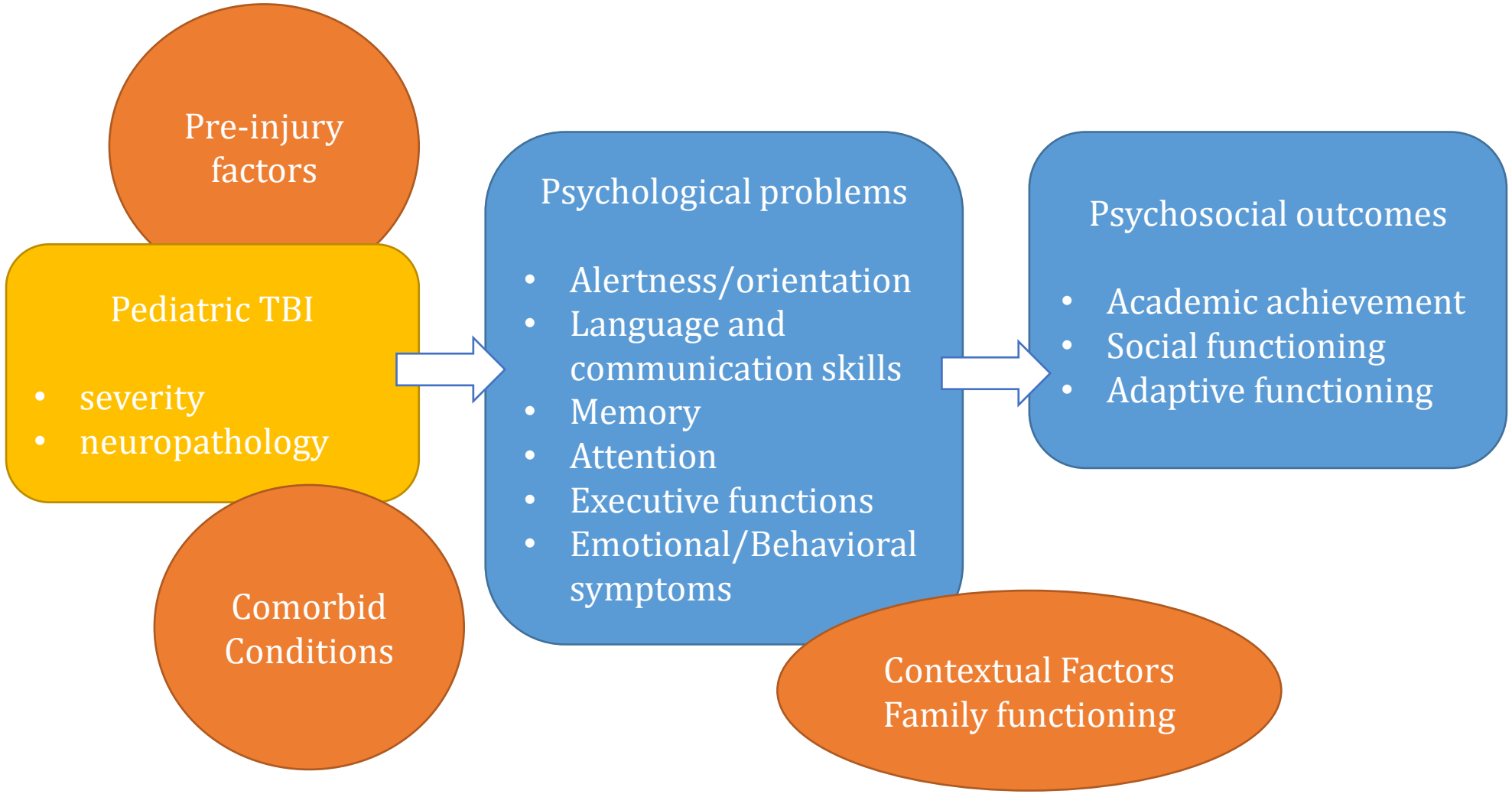
Overview


Pre-injury factors
Pediatric TBI
• severity
• neuropathology
Comorbid Conditions
Psychological problems
• Alertness/orientation
• Language and communication skills
• Memory
• Attention
• Executive functions
• Emotional/Behavioral symptoms
Psychosocial outcomes
• Academic achievement
• Social functioning
• Adaptive functioning
Contextual Factors
Family functioning

