Physical Activity after Spinal Cord Injury

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Aims & Objectives

- Healthy lifestyle promotion in SCI
- Evidence on increasing physical activity for fitness levels
- Shoulder health
- Resources
- Upper limb health class

Issues

People with SCI face physical, psychosocial and environmental barriers to physical activity

Therefore they are less active and more physically deconditioned than both the general population and individuals with many other types of disabilities

- Martin Ginis et al 2016, Fekete C et al 2012

Impact of SCI on cardiovascular system

There is an increased risk of Cardiovascular disease after SCI:

- Physical deconditioning – the body requires fewer calories due to reduced energy demands from paralysed muscles
- Atherogenic Dislipodaemia – elevated leves of triglecerides and low density lipo proteins
- Proatherogenic inflamatory activity – in the acute phase, the body's response to infection and inflammation induces tissue and plasma events that lead to changes to lipoproteins

Impact of SCI on metabolism

- Immediately after spinal cord injury, weight loss is common
  - The body is under stress at the time of the initial trauma, so its metabolism works faster
- Over time metabolism slows down
  - Muscle tissue is replaced by fat
- It is easier to become overweight if you follow your pre-injury diet

Why?

Access

Anxiety

Pain

Physical issues

Transport

Cost

Time

Bladder & Bowels

Facilities

Equipment needs

etc……

PHYSICAL ACTIVITY GUIDELINES
for Adults with Spinal Cord Injury

Physical activity guidelines for adults with spinal cord injury (SCI) have been developed by an international group of SCI scientists, people living with SCI, clinicians, and representatives from SCI organizations. These physical activity guidelines are based on the best scientific evidence available.

The guidelines have two levels: a starting level and an advanced level. Which level you choose depends on your goals, abilities and current fitness level. If you're just starting a physical activity program, consider working up to the starting level and ideally work up to the advanced level. If you're already physically active, you might want to begin with the advanced level.

STARTING LEVEL

AEROBIC ACTIVITY

20 MINUTES **2X** A WEEK

of moderate to vigorous intensity

AND

STRENGTH-TRAINING ACTIVITY

3 SETS **10** REPS **2X** A WEEK

for each major muscle group

ADVANCED LEVEL

AEROBIC ACTIVITY

30 MINUTES **3X** A WEEK

of moderate to vigorous intensity

AND

STRENGTH-TRAINING ACTIVITY

3 SETS **10** REPS **2X** A WEEK

for each major muscle group

START **MEET** **EXCEED**

GLOSSARY

- **The starting level** is the minimum level of activity needed to achieve fitness benefits.
- **The advanced level** will give you additional fitness and health benefits, such as lowering your risk of developing Type 2 diabetes and heart disease.
- **Aerobic activities** are physical activities that are done continuously and that increase your heart rate and breathing rate, such as wheeling, swimming, hand cycling or dancing.
- **Strength-training activities** are activities that increase muscle strength, such as exercises using resistance bands, or lifting weights.
- **Moderate intensity activities** require you to work somewhat hard, but you should feel like you can keep going for a long time. You should be able to talk during these activities, but not sing your favourite song.
- **Vigorous intensity activities** require you to work really hard, and you can only continue them for a short time before getting tired.

For more information please visit www.sciguidelines.com

SCI ACTION CANADA · cdpp Canadian Disability Participation Project · UBC THE UNIVERSITY OF BRITISH COLUMBIA · Rick Hansen Institute · Social Sciences and Humanities Research Council of Canada · Canada

05.29.19

Benefits of exercise

- Reduction in spasm
- Managing pain
- Managing weight
- Improved circulation
- Well being
- Improved sleep
- Improved function – eg transfers

How to achieve?

