

# Revising Stereotypes – Facts and Symptoms in Pediatric Traumatic Brain Injury

## Information Fact Sheet for School Professionals

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### Why is this important to you?

- This information fact sheet will provide you with a framework to assist you in understanding the difficulties that a child with TBI in your class room may experience. Its purpose is the replacement of common myths and misconceptions of pediatric TBI while offering guidance to implement appropriate support.



source: Google Images (Accessed: April 9 2011)

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# FACTS ABOUT TRAUMATIC BRAIN INJURY

## Epidemiology and Nature of TBI

### What is a Traumatic Brain Injury?

Traumatic brain injury (TBI) means an acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a child's educational performance. Traumatic brain injury applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem-solving; sensory, perceptual, and motor abilities; psychosocial behaviour; physical functions; information processing; and speech.

Traumatic brain injury does not apply to brain injuries that are congenital or degenerative, or to brain injuries induced by birth trauma [(Individuals with Disabilities Education Act (IDEA), 2004)].

The United States government's Centers for Disease Control and Prevention (Faul et.al., 2010) report an annual average of TBI-related emergency room visits for more than 500,000 children below the age of 15, making children the group at highest risk of TBI

**However, the true annual incidence rate of pediatric TBI is uncertain because not every head injury is medically evaluated** (Faul et.al., 2010; Bruns & Hauser, 2003)

**Most TBIs are MILD in nature** (Barlow et.al., 2010, Schutz et.al., 2010)

**MECHANISMS OF INJURY** vary widely and change with developmental stage (Sumich, Nelson, & McDeavitt, 2007; Keenan & Bratton, 2006) with the following main causes for each age group:

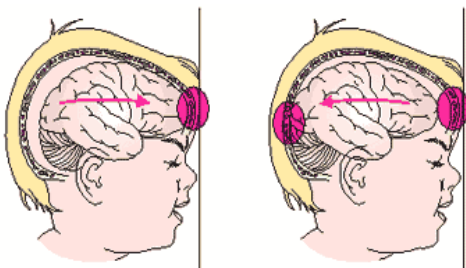


Image demonstrates how in a coup injury, a blow to the head (back or front) results in an injury to the opposite side of the brain. In a contra coup injury (right) the brain then recoils and strikes the other side of the skull as well, injuring the brain twice.

<http://www.braininjury.com/children.html>

Age Group	Main Cause
Infancy	Assaults
Toddlers (2-4 yrs)	Falls (stairs, playground equipment, furniture) Transportation-related
Younger school age (> 5 – 10 yrs)	Transportation-related Falls, Bicycle crashes
Older school age (10 -14 yrs) - adolescence	Sports-related Motor vehicle crashes

(adjusted from Keenan & Bratton, 2006)

# FACTS ABOUT TRAUMATIC BRAIN INJURY

## Severity and Symptoms

### Severity of TBI and its relationship to later outcome

TBI is classified into 3 distinct categories based on injury severity at the **acute** stage of injury, which is typically diagnosed based on criteria derived from a) Glasgow Coma Scale (GCS), b) length of post-traumatic amnesia (PTA), and c) duration of loss of consciousness (LOC) (see appendix for definitions), resulting in the terms mild TBI, moderate TBI, and severe TBI (Lee, 2007)

Because severity is assigned at the acute or initial stage of TBI, these initial markers have no relationship to later disability for children with *mild* TBI (Thornhill et.al., 2000, p. 1632). However, it predicts degree of recovery for children with severe and mild TBI (Schutz et.al., 2010).

**Despite controversy regarding negative effects of mild TBI** (Lee, 2007), **also mild TBI can result in serious consequences for the child that can last for years** (Barlow et.al., 2010; Hux, 1996).

### Cognitive symptoms

- ❖ Short attention span
- ❖ Difficulties remembering information- e.g. forgetting assignments and/or misplacing items
- ❖ Slowed information processing- e.g. taking longer to complete tasks and assignments
- ❖ Difficulties with problem solving, organizing, and integrating new abilities
- ❖ Cognitive Fatigue- e.g. requiring frequent breaks when completing longer tasks/ assignments

### Behavioural symptoms

- ❖ Emotional lability, irritability, and frustration
- ❖ Depression and Withdrawal
- ❖ Decreased anger control
- ❖ Inappropriate risk taking (adolescents)
- ❖ Inappropriate social interactions
- ❖ Hyperactivity
- ❖ Impulsivity - e.g. violating school rules
- ❖ Insensitivity and Egocentricity
- ❖ Aggression and confrontational Behaviour

### Somatic symptoms

- ❖ Headaches
  - ❖ Fatigue
  - ❖ Disrupted sleep schedule
  - ❖ Apathy
- (Schutz et.al., 2010; Dykeman, 2003; Hux, 1996)

# CHALLENGES and IMPLICATIONS

## for School Professionals

In 1990, the IDEA (PL101-476) stipulated that schools identify students with TBI and provide support in form of special education appropriate to their needs. However, 98 to 99 percent of school children with TBI are either not identified at all or misidentified by schools, placing them at risk for academic failure and maladjustment (Schutz et.al., 2010).