Overview

Development of psychiatric disorders after childhood TBI

- **Intellectual disabilities**
- **ADHD**
- **ODD/CD**
- **Mood and Anxiety disorder**
- **PTSD**

Psychological problems

- Alertness/orientation
- Language and communication skills
- Memory
- Attention
- Executive functions
- Emotional/Behavioral symptoms

One specific syndrome constellated by the psychosocial sequelae of pediatric TBI

- **Postconcussion syndrome**

Cognitive functioning after pediatric TBI

- Longitudinal studies have documented **multiple cognitive deficits** during the **acute stage** of TBI recovery, with **most recovery** occurring during **the first year post-injury**, although **persistent deficits in attention, memory, processing speed, and executive functions** have been documented.

Cognitive functioning after pediatric TBI

A Systematic Review of Cognitive Functioning After Traumatic Brain Injury in Individuals Aged 10–30 Years

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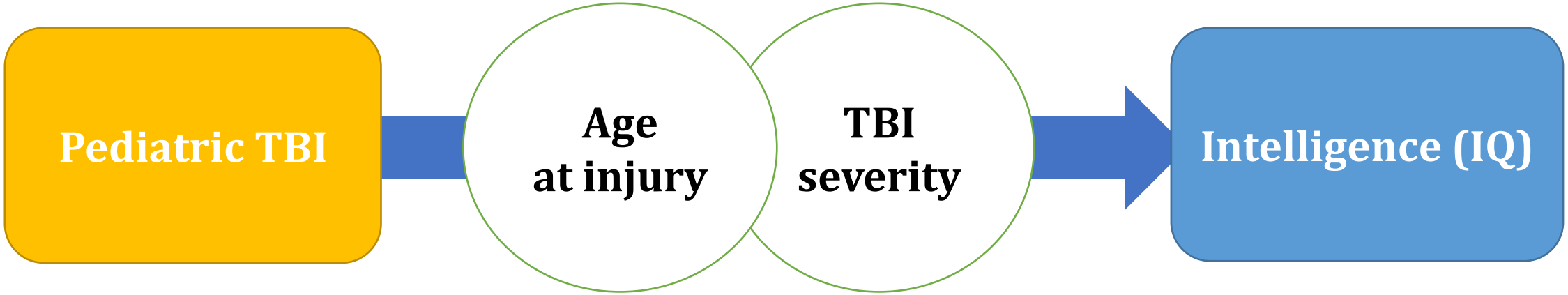
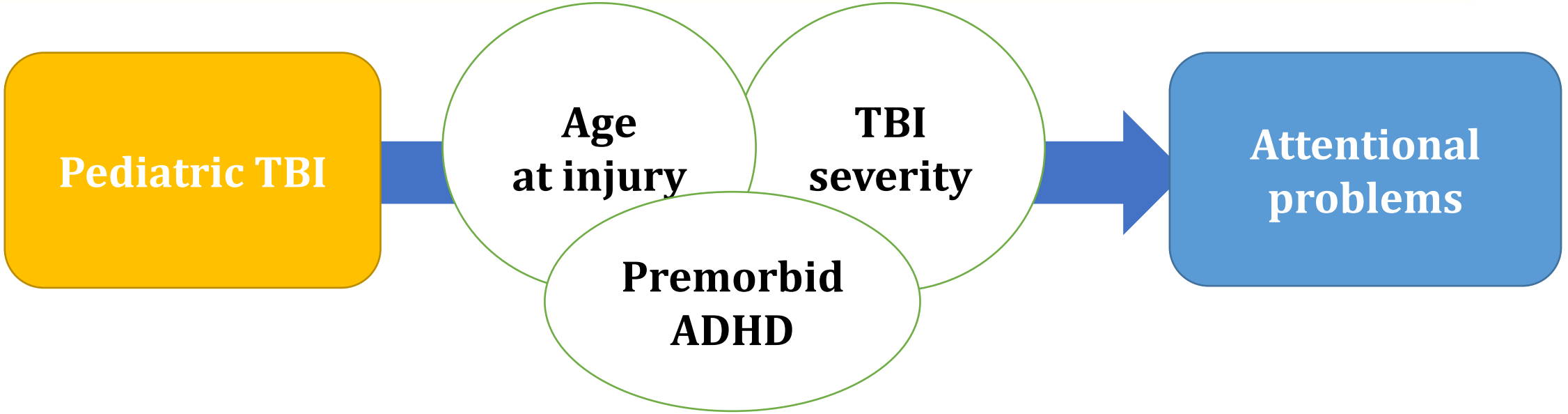
- Cognitive performance deficits can be evident in the **longer term**, including up to **at least 10 years** post injury.
- These long-term deficits appear despite reports of accelerated **recovery during the first 5 months** post TBI, as **relatively fewer gains** in cognitive performance appear to be made **over longer periods of time**
- The cognitive deficits in the **younger (<14 years) group** tended to be **greater** and **longer lasting with increasing TBI severity.**

