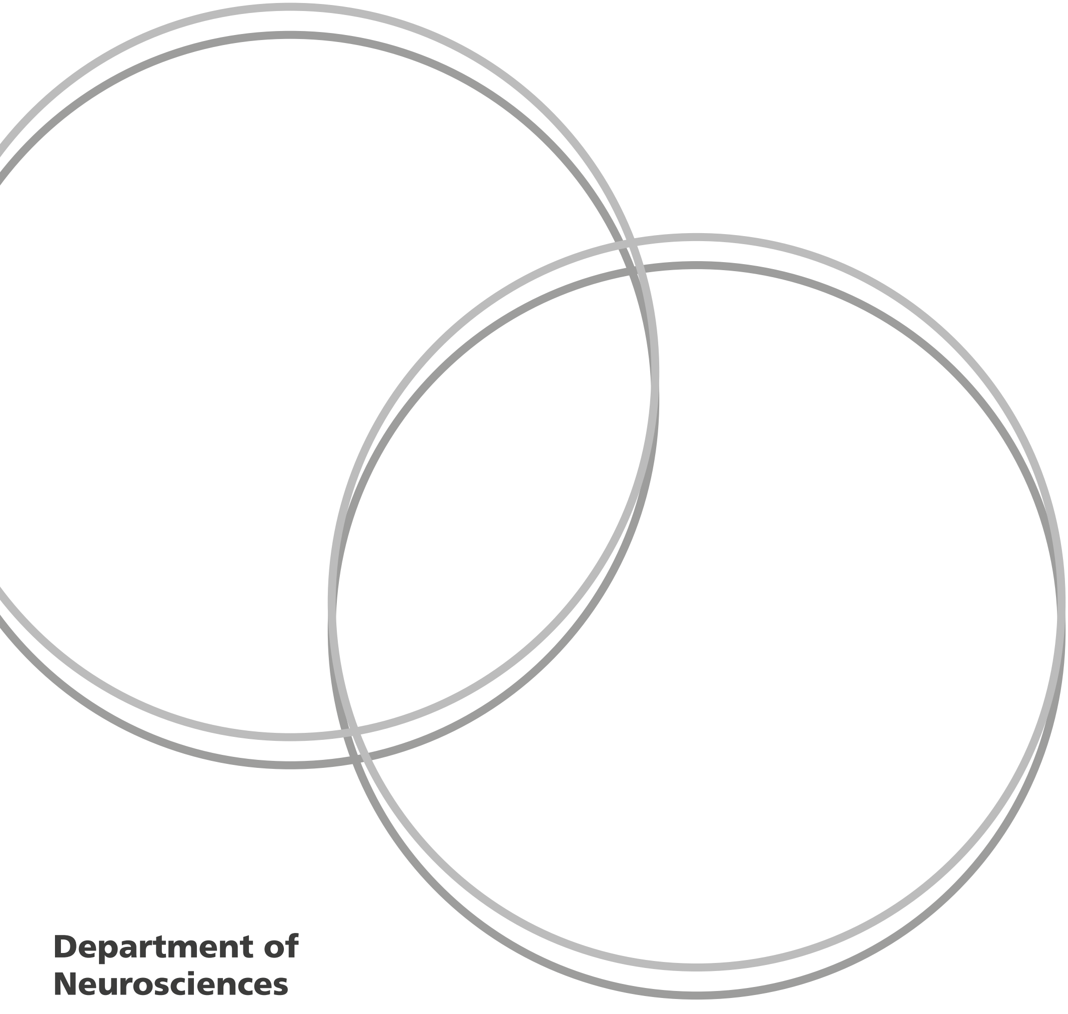
Oxford University Hospitals
NHS Foundation Trust

An Introduction to Spinal Cord Stimulation

Pre and Post-Operative information for patients



Department of Neurosciences

Introduction

We have seen you in clinic as you have had pain for a long period of time. Spinal cord stimulation, also called neurostimulation, has been offered to you as a treatment for your pain. This leaflet tells you about Spinal Cord Stimulation (SCS). It gives you the sort of information you might need in order to decide whether a stimulator is the right thing for you. If there is anything else you wish to know about this treatment please do not hesitate to contact us.

