

## Preserving Your Shoulders, Arms, Wrists and Hands

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### Overview

- Using a wheelchair puts different and unusually greater forces on the upper limbs (shoulders, arms, wrists and hands).
- Over time, this can lead to pain and injury to the joints, tendons or muscles, particularly the shoulders. Problems with the rotator cuff are a common source of shoulder pain in manual wheelchair users.
- Persons with SCI who rely on wheelchairs or assistive devices (crutches, walkers, etc.) for walking can also develop problems with nerve compression, such as carpal tunnel syndrome or problems with the ulnar nerve.
- Surgery for longstanding shoulder problems is often not as helpful or successful over time for people with SCI as it is for non-wheelchair users. This is because it is difficult to effectively repair the problem and reduce ongoing stress on the upper limbs. If you have an SCI, recovering from upper limb surgery often required periods of restricted activity, a temporary increase in care needs, or new equipment. If you are considering surgery, consult with a surgeon who is familiar with SCI, along with your SCI rehabilitation provider.
- Using good upper limb preservation strategies over your lifetime can help you avoid injury and the need for surgery and maintain your level of function and independence for as long as possible. This includes a careful evaluation of seating and positioning and how you use your arms for transfers or using walking devices.
- For people with tetraplegia (quadriplegia), preserving hand function is important in order to maintain range of motion and the ability to use tenodesis to grip objects. (Tenodesis is the natural bending and coming together of finger and thumb to form a pinch when you bend your wrist back.)
- Physical and occupational therapists play a key role in helping to maintain function and to treat upper limb problems after SCI.

### Manual wheelchair users

Upper limb pain and overuse are often related to poor biomechanics (the combined effects of anatomy, position, and technique) when performing wheelchair propulsion, transfers, and other activities of daily living.

#### Recommendations:

- Minimize repetitive shoulder, elbow and hand tasks.
  - Use long and smooth strokes in a circular motion when propelling the manual wheelchair.
  - Wear wheelchair gloves to protect your skin and improve grip.
  - Decrease the number of transfers you do on a daily basis.
- Avoid frequent and prolonged activities where your arms are overhead or reaching out of your range of stability. Keep activities low and close to your body.
- Be sure that the wheelchair is set up for optimal posture and body mechanics when performing tasks and pushing:
  - Rear axle of wheelchair is as far forward as possible without becoming unstable.
  - Elbow angle is between 100-120 degrees when the hand is placed at the top of the wheel.
- Keep your body weight within a healthy range.

### **Work with a skilled therapist (OT and/or PT), who will:**

- Assess the way you use and move your arms so your activities are less painful and more efficient.
- Evaluate your equipment, i.e., your wheelchair and the environment (desk, kitchen, bathroom) and make modifications that can reduce strain on your upper limbs (for example, changing seat angle or considering power-assisted manual wheelchair options).
- Prescribe strengthening and stretching programs that improve or maintain the health and strength of your upper limbs.
- Assess your positioning in your wheelchair.

### **Power wheelchair users**

Upper extremity pain is often related to poor biomechanics with transfers and other activities of daily living. It can also be related to poor posture in the power wheelchair.

#### **Recommendations:**

- Minimize repetition with shoulder, elbow, and hand tasks.
- Decrease the number of transfers you do on a daily basis.
- Be sure that your position is properly aligned in the wheelchair. Check your alignment throughout the day.
- Avoid prolonged and frequent activities where your arms are overhead or reaching out of the range of stability. If you have a seat elevator, use it to avoid reaching overhead.
- See above section on working with a PT and/or OT if you have questions about your power wheelchair.

### **Hand preservation in tetraplegia (quadriplegia)**

- Maintaining the natural appearance (structure) and flexibility of the hand is essential if you do not have hand movement.
- An occupational therapist can prescribe a program to help you strengthen and purposefully tighten certain aspects of your hand to increase your function.
- Many individuals without hand function are able to use a passive grip or pinch called “tenodesis” for tasks such as holding a pen or light bottle.

#### **Recommendations:**

- Maintain good range of motion in all your finger and wrist joints. Your occupational or physical therapist can teach you how to perform daily range of motion exercises.
- Although it's important to maintain good range of motion, be careful not to overstretch your fingers into the straight position when your wrist is cocked back. You should avoid placing an open palm on a flat surface. Instead, make sure to curl your fingers into your palm when bearing weight on your hands.
- Use the splints prescribed to you by your occupational therapist. These are typically worn during the night and occasionally during the day to give your fingers a passive stretch.
- Dry, cracked skin can lead to skin breakdown and infection. Cleanse often and apply lotion as needed.

### **Work with a skilled therapist (OT and/or PT), who will:**

- Design a splinting program to help preserve and improve the functional use of your hands. This may include orthotics (braces), flexion wraps, and strengthening exercises.
- Prescribe range of motion exercises for your hands, wrists, elbows and shoulders.
- Train you to use a tenodesis grasp to pick things up.
- Issue adaptive equipment to increase your independence with daily tasks.

**Resources****For patients:**

- Shoulder pain: Model Systems Knowledge Translation Center. (n.d.). *Shoulder pain*. Retrieved from <http://www.msktc.org/sci/Hot-Topics/Pain/Managing-Pain-After-SCI>
- Shoulder exercises: Model Systems Knowledge Translation Center. (n.d.). *Shoulder exercises*. Retrieved from <http://www.msktc.org/sci/Hot-Topics/Pain/Shoulder-Exercises>
- SCI Forum Video about Protecting your Shoulders and Staying Active after SCI  
Kaupang, K. (2012, April 10). *Protecting Your Shoulders and Staying Active after Spinal Cord Injury*. Retrieved from [http://sci.washington.edu/info/forums/reports/shoulder\\_health.asp](http://sci.washington.edu/info/forums/reports/shoulder_health.asp)
- Lateral Transfers: Fahana, J and Young, J. (2015, December 18). *Lateral Transfers*. Retrieved from <http://www.spinalcordessentials.ca/Handouts/Lateral-Transfer/>
- Floor to chair Transfers: Alappat, M. (2015, December 17). *Floor to chair transfers*. Retrieved from <http://www.spinalcordessentials.ca/Handouts/Floor-to-Chair-Transfer/>
- Car Transfers: lafolla, S. (2015, October 28). *Car transfers*. Retrieved from <http://www.spinalcordessentials.ca/Handouts/Car-Transfer-with-Assistance/>
- Functional Movements: Spinal Hub Collaborators. (2017). *Functional movements*. Retrieved from <http://www.spinalhub.com.au/what-is-a-spinal-cord-injury/how-do-i-move/functionalmovements-with-complete-sci>

**For Health care providers**

- Consortium for Spinal Cord Medicine. (2005). *Preservation of Upper Limb Function*. Washington, DC: Paralyzed Veterans of America. Retrieved from <http://www.pva.org/CMSPages/GetFile.aspx?guid=046ed316-900d-4126-a2db-88bc510d9d94>
- Spinal Cord Injury Rehabilitation Evidence (SCIRE) Project. (2016). *Upper limb*. Retrieved from <http://www.scireproject.com/rehabilitation-evidence/upper-limb>
- Spinal Cord Injury Rehabilitation Evidence (SCIRE) Project. (2016). *Wheelchairs and Seating*. Retrieved from <https://scireproject.com/evidence/rehabilitation-evidence/wheeled-mobility-and-seating-equipment/>

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**Disclaimer: This information is not meant to replace the advice from a medical professional. You should consult your health care provider regarding specific medical concerns or treatment.**

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