

Staying Fit and Well After Spinal Cord Injury

As you will be aware, your body undergoes a number of changes after spinal cord injury. When muscles don't function, a process called deconditioning takes place which is basically your body becoming accustomed to reduced levels of activity. The reduction in the amount of muscle tissue working in your body has effects both locally in the paralysed limbs and globally throughout your body. This starts within 24 hours of injury and can settle down after 6 to 12 weeks. The good news is that many of these effects can be limited by proper management on your part. We explain these effects below with a number of practical options for you to use to keep yourself as fit and healthy as possible after your injury.

Cardiovascular System

Your cardiovascular system is your heart, arteries, veins, and blood vessels that are essential to your body's health. This system carries oxygen and nutrients to all of your other body systems. Like the general population, cardiovascular disease is one of the biggest causes of death for people with spinal cord injuries. And like the general population, we recommend regular exercise of moderate intensity for 30 minutes at least, 3 to 5 days of the week to maintain and improve cardiovascular fitness.

People with SCI are generally less active than the general population. This can be due to limited movement, access problems or a lack of knowledge about what activities are available in your community. Over time, reduced levels of activity along with the reduced demands on the heart from less muscle activity causes the cardiovascular system to become deconditioned. This will make you less fit and you may feel that you have little energy and become breathless very quickly with any activity. However, you can avoid this with regular activity and it's never too late to start!

Regular exercise not only keeps you physically fit, your muscles strong and your weight under control, it can also improve psychological wellbeing.

Weight Management

Initially after your injury you will probably lose weight. This can be due to muscle atrophy (wasting), reduced appetite or intake of food, and your body burning up a lot of energy to help you recover. However, over time many people find that their weight gradually creeps up and possibly more than before your injury. This is because you may continue to eat what you did before your injury but are less active than you were. If you consume more energy through eating than you use up through activity you will start to put on weight.

Increasing your weight beyond what is considered healthy for your height can lead to a number of problems after SCI. Transferring and pushing your wheelchair will become more difficult and you may increase shoulder pain and the likelihood of injury as the load on your arms is increased. Increasing weight in your hips and legs will make leg handling more difficult and may mean that your hips rub against the side or wheels of your wheelchair which can lead to skin issues.

While losing weight after a SCI can be more difficult than before, you can do this through sensible eating and increasing your activity levels. A good balanced diet with lots of fresh fruit and vegetables will not only help your weight, it will help keep your skin, bladder and bowel healthy too.

Muscle Atrophy and FES (electrical stimulation)

You may have heard the phrase 'if you don't use it you lose it' and this is true with muscles. Just as muscles build up and get stronger with exercise, they shrink and get weaker if you do not use them. Some degree of muscle atrophy (wasting) is unavoidable in paralysed muscles and you will likely see the bulk of your muscles reduce. This can make limbs lighter and easier to handle but it can also make bony parts more

prominent as they will lose some padding which means they are more susceptible to skin problems.

It is possible to exercise paralysed muscles with electrical stimulation (FES) but this won't necessarily change your ability to control your muscles without the stimulator. FES artificially stimulates muscle activity by activating the nerves or fibres within the muscle through pads attached to the skin over the muscle. You have to use it regularly for it to be effective.

Different systems are required for different types of nerve injury i.e. one system for upper motor neuron or high tone paralysis and one system for lower motor neuron or flaccid paralysis. Some people with SCI use FES for aesthetic reasons (e.g. to increase the muscle bulk in the legs as they feel it looks better) but there are a number of health benefits to using FES. FES assisted cycling has been shown to improve muscle bulk, bone density and cardiovascular function.

Currently, there is no funding available through the NHS for FES equipment and it is something that you would have to purchase privately. If it is something that you are interested in, speak to your physiotherapist for details about which system is appropriate for you.

Bone Strength

Your bones need stimulation through muscles pulling on them and weight being put through them to stay strong. Without this stimulation, bones in the paralysed limbs, especially in the legs, start to lose their density and get weaker. This makes them at a higher risk of fracture (break) so you need to be careful when handling your paralysed limbs and how you position them for transfers. The outpatient clinic may arrange for a DXA scan to check your bone density. You can minimise bone density loss by standing regularly or through certain uses of FES (see below).

Joint Stiffness

The joints and muscles of your limbs will stiffen and may permanently contract if you do not move them regularly through range or stretches. This can happen in both paralysed limbs and limbs with partial muscle function. You are more likely to lose range if you have increased tone or a muscle that pulls in one direction stronger than the one pulling in the opposite way (e.g. strong biceps with weak triceps which will lead to the elbow always sitting with a bend in it). Keeping a good range of movement can help with becoming more independent with your every day activities. If you allow joints to become too contracted, you may lose function and independence.

It is important to follow the advice from your Occupational Therapist or Physiotherapist about splinting or stretching. Sometimes you can have stretching put into your care plan. Staying active will help you maintain range as will regular standing or lying prone (on your tummy) if possible.