Our contact details can be found on the last page of this leaflet.

What is Spinal Cord Stimulation?

SCS uses a piece of equipment which is surgically implanted under your skin. The system sends mild electrical impulses to your spinal cord and changes pain signals from travelling to your brain. The tiny electrical impulses are sent via a lead implanted into the spine and are powered by a battery which is implanted under the skin. We will discuss where you may like the battery to go before the operation.

What are the benefits of Spinal Cord Stimulation?

Because SCS works in the area where the pain signals travel, electrical impulses can be directed to specific sites where you are feeling pain. SCS can give effective pain relief and help you bring down your need for medications. This can Improve your ability to perform daily activities. This therapy does not cause permanent changes to the spine or nerves and Is reversible.

What does Spinal Cord Stimulation feel like?

There are two different stimulation patterns. Depending on which pattern is used you will either feel a tingling or no tingling sensation. Both can be effective in helping pain. Your nurse will explain which stimulation pattern has been set up and how it works.

Does Spinal Cord Stimulation completely eliminate pain?

SCS does not cure the source of the pain, so the amount of pain reduction varies from person to person. SCS requires a strong commitment to effectively control pain.

Learning to operate the SCS equipment and taking part in other prescribed therapies, such as physiotherapy and weight loss, will make the treatment as effective as possible.

Before your admission to hospital

Following being listed for surgery, you will have the opportunity to attend a preparation session with one of the Neuromodulation nurses. This appointment can be attended face to face or can be scheduled as a telephone consultation according to your requirements.

The Neuromodulation Nurse at this appointment will answer any questions you might have.

About 2 to 4 weeks before your planned admission to hospital you will be asked to attend a Preadmissions Clinic. This is routine for all Neurosurgical admissions. At this appointment we will take a detailed medical history and some blood samples.

System components

Surgically implanted parts of the Spinal Cord Stimulation (SCS) system:

Implantable battery

The implantable battery generates the electrical impulses which are sent to your spinal cord to control your pain. The battery is placed just under the skin. Your doctor or nurse will discuss where this will be before your surgery.

There are two types of battery -

- Rechargeable:

A rechargeable battery and has the potential to last up to nine to ten years. You will need to charge the battery inside you by placing an antenna over your skin covering the battery. How often you need to do this varies depending on what programmes you have, but on average may be once or twice a month.

- Non-rechargeable:

A non-rechargeable battery will need to be replaced when the battery is depleted. These can now last up to 10 years. These batteries require no maintenance.

Leads

SCS leads are special medical wires with either a paddle design at the tip (as shown) or a narrow electrode (percutaneous as shown). Both are designed to deliver mild electric impulses to the spinal cord.

Paddle electrodes as above, are inserted under general anaesthetic. Your neurosurgeon will make a spinal incision below the intended location of the electrode then remove enough bone and ligament tissue to place the permanent electrode flat on the surface of the lining of your spinal cord. Usually, you will be admitted on the day of surgery and will be in hospital overnight. Sometimes, depending on where your pain is, the surgical team will advise you to stay in hospital for a week (trial) and then decide whether to implant your battery.

The procedure

The procedure is performed under general anaesthetic (you will be asleep). The surgeon will place electrodes onto your spinal cord. If you are undergoing a trial, the wires are then placed to run under the skin on your side (between your armpit and the bottom of your ribs), to the outside of your skin and are secured outside your body on top of the skin. These will then be connected to an external battery for the trial. If you are having the full procedure straight away, we place the wires under the skin to your chosen battery site (top of your buttock, side of your chest wall or abdomen are the common sites). This will then be programmed two weeks after the operation.