Equipment

Other equipment

Here to help:

WheelPower
British Wheelchair Sport

back up
transforming lives after spinal cord injury

Aspire
Supporting people with spinal injury

sia
spinal injuries association

Regain
Supporting Sports Tetraplegics

Resources

- http://sciactioncanada.ca/docs/home-strength-training-guide-paraplegia.pdf

- http://sciactioncanada.ca/docs/home-strength-training-guide-tetraplegia.pdf

Resources (continued)

- Inclusive fitness
- Accredited sites train gym buddies to support disabled people with exercising
- Use a postcode finder for local options

http://www.activityalliance.org.uk/get-active/inclusive-gyms

Physical Activity High level lesions

- Singing
- Reading aloud
- FES
- Arm cycling
- Active assisted movements

Precautions

Thermoregulation is poor:

- Keep cool clothes or spray bottle handy to assist with cooling
- Dress in layers if environment is colder
- Drink plenty of water

Precautions

- **Autonomic Dysreflexia:** for individuals above T6
- Be aware of warning signs and do not ignore!
- Shoulders – overuse
- Feeling unwell
- Pressure sores

Symptoms = a lot of sweating, headache, shivering, flushing (especially reddening of the face) and nausea.

Seek medical attention immediately and stay sitting upright

Shoulders

- Pain is common post SCI due to increased demands placed on upper limbs
  - We are placing many of the demands of the lower limb onto the upper limb and this can have consequences
  - 3 dimensional range in shoulder allows mobility but of course compromises on stability
- Back muscles can become stretched and weakened, muscles on the chest can become tight

Mobility

Preventing shoulder pain

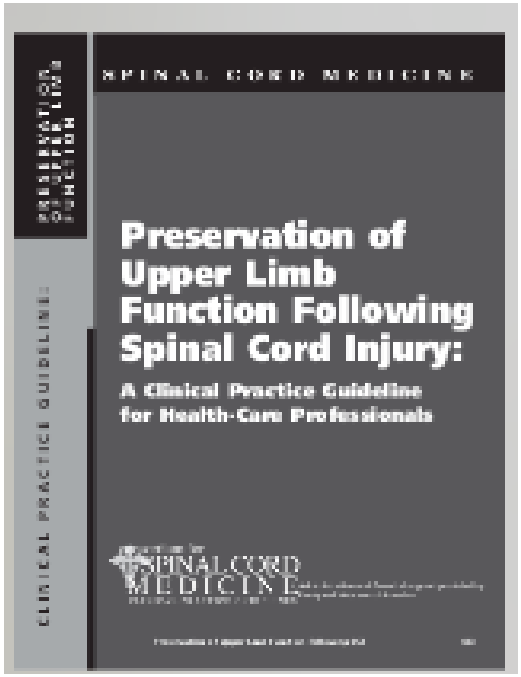
Recommendations:

1. Routine assessments
   - transfer and wheelchair propulsion techniques
   - equipment provided, ie is it suitable for needs?
2. Minimise repetitive upper limb tasks
   - as in an able bodied population, Boninger et al 1999
3. Avoid potentially extreme positions at the shoulder- use good propulsion technique
   - With a stroke occurring approx once per second, this exceeds what studies perceive to be a frequent task!
   - Hugely related to median nerve injury

Preventing shoulder pain

1. Light-weight manual wheelchair with correct set up is important for shoulder health
   - Lighter chairs require less force to propel
   - Lighter wheelchairs are made with better components eg high grade materials and components like bearings, titanium frames dampen vibration
   - Lighter wheelchair are adjustable - rolling resistance is lower with larger diameter wheels (Brubaker, 1986)
2. Consider powered options, realistic, power assist, aesthetics - Cooper et al (2001)
   - Demonstrated that powered assisted devices have been shown to require considerably less energy expenditure
3. Collinger et al. (2008) investigated shoulder biomechanics during wheelchair propulsion in 61 persons with paraplegia.
   - They found that at faster speeds shoulder joint forces and moments increased.
   - They also found that increased BMI increases forces through pushrims

Preventing shoulder pain



Most recent guidelines for shoulder preservation came out in 2005. Compiled by the Consortium for spinal cord medicine and supported by the Paralysed Veterans of America. Panel chair Michael Boninger

April 2015 – Paper published:

The Need for Updated Clinical Practice Guidelines for Preservation of Upper Extremities in Manual Wheelchair Users: A Position Paper

Sawatzky, Bonita PhD; DiGiovine, Carmen PhD, ATP/SMS, RET; Berner, Theresa OTR/L; Roesler, Tina PT, MS, ABDA; Katte, Lyndall PT

