Introduction
Chronic pain affects almost one in five adults, impacting their ability to lead productive working, social and family lives. Chronic pain is defined as pain lasting longer than 6 months. Like you, most people experience months or even years of treatments without finding a suitable option.

Chronic pain is a complex disease with different causes and symptoms. It is often difficult to identify the exact cause and treatment must be customized for each patient. You probably have had one or multiple treatments to relieve your pain symptoms. You might still use medication to treat your pain.

Spinal Cord Stimulation (SCS) has been available for more than 40 years and is a well-established treatment for pain. The Dorsal root ganglion Neurostimulator System is a variation of SCS. This targets the Dorsal Root Ganglion (DRG), a small nerve structure branching off the spinal cord. It does not cure chronic pain, but it can provide effective pain relief in addition to medications and other treatments.

What is Spinal Cord Stimulation (SCS)?
The sensation of pain is felt when your body sends a pain signal to your brain. With chronic pain, that signal can continue even after the original problem has gone. Spinal Cord Stimulation is a more precise way of treating pain. SCS uses a small implanted system, similar to a pacemaker. The system creates small electrical pulses that go to your spinal cord. These pulses replace the pain signal with a tingling or massaging feeling called paraesthesia. This paraesthesia covers the specific areas where you feel pain.

What is DRG Stimulation?
DRG is a novel and still largely experimental method for focusing electrical stimulation of nerves to reduce pain. The target is a branch nerve of the spinal cord called the Dorsal Root Ganglion (DRG). The DRG has been a target for physicians for pain relief for many years. The DRG can regulate pain signals before they enter the spinal cord and travel to the brain.

The DRG acts like a traffic light and controls when sensations can enter the spinal cord. Stimulation at the DRG can create more red lights which may prevent pain signals from traveling to the brain. This provides a comfortable tingling or even an absence of pain.

With traditional SCS, leads are placed in the space behind the spinal cord, further from the nerves. With the DRG stimulation, the special leads can be placed closer to the target. This allows the system to focus the stimulation where it may better help relieve your pain.

The leads are stable and only small changes in stimulation occur when you move between standing, sitting or lying down. This can be a problem with traditional spinal cord stimulation. Clinical research has shown that DRG stimulation can treat pain in areas that have been hard to reach with SCS, like the lower leg and foot.
Introduction to the Dorsal root ganglion Neurostimulator System

Your DRG implant system consists of three components:

**Neurostimulator:** A match box-sized device that sends out mild electrical pulses. Both stimulators contain a battery and electrical components.

The Trial Neurostimulator (TNS) is used first and is worn on the outside of your clothing. The Implantable Neurostimulator (INS) replaces the TNS. It is implanted under the skin.

**Leads:**

Thin insulated wires which carry the pulses from the neurostimulator to the Dorsal Root Ganglion. The INS and leads are implanted inside your body.
Programmer:

A hand held “remote control” that lets you adjust the strength or the location of the stimulation and turn the stimulator on and off.

Process of trial and Implantation

Step 1: Trial Stimulation

If you decide to try the DRG stimulation, you will start with a short, reversible surgical procedure to implant the lead tip by the DRG. This will take 1-2 hours and is done under local anesthetic. You will stay in the hospital for approximately one day.

You will be awake during the procedure so you can give feedback about the stimulation. You will be lying on your stomach. Using techniques similar to a spinal injection or nerve block, your physician will first implant the small, thin leads near your DRG. The leads will then be attached to an external trial stimulator that you will wear on your belt or keep in your pocket.

Your nurse will program different settings and ask you what feels best. The goal of this stimulation procedure is to cover the complete area of pain with a pleasant tingling feeling. This is an important time to give feedback on how and where you are feeling the stimulation.

After the procedure, you will be trained on how to use your wireless programmer. You will be able to adjust the therapy settings yourself using this programmer. You can also turn stimulation on or off.

During the trial period, you and your doctor will decide whether DRG stimulation is right for you. You will be able to slowly resume typical daily living with the following precautions. For the first six to eight weeks after implantation of leads, you should:

- Limit physical activities that require lifting, bending or twisting of your back
- Avoid raising your arms over your head
- Not pull the extension lead coming out of the skin
- Take care of your surgical sites as directed
- Keep your trial stimulator dry and do not shower
Step 2: Implantation of the Permanent System

If the device fits your lifestyle and you are satisfied with the pain relief, you can choose to have the system permanently implanted.