After your surgery you will return to the ward. If you are having an inpatient trial, you will be seen each day by the nurse specialists and doctor. The stimulator will be tested with you sitting, standing, walking and lying down. We can adjust the programmes over the course of the trial period. After the trial period we will assess your suitability for the full implant. We actively encourage you to be as mobile as possible during your stay in hospital so that we can test the stimulator's effectiveness fully. We will also teach you how to use the patient controller handset.

Percutaneous leads are inserted under local anaesthetic and sedation. The surgeon will insert the percutaneous lead through a needle under X-ray guidance and then anchor it to help prevent movement. The team may do an 'on table trial' to ensure that the leads are covering your pain area (testing the stimulator to check the position with you more awake). Once they are happy that the stimulation is in the right place, they will then anaesthetise the skin where the battery is going to go and make a pocket for the battery. The lead is then thread through the fatty tissue under the skin to the site of the battery. This procedure can usually be carried out as a day case so you will be sent home with the stimulator on the same day. The team will normally follow you up in clinic 2 weeks later for system activation and wound checks, and 4 weeks after this.

Extensions

The extension is an insulated wire which is placed under the skin and connects the lead to the battery. We do not always use extensions; it will depend where the battery is placed.

Clinician programmer

This is a hand-held remote device which lets your nurse adjust your neurostimulation system to the appropriate level for your pain needs. For example, the multiple electrodes on your leads can be readjusted to provide therapy for wider or smaller areas of pain.

Patient programmer

The hand-held patient programmer allows you to program or to adjust your own stimulation (within the settings your clinician/nurse has selected). You can also use it to turn you stimulation off and on and select between different programmes.

Additional external parts for the rechargeable system:

Recharger

The Recharger is a hand-held device for recharging your battery. The recharger communicates with your battery (Implanted IPG). It fits into a recharger belt which holds it in the right place over your battery.

Recharger belt

The belt allows you to keep the charger directly over your battery during a recharging session by holding it in place.

Power adapter and charging cable

This is used to charge the recharger. The power adapter plugs into a normal plug socket at home and connects via charging cable to the recharger.

Virtual clinic follow up

Your system may be compatible with a Virtual clinic application called Neurosphere™ which allows remote device checks and reprogramming. Please ask your Neuromodulation nurse If you would like to be enrolled for this.

Frequently asked questions prior to implantation

How long will my fully implantable SCS system last?

This time varies. The battery life depends on which kind of battery you receive, how many hours a day the system is used, the intensity of the stimulation, and individual patient differences. The screening trial process can help us to decide whether a non-rechargeable or rechargeable system is best for you, based on your pain requirements.

How will I know when the battery needs to be replaced?

We will be able to tell you the state of the battery during regularly scheduled follow-up visits. Your patient programmer also has a battery indicator to show when your battery is low.

What happens when my battery needs to be replaced?

With a fully implantable system, when it is time to have your battery replaced your Consultant will remove the existing battery device and replace it with a new one during a short surgical procedure. You will come into hospital and have the procedure done under local or general anaesthetic as a day case admission. You will be able to go home later the same day.

When should I call the Neuromodulation team at The John Radcliffe about my SCS system?

Call us if:

- You have any concerns about your wounds after the implant has been put in.
- You experience additional/unusual/new pain.
- You notice unusual changes in the quality of your stimulation or when you experience no sensation at all.
- You are increasing stimulation levels more often than normal.
- The area normally being stimulated changes or moves.

Otherwise, visit us according to your follow-up schedule. A typical follow-up appointment will be once every 12 months, although initially the equipment may require more frequent adjustments. We may want to see you more or less often in the months following initial implant.

Will I be able to adjust my Spinal Cord Stimulation system?

Your Spinal Cord Stimulation system has a patient programmer that allows you to turn the SCS on/off and up/down within the limits initially set up by your nurse.

Will I hear or feel the stimulation system inside me, and will people notice it?

Your stimulation system does not make any noise. It may be felt as a lump under your skin. It does not normally show through your clothes (unless they are tight fitting). It is implanted where it is most comfortable and least visible.