Cognitive functioning after pediatric TBI



- Studies focusing on the youngest of the cohorts (≤14 years) and measuring intelligence reported a negative correlation between IQ scores and TBI severity
- Anderson et al. (2000) examined the recovery of IQ after pediatric TBI and found that recovery of intellectual ability was minimal in young children (<7 years) following severe TBI, whereas older children experienced more recovery of intellectual skills after severe injury.

Cognitive functioning after pediatric TBI



- Long-term attention problems following TBI and found that **younger age** of injury and **severity of injury** were related to the development of attention problems.
- Children with severe TBI displayed long-term deficits with cognitive and behavioral aspects of attention, especially **when premorbid attention problems existed.**

Cognitive functioning after pediatric TBI

Attentional problems

JAMA Pediatrics | Original Investigation

Association of Attention-Deficit/Hyperactivity Disorder Diagnoses With Pediatric Traumatic Brain Injury
A Meta-analysis

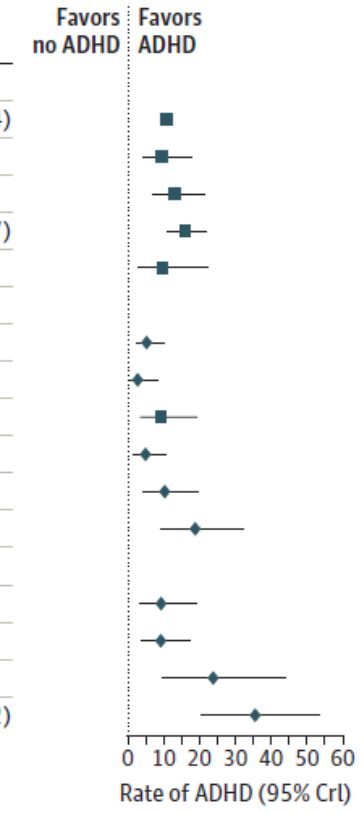
Robert F. Asarnow, PhD; Nina Newman, PhD; Robert E. Weiss, PhD; Erica Su, MS

- Of 5920 children with severe TBI, 35.5%(95%CI, 20.6%-53.2%) had ADHD more than 1 year post-injury.
- The odds for ADHD following severe TBI were increased compared with children with other injuries and non-injured controls, as well as those with mild TBI

- The rate of pre-TBI ADHD diagnoses was significantly greater than the incidence of ADHD in the general pediatric population.

