



**PAIN
SPECIALISTS
AUSTRALIA**

Spinal cord stimulation

A guide to spinal cord stimulation therapy for chronic pain

Written by Pain Specialists Australia

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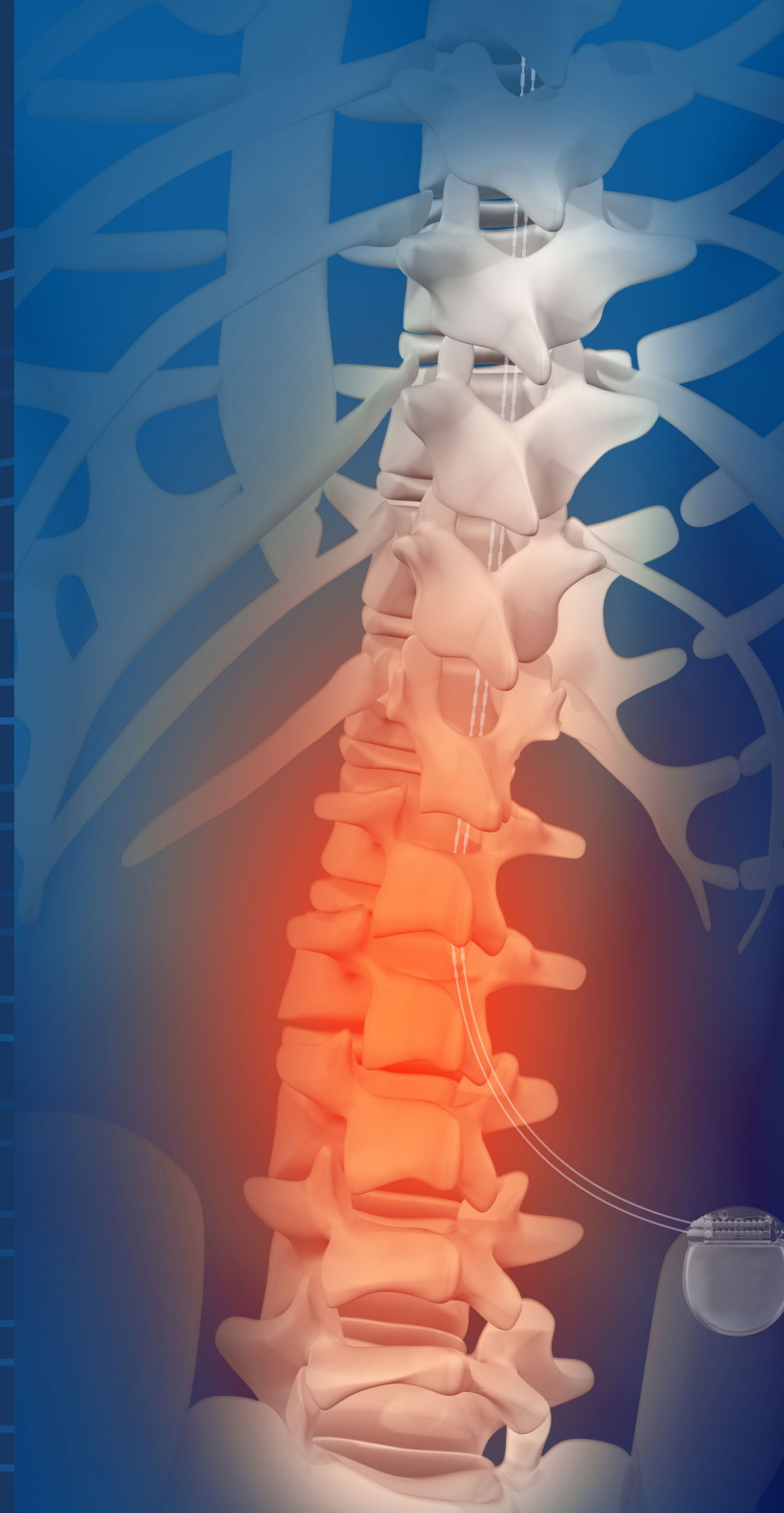


Table of Contents

<i>About Pain Specialists Australia</i>	3	The trial phase of spinal cord stimulation	14	Are there any restrictions after my operation?	24
An introduction	4	The assessment for suitability for spinal cord stimulation		Physical activities	
Medicine is moving away from the biochemical era into the bioelectrical era	6	Other things you need to be made aware of during the assessment process	15	Having medical treatments or scans	
Is spinal cord stimulation effective in relieving pain?	8	What happens during the trial phase?	16	Driving	
Is spinal cord stimulation effective in improving function?		Your pain medications before the trial phase		Getting back to work	
What are the risks of spinal cord stimulation?		The trial procedure explained in pictures	17	Taking your pain medications	
Do the effects of spinal cord stimulation change over time?		Upon discharge from hospital during the trial phase	18	<i>Post-operative complications</i>	25
The components of the system	11	Your pain medications during the trial phase		Follow-up and ongoing care after your spinal cord stimulator implant	26
What is involved if I wish to go ahead?	12	<i>Post-operative complications</i>	29	Follow-up	
Who will look after me during the process?	13	The permanent implant phase of spinal cord stimulation	20	Did you know?	
		What can I do to prepare for my permanent implant procedure?	21	Remember	
		The permanent implant explained in pictures	22		
		Leaving hospital after the implantation of a spinal cord stimulator	23		
		Going home			
		Looking after your wounds			
		Getting back to normal			



Pain Specialists Australia

Pain Specialists Australia is a pain management clinic staffed by qualified pain specialist physicians. We manage chronic pain using a range of techniques including medication and cutting-edge interventional procedures. We use a multidisciplinary team and lifestyle approach, delivered by allied-health pain experts like physiotherapists, occupational therapists and psychologists.

Because pain is a personal experience and complex, we believe that patients shouldn't manage pain alone and should be empowered to play an active role in their own pain management.

