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An Evidence-based Review of Cognitive and Behavioral Rehabilitation Treatment Studies in Children With Acquired Brain Injury

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Objective: The aim of this study was to complete a systematic evidence-based review of published cognitive and behavioral treatment studies with pediatric subjects who have a history of an acquired brain injury (ABI). **Data sources:** We utilized PubMed and EMBASE to search peer-reviewed journals from 1980 to 2006. **Data selection:** Terms such as cognitive rehabilitation, speech therapy, language therapy, and behavior therapy were employed in the search and 28 studies met established criteria. **Data extraction:** The data extracted from each study included specific details about the cognitive or behavioral treatment, subjects, study design, outcome measurements, and treatment effectiveness. **Data synthesis:** The studies, involving 366 children and youth with ABI, were classified as 1 Class I study, 5 Class II studies, 6 Class III studies, and 16 Class IV studies. **Conclusions:** Despite a limited number of studies, 2 treatment recommendations and 1 option were developed from this systematic literature search. **Keywords:** *acquired brain injury, adolescents, behavior, brain injury, children, cognitive rehabilitation, rehabilitation, treatment*

CURRENTLY, in the United States, an estimated 1 million children and youth annually experience a brain injury from motor vehicle accidents, sports, falls, brain tumors, and abuse.[1–3] Commensurate with these demographics, there has been increased awareness of the long-standing, global impact of an early brain injury in the life of the child.[4] Acquired brain injury (ABI) is a diverse condition involving occurrence of events that affect brain functioning such as closed, open, and blast traumatic brain injury (TBI), brain infections, tumors and radiation, hypoxia, and stroke.[3,5]

Treatment of ABI generally consists of an acute treatment phase, involving emergency department treatment, possibly inpatient hospitalization, transfer to outpatient treatment, and then return to the school and home environment. There is extreme variability, however, in the type, diversity, and intensity of treatment received by children who have experienced an ABI. Some of the reasons for this include a lack of available trained treatment personnel, gaps in communication between phases of treatment, limited access to medical care for financial reasons, and the child's relatively restricted self-advocacy potential. In addition, after the acute recovery phase, the brain injury often becomes "invisible" to family, friends, educators, and other professionals (as children with such injuries often have no outward physical indications of their underlying condition) and as such children's needs for related interventions are often missed upon returning to home and school. Issues such as these, surrounding treatment of children post-ABI, are complex and have hindered the development of objective, systematic, and accepted treatment protocols.

Limond and Leek[5] report similar challenges and variations in clinical practices in the United Kingdom as found in the United States, and indicate that, in the community setting, a child's significant problems following an ABI are frequently misattributed as non–ABI-related. These authors[5] reviewed published cognitive treatment studies involving children with ABI and found no conclusive evidence for the efficacy of cognitive rehabilitation. Their review was drawn from studies published between 1967 and 2002 and included only studies involving treatment of cognition.[5] Because advances in the field are occurring rapidly, and the need for effective

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interventions is great, the Pediatric-Adolescent Brain Injury Special Interest Group of the American Congress of Rehabilitation Medicine decided to update the Limond and Leeke review to include studies published before March 2006 and enlarge the scope to include both behavioral and cognitive treatment studies with children with a history of ABI. This broadening of the scope of

were divided into 4 treatment domains: comprehensive, attention and memory, speech and language, and behavior; (2) 2 members of the team reviewed studies in each domain and completed the data extraction form, and the first author reviewed all studies to resolve disagreements; (3) an evidence-based summary table was created using the data extraction form. The data extracted from each