

Spinal Cord Stimulation

What Is A Spinal Cord Stimulator?

A Spinal Cord Stimulator (SCS) is a device placed on the spinal cord to improve pain.

SCS can be used to control neck or low back and leg pain. The exact mechanism of pain relief remains unknown. However the proposed theory is that the stimulator blocks the sensation of pain as it travels to the brain so that the patient does not perceive the pain. Additionally, the stimulator may cause certain chemicals to be released that suppress pain. A SCS does not improve other symptoms such as weakness or numbness.

Prior to consideration for SCS, the patient must undergo neuropsychiatric testing. Psychosocial influences are recognized as an important determinant to SCS treatment, and ~20-45% of chronic pain patients suffer from psychiatric illness. Depression consistently has been proven to prevent a good outcome with SCS. Severe anxiety, paranoia and other psychiatric conditions are also conditions associated with poor success of SCS.

Prior to permanent implantation a stimulation trial is performed, usually by a pain physician. Trial electrodes can be placed through the skin and are connected to a battery for 3-5 days. This is an outpatient trial and the patient goes home and proceeds with normal activities. If the patient experiences greater than 50% pain relief, a permanent SCS can be considered. The trial cannot be continued indefinitely because the electrodes outside the body can become infected.

To place a permanent SCS, the stimulator itself and the battery are surgically placed under the skin. The surgeon accesses the spine through an incision in the back. The SCS is placed on the spinal cord and connected to a battery, usually in the buttock.

The benefit of SCS is that it controls pain from many different causes. Some people have spine and extremity pain but are not candidates for other spine surgeries. Some people previously have tried spine surgery and all of their symptoms are not resolved. Some people have nerve damage from injuries or other orthopedic procedures. Regardless of the cause of pain, SCS may improve the pain. It is important to understand that SCS does not work in everyone and that is why a trial is done prior to permanent implantation. Additionally, SCS does not resolve all pain and does not preclude the need for other spine surgery in the future. Most patients still need to take

at least some medication after SCS and the effect of SCS can diminish with time.

Often SCS is performed with the patient awake so the stimulator can be tested in the operating room to verify it's in the correct location. Some people are not candidates for an awake procedure or cannot tolerate an awake procedure. In these instances the procedure is performed asleep.

Why Do I Need This Procedure?

A SCS is placed for pain control only. It is primarily reserved for patients either who have tried other spine procedures without satisfactory pain relief or for patients with pain who do are not otherwise candidates for spine surgery. Rarely SCS is used in patients who could benefit from a fusion or decompression, but this usually is not recommended.

Common known conditions treated with SCS are failed back surgery syndrome (FBSS), complex regional pain syndrome (CRPS), reflex sympathetic dystrophy (RSD), peripheral neuropathy, phantom limb pain, and ischemic limb pain

SCS is not used to treat weakness or numbness. If you have these symptoms, they will still be present after SCS surgery.

How Do I Prepare For This Surgery?

- 1) **Stop smoking.** If you smoke, try to stop before your surgery. People who smoke have more disc problems and back/ leg pain than people who don't. The complications of surgery are lower and recovery is quicker in non-smokers.
- 2) **Stop certain medications.** If you are on blood thinners such as Coumadin (Warfarin), Plavix, Pradaxa, Xarelto, Eliquis, notify Dr. Smith and your primary care physician. These medications will need to be stopped prior to surgery and you will need to remain off them for a period following surgery.
- 3) **Weight loss.** If you are overweight, then weight loss before surgery may lower complications and improve your recovery. Discuss with Dr. Smith and your primary care physician if it is recommended for you to try weight loss before surgery and how to go about the weight loss.
- 4) **Ask for time off work.** You will need to be off work for at least 4 to 8 weeks following surgery. It may be longer in certain circumstances. Make arrangements with your employer. We understand the financial constraints of many patients and the need to return to work as soon as possible. But please understand that if you return too early this may impair your healing and limit the beneficial effects of surgery.

- 5) **Stop eating and drinking the night before surgery.** It is standard to stop all food and drink the midnight before your surgery, even if your surgery is not first thing in the morning. You may also be asked to stop certain medications as well. If you are allowed to take some of your medications, you may take them with small sips of water. Definitely no coffee or juices the morning of surgery.
- 6) **Be a little early to the hospital.** The hospital will call you the day before surgery to notify you when to arrive at the hospital. Please be a little early. Dr. Smith performs many surgeries in a day and so your surgery time may be moved earlier than scheduled. Please be near your phone the day before and the day of surgery in case you are called of scheduling changes. Unfortunately, your surgery may also be delayed and we will notify you of this as well.
- 7) **Ask someone to drive you home and be available after surgery.** You will be admitted to the hospital for a few days following surgery, but when you are discharged you cannot drive yourself home. You need to make these arrangements ahead of time.