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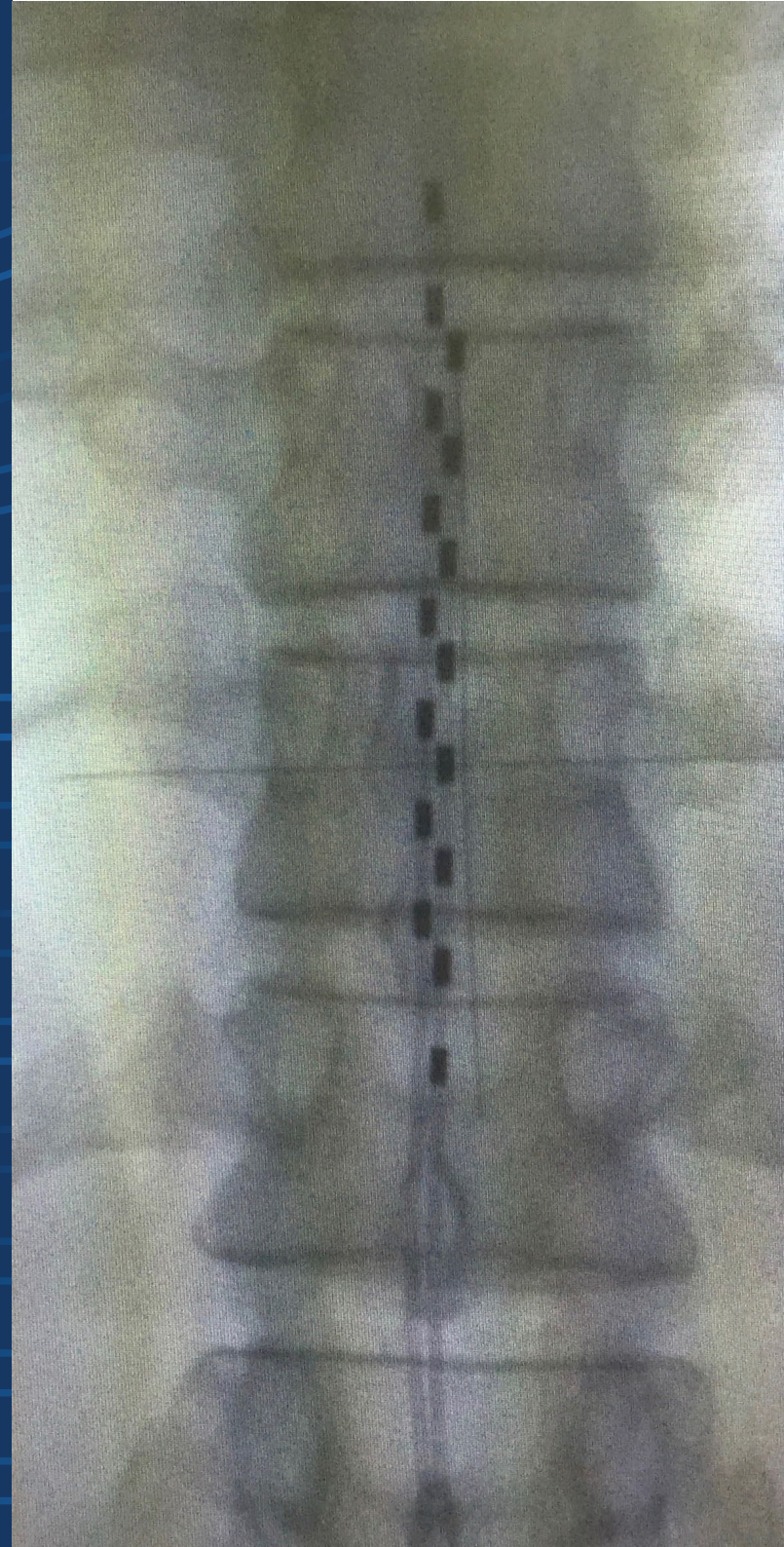
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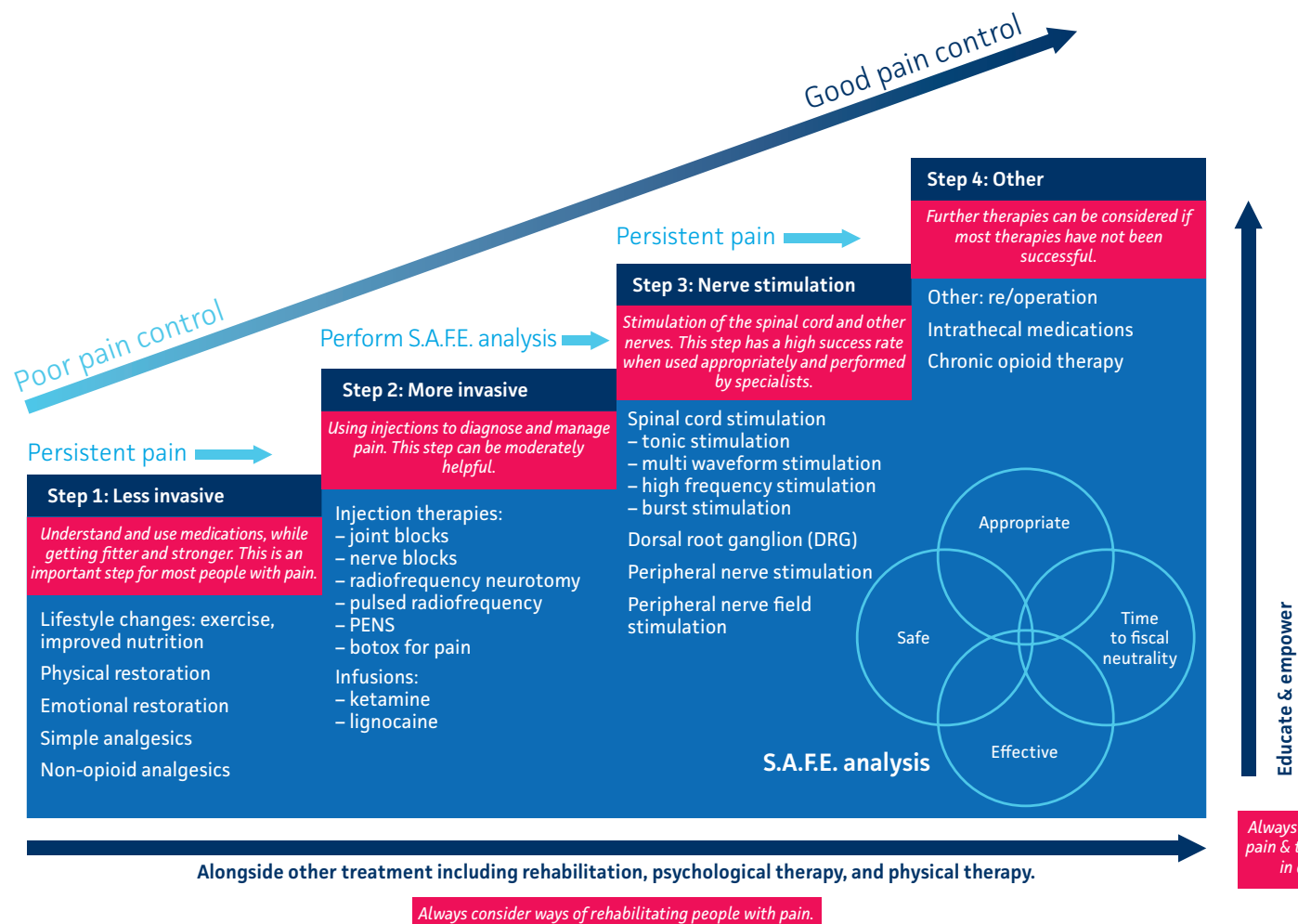
An introduction to spinal cord stimulation

