

Acquired brain injury and exercise

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 such as Multiple Sclerosis and Parkinson's disease. However these conditions are addressed in separate EIM factsheets. Consequences of ABI 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 and mental health consequences.

How does exercise help?

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.

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 to indicate that:

- **Aerobic exercise** improves cardiorespiratory fitness in people with ABI. The quantity and intensity of exercise required for improvements 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 those 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;

In addition to this strong evidence, there is emerging evidence that aerobic exercise may confer cognitive benefits and that exercise in group settings can assist community re-entry by providing opportunities for social interaction and development of social skills.

What exercise is best for people with ABI?

Because the effects of ABI are very variable and the quantity and quality of research on this population is limited, specific, prescriptive recommendations for 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;
- Those commencing an exercise program for the first time should prioritise establishing a regular weekly exercise routine. The type, duration and intensity of the exercise is of less importance;
- Those with minor disabilities should follow the exercise recommendations for the general population;
- Those with moderate to profound disabilities should undertake exercise programs tailored according to the type of impairment/s, the severity of impairment/s, their interests, and the 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 joint health (e.g. pain, swelling) should be monitored carefully;
- Exercise programs for people with functional goals should incorporate functional activities.
- Where possible, exercise which provides opportunities for social interaction should be encouraged.

References and further information

Refer to the full version of this factsheet at Exercise is Medicine Australia www.exerciseismedicine.org.au

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