

# Acquired brain injury



## What is an acquired brain injury?

Acquired brain injury (ABI) refers to damage to the brain that occurs after birth. Causes include trauma from an external force (e.g. a direct blow to the head), hypoxia (lack of oxygen to the brain), substance abuse (e.g. alcohol), and tumours or infections (e.g. meningitis). There are two other major causes of ABI - stroke and neurodegenerative conditions, which are addressed in separate EIM factsheets.

Consequences of ABI may include cognitive impairment (e.g. memory), physical impairment (e.g., high muscle tone and impaired coordination), behavioural impairment (e.g. impulsivity), as well as social isolation and poor mental health. However, the functional profile for a person with ABI can vary enormously; from someone who, for example, mobilises with a motorised wheelchair, is non-verbal and depends on personal support for self-care, to someone who is fully independent in employment, self-care and mobility.

The evidence presented in this factsheet is relevant for people with ABI who have been discharged from hospital and who undertake exercise similar to that undertaken by the general population. Evidence relating to inpatient rehabilitation and specific, exercise-based neurological rehabilitation techniques (e.g. body weight supported treadmill training, movement constraint therapy and Functional Electrical Stimulation) is not reviewed.

## How does exercise help with acquired brain injuries?

People with ABI are among the most physically inactive members of society and those with severe brain impairments are less active than those with mild to moderate impairments. This physical inactivity is harmful for health, fitness and function, and compounds the primary impairments resulting from ABI. There is strong scientific evidence that indicates:

- **Aerobic exercise** improves cardiorespiratory fitness in people with ABI. The quantity and intensity of exercise required for good health is similar to the general population.
- **Resistance training** improves muscular strength in people with ABI. While the quantity and intensity of exercise required for improvements is similar to the general population, it should be noted that no studies have specifically investigated the effects of strength training on people with ABI who are affected by spastic hypertonia, an impairment that could potentially affect outcomes.
- **Regular functional exercise** (e.g., sit-to-stand, walking, climbing stairs) can improve performance on everyday tasks (e.g., ease of sit-to-stand, walking speed or walking duration).
- Exercise can alleviate depressive symptoms as well as improve other aspects of mood and quality of life.
- Importantly, exercise, particularly in group settings, provides structured opportunities for social interaction and development of social skills.



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## What type of exercise is best for acquired brain injuries?

Because the effects of ABI are varied as well as the quantity and quality of research on this population being limited, general prescriptive recommendations for ABI exercise programs are not possible. However, some general recommendations can be made:

- Health professionals should strongly encourage people with ABI to be as physically active as they can be.
- For optimal health, the recommended volumes of aerobic and strength exercise are the same as the general population.
- Aerobic exercise: at least 30 minutes of moderate-intensity aerobic activity on five or more days per week, or at least 25 minutes of vigorous intensity on three or more days per week.
- Strength exercise: for major muscle groups, three sets of 8-10 repetitions resistance exercises at moderate intensity.

These recommendations will initially be unachievable for many people with ABI, particularly for those with severe mobility impairments, multiple comorbidities and/or people who have been inactive for extended periods. It is therefore recommended that an Accredited Exercise Physiologist is involved in the program design and that they use their knowledge, skills and experience to ensure that initial training volumes and subsequent increases in training volume are individually tailored for the person affected by ABI.

It is important to note that:

- People who have moderate to profound disabilities should undertake exercise programs tailored according to the type of impairment/s, the severity of impairment/s, their interests, and their available social support and community access.
- People with altered joint mechanics (e.g. resulting from contracture or altered muscle tone) can undertake strength training with weights, but when considering joint health (e.g. pain, swelling) should be monitored carefully.
- If the person is hoping to achieve functional goals, speak to an AEP to incorporate functional activities in the exercise program.



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Always seek professional advice from an Accredited Exercise Physiologist. Find one here: [www.essa.org.au/find-aep](http://www.essa.org.au/find-aep)