Figure 2. Estimated Rates of Attention-Deficit/Hyperactivity Disorder (ADHD) for 4 Levels of Traumatic Brain Injury (TBI) Severity at Preinjury, 1 Year or Less (T1), and More Than 1 Year (T2) Post-TBI

Group	Rate of ADHD (95% CrI), %
Preinjury	
General pediatric population	10.8 (10.2-11.4)
Noninjured control	9.5 (4.3-17.7)
Other injured control	13.1 (7.1-21.5)
TBI[a]	16.0 (11.3-21.7)
Concussion	9.8 (3.1-22.3)
T1	
Other injured control	5.2 (2.3-10.1)
Concussion	2.8 (0.6-8.2)
Mild included	9.2 (3.4-19.3)
Mild	4.9 (1.8-10.7)
Moderate	10.3 (4.4-19.5)
Severe	18.8 (9.3-32.1)
T2	
Other injured control	9.2 (3.6-18.9)
Mild	9.1 (3.9-17.4)
Moderate	23.8 (9.6-44.2)
Severe	35.5 (20.6-53.2)



Estimated rates are presented with 95% credible intervals (CrIs). Mild included indicates mild TBI with preexisting ADHD.

Cognitive functioning after pediatric TBI

Memory

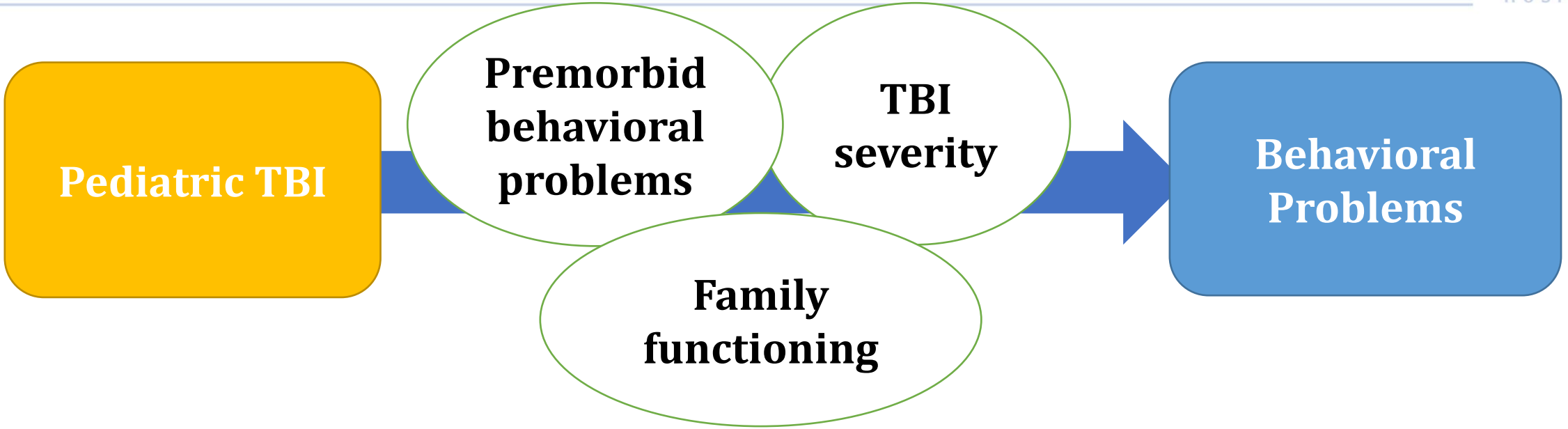
- Verbal memory deficits following TBI have been found on measures of auditory working memory, list learning, and story recall, as well as on parent interviews of day-to-day memory functioning.
- Several studies have documented deficits in explicit memory (i.e., conscious recollection) after childhood TBI, whereas **implicit memory** (i.e., procedural memory) is **typically not affected by TBI**.

