



Musculoskeletal

A guide for patients

Passive movements and stretches

It is important to perform stretches regularly to maintain flexibility of muscles and joints. How often you need to stretch will depend on the amount of spasm you have, and how quickly your muscles tighten up. Your stretching routine can vary from daily to twice a week. If you do not perform your stretches your muscles will shorten, which can result in:

- Difficulty performing daily activities such as dressing, showering and transfers.
- Changes to your posture affecting sitting pressures and making you more prone to pressure areas.
- Spasms becoming more severe.
- Joints tightening, causing increased pain.

Your Physiotherapist and Occupational Therapist will assist you and your carers with your stretches. You will also be given written information on stretches that are suitable for you, and advice on how often to carry them out.

Splinting

Splints are worn to:

- assist with functional tasks
- prevent deformity and maintain joint and muscle flexibility (prevent stiffness).
- substitute for reduced muscle power and/or joint alignment.

Individual hand splints will be prescribed and fabricated by your Occupational Therapist.

Hand splinting is often combined with other treatment techniques such as stretching and strengthening for maximum effectiveness. Splints may be prescribed for wear during the day, at night, or worn to assist hand function for a particular activity during the day e.g. self-catheterisation.

You and your family will be taught the correct way to wear, use and care for the splints. If you have any queries or problems with a splint, please contact your Occupational Therapist.

Some individuals may be provided with splints for their ankles and/or feet. These will be provided by an Orthotist or Physiotherapist with relevant education.

Maintenance of the Splints

1. Clean your Thermoplastic Splint with soap and room temperature water (NOT HOT WATER). Just sponge the splints; do not submerge them in water
2. Elastic and/or velcro strapping may be scrubbed with mild soap, water and a small brush
3. If your splint still has an odour after cleaning, try wiping it with a little toothpaste. If relining of the padding is necessary, consult your Occupational Therapist
4. All thermoplastic materials can be damaged by heat. Do not allow splints to lie in sunlight, hot cars, or on or near heaters
5. Instruct people on how to store your splints in a safe place. Do not allow heavy objects to rest on top of them.

Types of Splints

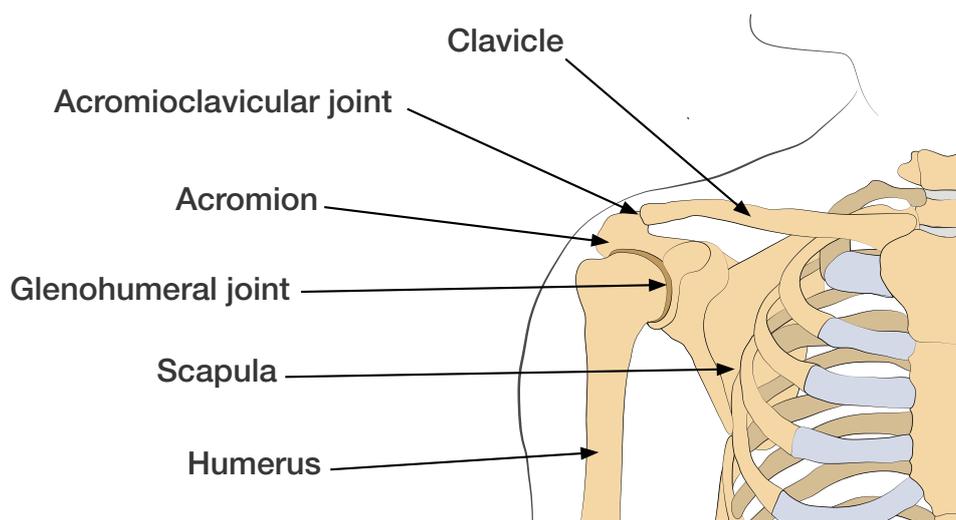
Some of the more common types of splints that the Occupational Therapists in the Spinal Injuries Unit make and their purpose are listed in the table below. Occupational Therapists also make many other types of splints depending upon a person's needs.

Type of Splint	Purpose
Resting Splint	To keep hand in a functional position with wrist and fingers slightly bent. To be worn at night.
Writing Squiggly	To hold and position a pen for writing.
Typing Splint	To stabilize finger position to type on a computer.
Boxing Glove	To be used for short periods only to maintain full flexion in fingers.

