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Information/Education Page

Exercise Recommendations and Considerations for Persons With Spinal Cord Injury

Increasing activity and exercise is essential for health and quality of life for people living with spinal cord injury (SCI). Obesity, cardiovascular disease, and diabetes are 2 to 4 times higher for people with SCI compared to the general population. This is due, in part, to low levels of activity, limited access and opportunities to participate in exercise, as well as changes in muscle and heart function that are common after injury. Exercise is necessary to improve fitness and reduce long-term health complications after SCI. Below are exercise recommendations for improving cardiovascular health, muscular strength and endurance, and flexibility for people with SCI.

Exercise Guidelines

It is important to note that anyone with SCI should first seek medical advice to ensure that it is safe to begin an exercise program, especially for those who have not exercised in the past 6 months. The following exercise recommendations can be used to build fitness. The balance of intensity and duration of activity should be gradually adjusted over time based on level of conditioning, preferably under the guidance of a clinician or exercise professional specializing in SCI management.

Cardiovascular Health — Cardiovascular health, as a predictor of disease risk, has significant implications for those with SCI. Cardiovascular fitness has generated greater attention from both the clinical and research communities because poor cardiovascular fitness has been directly linked to the presence of secondary health conditions, including cardiovascular disease and cardiometabolic syndrome,

	Cardiovascular Health*	Muscle Strength and Endurance*	Flexibility and Range of Motion
Frequency	Minimum 2 days/week	Minimum 2 days/week	Daily
Intensity	Moderate to vigorous†	8—10 repetitions	30—60 seconds/stretch; gentle , slow, pain free
Duration	20—30 minutes/session	3 sets; 1—2 minutes rest between sets (30—60 minutes total)	2 sets; 5—15 minutes
Activities	Wheeling, arm cycle, sports, recumbent stepper, aquatics, cycling, circuit training, functional electrical stimulation	Free weights, elastic resistance bands, cable pulleys, weight machines, functional electrical stimulation	Standing in standing frame (if medically cleared); passive and active static stretching

* These cardiovascular and muscular strength/endurance recommendations are adapted with permission from SCI Action Canada (www.sciactioncanada.ca/guidelines accessed August, 2014).

† *Moderate intensity:* somewhat hard but can be sustained for long periods without experiencing excessive fatigue; *Vigorous intensity:* very hard, close to maximum and cannot be sustained for long without experiencing excessive fatigue.

in the SCI population. It can be affected by a number of factors including level of injury, severity of injury, degree of physical deconditioning, and extent of autonomic nervous system impairment. Participation in a variety of activities can be used to improve cardiovascular health, some of which have been listed in the table above; however, any sustained physical activity can be of benefit as long as it meets the requirements for time and intensity.

Muscular Strength and Endurance — Muscle strength refers to the ability of a muscle or muscle group to generate maximal force. Muscle endurance refers to the ability of a muscle or muscle group to produce force over multiple repetitions. These are important components of fitness and play a vital role in improving or maintaining bone mineral density, muscle mass, resting metabolic rate, force and power production, muscle and tendon health, and glucose metabolism.

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Individuals with SCI rely heavily on their shoulder and arm muscles for mobility and for performing activities of daily living. Resistance training programs should be comprehensive, but an emphasis should be placed on improving strength and endurance of the muscles supporting the scapulae (shoulder blades) and posterior shoulders.

Any muscle that can be voluntarily activated has the potential to benefit from resistance training exercise. However, the following exercises can have direct positive impact on the major muscles required for common daily activities: Bicep Curl, Triceps Press, Shoulder Press, Latissimus Pull-Down, Chest Fly, and Seated Row. For individuals with diminished trunk and shoulder stability and strength, external support such as a lumbar roll or a chest strap can be added to improve posture and reduce the risk of injury while exercising.

Flexibility and Range of Motion — Flexibility and adequate joint range of motion are essential to maintaining mobility and decreasing the risk of injury. Extra attention should be directed toward stretching the chest, shoulders, and biceps, as these muscles are likely to be used extensively for mobility and may tighten after SCI. Lower body stretching should also be included, but caution should be taken not to overstretch limbs where impaired sensation exists, as this may lead to overstretching and excessive stress on joint structures. Specific muscles to be stretched should be based on individual needs and can be identified with the help of a trained clinician or exercise professional.

Exercise Participation Safety Considerations

The following list summarizes several major considerations for ensuring safe and effective exercise participation for persons with SCI:

Autonomic Dysreflexia	•Can occur among injury levels T6 and above •This is an emergency situation; immediately stop exercise and address cause.
Skin Breakdown	•Individuals with SCI often have reduced or absent sensation. •Monitor skin, use padding with equipment, and perform frequent weight shifts.
Fractures	•Individuals with SCI may have low bone density. •MD clearance should be obtained before standing and weight-bearing activities, especially if individuals have not stood for 1 year or more.
Blunted Heart Rate Response	•Physiologic response to exercise may be blunted after SCI. •Rating of perceived exertion or "talk test" (being able to carry on a light conversation while performing the exercise) may be effective for monitoring exercise intensity, especially for those with cervical injury.
Postexercise Hypotension	•Individuals without active muscle movement in lower extremities may have reduced circulation. •Warm-up and extended cooldown are important to optimize ciruculation and maintain blood pressure.

Disclaimer

This information is not intended to replace the advice from a medical professional. Individuals with SCI should consult their health care provider before participating in an exercise program.

Authorship

Exercise Recommendations and Considerations for Persons With Spinal Cord Injury was developed by Nicholas Evans, MHS; Brooks Wingo, PhD; Elizabeth Sasso, DPT; Audrey Hicks, PhD; Ashraf S. Gorgey, MPT, PhD; and Eric Harness, BS; and supported by the ACRM SCI-ISIG Fitness and Wellness Task Force and its members. This Information/Education Page may be reproduced for noncommercial use for health care and exercise professionals to share with clients, patients, and their caregivers. Any other reproduction is subject to approval by the Publisher.