



Hennepin County
Medical Center

Move it or Lose it: The Benefits of Movement and Exercise in Traumatic Brain Injuries

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Objectives:

- Participants will understand common symptoms and impairments that physical therapists treat in patients who have had a traumatic brain injury.
- Participants will be able to list three benefits of early intervention and exercise to those who have sustained a traumatic brain injury.
- Participants will be able to demonstrate 2 common exercises completed in physical therapy during treatment of a patient who has had a traumatic brain injury.



What is a traumatic brain injury (TBI)? (1,2,4)

- Multiple causes (bump, blow, jolt or penetrating head injury)
- Disrupts normal function of the brain
- Not all hits to the head result in a TBI
- Range of severity
 - Mild (i.e., a brief change in mental status or consciousness)
 - Severe (i.e. an extended period of unconsciousness or memory loss after the injury)



Mild traumatic brain injuries (1,2,4)

- Common causes:
 - Falls
 - Vehicle-related collisions
 - Violence
 - Sports injuries
 - Explosive blasts and other combat injuries
- Common symptoms
 - Physical
 - Behavioral/emotional
 - Cognitive



Outpatient treatment of mild TBIs⁽³⁾

- ▶ Collaboration of an interdisciplinary team
 - ▶ Physical Medicine and Rehabilitation physicians
 - ▶ Developmental optometrist
 - ▶ Nurse practitioners, Physician Assistants
 - ▶ Occupational Therapists
 - ▶ Speech Language Pathologists
 - ▶ Physical Therapists
 - ▶ Neuropsychologist
 - ▶ Clinical Psychologist
 - ▶ Audiology / Vestibular specialists
 - ▶ Therapeutic recreation
 - ▶ Nurse coordinators
 - ▶ Social Workers



Common symptoms of mild TBI_(2,4,5)

Physical	Behavioral/Emotional	Cognitive	Sleep
Headache	Drowsiness	Feeling “slowed down”	Sleeping more than usual
Nausea	Fatigue/lethargy	Feeling “in a fog” or “dazed”	Sleeping less than usual
Vomiting	Irritability	Difficulty concentrating	Trouble falling asleep
Blurred or double vision	Depression	Difficulty remembering	
Seeing stars / lights	Anxiety		
Balance problems	Sleeping more than usual		
Dizziness	Difficulty falling asleep		
Sensitivity to light or noise			
Tinnitus (ringing in the ear)			



Common symptoms that physical therapists treat in patients with mild TBI

- Headaches
- Neck pain
- Balance problems
- Motion sensitivity
- Visual deficits
- Dizziness
- Fatigue
- Deconditioning
- Poor tolerance to activity



What are functional limitations associated with persistent symptoms of a mild TBI?

- Anything that limits a person's abilities to complete normal activities, return to work or return to sport such as:
 - pain
 - difficulty turning their head
 - difficulty moving in bed, standing, sitting, or walking
 - falls or near falls
 - poor tolerance to a household activity (making meals, cleaning, shopping, walking)
 - poor tolerance to aerobic activity (running, jumping, turning quickly)
 - inability to tolerate busy places



Why is early mobilization after a mild TBI with a physical therapist important?

- People need to get moving!
 - prolonged rest can lead to fatigue, reactive depression, and physiological deconditioning ⁽¹¹⁾
 - most mild TBIs resolve themselves within 7 to 10 days, up to 3 months for non-athletes ^(6,7,8)
 - people are **able to** and **should** exercise despite having persistent symptoms with the assessment and guidance of a physical therapist ^(6,7,8,9)
 - quantitative, individualized, and progressive subsymptom threshold aerobic exercise rehabilitation ⁽⁹⁾
 - improved symptom resolution compared to strict rest ⁽¹⁰⁾



Benefits of early intervention and exercise⁽⁸⁾

- Cardiovascular system
- Sleep
- Pain
- Fatigue
- Cognition
- Psychiatric conditions



Exercise benefits and the cardiovascular system

- Increases the body's relaxation response (parasympathetic) that helps to regulate elevated heart rate and blood pressure (8, 12, 13)
- Increases blood flow to the brain (13)
- Improved endurance and fitness after completing light and high resistance weight training as well as long duration aerobic exercise (8,14,15)



Exercise benefits and sleep

- Moderate intensity exercise improved self-reported sleep quality scores in a study of older adults ^(8,16)
- In healthy army recruits, aerobic exercise improved ^(8,17)
 - Sleep onset latency
 - Sleep efficiency
 - Decreased wake time during sleep



Exercise benefits on cognition and fatigue

- Reduction in fatigue after endurance conditioning noted in studies of patients with cancer and multiple sclerosis_(8,18,19,20,21)
- Increased blood flow to the brain which aids in improved cognitive performance _(13,22,23)
- Associations of exercise and cognition in older adults and the elderly₍₈₎
 - decreased brain tissue loss ₍₂₄₎
 - lowering risk of dementia, Alzheimer's disease ₍₂₅₎
 - delayed onset of age-related decline in brain function₍₂₆₎



Exercise benefits on psychiatric conditions

- Regular aerobic exercise associated with decreased incidence of depression and anxiety disorders (8,27)
- Improved mood and emotion in patients with a TBI (8,28)



Long-term benefits of exercise after sustaining a mild TBI

- Improved quality of life⁽²⁹⁾
- Prevention of chronic disease that is associated with a sedentary lifestyle⁽⁸⁾
- Maintain and progress physical work capacity^(8,30)
- Maintain and progress level of endurance and balance^(8,30, 31)
- Manage and/or reduce levels of fatigue and stress^(8,30)
- Reports of improved self-esteem and less depression^(29,31)
- Reports of improved social participation^(29,31)



Suggestions for a life long exercise program

- Walking program
 - 15-20 minutes, 4-5 days a week
- Bicycle
- Body weight exercises
 - Squats
 - Lunges
 - Arm and leg lifts
 - Completed in standing, sitting, laying down, or on hands and knees
- Weight lifting
- Free / low-cost exercise groups
- Personal training / accountability group
- Community centers



Common exercises completed with PT

- Aerobic
 - walking program
- Head and neck
 - looking side to side, up and down
- Strength and endurance
 - squats
 - bicep curls and shoulder press
- Balance
 - feet together (eyes open, eyes closed)



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Questions?



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