

Studies uncover long-term effects of traumatic brain injury

10 February 2017



Credit: Robert Kraft/public domain

Doctors are beginning to get answers to the question that every parent whose child has had a traumatic brain injury (TBI) wants to know: What will my child be like 10 years from now?

In a study to be presented Friday Feb. 10 at the annual meeting of the Association of Academic Physiatrists in Las Vegas, researchers from Cincinnati Children's will present research on long-term effects of TBI—an average of seven years after injury. Patients with mild to moderate brain injuries are two times more likely to have developed [attention problems](#), and those with severe injuries are five times more likely to develop secondary ADHD. These researchers are also finding that the family environment influences the development of these attention problems.

- Parenting and the [home environment](#) exert a powerful influence on recovery. Children with severe TBI in optimal environments may show few effects of their injuries while children with milder injuries from

disadvantaged or chaotic homes often demonstrate persistent problems.

- Early family response may be particularly important for long-term outcomes suggesting that working to promote effective parenting may be an important early intervention.
- Certain skills that can affect social functioning, such as speed of information processing, inhibition, and reasoning, show greater [long-term effects](#).
- Many children do very well long-term after brain injury and most do not have across the board deficits.

More than 630,000 children and teenagers in the United States are treated in emergency rooms for TBI each year. But predictors of recovery following TBI, particularly the roles of genes and environment, are unclear. These environmental factors include family functioning, parenting practices, home environment, and socioeconomic status. Researchers at Cincinnati Children's are working to identify genes important to recovery after TBI and understand how these genes may interact with [environmental factors](#) to influence recovery.

- They will be collecting salivary DNA samples from more than 330 children participating in the Approaches and Decisions in Acute Pediatric TBI Trial.
- The primary outcome will be global functioning at 3, 6, and 12 months post injury, and secondary outcomes will include a comprehensive assessment of cognitive and behavioral functioning at 12 months post injury.
- This project will provide information to inform individualized prognosis and treatment plans.

Using neuroimaging and other technologies, scientists are also learning more about brain

structure and connectivity related to persistent symptoms after TBI. In a not-yet-published Cincinnati Children's study, for example, researchers investigated the structural connectivity of brain networks following aerobic training. The recovery of structural connectivity they discovered suggests that aerobic training may lead to improvement in symptoms.

Over the past two decades, investigators at Cincinnati Children's have conducted a series of studies to develop and test interventions to improve cognitive and behavioral outcomes following pediatric [brain injury](#). They developed an innovative web-based program that provides family-centered training in problem-solving, communication, and self-regulation.

- Across a series of randomized trials, online family problem-solving treatment has been shown to reduce behavior problems and executive dysfunction (management of cognitive processes) in older children with TBI, and over the longer-term improved everyday functioning in 12-17 year olds.
- Web-based parenting skills programs targeting younger children have resulted in improved parent-child interactions and reduced behavior problems. In a computerized pilot trial of attention and memory, children had improvements in sustained attention and parent-reported executive function behaviors. These intervention studies suggest several avenues for working to improve short- and long-term recovery following TBI.

Provided by Cincinnati Children's Hospital Medical Center

APA citation: Studies uncover long-term effects of traumatic brain injury (2017, February 10) retrieved 20 November 2022 from <https://medicalxpress.com/news/2017-02-uncover-long-term-effects-traumatic-brain.html>

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