PATIENT INFORMATION

What is sacral nerve stimulation?

Sacral nerve stimulation ("SNS" for short) is used to treat several types of bladder problems and severe bowel incontinence. It is also occasionally offered for constipation and pelvic pain. Your specialist will discuss its use with you, along with other options.

When is SNS considered?

SNS may be worth considering if other treatments for your bowel or bladder incontinence have not helped and your symptoms are severe. SNS may not cure all of your symptoms, but it can reduce the amount of leak enough to improve your day-to-day life.

How does SNS work?

For SNS, flexible wires are placed through the small holes that everyone has in the fused bones at the base of the spine (the "sacrum"). The wires provide a small electrical pulse to the nerves that run behind the sacrum. The electrical stimulation is provided by a battery implanted in the buttock that acts like a heart pacemaker.

Figure 1 *An Interstim II sacral nerve stimulator (image reproduced with permission from Medtronic Limited, 2018).*

How SNS works is not fully understood, but it can improve symptoms of urgency (frequent urges to have a bowel movement) and improve control, which decreases the risk of accidents.

SNS can have a dramatic effect on bowel function and control, but not everyone sees a significant benefit. For this reason, SNS is set up in two stages. The first stage is a temporary SNS, where a small flexible wire is placed under the skin and attached to an external battery. The temporary device is left in place for 2–3 weeks while you keep a bowel diary, noting the times when you open your bowels and times when there have been bowel accidents or leaks. Your specialist then uses this diary to decide if a permanent implant will be beneficial to you. About 8 in 10 patients have a successful trial and go on to have a permanent implant.

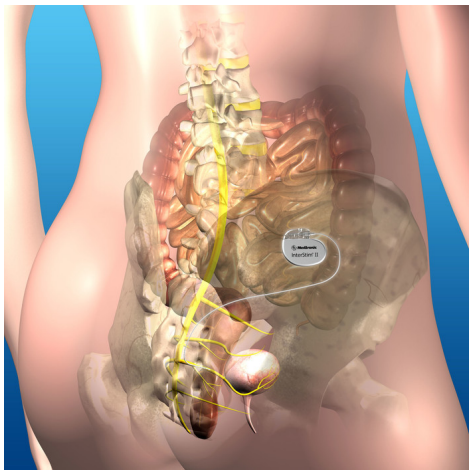

Figure 2 *An Interstim II sacral nerve stimulator in position (image reproduced with permission from Medtronic Limited, 2018).*

Trial phase

Your surgeon will advise you about two types of trial. One requires a temporary wire and the other requires a tined lead.

A temporary wire

For a temporary wire trial, a small flexible wire is placed using a small needle through the skin of the buttock to provide the stimulation. This wire may be placed under local anaesthesia with or without sedation or under general anaesthesia. The surgeon may use an X-ray machine to guide the placement of the wire. You will be given a small external stimulator box and taught how to control it with a handset. You may feel a slight tingling or pulsing sensation around the anus but this should not be uncomfortable. The lead is only kept in place by dressings, so these must be kept dry and not displaced during the trial period. You should keep the stimulator switched on throughout the trial, except when you are driving. Many people return to work during the trial period, but you should discuss your circumstances with your doctor. When you return at the end of the trial, the dressings and wire are removed

easily and painlessly without an anaesthetic. Your symptoms will likely return shortly after this, but if the trial was successful, a permanent implant can be arranged.

A tined lead

You may be offered a trial in which the actual electrode lead that will be used for the permanent stimulator is used for the test phase. This lead is placed through a needle but has anchors (tines) to keep it permanently in place in the bone. An X-ray machine is used to guide the placement of the lead. The lead is then tunnelled under the skin to a connector, which allows an external stimulator to control the stimulation in the same way as the test lead described above for a temporary wire. Again, dressings are used and these must not be dislodged or allowed to become wet.

During the trial phase you must do the following:

- Keep a symptom diary that can be used to determine if the trial is successful (this is a requirement of the National Health Service)
- Keep the dressings, stimulator box, and controller dry; ideally, have sponge baths rather than full baths or showers
- Avoid excessive bending, stretching, and lifting
- Refrain from sexual activity
- Discuss any additional medical procedures you may be undergoing during the trial phase with your doctor; diathermy (cautery) and MRI scans cannot be performed at this time
- Switch off the stimulator when driving or operating power tools.