A permanent implant procedure will be scheduled. Stimulation will be stopped ahead of the permanent procedure. The pain that was being treated may return to its original level.

The permanent implant procedure is similar to the trial procedure. At the implant, the lead outside of your body will be removed. A pocket will be made just under your skin, usually in the abdomen or buttocks area. The leads will be connected and an internal pulse generator (IPG) will be secured in the subcutaneous pocket.

After the implant, you and your Pain Specialist will work together to program the best pain relief. You will still use the wireless patient programmer to control your therapy.

If the choice is made to stop therapy, all leads and the stimulator will be removed. You and your Pain Specialist will discuss alternative treatments.

Frequently Asked Questions

What can I expect with my DRG stimulator System?

The DRG System does not cure or treat the cause of pain. However, it may improve your quality of life by helping to manage your pain. The amount of relief provided by the system varies from patient to patient. Do not expect to be completely pain free.

How long will it take before I feel better?

Recovery times vary among patients. The stimulation therapy will work within the first week after leads are placed. The wounds from the lead implant will take 1-2 weeks to heal. The pain from the stimulator placement will decrease over a 2-3 month period.

When can I resume my normal activities?

You should avoid bending, twisting, reaching, and picking up heavy objects for at least six weeks. You should continue to avoid extreme activities after these six weeks. Make small goals for yourself and attempt to achieve these goals.
Is DRG stimulation safe?

We think so from initial studies. The DRG Neurostimulator System has European approval (CE marking), indicating that this system is safe. However the procedure is very novel and so the complication rate in routine use in large numbers of patients is unknown. However we expect it will be no more than for SCS. The main complication is infection, treated by antibiotics but often requiring removal of the stimulator system.

What are the other things that can go wrong?

There are three main possible problems;
1. Movement of the lead away from the DRG, leading to reduction or loss of effect
2. Failure of the stimulator system
3. Inability to achieve adequate pain relief by stimulation

What about the evidence for long term efficacy?

There is limited data regarding its long term efficacy as the treatment has not been around for long. If at any time you would like to have the system removed, the leads and stimulator can be taken out by the doctor here.

Can I control the stimulation therapy?

Yes. You will be given a programmer that allows you to adjust the settings on your stimulation device. Your nurse will train you on how to use this programmer. You will be able to turn the therapy on and off, change the level of the stimulation and choose between different stimulation patterns.

Will the implanted device be visible? Will I feel it?

This depends on your size, your build and the location of the stimulator. You most likely will feel the stimulator under your skin but in most cases it is not visible to others.

Is it safe to use household appliances or cell phones with the stimulator?

Yes. It is safe to use microwaves, computers, cell phones and other general household appliances with your device. Security gates at stores or in airports may cause temporary changes in the level of your stimulation. While these will not damage your device, we recommend turning off your system as you pass through to ensure your comfort.
Can I drive my car with my stimulator on?

No. Always turn the stimulator off when you are operating a motor vehicle or other heavy equipment.

Can I travel or fly with the stimulator?

Yes. Air travel does not interfere with your system. Security gates in airports may cause temporary changes in the level of your stimulation. While this will not damage your device, we recommend turning off your system as you pass through to ensure your comfort.

In many cases, you may be able to bypass the security gate if you identify that you are implanted with a stimulation system. You will be given a patient identification card after your implant. Show this card to the security officer before you enter a security gate and/or choose to bypass the security gate.

Assessment of benefit or complications

To enable us to optimize your care, and to gain more information about this novel technique, we will need to assess you, your pain and its effects on your quality of life in the short term and long term. We will be using different methods to assess these points.

How long will benefit last?

Because this is a novel technique, no one really knows. We expect that if pain reduction is achieved by DRG stimulation, this will persist for some years. As for SCS, the batteries in the stimulator may wear out and be replaced after five years or more, requiring another small operation.

It is hoped that this leaflet will provide you with all of the information you require, but should you have any questions regarding this procedure please do not hesitate to contact the secretary for your pain consultant. Through the main hospital switch board 0151 525 3611.
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Log on to:

www.thebraincharity.org.uk or call 0151 298 2999 for advice and information for people with neurological conditions and their carers.