If you are reading this, either you, a member of your family or your pain specialist thinks you may benefit from having a nerve stimulator or spinal cord stimulator trialled to assess whether your pain can be treated by this advanced and effective pain therapy.

Nerve stimulation/spinal cord stimulation is considered when other forms of pain therapies have been tried and have not been successful.



This is our stepped approach to effective pain control. Starting with simple approaches, we then carefully progress on to more technical therapies. If these therapies fail, then step 3 neurostimulation can be considered. This is when spinal cord stimulation is considered as a therapeutic approach.



Based on Poree L, Krames E, Pope J. Implementing the SAFE principles for the development of pain medicine algorithms that include neuromodulation techniques. *Neuromodulation* 2013; 16:125-41



Spinal cord stimulation is applied when we activate parts of the nervous system using microelectrodes inside small, soft, thin, flexible wires (like a 'fishing line') that are connected to a small implantable battery (the size of a matchbox). *Spinal cord stimulation uses the same principle as heart pacemakers to control an abnormal heartbeat*, except we can now use these pain pacemakers to control abnormal nerve signals causing chronic pain.

We can now 'pace' nerves, which scrambles pain signals to the brain and reduces pain. We can stimulate any part of the nervous system. When applied to the spinal cord, we call this spinal cord stimulation (SCS). When applied to the smaller nerves of the body, we call it peripheral nerve stimulation (PNS) or nerve stimulation. There are other types of nerve stimulators for pain control like occipital nerve stimulation (ONS) for migraines and headaches.

This therapy does not remove your pain or cure it. It forms part of your treatment plan, like physiotherapy for example.

Spinal cord stimulation can sometimes be called neurostimulation or neuromodulation. For the purposes of this eBook, and from here on, we'll use the term spinal cord stimulation.

Spinal cord stimulation is not the end of the treatment line. We consider it the start of the next phase in your pain therapy and rehabilitation.

Medicine is moving away from the biochemical era into the bioelectrical era.

Medicine is moving away from using chemicals (medications) to control diseases to using small electrical currents (neurostimulation).

We now understand how to use electrical technology to manage diseases including the use of spinal cord stimulation and nerve stimulation to control chronic pain. This technology is very effective in some pain conditions.

Spinal cord stimulation means using technology to target the nervous system to control diseases. There is even an International Neuromodulation Society (www.neuromodulation.com). The society aims to uphold high clinical standards in spinal cord stimulation by supporting and publishing research into this therapy.

Electrical technology has been around for 50 years and today the technology is highly sophisticated, which means we can now use it to target different pain conditions.

Nerve cord stimulation is also used in other parts of medicine. For example, a cochlear implant stimulates the nerves in the ears to restore hearing, while deep brain stimulation (DBS) is used for people to improve diseases like Parkinson's disease.



When using spinal cord stimulation for pain control, the first step is a temporary trial phase. The small, soft, thin and flexible wires (leads) are inserted into your body through special needles while you are under sedation. You then wear the battery on the outside of your body, clipped to a belt, to test whether it controls your pain. The trial phase can take 1-2 weeks.

Research suggests if you have a trial of spinal cord stimulation, you have about a 60% or greater chance of success.

These are very good statistics for pain sufferers. If you have significant pain reduction the trial has been successful.

Who can undergo spinal cord stimulation therapy?

We know that spinal cord stimulation is a safe and effective treatment for a variety of chronic pain conditions and can provide long-term pain reduction in the following conditions:

- *Leg pain and/or back pain after spinal surgery*

Also called persistent operative pain syndrome (POPS). Previously called failed back surgery syndrome (FBSS).

- *Nerve pain following nerve damage or injury (neuropathic pain)*

This includes diabetes neuropathy or nerve damage from trauma.

- *Complex regional pain syndrome (CRPS)*

Previously called Reflex Sympathetic Dystrophy (RSD).

- *Ongoing angina (chest) pain*

Refractory angina, despite your heart being successfully managed and treated by your cardiologists.

- *Poor vascular circulation in the legs and feet*

Severe ischemic limb pain secondary to peripheral vascular disease (PVD) that is ongoing despite successful treatment and surgeries by your vascular surgeons.

There are other conditions that spinal cord stimulation may help, but they are best discussed with your pain specialist:

- Back or spinal pain without previous spinal surgery, called axial pain.
- Pain following many different types of surgery e.g. intercostal neuralgia after a thoracotomy, chest pain after mastectomy, or abdominal pain after hernia surgery.
- Brachial plexus injuries called brachial plexus avulsions.
- Pelvic pain.
- Visceral pain.
- Bladder pain/spasm.
- Bowel or rectal pain/spasm.

It is also important that you have tried and not responded to other conservative treatments, and that you are willing to reduce your medications and use other techniques of pain management. You should also be able to manage the equipment required for the system to work efficiently and effectively to help with your pain.

Spinal cord stimulation is not useful for some pain conditions like arthritis, spinal instability, widespread pain syndromes, infective illness, some psychiatric illnesses, and allergies to components of the system.



Is spinal cord stimulation effective in relieving pain? ¹

Scientific research shows that spinal cord stimulation is effective in reducing pain. A positive trial is when your pain is reduced by 50% or more. Reductions in pain that people may experience include anything from 50% to 100%.