Shoulder Function

The shoulder is one of the most complex joints in the body due to the number of parts needing to work together to create movement. It consists of the clavicle (collar bone), scapula (shoulder blade), and humerus (upper arm bone) that join together to form the shoulder complex. (See Figure 1)

Figure 1. The bones of the Shoulder

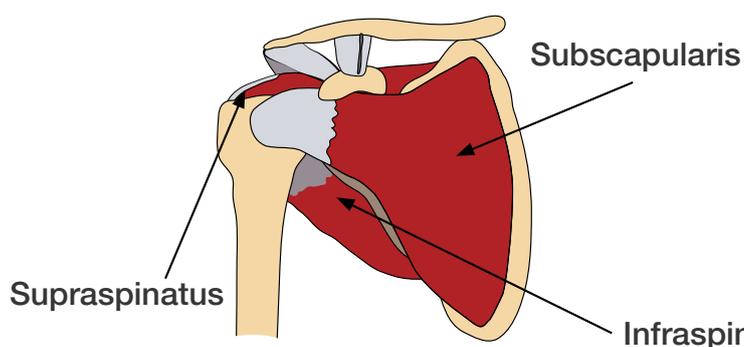


The shoulder joint is designed for movement which relies on the shoulder capsule, ligaments and muscles all working together. The shoulder joint is a shallow ball and socket joint which is designed to allow movement only, unlike the hip joint which has a deeper socket to support your body weight in standing and walking. After Spinal Cord Injury, you now rely on your shoulders to support your body weight during activities such as transfers, and propelling your wheelchair. As your shoulder is not designed for these activities, you must take special care of them to avoid injury.

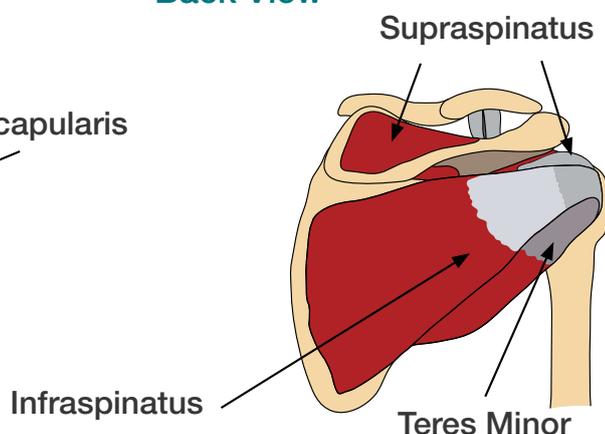
The shoulder joint receives stability and control from the 'rotator cuff' muscles surrounding the joint. It is made up of 4 muscles which, when evenly balanced, control the slide, glide and roll of the humeral head in the socket to allow painless movement of the arm. (See Figure 2)

Figure 2. The muscles of the Rotator Cuff

Front View



Back View



The shoulder blade also needs to be aligned correctly to maintain smooth coordinated shoulder movement. Along with the muscles, the ligaments and capsules also help to control the shoulder, therefore it is important to maintain the flexibility of the capsule and ligaments. If these structures get tight, this can cause problems.

After Spinal Cord Injury, shoulder pain can be a common problem. This can be for a number of reasons:

- You may be using your shoulder for more demanding things. For example: transfers and propelling your wheelchair.
- Taking body weight is not a natural thing for the shoulder to do, and you will need to increase their strength with the guidance of your Physiotherapist.
- People with Tetraplegia may only have some of the muscles around the shoulder joint working, but not others. This creates an imbalance so the joint is not moving normally and can cause pain.
- Continuous and repetitive use of the shoulder muscles can lead to overuse injuries.

Prevention of shoulder pain

- During your rehabilitation your Physiotherapist will teach you strengthening and flexibility exercises to maintain the muscle balance around your shoulders. It is important to continue this when you get home to reduce the risk of shoulder pain in the future.
- Do not increase your level of activity or exercise too quickly, as your shoulders need time to adapt to new activities or demands. If you start a new sport, increase your training slowly, and vary the type of training activities you do, so you do not cause an overuse injury.
- Plan your day to minimise the number of transfers. For example: Have all of your clothes by the bed before you start to dress, so you don't have to keep getting into your chair to get things.
- Warm up and stretch your shoulders before transferring or pushing in the morning.
- Set up your house so you don't have to reach overhead too often. Put things you use more often on the lower shelves.
- Seek treatment early if you experience pain and try to avoid the activity if possible, or request help with tasks that cause pain.
- Posture in the wheelchair can be a cause of pain, so always make sure your wheelchair and cushion are well maintained, and set up properly so your shoulders work in the most efficient way.

