

Traumatic Brain Injury in Infants and Children

Unlike a traumatic brain injury (TBI) in an adult, an injury to a child's brain affects an organ that is still developing. It is often believed that an immature brain may be more plastic or resilient, allowing children to "bounce back" more easily after a TBI. However, research suggests the younger a child is at the time of injury, the greater the possibility of long-term developmental challenges (Karver, 2012; Taylor, 2008; Turkstra, 2015).

The course of recovery is very difficult to predict for any given child. With early diagnosis and ongoing therapeutic intervention, the severity of these symptoms may decrease. Symptoms can vary greatly depending on the extent and location of the brain injury.

The effects of TBI on children differ in several ways from the effects on an injured adult:

- After a brain injury, previously learned information, which provides important building blocks for subsequent learning, is retained and used. However, in very young children, these building blocks are relatively few, affecting them as learners in comparison to older children or adults experiencing a brain injury, who have larger foundations of intact information.
- The effects of the TBI become apparent in the child's life when, during the course of the child's development, affected skills are called upon. Research indicates that TBI in childhood can be followed by a significant decrease in cognitive, social, or behavioral skills at the time of injury and also by a later "stall" (possibly years later) during which failure to develop cognitive, behavioral, or social skills affects learning and the ability to maintain friends and jobs (Gamino et al., 2009).
- A young brain that has experienced a TBI fails to mature at the same rate as the child's physical growth and development, cognitive communication issues become apparent as the child gets older and faces increasing expectations for new learning and independent, socially appropriate behavior. Youth with TBI often are found to have decreased academic and social performance that worsens through adolescence; specific reasons for this performance decline are unclear.

To Consider as the Child Enters School:

- **Cognitive communication** is the ability to use language and underlying skills such as attention, memory, self-awareness, organization, and problem-solving skills to communicate effectively. Cognitive communication combines thinking skills with language. Language skills may appear to have returned after brain injury. However, when the child most needs to communicate at home, in school, and in the community, the spontaneous and unpredictable nature of communication demands can result in decreased language performance. Changes are most likely to be seen at school under the pressures of time, grades, assignments, the struggle to keep up with curricular requirements, and social pragmatic interactions (DePompei).

- **Strategic learning** is essential for success at all educational and social levels and often does not develop properly in students with TBI. Strategic learning, an important function that underlies the brain's capacity to learn, is the ability to extract important information while inhibiting the unimportant features of that information. When a student is presented with a new learning task, the student's ability to identify meaningful information, generalize or abstract this information, and store it for future use may be impaired. Thus, this student may store details related to less important information and be unable to recall the gist of the new learning task efficiently or successfully. Language and cognitive communicative difficulties are often at the root of these problems and treatment is usually indicated (Chapman, DePompei).
- **Receptive language skills** also may be affected and the student may appear not to hear well. In many circumstances, a hearing assessment reveals normal hearing but delayed auditory-processing capacities. The student who may have difficulty processing what is said or written may ask for multiple repetitions, have poor vocabulary recognition, and have difficulty following instructions or remembering what was said.

Given this delay in TBI effects, a student's cognitive-communication skill development should be followed in the schools and community until high school graduation. Periodic checks are essential to determine if the student's language learning is sufficient in all developmental stages.

References

- Karver CL, Wade SL, Cassedy A, et al. Age at injury and long-term behavior problems after traumatic brain injury in young children. *Rehabil Psychol*. 2012;57(3):256-265. doi:10.1037/a0029522
- Taylor HG, Swartwout MD, Yeates KO, Walz NC, Stancin T, Wade SL. Traumatic brain injury in young children: postacute effects on cognitive and school readiness skills. *J Int Neuropsychol Soc*. 2008;14(5):734-745. doi:10.1017/S1355617708081150
- Lyn S Turkstra, Adam M Politis, Rob Forsyth (2015) Cognitive-communication disorders in children with traumatic brain injury *Developmental Medicine & Child Neurology* Volume57, Issue3 Pages 217-222 <https://doi.org/10.1111/dmcn.12600>
- Gamino, Jacquelyn & Chapman, Sandra & Cook, Lori. (2009). Strategic Learning in Youth With Traumatic Brain Injury Evidence for Stall in Higher-Order Cognition. *Topics in Language Disorders*. 29. 224-235. 10.1097/TLD.0b013e3181b531da.
- Pediatric Traumatic Brain Injury Where Do We Go From Here? Roberta DePompei, CCC-SLP/A <https://leader.pubs.asha.org/doi/10.1044/leader.FTR2.15132010.16>