A nerve stimulation/spinal cord stimulation trial period should be undertaken for each person, to identify the potential benefits of a permanent implant, because each person and their pain is unique.

Is nerve stimulation/spinal cord stimulation effective in improving function? ²

The effects of spinal cord stimulation on your function are less clear, and this is because most research has not previously focused on answering this question.

This is why a trial period is recommended to assist you and your pain specialist to identify whether spinal cord stimulation will lead to improvements in your function.

Some benefits that people may experience include improved quality of sleep, increased ability to perform everyday tasks, a reduction in opioid pain medication and the ability to get back to work.

Research

1. Cameron T. Safety and efficacy of spinal cord stimulation for the treatment of chronic pain: a 20-year literature review. *J Neurosurg.* 2004 Mar;100(3 Suppl Spine):254-67.

2. Turner, JA, Loeser JD, Devon RA, Sanders SB. Spinal cord stimulation for patients with failed back surgery syndrome or complex regional pain syndrome: a systematic review of effectiveness and complications. *Pain*, 2004; 108: 137-147



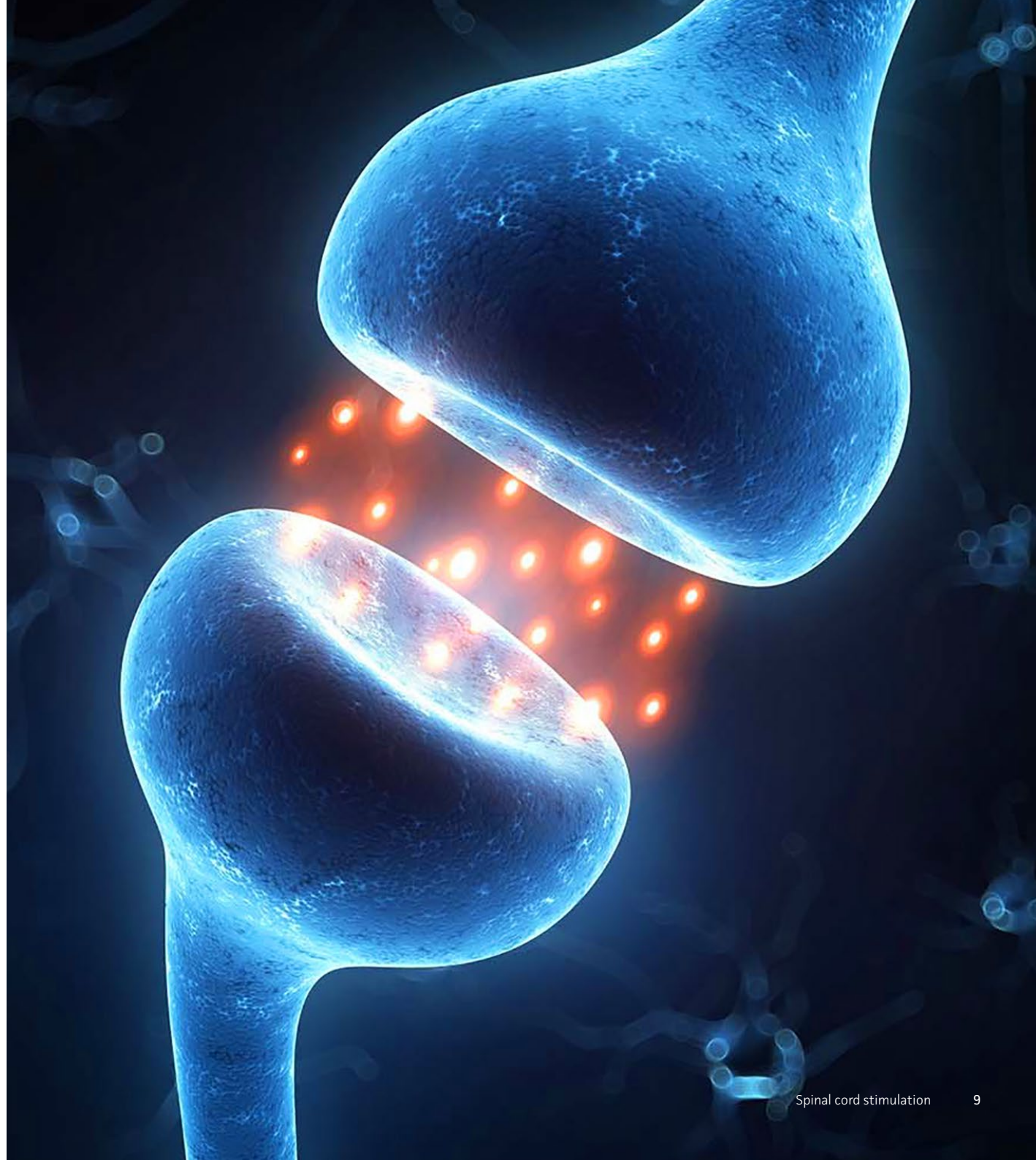
What are the risks of spinal cord stimulation?

Like most medical treatments, spinal cord stimulation is not risk free.

Complications can occur in both the trial phase and implant phase.

Overall, spinal cord stimulation is considered a safe therapy. Problems that may occur are considered mild and may include:

- Lead movement (migration) requiring repositioning of the leads.
- Infection, usually mild. If a severe infection occurs, the system may need to be removed.
- Pain around the battery site.
- The effects of the therapy may reduce over time.



Like most medical therapies, spinal cord stimulation is not risk free. Two well known research studies examined the complications that can occur with spinal cord stimulation:

- **+Any complication 0 – 30%**

This means that the risks of any complication, even minor, can occur 0 to 30% of the time.

- **+Revision 0 – 20%**

This means that there is a 0 – 20% chance that the system will need to be adjusted in some way. This is usually a minor adjustment e.g. repositioning of a lead if it moves.

- ***Lead migration or breakage 0 – 13%**

This means there is a 0 – 13% chance of the leads moving or sometimes even breaking. With the newer systems we use and with advanced techniques used to secure the leads, these risks are reducing over time.