Looked at current evidence and agreed with all findings. Emphasised need for wheelchair skills training and impact for carers

Key factors in maintaining upper limb health:

- ✓ Prevent muscle imbalance around shoulder girdle
- ✓ Maintain range of movement by stretching
- ✓ Choose the right wheelchair according to individual needs
- ✓ Aim for as upright a posture as possible
- ✓ Adopt good propulsion technique
- ✓ Use transfer board in difficult transfers (or on bad days!)
- ✓ Consider power assist devices with aging

Key exercises

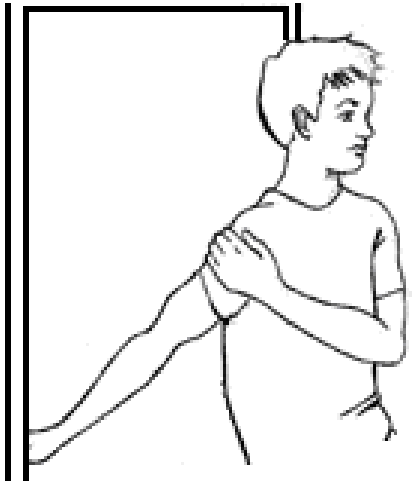
Biceps Stretch

Position your arm 45° out to the side from your body. Keep your elbow straight and thumb pointing up.

Place your wrist on to the inside of the doorframe.

Rotate your wheelchair away from the doorframe so that you feel the stretch on your biceps.

Hold the stretch for 30 seconds and repeat 10 times



Pectoralis Stretch

Seated in your wheelchair, position your wheelchair in the doorway so that your body is in line with the doorframe.

Place your forearm and hand on the doorframe so that your elbow and shoulder are bent to 90°.

Slowly lean forwards so that you feel the stretch across the front of your chest, keep your forearm and wrist in contact with the doorframe at all times.

Move your arm up and down the doorframe to stretch different parts of the muscle.

Hold the stretch for 30 seconds and repeat 10 times.

Key exercises

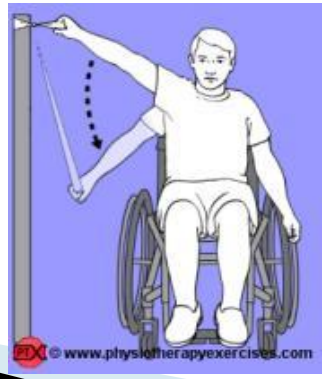
Shoulder Adduction

Tie one end of Theraband securely to a fixed point e.g. a stair rail at head height and at arms width (out to the side) away from your body.

Hold the Theraband in the hand of the arm that you are going to exercise.

With your arm straight, take your arm out to the side at shoulder height. Slowly and controlled bring your arm down to you side keeping your arm straight and thumb pointing upwards at all times, hold, then slowly raise the arm back to the starting position, controlling the tension of the Theraband.

Repeat____repetitions and____ sets to each side with rests in-between each set.



Shoulder External Rotation

Hold onto a piece of Theraband, with one end either tied to a supportive fixture (as in picture) or with one end in each hand and ensure that the Theraband is taut.

With your elbow bent at 90° and held in at your side, place a towel between your body and your elbow on the side that you are going to exercise.

Keeping your elbow in at your side and bent to 90°, take your hand with thumb pointing upwards out to the side, slowly and controlled.

Repeat____repetitions and____ sets to each side with a rest in-between each set.

Key Exercises

Rowing

Take two pieces of Theraband, provided by your physiotherapist (*), of equal length and tie one end of each piece to something at shoulder height, directly in front of you.

Hold one piece of Theraband in each hand. Position yourself so that you are directly in the middle of the 2 pieces of Theraband and reverse your chair until the Theraband is taut.

With arms at chest level straight out in front of you, pull your arms back, bending your elbows in a rowing motion, remembering to keep your shoulder blades back and down.

Return slowly in a controlled manner to your starting position, to ensure the Theraband doesn't "ping" back.

Repeat ____ repetitions and ____ sets, with a rest in-between each set.