Cognitive functioning after pediatric TBI

Executive functions

- Children with TBI displayed deficits on a variety of **tasks** meant to assess executive functions, such as **planning, working memory, inhibitory control,** and **cognitive flexibility**.
- Executive deficits have also been documented using **parent report** during the postacute and long-term recovery phases of TBI.
- The magnitude of excutive deficits on executive function tasks has been shown to **correlate with the volume of lesions in the frontal lobes**.
- **Young** children and those with **severe** injuries are particularly vulnerable to executive deficits after TBI

Emotional/Behavioral problems after pediatric TBI



- Pediatric TBI is associated with a host of neurobehavioral problems, although research in this area is often confounded by the high incidence of preinjury behavioral problems in children with TBI.
- The presence of premorbid behavioral problems actually increases the likelihood of traumatic injuries.

Emotional/Behavioral problems after pediatric TBI

Behavioral problems

- Schwartz et al. (2003) investigated the long-term persistence of behavioral problems after childhood TBI and found that injury severity, low socioeconomic status, and preinjury behavioral problems predicted the persistence of behavioral problems 4 years post-TBI.

- Yeates et al. (2001) found that cognitive/somatic symptoms (e.g., fatigue, headache, inattention) tended to decline in the first year, whereas emotional/behavioral symptoms (e.g., aggression, impulsivity) tended to increase over time, especially in children with severe TBI and in those with poor family functioning.

Emotional/Behavioral problems after pediatric TBI

Mood and Anxiety disorders

- Investigators have also examined the emergence of internalizing disorders following pediatric TBI and have documented the emergence of obsessive-compulsive symptoms, generalized anxiety, separation anxiety and depressed mood after pediatric TBI.

PTSD

- Few children develop full diagnostic criteria for PTSD, although PTSD symptoms are common.
- Predictors of postinjury PTSD symptoms are injury severity and premorbid internalizing symptoms as well as social disadvantage

Postconcussion Syndrome

- Diagnostic criteria for postconcussion syndrome were first proposed in 1992 in the **ICD-10** which included **clinical and research criteria** sets for PCS (Code F07.2).
- Criteria for the diagnosis of postconcussional disorder were published in modified form in a **DSM-IV** appendix of provisional criteria sets designated as **needing further research** in 1994.

Postconcussion Syndrome

DSM-IV-TR Criteria for Postconcussional Disorder

(A) A history of **head trauma** that has caused **significant cerebral concussion**
(B) Evidence from **neuropsychological testing** or quantified cognitive assessment of difficulty in **attention** (concentrating, shifting focus of attention, performing simultaneous cognitive tasks), or **memory** (learning or recalling information).
(C) **Three (or more)** of the following occur shortly after the trauma and last **at least 3 months**:

1. **Becoming fatigued easily**
2. **Disordered sleep**
3. **Headache**
4. **Vertigo or dizziness**
5. **Irritability or aggression with little or no provocation**
6. **Anxiety, depression, or affective lability**
7. **Changes in personality**
8. **Apathy or lack of spontaneity**

(D) The symptoms in criteria B and C have **their onset following head trauma** or else represent a substantial worsening of preexisting symptoms
(E) The disturbance causes **significant impairment in social or occupational functioning** and represents a significant decline from a previous level of functioning. In school-aged children, the impairment may be manifested by a **significant worsening in school or academic performance** dating from the trauma
(F) The symptoms do not meet criteria for dementia due to head trauma and are not better accounted for by another metal disorder.

Postconcussion Syndrome in Pediatric TBI

- The occurrence of postconcussion syndrome in children and found that **children who experienced TBI** showed **more postconcussive symptoms** than a **control** group of children **with orthopedic injuries.**
- **Injury severity** and **self-report of child anxiety** were related to the expression of symptoms.
- In addition, the rate of postconcussive symptoms was **similar** to that found in a group of **adults** matched for injury severity.
- Children with **mild TBI** were more likely to demonstrate trajectories showing **high acute levels** of **post concussive symptoms**, as well as **persistent increases** in postconcussive symptoms **in the first year** postinjury than children with orthopedic injuries.

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