- **+Explant 0 – 10%**

This means there is a 0 – 10% chance of the system being removed. Some reasons for removing the system include serious infection, the therapy is no longer needed, the pain changes, an operation is needed in the area where the system has been placed or the therapy fails. Spinal cord stimulator systems can be reinserted again later on.

- **+Equipment failure 0 – 10%**

This means there is a 0 – 10% chance of the equipment malfunctioning in some way. This complication is reducing as the systems are becoming more sophisticated. Most issues can usually be resolved.

- **+Pain in the area of the components 0 – 6%**

This means there is a 0 – 6% chance of experiencing some pain where the components are placed, e.g., discomfort from the battery. Smaller batteries are being invented, developed and used. If the battery site is uncomfortable, the battery can be moved to a different location on the body.

- **+Superficial infection 0 – 5%**

Minor infections can occur in 0 – 5%. These are usually managed with antibiotics and monitoring.

- ***Seroma 0 – 3%**

Sometimes there is a 0 – 3% chance of a painless swelling at the site of the battery or the skin incision. This usually resolves over a few weeks.

- ***Dural puncture 0 – 2%**

Sometimes there is a small chance, 0 – 2%, of the needles used being placed slightly deeper than intended. This can result in some spinal fluid leaking. Usually this can result in a headache. Sometimes follow-up treatments are needed.

- ***Battery failure 0 – 2%**

There is a small chance of the battery malfunctioning. If the battery stops working, the battery is replaced, which is a very minor procedure.

- ***Epidural haematoma 0 – 0.3%**

There is a small chance of bleeding in the area where the leads are placed. This may require monitoring or an operation to relieve the blood.

- **+Deep infection 0 – 0.1%**

There is a small chance of a deep infection occurring. Usually this is treated with intravenous antibiotics, but may result in the system being removed. When the infection has resolved, the system can be reinserted.

- ***Bleeding**

There have been isolated reports of this occurring. We are not sure how often this occurs.

- ***Epidural fibrosis**

Sometimes scarring can develop where the leads are placed. There have been isolated reports of this occurring. We are not sure how often this occurs.

- **Allergy to the components**

Some people can have an allergic reaction to the components of the system. This is very rare. There have been isolated reports of this occurring. We are not sure how often this occurs.

- **Serious nerve or spinal cord injury**

There is always a chance of serious injury to parts of the nervous system occurring. There have been isolated reports of this occurring. We are not sure how often this occurs. This is a rare occurrence.

- **Permanent neurological injury**

There is always a chance of serious injury to parts of the nervous system occurring. There have been isolated reports of this occurring. We are not sure how often this occurs. This is a rare occurrence.

+Turner, JA, Loeser JD, Devon RA, Sanders SB. Spinal cord stimulation for patients with failed back surgery syndrome or complex regional pain syndrome: a systematic review of effectiveness and complications. Pain, 2004; 108: 137-147 *Deer TR et al. 2014. The Appropriate Use of Neurostimulation: Avoidance and Treatment of Complications of Neurostimulation Therapies for the Treatment of Chronic Pain. Neuromodulation 2014; 17: 571-598



Overall spinal cord stimulation is considered safe and effective therapy with relatively minor risks.

There have been reports of rare but serious complications following neurostimulation treatments, such as permanent neurological injury, but the incidence of these is unknown.

Do the effects of spinal cord stimulation change over time? ²

Most of the research does not clearly answer this question. However, there is some suggestion that pain relief reported from spinal cord stimulation may reduce over time.

Sometimes the system may need to be removed. This is called explanting the system. Spinal cord stimulators can then be re-implanted when appropriate.

The components of the system

The leads

The leads are soft, thin flexible wires (like a fishing line) that contain small electrodes. The electrodes are programmable electrical contacts that send small electrical currents to the spinal column or the targeted nerve(s). These electrical currents interrupt the pain signals from the painful area(s) of your body.

The battery

This is a small programmable computer, about the size of a matchbox, placed under the skin through a small cut, usually in the upper buttock or flank region. It emits electrical pulses that you control with a small remote control. The battery is rechargeable and uses wireless technology across your skin during the recharging process. The battery is called an implantable pulse generator (IPG).

The average lifespan of a battery is about 10 years or more. The old battery can be removed, and a new battery inserted in its place via a small cut. Batteries can be upgraded if needed.

The remote controller

You are in control of your spinal cord stimulator. The small handheld remote controller is programmed for you and your pain. It is simple and easy to use. You control your neurostimulator system and hence, your pain.

The charger

The battery is charged by a wireless recharger held over the skin. How often you recharge your device depends on how it is programmed and how much current it uses. Recharging will be required from once a day to twice a week. With heavy use, the charging will be more often. There are some batteries that don't need recharging and can be used in some circumstances.

Some practical points:

- *Most current spinal cord stimulation systems restrict the use of MRI scans. This means that in some circumstances you are unable to have an MRI scan. Other scans like a CT scan, ultrasound and x-ray, are safe to have. Soon, most devices will allow all types of MRI scans to be safely undertaken.*
- *It is recommended that certain spinal cord stimulation devices are turned off whilst driving.*



Spinal cord stimulation – What is involved if I wish to proceed?

It is best not to hurry through the process of spinal cord stimulation. This improves outcomes and reduces risk.

There are usually two procedures: a trial procedure and, if that is successful, the implantation of the device at a later date.

This information does not go into all details of the particular spinal cord stimulation devices that might be used. We will supply detailed information to you during the education sessions you will undertake with your pain team.

Further reading about some of the current nerve stimulation/spinal cord stimulation devices:

- **Boston Scientific**
www.controlyourpain.com
- **Nevro**
www.nevro.com/English/Patients/Chronic-Pain-and-Treatments/default.aspx
- **St Jude Medical**
www.poweroveryourpain.com
- **Medtronic**
www.medtronic.com/us-en/patients/treatments-therapies/drug-pump-chronic-pain.html

The process of spinal cord stimulation follows several key steps:

1. Consideration of the appropriate spinal cord stimulator by your pain specialist;
2. Giving you relevant information (like this booklet) and having an education session with one of our pain nurses;
3. Assessment of your physical and psychological attributes;
4. The informed consent process;
5. A trial phase;
6. The implantation phase;
7. Follow up and ongoing care.

This process might seem long-winded but is designed to ensure you obtain every possible percentage benefit from this process and reduce the risk of any complications occurring, or if they do, keeping their severity to a minimum.



