

# Exercise After Traumatic Brain Injury

Author: Kimberly Miczak, PT, NCS

## FACT SHEET



### Introduction:

Exercise is beneficial for many people, including for someone who has suffered a traumatic brain injury (TBI). Exercise has been shown to help improve and prevent many conditions, including: weight management, stress levels, emotional regulation/mood, memory, attention, strength, endurance, balance, flexibility, and blood pressure regulation. Exercise has been shown to help with the prevention of Type II diabetes, stroke, heart disease and some forms of cancer. (Garber 2011)

### Benefits:

The benefits of exercise can be especially helpful after a TBI as many people who have had an injury report difficulty in at least one or more of the following areas: weight management, stress management, emotional regulation/mood, memory, attention, strength, endurance, and energy levels. (Webb 1995). TBI survivors who engaged in exercise 3x/week for 30 minute intervals reported less depression, improved perception of physical abilities, and increased community integration as compared to TBI survivors that did not exercise regularly (Gordon 1998). Studies show that regular exercise can positively influence cognition and cardiorespiratory fitness in persons who have suffered a TBI (Chin 2014, Chin 2015). Current research suggests exercising 20-40 minutes 3-4x/week will help to achieve optimal benefits. (Garber 2011, Mossberg 2010)

Parameter	Recommendation
<b>Type of exercise</b>	Low resistance, rhythmic, dynamic (walking, jogging, cycling, elliptical)
<b>Intensity</b>	60%-90% of age predicted maximal HR (220-age)
<b>Duration</b>	20-40 min per session
<b>Frequency</b>	3-4x/week

(Mossberg 2010)

### Challenges & solutions:

After a TBI, a person may have difficulty exercising as they did prior to their injury. Many persons are unable to drive after their injury, thus they have difficulty getting to a gym or place to exercise. Physical limitations impact the kinds of exercises and types of exercise machines that can be used safely. In addition to physical deficits, many persons have difficulty with their thinking skills (cognition) after a brain injury, including problem solving, judgment, and reasoning (McCullagh 2011). These deficits can place them at risk of injuring themselves while exercising.



1111 North Fairfax Street  
Alexandria, VA 22314-1488

Phone: 800-999-2782,  
Ext 3237

Fax: 703-706-8578

Email: [neuropt@apta.org](mailto:neuropt@apta.org)

[www.neuropt.org](http://www.neuropt.org)

## Exercise After Traumatic Brain Injury



Challenge	Solution
Unable to drive	<ul style="list-style-type: none"> <li>Public transportation</li> <li>Ride sharing</li> <li>Home-based exercise program</li> </ul>
Physical limitations	<ul style="list-style-type: none"> <li>Physical therapist can help develop an appropriate exercise program</li> <li>Modified selection of exercises/machines</li> <li>Group/club-based activities</li> <li>Adaptive sports/recreation</li> </ul>
Cognitive limitations	<ul style="list-style-type: none"> <li>Structured routine (assists with remembering exercises)</li> <li>Write down exercises (weight used, # reps)</li> <li>Use timers or alarms to help keep to a schedule</li> </ul>

### Specific exercises:

It is important to tailor an exercise program to an individual's specific needs and abilities. A physical therapist or a personal trainer can assist with this. Types of exercise to consider include:

**Cardiovascular:** This sort of exercise is meant to increase the heart rate which encourages the heart muscle to stay strong. Cardiovascular exercise can impact the heart, lungs, circulation, and muscles. Examples include: walking/jogging on a treadmill, pedaling a stationary bike, swimming laps, dancing, or aerobics class.

**Strength:** This sort of exercise is meant to challenge muscles by pushing or pulling against resistance. Strength training can also influence bone density, balance, and posture in positive ways. Examples include: using free weights, using resistance training machines, using resistance tubing/bands.

**Flexibility:** This sort of exercise is meant to increase muscle length and allow an individual to move his/her joints thru a greater range of motion. Improved flexibility may make it easier to getting into positions such as squatting, bending, or reaching. Examples include: stretching, Tai Chi, and yoga.

**\*\* Remember to always consult with a physician prior to starting an exercise program. \***

### References:

- Chin L, et al. 2015. Improved cognitive performance following aerobic exercise training in people with traumatic brain injury. <https://www.ncbi.nlm.nih.gov/pubmed/25433219>
- Chin L et al. 2014. Improved cardiorespiratory fitness with aerobic exercise training in individuals with traumatic brain injury. <https://www.ncbi.nlm.nih.gov/pubmed/24901330>
- Garber CE, Blissmer B, Deschenes MR, Franklin BA, Lee IM, Nieman DC, Swain DP. Quantity and Quality of Exercise for Developing and Maintaining Cardiorespiratory, Musculoskeletal, and Neuromotor Fitness in Apparently Healthy Adults: Guidance for Prescribing Exercise. Official Journal of the American College of Sports Medicine 2011; 1334-1359.
- Gordon WA, Sliwinski M, Wcho J, McLoughlin M, Sheerer MS, Meili TE. The benefits of exercise in individuals with traumatic brain injury: A retrospective study. J Head Trauma Rehabil 1998;13(4):58-67.
- McCullagh S, Feinstein A.(2011). Cognitive Changes. In Silver JM, McAllister, TW, Yudofsky SC (eds), Textbook of Traumatic Brain Injury 2<sup>nd</sup> edition. (pages 279-293) American Psychiatric Publishing Inc.
- Mossberg K. 2010. Endurance training and cardiorespiratory conditioning after traumatic brain injury. Journal Head Trauma Rehabil 2010;25(3): 173-83.



1111 North Fairfax Street  
Alexandria, VA 22314-1488

Phone: 800-999-2782,  
Ext 3237

Fax: 703-706-8578

Email: [neuropt@apta.org](mailto:neuropt@apta.org)

[www.neuropt.org](http://www.neuropt.org)