### CASE EXAMPLE 1

13-year old Robert sustained a mild TBI when struck by a car while running across the street. No educational adjustments were made to Robert's curriculum because no one realized the potential for problems in the classroom. By the end of the semester, his grades had dropped from As and Bs to Cs and Ds. Finally, a year later, an evaluation was completed, which did not show a large enough discrepancy between full scale IQ and academic achievement to make him eligible for special educational services. Only when making the connection between the previous accident and consequent negative changes in Robert's cognitive and academic status, were special educational services considered for Robert (adjusted from Hux, 1996).

### Some reasons for misidentification of students with TBI in the classroom

(Schutz et.al., 2010; Dettmer et.al., 2007; Hux, 1996)

- ❖ Inaccurate popular stereotypes<sup>\*\*</sup> see next 2 pages
- ❖ Lack of training
- ❖ Lack of information for parents and school professionals
- ❖ Parents may perceive their child as normally functioning or as not requiring treatment despite behavioural problems
- ❖ Parental lack of knowledge of special education or misconception resulting in resistance
- ❖ Delayed presentation of student's difficulties as school demands increase
- ❖ Parents and school professionals may not realize that a previous injury caused a TBI
- ❖ Difficulties to medically diagnose milder forms of TBI
- ❖ Parents may not be informed about potential long-term cognitive and behavioural consequences of milder forms of TBI

# REVISING MISCONCEPTIONS and STEREOTYPES

## What you should know

### CASE EXAMPLE 2

In 1980, eight-year old bright Hester sustained a severe TBI. Notwithstanding the fact that she made good improvements in language and cognition during patient rehabilitation, it was suggested that Hester would require special education services. However, she did not show a large enough discrepancy between test scores to qualify for the latter and was never classified as TBI student despite continued efforts. As a result, she entered 4<sup>th</sup> grade with barely passing her 3<sup>rd</sup> grade subjects whereas she had consistently received A's and Bs prior to her injury. Her grades gradually declined to eventually result in consistent failure while also becoming isolated as she lost friends. She began to associate with the *Goth* scene and deviant, drug-using students, however, she never gaining full acceptance in this group either. Hester was lastly reported dropping out of high school and becoming a drug-addicted prostitute (adjusted from Schutz et.al., 2010).

☛ **Once a child has fallen behind, life-long failure is the typical trajectory** ☛ (Taylor et.al., 2003; Jaffe, et.al. 1995 all cited in Schutz et.al., 2010)

- ❖ Although brain injuries can range from mild versus moderate to severe, only the most severe head injuries will result in obvious functional impairments that are readily identified by school professionals. In contrast, most children with traumatic brain injury including severe TBI will have less obvious impairments. Moreover, it is suggested that due to the relatively normal appearance of these children, parents and school professionals may incorrectly believe that the child has completely recovered and may function normally in the classroom (Schutz, et.al., 2010).
- ❖ When academic problems become obvious, these children often are misclassified as having, for example, a Learning Disability or Emotional Disturbance. Misidentification of students' classroom difficulties results in the provision of inappropriate educational services that do not address their educational nor psychosocial needs (Glang, McLaughlin, & Schroeder, 2007 and Chapman, 2007 all cited in Schutz, 2010), thereby jeopardizing their eventual functioning as adults (Lehr & Savage cited in Schutz, 2010).

# REVISING MISCONCEPTIONS and STEREOTYPES

## What you should know cont'd

### Misconceptions and Stereotypes

(Schutz et.al., 2010; Savage 2007 cited in Dettmer et.al., 2007, Thornhill et.al., 2000; Hux, 1996)

1. Severe Brain Injury will manifest in obvious symptoms and thus will be easily noticeable
2. TBI is a low incidence disability
3. Brain damage leads to inability to perform normal tasks
4. TBI produces physical disability
5. Behavioural symptoms of TBI will have a noticeable quality similar to mental illness
6. Children with TBI will appear intellectually challenged
7. Mild TBI will have minimal/ mild functional and /or educational impact

### REVISED

(Barlow et.al., 2010; Faul et.al., 2010; Schutz et.al., 2010; Savage 2007 cited in Dettmer et.al., 2007, Thornhill et.al., 2000; Hux, 1996)