Who will look after me during this process?

The spinal cord stimulation team

Medical staff

Your pain specialists will provide the specialist medical care and perform the trial and permanent procedures. You may meet more than one member of the medical team along the way.

Nursing staff

Our highly trained pain nurses provide great expertise in supporting you through this process. You will meet with them at most steps along the way. Your pain nurse will coordinate the education sessions, theatre dates and follow-up.

Psychologists, physiotherapists and occupational therapists

The allied health specialists are often vital in the support of your treatment plan.

Administration staff

Our admin team will also support you through the administration processes.

Company representatives

The company chosen to supply your device will allocate a representative who will provide the necessary equipment and attend some of your appointments to ensure the device is programmed to suit you. They can be contacted at any time for support and advice.



The trial phase of spinal cord stimulation

The assessment for suitability for spinal cord stimulation

To gain the best outcomes from spinal cord stimulators, you need to be in an optimal state, both physically and emotionally. Other members of our team may need to assess you and support you through this process.

Spinal cord stimulators are not a cure for your pain but a tool to help you control it.



Other things you need to be made aware of during the assessment process

You need to be physically and emotionally prepared to deal with the treatment.

Spinal cord stimulation may mark the next phase of your recovery process. For example, when some people have their pain dramatically reduced, they end up doing more physical activities because they have far less pain, but what they find is that their bodies tire easily. This is because the pain has weakened their body.

A weakened body is called *deconditioned*. *When you have improved pain control, the next step will require you to be physically fitter and stronger.* This is a reason why we may invite physiotherapists and occupational therapists to be involved in the treatment plan – to make sure you get the most out of your spinal cord stimulator.

People in a positive frame of mind, with a caring team around them, do far better than those with a pessimistic outlook.

After the assessment phase we discuss your treatment plan and timeframe. In some instances there might be a delay because other treatments are recommended before a spinal cord stimulator can be trialled.

Your education session might include the following:

- Understanding how nerve stimulation/spinal cord stimulation works.
- Understanding the sensation of *paraesthesia*, which is the tingling sensation that you might feel, depending on the device that is used.
- Allowing you to handle the system and demonstrate how it works.
- The trial procedure is explained in detail.
- Understanding that a successful trial will aim to reduce your pain by at least 50%, although the reduction may be far greater.
- Understanding about restrictions during the trial period such as showering, high impact exercise and activities.
- Understanding the differences between rechargeable and non-rechargeable batteries.
- Understanding any physical restrictions for the first 6-8 weeks after the implant.
- Understanding physical aspects e.g. how to manage the system when driving or doing physical activities or when undergoing medical imaging like MRI scans.
- Understanding the implant ID card and how to use it.
- Understanding how to deal with any problems that may arise.
- Providing you with relevant contact information and support.

Before you receive a spinal cord stimulator, you might undergo an assessment by several members of the team to ensure this is the right treatment for you.

We look at:

1. How you cope with unexpected events;
2. Other strategies you may use to manage your pain;
3. Your expectations regarding this therapy;
4. Your support network.



What happens during the trial phase?

The trial phase is the first step. The neurostimulator device is temporarily trialled for between 1 – 2 weeks.

The leads are inserted into the desired location through special needles. The leads and battery are then temporarily attached to the outside of your body, e.g. clipped to a belt.

The trial phase will seek to clarify whether your pain is reduced by spinal cord stimulation and how much you would benefit from a permanent implant.

You are encouraged to follow your regular daily activities to identify the benefits of the trial phase.

You will be regularly reviewed during the trial phase, in person and by phone. After the trial is done, the leads are easily removed.

You will need to complete a pain questionnaire before and during the trial phase. This will help identify the benefits of the trial.

You will sign a consent form with your pain specialist. The procedure is performed in a sterile operating room under sedation. An experienced consultant anaesthetist delivers the sedation. In some instances during the insertion and once the leads are in place, the device is activated and tested. This allows us to position the leads as perfectly as possible. To allow testing, the sedation will be reduced, so that you can provide feedback to your pain specialist.

You will stay in hospital for one night. This is to make sure there are no immediate problems and to allow time for accurate programming of the system, so as to provide you with the optimal amount of pain reduction.

Your pain medications before the trial phase

- *Please inform us if you take **any** blood-thinning medications such as Warfarin, Plavix, Pradexa, Xarelto or Eliquis. We generally ask that you stop your aspirin for a week before the procedure.*
- *To allow safe sedation, you will be instructed not to eat or drink anything for at least 6 hours before your procedure. This includes chewing gum.*
- *On the morning of the trial procedure, take all regular pain medications as you normally do, with a sip of water. Don't change the doses or stop them before or after the procedure.*



The trial procedure explained in pictures



The needle is positioned in the desired location while you are sedated. X-rays are used to guide accurate and precise placement of the needle(s).

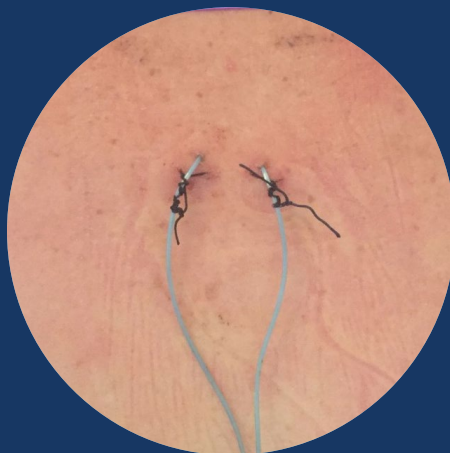
The aim is your absolute safety at all times.



Once the needle is in the correct position, the lead is inserted through the needle and placed in the correct location using x-rays to aid precise location.



Usually two leads are placed via two needles. This increases the chances of success.



Once the leads are correctly positioned, the needles are removed. The leads are left stitched to the skin, then taped up.



The leads and battery are secured to the outside of your body by various types of tape (or a belt) with the aim of ensuring they remain in position throughout the trial.

Upon discharge from hospital during the trial phase

Sometimes there can be discomfort from where the needles were inserted. This pain can last for 1-3 days. Once discharged from the hospital, it is beneficial to be as active as you would usually be – this will allow you to identify whether neurostimulation/spinal cord stimulation is effective in reducing your pain.

