

REVIEW ARTICLE

Psychosocial Consequences of Mild Traumatic Brain Injury in Children: Results of a Systematic Review by the International Collaboration on Mild Traumatic Brain Injury Prognosis



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Abstract

Objective: To synthesize the best available evidence regarding psychosocial consequences of mild traumatic brain injury (MTBI) in children.

Data Sources: MEDLINE, Embase, CINAHL, PsycINFO, and SPORTDiscus were searched (2001–2012). Inclusion criteria included published peer-reviewed reports in English, French, Norwegian, Spanish, Swedish, and Danish. References were also identified from relevant reviews and meta-analyses, and the bibliographies of eligible articles.

Study Selection: This article presents an update of a previous review with a much larger scope, of which this topic is a small subset of the questions addressed by that review. Controlled trials and cohort and case-control studies were selected according to predefined criteria. Two independent reviewers used modified Scottish Intercollegiate Guidelines Network criteria to critically appraise eligible studies. A total of 77,914 records were screened; 101 of these articles were deemed scientifically admissible, of which 6 investigated the psychosocial consequences of MTBI in children.

Data Extraction: Two reviewers independently extracted data from accepted studies into evidence tables.

Data Synthesis: We conducted a best-evidence synthesis by linking our conclusions to the evidence tables. Most accepted studies were exploratory rather than confirmatory. Preliminary evidence suggests that most children recover within 3 months post-MTBI. After 1 year, the prevalence of postconcussion symptoms and syndrome is similar between children with MTBI and children with orthopedic injuries. The

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functional status of children with MTBI improves over a 30-month follow-up period, but further research is needed to investigate the possibility that children with MTBI experience greater rates of psychiatric illness during the 3 years after their injury.

Conclusions: The prognosis of MTBI is favorable in children. Most appear to recover functionally from a physical and psychological perspective. However, future research should investigate the risk for psychiatric illness.

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Mild traumatic brain injury (MTBI), or concussion, is a prevalent injury in children and youth younger than 19 years (see case definition of MTBI below). Determining the true incidence of pediatric MTBI has historically proven difficult; however, it is estimated that 1 in 220 pediatric emergency department visits is the result of an MTBI.¹ Recent statistics from the Centers for Disease Control and Prevention (CDC) indicate that an estimated 3.8 million concussions occur annually in the United States, the majority in children and young adults.²

Similar to adults, youth may experience a range of neuro-behavioral deficits after concussion that can include combinations of somatic, cognitive, and emotional/behavioral postconcussion symptoms.³ These deficits can affect psychosocial functioning via participation restrictions in daily activities (eg, sport, school, family, social). Because childhood and adolescence are the periods during which the greatest plasticity and growth occurs in the brain,^{4,5} it is thought that the young brain may be more vulnerable to the effects of MTBI,^{6,7} resulting in delayed recovery⁸ and the potential for persisting functional deficits that may influence psychological outcomes. While it has been suggested that individuals with MTBI typically recover within 1 to 2 weeks,^{9,10} symptoms and related performance deficits persisting for several weeks to months postinjury have been reported.¹¹ Similarly, adolescents have been reported to be more susceptible to short-term neuropsychological and neurophysiological deficits after concussion than younger children and adults.¹² However, the long-term impact of MTBI in children remains to be examined, in particular, how short-term MTBI-related psychological deficits influence long-term psychosocial outcomes.

In its 2004 systematic review¹³ of MTBI prognosis, the World Health Organization (WHO) Collaborating Centre for Neurotrauma Prevention, Management, and Rehabilitation Task Force reported that the prognosis is favorable for children with MTBI. The WHO Collaborating Centre Task Force found that post-concussion symptoms were generally transient, usually resolving within 3 months, and resembled symptoms experienced by children who had sustained other types of injuries (ie, orthopedic). The evidence available at the time also suggested that few children experienced short- or long-term cognitive deficits and that children with MTBI did not subsequently have higher rates of behavioral or school problems than children with other types of injuries.¹³

Little information exists specific to the psychosocial outcomes of MTBI in children. The term *psychosocial* was first coined by Erikson in the 1950s and is generally used to refer to the broad category of behavioral/psychological and social determinants or outcomes. The medical and research communities have prioritized research focused on MTBI in children and youth because of its high prevalence in this population and the potentially disabling consequences of the injury.⁸ The purpose of this systematic review is to synthesize the best available evidence in order to describe the psychosocial consequences of MTBI in children, including psychosocial outcomes such as behavioral, emotional, psychological, or psychiatric outcomes or family functioning. This article is an update of a previous WHO review¹³ but is focused only on psychosocial issues in children. The previous WHO review included all prognostic issues in all age groups. We have done this to provide greater detail on this issue. Other focused prognostic updates are reported in companion articles in this journal supplement.

Methods

Protocol registration

We conducted a systematic review and best-evidence synthesis in order to update the findings of the WHO Collaborating Task Force.¹³ The review was conducted and reported in compliance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement.¹⁴ In accordance with the statement, our systematic review protocol was registered in the International Prospective Register of Systematic Reviews¹⁵ on July 11, 2011, and was last updated on November 2, 2012 (registration no. CRD42011001410). We also published the protocol for our review.¹⁶

Search strategy

The literature search and critical review strategy is outlined in detail elsewhere.¹⁷ Briefly, the electronic databases MEDLINE, PsycINFO, Embase, CINAHL, and SPORTDiscus were systematically searched from January 1, 2001, to June 30, 2011. These searches were updated on February 10, 2012. The search terms included “craniocerebral trauma,” “prognosis,” and “mental disorders” among others. The reference lists of all reviews and meta-analyses related to MTBI, and articles meeting the eligibility criteria were screened for additional articles that may have been missed by our electronic searches. International Collaboration on MTBI Prognosis (ICoMP) members also provided information about studies that they had knowledge of but were not found in the databases or reference lists.

Selection of articles

Articles were screened for eligibility according to predefined inclusion and exclusion criteria. Inclusion criteria included original,

List of abbreviations:

CDC	Centers for Disease Control and Prevention
CI	confidence interval
ICoMP	International Collaboration on MTBI Prognosis
MTBI	mild traumatic brain injury
PTSD	posttraumatic stress disorder
SIGN	Scottish Intercollegiate Guidelines Network
TBI	traumatic brain injury
WHO	World Health Organization

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