

Spinal cord injury and exercise

The spinal cord is the major pathway through which the brain sends and receives information. Spinal cord injury (SCI) refers to damage resulting from trauma (e.g. motor vehicle accidents or falls). SCI usually results in impairments of motor and sensory function, as well as autonomic function (e.g. sweating and heart rate control). Two factors determine which of these functions are impaired and how much they are impaired:

- **How high the injury is.** The higher the injury occurs, the more function is impaired. Tetraplegia (preferred to quadriplegia) refers to injuries in the neck region and typically results in impairments of arm, trunk and leg function. Paraplegia refers to injury below the neck and while trunk and leg function is impaired, arm function is preserved;
- **The completeness of the injury.** When an injury does not damage the full thickness of the spinal cord, some connections with the brain remain intact and some function can be preserved. The amount of function preserved is highly variable, even for people with injuries at the same level.

How does exercise help?

The evidence presented below relates to people with SCI who have been discharged from hospital and who undertake types of exercise similar to the general population. Evidence relating to in-patient rehabilitation exercise and specialised electromechanical modes of exercise is not presented.

People with mobility impairments, including people with SCI, are among the most physically inactive members of society. This profound physical inactivity is very harmful for health, fitness and function, and compounds the consequences of SCI.

Research shows that:

- Aerobic exercise (e.g. wheelchair pushing, hand cycling, swimming) improves cardiorespiratory fitness, reduces the risk of cardiovascular disease and may reduce the incidence of urinary tract infections;
- Resistance training improves strength of non-paralysed muscles and may improve strength of partially-paralysed muscles
 - Exercise interventions can enhance functional independence
- Exercise interventions that avoid painful movements and include specific upper-limb strengthening can reduce shoulder pain, a common problem for manual wheelchair users
 - Exercise can decrease depression and anxiety, and increase quality of life
 - Exercise may be associated with greater health of the bones in paralysed limbs

What exercise is best for people with SCI?

Because this population is extremely varied and the quantity and quality of research is limited, specific, prescriptive recommendations for exercise programs are not possible. However some recommendations include: people with SCI should be as physically active as they can be; aim to accrue at least 150 minutes of moderate-intensity aerobic activity on most or all days of the week; and flexibility training is a recommended component of a comprehensive exercise training program. When first commencing, exercise intensity and duration should start low and increase gradually, particularly those with tetraplegia or a history of low blood pressure. Short Interval training (5 min work: 5min recovery) at low intensity may assist the very unfit to accumulate sufficient aerobic duration.

Type of exercise	Intensity	Duration	Frequency
Aerobic exercise (for heart and lung fitness)	Moderate	30-60 minutes	Most, preferably all, days every week to a total of 150-300 minutes of moderate or 75-150 minutes of vigorous
	Vigorous	15-30 minutes	
Resistance training (muscle and bone strength)	Light to Moderate	60 minutes per week	2 or more times per week (three sets of 8-10 repetitions of each exercise for the major muscle groups)

References and further information

Exercise is Medicine Australia www.exerciseismedicine.org.au

Find an Accredited Exercise Physiologist www.essa.org.au

Exercise Right www.exerciseright.com.au

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For more detailed information, please read the full version of this factsheet at www.exerciseismedicine.org.au