Whilst we encourage you to be as active as possible, it is also important to be mindful of some limitations:

- No bathing, showering, swimming – no contact with water during the trial.
- Bending: do not do a full bend down to your toes as this may cause the leads to move (migrate).
- Lifting: do not lift anything heavier than 2kg.
- Overhead reaching: do not lift your arms above your head as this may cause the leads to move (migrate).
- Twisting: do not make sudden, twisting motions as this may cause the leads to move (migrate).

Your pain medications during the trial phase

During the trial phase, take pain medications as you normally would.

Do not reduce or stop any of your pain medications.

At the week 1 trial review

Get an x-ray of the leads before you see your pain specialist and/or pain nurse. This will allow us to assess exactly where the leads are located. This will help with any extra reprogramming your system may require.

You will be given an x-ray form.

At the week 2 trial review

At this point you will be asked to complete a trial assessment questionnaire and the device will be disconnected and removed by cutting the stitch and pulling the leads out. You can then shower normally.

A positive/successful trial

A positive trial is when you experience significant pain reduction and/or other improvements like improved sleep. A permanent implant will then be appropriate.

A negative trial

If your trial is negative, other options will be discussed. These may include a different type of nerve stimulation/spinal cord stimulation device, or other non-interventional pain management options.



Post-operative complications

We are confident that your trial will go well but complications can still occur. These may include bleeding near the spinal cord or infections.

Problems that should not be ignored:

- Feeling unwell such as fever, nausea or flu like symptoms.
- New or worsening back pain.
- Any numbness or *pins and needles* that you did not have before the procedure.
- Weakness in the legs or arms.
- Difficulty passing urine.
- Incontinence of urine or bowels.

If any of these problems occur, you should alert our medical team immediately. If it is after hours or you are unable to get in touch with our medical team or a general practitioner, you should attend the nearest emergency department.

If you are unable to do that, call 000.



The permanent implant phase of spinal cord stimulation

Preparation for permanent spinal cord stimulator implant

We recommend about 4 weeks before proceeding to a permanent implant. This is to allow any swelling and inflammation from the trial phase to reduce.



What can I do to prepare for my permanent implant procedure?

Prior to hospital admission we recommend the following precautions taken to minimise the risk of infection. If any infections are detected, we must eradicate the infection before proceeding to the implantation phase.

- **Skin swab tests of the nose, groin and under arms**

We will arrange this for you.

- **Urinalysis test of your urine**

We will arrange this for you.

- **Dental check-up and professional teeth cleaning by your dentist**

Visiting your dentist to make sure there are no infections in your mouth and/or to get your teeth cleaned if necessary. This is because there are many bacteria in our mouths and if any of these bacteria get into your blood stream around the time of the implantation phase, this could cause an infection of the implant.

- **It is best to wear new or freshly cleaned pyjamas the night prior to your hospital admission and implant and for the nights you spend in hospital**

This is to minimize any dead skin flakes/cells and bacteria, which may be present on unwashed pyjamas.

- **Wash your skin**

In the days before the implantation phase we will ask you to use some pHisoHex (triclosan) or Johnson & Johnson Microshield (2% chlorhexidine) body wash to clean your skin. You should do this for 3-5 days before the implant.

- **Stop smoking**

If you smoke, you should stop: smoking increases the risk of infection. This is because smoking reduces blood flow and hence reduces your body's ability to deal with any infections. If you are unable to stop smoking, even just reducing the amount that you smoke around the time of the implantation phase can reduce the risk of infection somewhat.

- **Control your sugar**

If you are diabetic, your risk of infection will be higher than normal. The key to reducing this risk is to make sure your sugars are controlled and your diabetes is stable.

- **Control your weight**

Being overweight may put you at higher risk of infection. The key is to do your best to keep your weight controlled. Sometimes your pain specialist may even ask you to lose some weight before an implant can be safely implanted.

- **Live a healthy lifestyle**

Eating healthy foods may reduce your risk of infection.

- **Other procedures e.g. blood tests.**

Depending on the anaesthetist's assessment you may need other tests such as blood tests to ensure you are medically fit for the procedure.

The implantation procedure is undertaken under strict aseptic/sterile conditions in a clean operating room, with sterilised instruments and equipment. Your pain specialists follow a number of important steps during the implantation to keep the risk of infection to a minimum.

We focus on reducing the likelihood of an infection occurring, and we closely monitor the progress of the implanted device and the wound site.

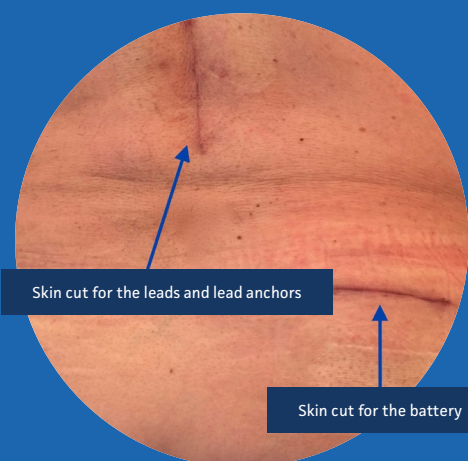


The permanent implant explained in pictures

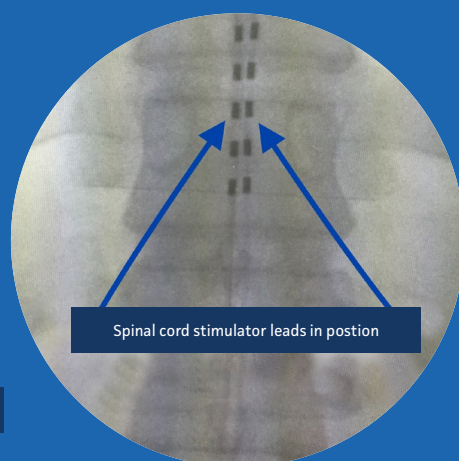
The permanent implant is undertaken in a similar way to the trial procedure except for a few extra steps, which enable the leads and the battery to be safely inserted.