Permanent implant

At the end of the trial period, you will need to undergo another procedure to implant the battery or, if the trial is not beneficial, remove the wire or lead. The temporary wire can be removed easily in the outpatients clinic, but a tined lead requires removal in an operating theatre (using either local anaesthesia and sedation or

general anaesthesia). If a temporary wire has been removed, the next step is implantation of both the tined lead and battery.

The battery is about the size of a small matchbox and is implanted in a pocket in the buttock. This is connected to the tined lead under the skin. The procedure can be performed using local anaesthesia, with or without sedation, or general anaesthesia. You will be given a hand controller that can change the settings when placed close to the battery. You will be taught how to change the settings. There are a number of programmes that your team can work through to give you the best control possible.

The lifespan of the battery depends on the settings used but should not need replacing for at least 5 years. Changing the battery or wire needs another procedure similar to the one on the implant day. Rechargeable batteries have been developed for SNS. A wireless recharging device is used to recharge them. The lifespan of these batteries may be up to 10 years.

Figure 3 *A rechargeable battery developed for sacral nerve stimulation (image reproduced with permission from Axonics Modulation Technologies Inc, 2018).*

What are the risks of SNS?

Your doctor will discuss the risks of SNS as part of the consent process. The immediate risk is an implant-related infection. This type of infection can be difficult to treat, so if you have any concerns about the wound, you must let your doctor know as soon as possible. An infection could involve the lead only or the whole

system. The risk of this complication is thought to be between 1 in 50 and 1 in 20. Bleeding and bruising may also occur, but are uncommon. Very rarely, a blood clot can cause pressure on a nerve and require treatment.

What will life be like with an SNS system?

An SNS system is designed to improve bowel function, allowing users to live normally with some exceptions:

- Activities that involve sudden, excessive, or repetitive bending, twisting, bouncing, or stretching, such as gymnastics and mountain biking, should be avoided, especially soon after surgery. There is a risk of the lead (wire) moving (migrating) with repeated heavy impact. Falls or jolts from skydiving, skiing, horse riding, or contact sports such as rugby may increase the risk of lead migration. Please discuss any physical activities you wish to pursue with your doctor before implantation.
- Sexual activity is not restricted after a permanent implant.
- Always tell other doctors treating you that you have a stimulator. Some medical treatments affect the working of the stimulator. Standard (monopolar) diathermy (electric cautery) cannot be used when you have an implant. You will be given a card to carry with you at all times to let people know you have an SNS system in place.
- People with an SNS are unable to have MRI scans (except for the head, and even then only with certain MRI scanners). If you have a condition that may require an MRI scan, you must discuss this with your specialist.
- SNS devices can be switched off by airport screening systems and theft detectors, so you will be given a card to show to airport security officers.
- Implanted stimulators should be turned off when driving or operating power tools.

- Patients using SNS should discuss scuba diving and use of a hyperbaric chamber with their doctor.

Are there any long-term problems with SNS?

SNS is considered to be the best surgical treatment for bowel incontinence, mainly because it is relatively safe. However, it is not perfect. About half of all people who opt for this treatment experience long-term problems that require reprogramming or modification of their SNS system in some way. The following are some of the unwanted effects of stimulation:

- Changes in bowel movements or emptying of the bladder (this is the intended effect of SNS, but may be more than expected)
- Pain related to the lead, battery, or stimulation. This may be helped by turning the current down or changing the programme (electrodes). Sometimes sudden electrical sensations may be experienced that require the stimulator to be turned off.
- Migration or breakage of the wire. Movement of the wire can prevent the SNS working correctly. This can be related to sudden impact (see above) but occasionally there is no obvious cause. This problem can be diagnosed by your doctor or nurse using the programmer. Some patients require another implant procedure.
- Persistent or recurrent symptoms. If a trial is successful, the permanent implant will usually be effective. However, it may take some time to establish the best programming. In a small number of cases, the permanent implant will not be effective.

For further information, please refer to the manufacturers' manuals.

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