Cognitive Rehabilitation Therapy for Traumatic Brain Injury
Evaluating the Evidence

Traumatic brain injury (TBI)—affecting an estimated 10 million people worldwide—results from a bump or blow to the head, or from external forces that cause the brain to move within the head, such as whiplash or exposure to blasts. TBI is a serious and growing problem, particularly among soldiers and veterans because of repeated exposure to violent environments. It can cause cognitive, physical, or psychosocial problems. One form of treatment for TBI is cognitive rehabilitation therapy (CRT), a patient-specific, goal-oriented approach to help patients increase their ability to process and interpret information. CRT involves a variety of treatments provided by health professionals in a wide range of fields and often involves the participation of family or caregivers.

Given that TBI is considered the “signature wound” of the conflicts in Iraq and Afghanistan, the Department of Defense (DoD) asked the Institute of Medicine (IOM) to conduct a study to determine the effectiveness of CRT for treatment of TBI. Specifically, the DoD asked the IOM to consider whether existing research on CRT provides a conclusive evidence base to support using specific CRT interventions and to guide the use of CRT for members of the military and veterans.

The IOM appointed a committee of experts to answer the following questions:

• Are CRT interventions proven to reduce an individual’s cognitive deficits across:
  • the three levels of injury (mild, moderate, and severe);
  • the three phases of recovery (acute, sub-acute, and chronic);
• the cognitive functions (attention, language and communication, memory, and problem-solving abilities known as executive function) or within a comprehensive rehabilitation program that may target more than one cognitive function?

• Are any CRT interventions associated with risk for adverse events or harm?

• Are CRT interventions safe and effective when administered through “telehealth” technologies?

The committee completed a review of the literature and evaluated studies that met selection criteria in each of the cognitive functions or comprehensive rehabilitation programs.

Understanding Cognitive Rehabilitation Therapy

The goal of CRT is to help an individual with a brain injury enhance his or her ability to move through daily life by recovering or compensating for damaged cognitive functions. A restorative approach helps the patient reestablish cognitive function, while compensatory approaches help the individual to adapt to an ongoing impairment.

CRT interventions are nearly as unique and varied as the individuals they are used to treat. A comprehensive rehabilitation program may be used for individuals with multiple impairments, for example memory loss combined with difficulties in problem solving, while approaches focused on a single cognitive function attempt to work on each impairment in isolation. In addition to the variation in treatment, an individual's response to any one treatment may vary as well, depending on the injury, the individual's prior state of health, and the individual's social context. Treatment strategies evolve, as different treatments become necessary at different points in time.

CRT is practiced by a wide range of professionals in rehabilitation medicine, nursing, physical and occupational therapy, speech-language pathology, psychology, and neurology. Each profession determines the training requirements for its own practitioners, and U.S. states regulate professional licensing standards. Because no national brain injury rehabilitation license and credential exist, the standards vary among rehabilitation professionals.

Shortcomings in the Research

In its report, the committee concludes that current evidence provides limited support for the efficacy of CRT interventions. The evidence varies in both the quality and volume of studies and therefore is not yet sufficient to develop definitive guidelines for health professionals on how to apply CRT in practice. The variation among patient characteristics, severity of injuries, and CRT interventions has made it difficult for researchers to know with certainty how effective a specific CRT intervention is in the long-term recovery of a specific individual. A lack of standardized terms for the different forms of CRT also presents a challenge for researchers.

Despite the methodological shortcomings of the evidence, the committee supports the ongoing use of CRT for people suffering from a TBI while improvements are made in the standardization, design, and conduct of studies.

Implementing a Research Agenda

The committee recommends an investment in research to further define, standardize, and assess the outcomes of CRT interventions. Developing studies that have larger sample sizes and that examine a more comprehensive set of variables regarding the injuries, patient characteristics, and outcomes will help advance knowledge about CRT. In addition, because CRT encompasses a wide range of therapies, research is needed to evaluate the effectiveness of each intervention for each cognitive function. To achieve standard-
sive registry of CRT interventions—a database to collect information about these variables.

As part of an effort to advance current research, the DoD in collaboration with other research and funding agencies, should support all phases of research on CRT, including pilot studies, early efficacy studies, large-scale clinical trials, and comparative effectiveness studies. In the future, researchers should capture information about potential adverse events as well as evaluate CRT interventions applied through telehealth technology, for example treating patients via voice or video calls over the Internet.

**Incidence of TBI in the Military**

![Incidence of TBI in the Military graph](image)

*SOURCE: Defense and Veterans Brain Injury Center, 2011*
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Conclusion

Each year, 1.7 million people in the United States sustain a TBI, and the number of military service members diagnosed with a TBI nearly tripled from 2000 to 2010. The incidence of TBI is rapidly rising, and while the survival rate is rising concomitantly—due to improved protective equipment and more effective life-saving measures—survivors of TBI may experience long-lasting physical and cognitive impairments. These trends point to a growing need to effectively treat the lasting consequences of traumatic brain injury. CRT interventions are promising approaches, but further development and assessment of this therapy is required.