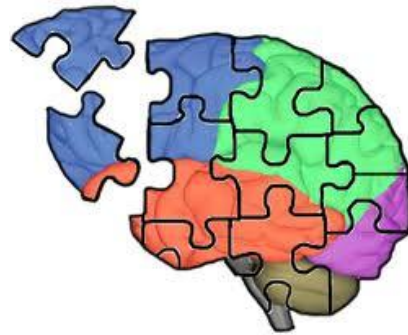
1. Most TBI symptoms are essentially silent
2. Actually, TBI has been called the "Silent Epidemic" because complications arising from TBI are not readily observable
3. TBI will mainly show up in subtle and situational difficulties
4. Most children will look fine physically
5. Actual behavioural symptoms will be more similar to signs of difficulty with personality, motivation, or character
6. After TBI, the child will be able to draw on his/her preserved pre-injury knowledge base while speech typically remains fluent, thus appearing intellectually intact
7. Although most children with *mild* TBI will recover within 12 months of the injury, *mild* TBI can have outcomes as problematic and long-lasting as more severe TBIs, affecting cognitive, psychosocial, and sensorimotor skills> therefore the educational needs of children with mild TBI should not be underestimated BUT will require proper management in the classroom

# PUTTING IT ALL TOGETHER

## Tools and Tips

### Supporting a child with TBI in the classroom requires:

- a) **Awareness** about the possibility that a previous TBI may be the reason for current behavioural problems or achievement difficulties, especially if these appear to be out of character (a TBI may have happened prior to the student's entrance into school or during the summer holidays)
- b) **Screening** to identify TBI in a struggling student
- c) **Evaluation** to identify areas of specific needs (i.e. neuropsychological evaluation)



[source: Google Images (Accessed 9 April 2011)]

### Identification of possible brain injury in school-aged children:

A tool to screen for the possibility of brain injury and to specifically identify TBI in students who struggle in school has been developed by Dettmer et.al. (2007): the **Screening Tool for the Identification of Acquired Brain Injury in School-Aged Children (STI)**. It can be distributed at no charge to school professionals from Dettmer et.al. (2007).

### Tips for the classroom:

(Schutz et.al., 2010; Hux, 1996)

**Be proactive-** ask the parents about previous TBIs in the child's medical history, and duration of coma (if severe TBI) or length of Loss of Consciousness/ period of confusion after incident

**Employ specific strategies** to enhance academic as well as social success (see *Suggested Websites* for 'Classroom Interventions' by Novack & Caldwell in addition to some specific strategies listed in the *Appendix*)

**Consider neuropsychological Evaluation and Cognitive Rehabilitation**

## Suggested Readings and Online materials

### Readings - Papers

Dettmer, J.L., Daunhauer, L., Detmar-Hanna, D., & Sample, P.L. (2007) 'Putting Brain Injury on the Radar: Exploratory Reliability and Validity Analyses of the Screening Tool for Identification of Acquired Brain Injury in School-Aged Children', *Journal of Head Trauma Rehabilitation*, 22 (6), pp. 339- 349.

Forsyth, R.J. (2010) 'Back to the future: rehabilitation of children after brain injury', *Archives of disease in childhood*, 95, pp. 554- 559.

Hux, K. (1996) 'Mild Traumatic Brain Injury: Facilitating School Success', *Intervention in School and Clinic*, 31 (3), p. 158-65.

Middleton, J. A. (2005) 'Acquired brain injury', *Psychiatry*, 4 (2), pp. 61- 64.

Schutz, L.E., Rivers, K.O., McNamara, E., Schutz, J.A., & Lobato, E.J. (2010) 'Traumatic Brain Injury in K-12 Students: Where have all the Children gone?', *International Journal of Special Education*, 25 (2), pp. 55- 71.

### **Books**

Lash, M. (1995) 'Families and educators: Creating partnerships for students with brain injuries', in Savage, R.C. & Wolcott, G. (eds.) *An educator's manual: What educators need to know about students with brain injuries*. Washington, DC: Brain Injury Association, Inc, pp. 41-48.

### Online materials - Videos

Baker, T. (2007) *Coping with Brain Injury: Brain Injury & School Success. The University of California and Brain Injury Foundation San Diego Speaker Series*. Available at: <http://www.uctv.tv/search-details.aspx?showID=11638> (Accessed on April 3, 2011).

Brainline.org (2011) *Traumatic Brain Injury in Young Children: In Harm's Way* (This documentary presentation was created to educate early childhood providers about TBI in young children). Available at: <http://www.brainline.org/content/multimedia.php?id=2984> (Accessed on April 9 2011).

### **Websites**

Individuals with Disabilities Education Act (2004) Available at: [http://idea.ed.gov/explore/search?search\\_option=all&query=traumatic+brain+injury&GO.x=14&GO.y=3](http://idea.ed.gov/explore/search?search_option=all&query=traumatic+brain+injury&GO.x=14&GO.y=3) (Accessed: 8 April 2011).