Your admission to hospital:

You will be admitted on the day of surgery and may be in hospital just for the day (daycase) or for up to 6-8 days (during a trial), depending on the type of lead that is inserted. During this time a trial period will allow us to assess how well the stimulator is working for you. The team will have decided which type of lead and system is most suitable for before admission to hospital and discussed this with you before you come in.

Complications

As with all types of surgery, there are risks of complications.

These include:

- Infection.
- Bleeding.
- Failure to relieve pain or an increase in pain.
- No stimulation or intermittent stimulation.
- Stimulation in the wrong area.
- Stimulator failure.
- Headache.
- Allergic reaction.
- Paralysis - this is very rare.

Success rates

We carry out this procedure routinely in our centre. The response to stimulation is different from patient to patient. >90% of the patients who have undergone this procedure have, on average, reduced their pain scores by 50 to 80%. This means that before surgery their average pain score was 10/10 and it reduced to an average of 2-5/10 with their stimulator.

Discharge Advice after Implantation

Going home after implantation of a Spinal Cord Stimulator can feel a little worrying. We hope that during your stay with us we will have answered many of your questions. This leaflet gives you further support and guidance about your recovery at home.

We feel it is important that you do not feel alone and isolated at home. If you need any advice or support please contact the Specialist Nurses on the contact numbers at the end of the leaflet.

Frequently asked questions after implantation

Will my medication be changed?

You will probably need to continue taking painkillers, at least in the first few months while we are adjusting your stimulator to get you the best pain relief that we can. You may always need to take some medication to help with the pain relief. If you are unsure about the medication you should be taking, please discuss this with us before you leave the ward. Once you get home, if you experience any symptoms which are unusual for you, please consult the Specialist Nurses or your GP.

How do I look after my wound?

Your stitches, if not dissolvable, will need to be removed at your GP surgery. We will give you the date for this and a letter. We will also give you wound care instructions in a leaflet. We will provide you with some more dressings to take home. Please change the dressings when they get wet. If you have Dermabond glue and dissolvable stitches, you do not need dressings over the wounds as the glue provides a water-resistant covering to the wound.

Signs to look out for:

Inspect your wounds daily with the aid of a mirror. If you notice any of the signs listed below please contact us:

- Any leakage from the wound, this may be brown, green, or clear.
- Any redness or swelling at the wound site or around it.
- Pain around the wound.

Adverse symptoms:

When you are discharged from hospital you should have already made a good recovery and we are confident this will continue at home. However, in the unlikely event of any of the following symptoms occurring, please telephone the Specialist Nurses for advice and help:

- Any fever or high temperature above 37 degrees centigrade.
- Any numbness or pins and needles that you did not have before the surgery.
- Difficulty walking or moving.
- Difficulty in passing urine.
- Difficulty swallowing food or liquids.
- Any incontinence of urine/faeces.
- A cough / coughing up sputum (phlegm).
- Tiredness which lasts for more than about 3 weeks.

Going home checklist

Before you leave the hospital please check that you have the following:

- Tablets and explanation documents.
- ID card and SCS Information.
- Transport arrangements.
- Your belongings including any valuables which have been locked away.
- Letter for your stitches to be removed if applicable.

Important information about your SCS system

As you return to everyday life, there are some things you should know about using household appliances and electronic equipment around your SCS system.

Patient control devices

Do not place patient control devices (e.g., patient programmer) over another device (e.g. pacemaker, defibrillator, another neurostimulator).

Component manipulation

Do not manipulate (move) or rub your SCS battery through the skin; this is sometimes called "Twiddler's Syndrome." Manipulation can cause damage to your system, movement of the lead, skin erosion (wearing away), or a feeling of pins and needles at the implant site. If you have a rechargeable battery, fiddling with the implant may also flip over your device so that it can't be charged.

Frequently asked questions about living with your SCS system

What are some of the possible complications that I should be aware of?

As with any implanted device an infection could occur. The lead, extension, or neurostimulator could move within the body or push through the skin. There could be unwanted changes in stimulation. It is also possible that the implanted materials could cause an allergic reaction or immune system response which might cause the body to reject the implant.