A few of the extra steps are as follows:

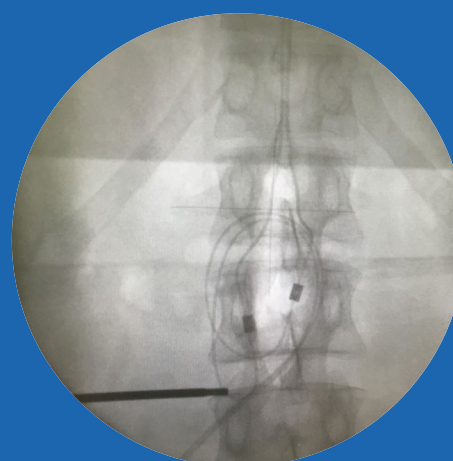
- You will have two small cuts on your skin: one is to allow the leads to be secured just in, or under the muscles of your back, and the other is to allow the battery to be placed under your skin.



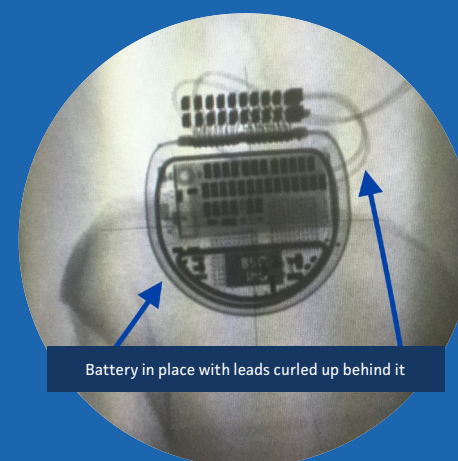
Skin cuts for the implant.



Two spinal cord stimulator leads and electrodes in position, side by side.



Curled leads and lead anchors both aimed to prevent any excessive movement of the leads.



Battery in place with leads curled up behind it.

Leaving hospital after the implantation of a spinal cord stimulator

Going home

You will stay in hospital for 1-2 nights after your operation to program your device.

The implant may hurt for a few days/weeks because it is a surgical procedure. You may require extra pain medications.

Sometimes you might be given some antibiotic medications to take home.

Going home after implantation of a spinal cord stimulator can make you feel a bit uncertain. We aim to provide you with the necessary information and support required to maximise the success of your treatment.

Looking after the wounds

You will have two wounds. The stitches are generally dissolvable and placed under your skin, so do not need to be removed.

Your dressings will remain in place for 3-5 days, until your review appointment.

Do not shower until after your review appointment, and leave the dressing intact. If the dressing needs reinforcing, it is ok to do so, but avoid removing the dressing where possible.

During the first week it is important to monitor your wound sites for infection. Look out for:

- Any leakage from the wound
- Any redness or excessive swelling
- Worsening pain around the wound site.

Let us know if you notice any of these. If there is an infection, we must treat it immediately to avoid removing the device.

Getting back to normal

It is normal to feel tired for up to 6 weeks after the implant. Remember to pace yourself.

Once the tiredness passes, you should naturally become more active.

You may go on holiday, including flying, as soon as you feel well enough. Your company technician will provide you with an ID card to show officers at airport security check points.

Make yourself known to airport staff for security clearance, which will then be conducted in a manner designated to passengers with implanted medical devices.

You may scuba dive up to 10m deep.



Are there any restrictions after my operation?

Physical activities

We encourage you to be as active as possible, however, it is important to avoid excessive activities for up to 8 weeks, as this may cause the leads to move (migrate):

- Bending: do not bend down to touch your toes.
- Overhead reaching: do not lift your arms above your head.
- Lifting: do not lift anything heavier than 2kg.
- Twisting: do not make sudden, twisting motions.

After about 3 months the device leads and battery will have settled into place and will be surrounded by scar tissue. At this time you will be able to increase your levels of physical activity.

Despite all the preparation and planning (safe movements), sometimes leads can move and complications can occur.

Having medical treatments or scans

Some medical treatments should be avoided, such as having MRI scans and radiation therapy.

X-rays, CT scans and ultrasound scans are safe but it is recommended that you turn your device off for them.

Some devices allow you to have MRI scans under certain conditions.

Driving

It is advisable that you don't drive for around a month after your implant. If you feel tired or unwell you should not drive.

You should turn off your device when you are driving. This reduces the risk of any episodes of excessive stimulation interfering with your ability to drive safely.

With a Nevro device, there are no restrictions to driving.

Getting back to work

This is best discussed with your pain specialist before you go home and will depend on what type of work you do. Generally you are the best person to decide how well you feel and what your limitations are. A period of 4–6 weeks' rest may be required.

We can provide you with a medical certificate for the hospital stay and your GP can provide further certificates as needed.

Taking your pain medications

The aim is to reduce your pain medication doses. This may take some time.

You should not make any changes to your pain medication following your spinal cord stimulator implant, as it can take time for the surgical pain and swelling to reduce. It can sometimes take a few weeks for the nerve stimulator control your pain.

We will advise you when to reduce your medications.

If you begin to experience side effects from your medications, please discuss this with your pain specialist or your general practitioner, as you may need to reduce some of the doses of your medications sooner than expected.



Post-operative complications

We are confident that your implant will go well, but complications can still occur. These may include bleeding near the spinal cord or infections.

Problems that should not be ignored:

- Feeling unwell such as fever, nausea or flu like symptoms.
- New or worsening back pain.
- Any numbness or *pins and needles* that you did not have before the procedure.
- Weakness in the legs or arms.
- Difficulty passing urine.
- Incontinence of urine or bowels.

If any of these problems occur, you should alert our medical team immediately. If it is after hours or you are unable to get in touch with our medical team or a general practitioner, you should attend the nearest emergency department.

If you are unable to do that, call 000.



Follow-up and ongoing care after your spinal cord stimulator implant

Follow-up

Appointments after the permanent implant are scheduled in the 1st and 2nd weeks and then at 1 month, 3 months and 6 months.

Annual review appointments will also be scheduled.

You may require several adjustments to the settings of your spinal cord stimulator; these can be undertaken with your device company representative. It can sometimes take a few months to reach adequate pain control, and your spinal cord stimulator may require small adjustments to the settings as your pain changes.

Did you know?

Most spinal cord stimulators come with a 12-month company warranty. The company does not cover the costs of accidental loss or damage to your equipment. It is recommended you add your programmer and recharging system to your Home and Contents insurance.

Spinal cord stimulation takes commitment from us as well as from you.

Remember

If you have any queries or concerns, or if something is not clear, please contact any member of your pain specialist team.

We are here for you and your family.

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