Spasms

Spasms are an involuntary reflex movement of a muscle, which means you are not in control of it. It can occur after a SCI at or above T12/L1. Spasms affect people in different ways. A small amount of spasm is beneficial as it maintains muscle tone and increases circulation. However, too much spasm can make functional tasks difficult, cause pain, keep you awake at night, or even increase of falling. If this is the case there are various things that may help, including:

- Stretching regularly.
- Standing in a standing frame or tilt table.
- Finding a different position to sleep in at night.
- Physical activity and exercise.
- The doctors may be able to prescribe medications such as Baclofen (see Medication section).

If you are experiencing problems managing spasm – discuss with your Physiotherapist or Doctor.

Everyone finds that different things are useful, so it is a case of trying out the various options to see if one helps you. (Refer to Anatomy and Physiology Section of this manual for more information on Spasm).

Transfers

Depending on the level of your injury, the type of transfers you perform may vary from being totally independent to using a hoist. Your therapists will determine the most suitable transfer for you, then they will work with you on this at Physiotherapy and Occupational Therapy. If it is appropriate, the Occupational Therapists and Physiotherapists will teach your relatives how to help transfer you onto a bed, which will enable you to go on day leave or weekend leave.

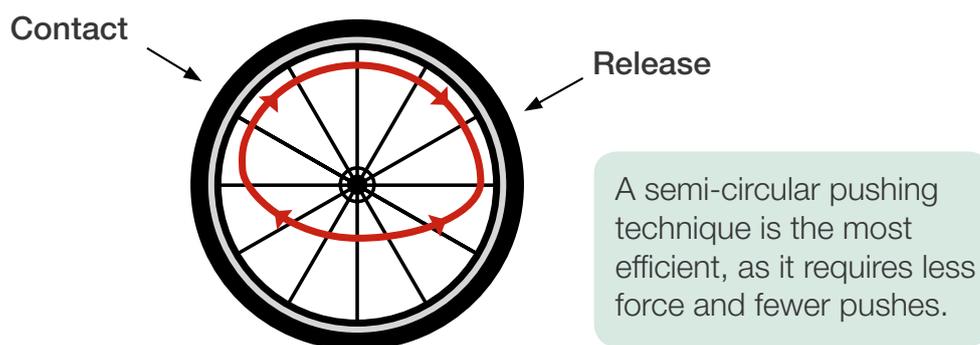
If you manage to achieve independent transfers the following tips may help.

- It takes less effort to shift a lower mass, therefore maintaining a healthy body weight is advisable.
- Performing a level, or downhill transfer, places less stress on the shoulders.
- Avoid unnecessary transfers, and attempt to minimise the amount of transfers you have to complete each day.
- Vary the technique used, and alternate the leading side.
- In the case of chronic shoulder conditions, consider the use of a hoist or slideboard.

Wheelchair Skills

Depending on your level of injury, strength and confidence, there are a number of wheelchair skills that are important for you to learn to be independent in the community. These include; back wheel balancing, negotiating kerbs and/or steps, uneven surfacing and slopes etc.

When pushing your wheelchair a semicircular technique is recommended as it gives the highest efficiency with the lowest impact.



Your seat height also needs to be considered to get the most out of your pushing technique. Your elbow should be at 100–120° when the hand is placed at the top of the push-rim.



Other things to consider when pushing your wheelchair include:

- **Chair weight:** It takes less force to propel a light chair.
- **Rear wheel position:** The rear axle should be positioned as far forward as possible, without compromising stability.
- **Posture:** Sitting in a symmetrical posture creates equal force distribution through the arms.
- **Tyres:** Keeping the wheels properly maintained, and the tyres pumped up will maximise pushing efficiency.

Calliper Use

Callipers are custom-made splints for the legs, that assist people to stand and/or walk. Calliper use can be an option for paraplegics with an injury below approximately T10. However you need to understand that calliper use is not a replacement for walking, and it may or may not be useful in every day situations. Calliper use is usually considered at the earliest one year post injury. It is very important to maintain your flexibility, as it is only possible to use callipers, if you have good range of movement in your hips and ankles. You also need very strong arms with no pain in your shoulders or wrists. For example, if you are able to do 50 tricep dips in the parallel bars, you would be considered strong enough to trial callipers. Spasms can also limit calliper use as they affect your balance. If you think you are suitable to trial callipers, please discuss it with your Physiotherapist.

Contact

State Rehabilitation Service

Fiona Stanley Hospital
11 Robin Warren Drive, Murdoch WA 6150
Phone Helpdesk: (08) 6152 2222
www.fsh.health.wa.gov.au

Compiled: Tracy Redwood, Royal Perth Hospital, 2008
Reviewed: Spinal Unit Management Team, Fiona Stanley Hospital,
State Rehabilitation Service, 2015
Publication number – FSH A 0000743

© State of Western Australia, Department of Health, 2015.

