Treatment & Research

# Traumatic Brain Injury

happyneuron

## Duration, Frequency, Intensity Meta-Analysis

This complied meta-analysis aims to identify structures necessary for maximizing the effectiveness of an adaptable cognitive training program for different disorders and diseases.

More specifically, we compiled the current research to answer these overarching questions:
- How much should someone train to significantly improve his/her cognitive profile?
- Is there an ideal regimen or approach to brain training that produces the optimal results?

Research has proven that brain training conducted in certain criteria may yield positive results for certain populations. As with any form of rehabilitation, cognitive training exercises' duration, frequency, and intensity should be determined based on appropriate diagnosis/assessment. These assessments and diagnoses should be completed by a trained professional with the individual functional needs of the individual in mind.

Disclosure:
This meta-analysis aims to create a place for clinicians to find the research connected with brain training easily. HappyNeuron is not claiming that participating in any form of brain training will result in higher functions, full recovery, or delayed disease onset. The information below is non-bias compliance of the evidence of computerized brain training to be used as a source reference or a supporting document for clinicians to use to help with the care of their clients. Some of this research uses our product, while others use other digital tools.

# Traumatic Brain Injury (TBI)

Traumatic brain injury occurs when a blunt force is applied to the head. Traumatic brain injuries can be penetrating or non-penetrating, depending on whether an object contacts the brain tissue. When a force is applied to someone's head, the brain tissue makes contact with the skull, thus disrupting neural connections which affect brain activity. Traumatic brain injuries often result in cognitive, psychological, and physical challenges causing someone with a traumatic brain injury to need therapeutic services for rehabilitation.

The goal of cognitive rehabilitation post a TBI diagnosis is to enhance the person's ability to process and interpret information and to improve the person's ability to perform certain cognitive functions.

As Cognitive Science continues to expand, there will be evolving understanding and research on how cognitive rehabilitation may help individuals living with a TBI. We will be updating this research each year, so please be sure to check back annually as more updated studies are published from this literature.

## Common Cognitive Defecits of Individuals with TBI

People with traumatic brain injury typically have cognitive deficits in the domains of **executive functioning, attention, language, and memory**. These cognitive deficits result in survivors of traumatic brain injury making impulsive decisions, having trouble inhibiting actions, being unable to focus during work or school, becoming forgetful of appointments, and having difficulty expressing themselves verbally.

In turn, these cognitive deficits may cause someone with a traumatic brain injury to experience depression, anxiety, irritability, and isolation. Thus, many people with traumatic brain injury undergo cognitive rehabilitation therapy with an occupational therapist, speech therapist, psychologist, or other clinical providers.

## Conclusion

Computer-assisted training (CT) has been found to have several benefits for individuals who have acquired a TBI. Several studies have shown computer-assisted strategies to improve **Attention, Memory, and Executive Skills** for those with TBI (Jung, 2021).

After the intervention referenced below, patients' sustained and complex attention improved. Long-term follow-up revealed continuing positive rehabilitation effects. Literature and studies have reported that effective cognitive rehabilitation interventions initiated post-TBI may enhance the recovery process, and minimize functional disability.

## Recommendations

Both studies evaluated below witnessed neurological changes in patients after 5 weeks of cognitive rehabilitation with digital cognitive training. This leads us to a recommendation of at least 10 sessions over a 5-week span, with a strong focus on exercises that target attention.

## Research

Kaldoja et. al's study evaluated the efficiency and usability of a computer-assisted program for training specific components of attention in children with mild TBI (mTBI) and partial epilepsy (PE). The second aim was to specify the intervention's short- and long-term effects. A strict intervention protocol consisting of patients completing 10 sessions over 6 weeks to train 4 components of attention was designed and applied. Follow-up assessments were conducted after the end of the last training and 1.63 years later. After the intervention, patients' sustained and complex attention improved. Long-term follow-up revealed continuing positive rehabilitation effects.

The second study analyzed comes from Westerberg et al's work which noted significant attention improvements in brain-injured persons undergoing direct attention training, an automated and computerized training program for 5 weeks.

## References


Barman, A. (2016, May). Cognitive Impairment and Rehabilitation Strategies After Traumatic Brain Injury. Indian J Psychol Med, 38(3), 172–181. 10.4103/0253-7176.183086

Jung, H. (2021, December). The Effectiveness of Computer-Assisted Cognitive Rehabilitation and the Degree of Recovery in Patients with Traumatic Brain Injury and Stroke. J Clin Med, 10(24). 10.3390/jcm10245728