Standing Frames

We will give you one form of standing frame from the spinal unit if it is appropriate for you and your circumstances (e.g. level of injury, space for equipment, someone to help you with standing). This may be in the form of a tilt table, power assisted standing frame, manual standing frame or leg splints (KAFOs) and a walking frame or crutches.

To have maximum benefit from this, we recommend that you stand for a minimum of 30 to 60 minutes, 3-5 times per week. Standing regularly e.g. using a standing frame will help to reduce the amount of bone density loss, minimise muscle spasm, prevent range of movement loss, change the area of pressure over your bottom and open up your stomach area which can help your bladder and bowel function.



If you have any questions about standing, speak to your physiotherapist.

There are also a number of standing wheelchairs ('sit to stand') available that you may be interested to privately purchase.

How can I exercise?

While in the spinal injury unit you have a substantial amount of equipment and support available to you but it can be a different story when you leave the unit. However, there are still lots of options to staying fit when you leave the unit.

You do not always need ongoing physiotherapy after you leave the unit and there are lots of other ways to keep working on getting stronger and fitter. The biggest difficulty to overcome is motivating yourself to stay active and once you have got this far, many things can be overcome with readily available pieces of equipment and a bit of imagination. Anything that gets you slightly out of breath will be working your heart and is classed as exercise. Here are some suggestions to get you started:

- Get pushing – much like you may have gone for a walk before your injury, push your manual wheelchair. Start on smooth surfaces and build up to bigger distances and slopes. Even if you can only push a chair for 1 meter, if you work at it regularly you will get stronger and be able to push further distances. This will benefit your fitness and arm strength.
- Set yourself up a fitness circuit at home – use resistance bands, bottles of water, tins of beans or anything to add weight to your arm exercises.
- Attend your local gym – many have wheelchair accessible weight and resistance training systems, some even have similar active-passive arm and leg bikes that we use in the spinal unit (e.g. veratrainer).

- If you have reduced hand function, buy some grip aid gloves – you can use these to strap your hands to dumbbells or the handles of weights or exercise bikes. Crepe bandages wrapped around your hand and the object work just as well.
- Find a work out buddy – team up with a friend or relative to assist you with exercising your arms and legs if you can't do it on your own.
- Use your local swimming pool – most pools have hoists to lift you in and out of the pool and many have allocated sessions for people with disabilities. Swimming is a fantastic way to exercise all of your available muscles. Contact your local pool or the Scottish Disability Swimming Development Officer to find out where your local sessions are on 01786 466502 or look at the website www.scottishswimming.com/index.php?id=86
- Take up a wheelchair sport – there are a number of wheelchair sports already available and new ones are being developed all of the time. It could be target based sports like archery, shooting or curling, individual endurance activities like wheelchair racing or team based sports like basketball or rugby.
- Get outdoors – there is an increasing variety of adaptive equipment available to get you to places your everyday wheelchair wouldn't be able to: be it water, rocks, sand, hills or snow. Many outdoor centres and parks have equipment available for loan or hire if you can't afford to privately purchase your own.
- Private purchase of equipment – there are a number of companies specialising in adaptive exercise equipment that you can buy to use in your home.

How do I find out what is available in my area?

The easiest thing to do is to call your local sports centre or swimming pool to see what's available or even better, go and have a look at it. Sometimes it's easier to work out what you

can use when you are there and can see the equipment. Fitness staff who haven't worked with someone with a spinal injury before might be nervous working with you at first as they won't want to cause further injury. Your physiotherapist may be able to assist with this and settle their anxieties.

Your local Scottish Disability Sport branch manager will be able to advise you on any exercise groups or sports in your area. The current contacts can be found on www.scottishdisabilitysport.com/sds/index.cfm/contact/regional-managers or by calling 0131 317 1130.

Here are a few suggestions for websites providing information about adaptive sport and outdoor activities to get you started.

- www.paralympics.org.uk – Official Team GB Paralympic site with information on Paralympic Sports
- www.wheelpower.org.uk – Information about a number of wheelchair sports associations
- www.backuptrust.org.uk – charity for people with SCI who run rehabilitative courses in a number of outdoor pursuits as part of their range of services
- www.equaladventure.org – provides equipment and training to make the outdoors accessible
- www.parasport.org.uk – information on wheelchair sports nationwide
- www.youtube.com/user/ParalympicSportTV – Internet TV channel with archives and live coverage of disability sport worldwide
- www.calvert-trust.org.uk – run activity breaks for people with all levels of disability
- www.disabilitysnowsport.org.uk – run ski and snowboarding lessons and activity breaks here and abroad regardless of level of injury

If you are unsure about what activities may be appropriate for you, please speak to your physiotherapist or contact the physiotherapy department on 0141 201 2558.