[www.cdc.gov/TraumaticBrainInjury](http://www.cdc.gov/TraumaticBrainInjury) (Accessed April 8, 2011).

Novack, T. & Caldwell, S. (2003) 'Traumatic Brain Injury Model System - Classroom Interventions', in *Educating the Traumatically Brain-Injured Student*. The University of Alabama. Available at: <http://main.uab.edu/tbi/show.asp?durki=10072> (Accessed: 20 April 2011).



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- Bruns, J. & Hauser, A.W. (2003) 'The Epidemiology of Traumatic Brain Injury: A Review', *Epilepsia*, 44 (Suppl. 10), pp. 2- 10.
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- Faul M., Xu, L., Wald, M.M., Coronado, V.G. (2010) '*Traumatic Brain Injury in the United States: Emergency Department Visits, Hospitalizations and Deaths 2002–2006*', Atlanta (GA): Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Available at: [www.cdc.gov/TraumaticBrainInjury](http://www.cdc.gov/TraumaticBrainInjury) (Accessed April 8, 2011).
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- Lee, L.K. (2007) 'Controversies in the Sequelae of Pediatric Mild Traumatic Brain Injury', *Pediatric Emergency Care*, 23 (8), pp. 580- 586.
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- Reilly, P.L., Simpson, D.A., Sprod, R., & Thomas, L. (1988) 'Assessing the conscious level in infants and young children: a paediatric version of the Glasgow Coma Scale', *Child's Nervous System*, 4 (1), pp. 30- 33.
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Sternbach, G.L. (2000) 'The Glasgow Coma Scale', *The Journal of Emergency Medicine*, 19 (1), pp. 67- 71.

Sumich, A.I., Nelson, M.R., McDeavitt, J.T. (2007) 'TBI: A Pediatric Perspective', in Zasler, N.D., Katz, D.I., & Zafonte, R.D. (eds.) *Brain Injury medicine: Principles and Practice*. New York: Demos Medical Publishing, pp. 305- 313.

Thornhill, S., Teasdale, G.M., Murray, G.D., McEwen, J., Roy, C.W., Penny, K.L. (2000) 'Disability in young people and adults one year after traumatic brain injury: a prospective cohort study', *British Medical Journal*, 320 (7250), pp. 1631- 1635.

# Appendix

## Terms:

**Acquired brain injury (ABI):** a broader umbrella term that includes traumatic (i.e. TBI) and non-traumatic brain injuries such as stroke, brain tumors, and brain infections (Dettmer et.al., 2007; Middleton, 2005)

**Cognition (= Thinking skills):**

Include(s) attention, memory, information processing, perception, and executive functions (e.g. more complex functions such as planning, organizing, making judgments, problem solving, decision making, ability to initiate and execute a plan to achieve a goal) (Middleton, 2005)

**Glasgow Coma Scale (adjusted for children)**– a clinical tool to measure impaired consciousness (at time of injury) based on the sum of scores of three types of responses: verbal response, motor response, and eye opening (Rujis, Keyser, & Gabreels, 1994 and Holmes, Palchak, MacFarlane et.al., 2005 all cited in Dettmer et. al., 2007; Sternbach, 2000; Reilly, Simpson, Sprod, & Thomas, 1988)

**Post-traumatic amnesia** – a period of mental confusion immediately after head trauma that results in disorientation (i.e. to place, time, person) and an inability to retain memories for current daily events (Rujis, Keyser, & Gabreels 1994 cited in Lee, 2007)

A **traumatic brain injury (TBI)** can be mild, moderate, or severe. However, be aware that a concussion can also be differentiated as mild, moderate, or severe. Notwithstanding, a **concussion** (from Latin: concussus = violently shaken), independent of its severity (mild > moderate > severe), considered a *mild* TBI.

Different terms that denote the same concept (Lee, 2007):

- mild TBI
- Closed Head Injury
- bump to head
- Concussion

# Appendix cont'd

## Specific Strategies in the classroom

(adjusted from Hux, 1996)

### Limitation

### Compensatory strategy

Slowed information processing

- \* Use other students as supplemental note takers
- \* Allow extra time to complete in-class assignments and tests
- \* Present information in small chunks
- \* Minimize external distractions

Impulsivity

- \* Teach self-monitoring techniques
- \* Insist that students show all of their work when they are completing assignments

Poor organization

- \* Maintain high structure and minimize schedule changes
- \* Provide outlines of class lectures identifying main points
- \* Draw semantic maps showing relations among key points
- \* Provide step-by-step instructions for performing tasks
- \* Keep class papers in separate sections of a notebook and insist that all pages be dated and kept in chronological order
- \* Use outlines to structure papers and oral presentations