Your SCS system might unexpectedly cease to function due to the battery wearing out or other causes. These events, which can include wires becoming dislodged or moving out of position, cannot be foreseen.

What types of activities can damage or move the lead?

Most activities are safe; however, you should always follow the teams instructions about work, exercise and hobbies.

You should know where your lead is placed and keep in mind which movements may put strain on the lead. Although it is made of flexible and durable material, some seemingly harmless or repetitive movements could cause unseen damage over time, eventually causing the lead to break. You may then require surgery to replace the lead.

Will I be able to drive?

If you have the stimulation pattern that produces 'tingling' then you must turn OFF your stimulator before you drive. This ensures that you can be in normal control of the safe operation of your vehicle. Your nurse will advise which pattern of stimulation you have, and advise you whether to turn the stimulator off for driving.

What should I do about airport security and shoplifting/theft detectors?

Use care when approaching airport security and shoplifting or theft detection devices such as those found by the exits in libraries and some shops.

With airport security you must show your device identification card which is given to you when you leave hospital, and request a hand search. Security personnel may use a handheld security wand, but ask them not to hold the wand over the neurostimulator battery.

If you must pass through the security screening device:

- Turn your SCS system OFF.
- Approach the centre of the security device and walk through normally.
- Proceed through the security device, keeping as far away as possible from the gate(s).
- Do not linger or lean on the security device.
- After you pass through the security device, turn your SCS system ON again to resume therapy .

Can I travel on an aeroplane?

Yes. Your SCS system should not be affected by aeroplane flights.

What happens when the battery runs out?

If you have a rechargeable device, you will be able to use the patient programmer to find out when the batteries in both the device and the programmer are low. If you have a non rechargeable SCS system, your Specialist Nurse will be able to tell you the state of the battery in your device during regularly scheduled follow-up visits. If your Specialist Nurse finds that the battery in the device is low he or she will discuss with you how the battery can be replaced. You will also see a low battery warning on your patient controller.

Can I go in a hot tub, steam room, or sauna?

Yes, but if you feel a hot sensation in the area around your battery, get out.

Can I scuba dive or enter a hyperbaric chamber?

Do not dive below 33 ft. (10 m) of water or enter a hyperbaric chamber above 2.0 atmospheres absolute (ATA). Exceeding these limitations can damage your SCS system.

Before diving or using a hyperbaric chamber, discuss the effects of high pressure on your SCS system with your Neuromodulation Team.

Can I sky dive or participate in other high-altitude activities such as skiing or hiking in the mountains, or flying in a non-commercial aeroplane?

High altitudes should not affect your SCS system. However, you should consider the movements involved in an activity, and take care to not put undue stress on your implanted SCS system. For example, the sudden jerking which occurs during skydiving when the parachute opens can dislodge or fracture the lead. You would then need to have additional surgery to repair or replace the lead.

Are there any specific medical procedures that could interact with my SCS system?

Please consult us before undergoing any medical procedures. We recommend turning your device OFF before undergoing any medical related procedures. Monopolar diathermy is NOT recommended with a neurostimulator in place.

There are restrictions and risks associated with Magnetic Resonance Imaging (MRI)

Most stimulators are MRI conditional meaning you can have scans under set conditions. Please contact your Specialist Nurse regarding MRI scans.

Contact details

Specialist Nurses:

Telephone: 01865 231 874

E-mail: neuromodulation.pain@ouh.nhs.uk

Further information

If you would like an interpreter, please speak to the department where you are being seen.

Please also tell them if you would like this information in another format, such as:

- Easy Read
- large print
- braille
- audio
- electronic
- another language.

We have tried to make the information in this leaflet meet your needs. If it does not meet your individual needs or situation, please speak to your healthcare team. They are happy to help.

Author: Neuromodulation Nurses
December 2024
Review: December 2027
Oxford University Hospitals NHS Foundation Trust
www.ouh.nhs.uk/information

Leaflet reference number: OMI 109527