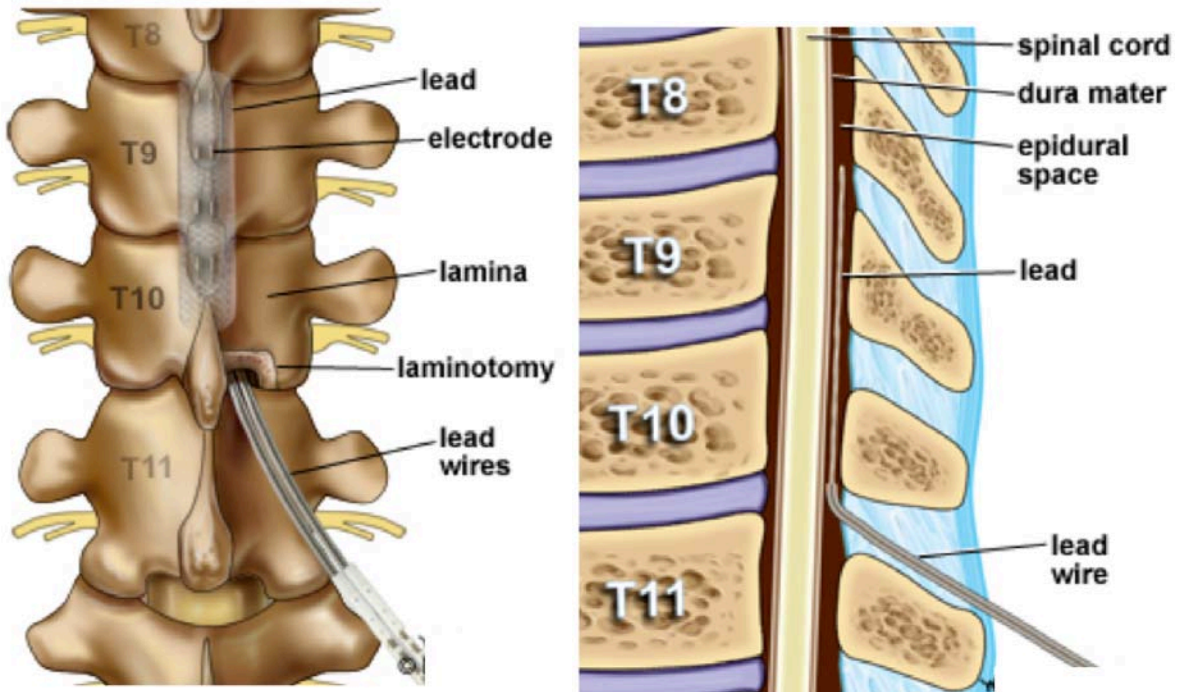
How Is A SCS Performed?

The Operation

The operation is performed with the patient positioned on his or her stomach. Usually you are sedated but awake for the procedure. If awake, the anesthesiologist will perform a nerve block in your spine and give you relaxing medication.

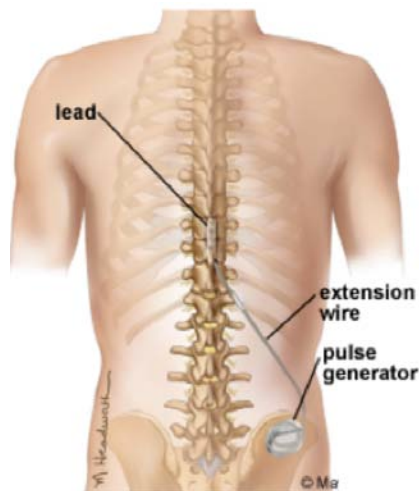


Using xray as a guide, the SCS for neck pain is placed high in the cervical spine and the SCS for low back and leg pain is placed in the low thoracic spine. A 6-7 centimeter incision is made and the bone covering the spinal cord (lamina) is removed.



The spinal cord stimulator paddle is passed over the back of the spinal cord in what's called the epidural space.

With the patient awake, the SCS is stimulated and the patient is asked if the pain is improved in the region where the pain previously was felt. Once the stimulator is in the correct position, the patient is sedated and the SCS is connected to a battery in the buttock



What Happens After Surgery??

You will wake up from surgery in the operating room or recovery area. After about 45 minutes, your family will be allowed to see you. Often you will have new back pain from the procedure itself. As most patients have been on pain medications for a long time, the usual pain medications tend not to work as well. However this pain will improve with time. Often the SCS is not yet turned on and you will need to visit your pain physician to start the stimulation. You will visit with them for multiple visits to adjust the stimulation to maximize the benefits and limit the side effects. This is an outpatient procedure so you will be discharged home.

What Happens When I Get Home??

When you get home, it is important to be active. It will be much harder to fully recover if you stay in bed or sit in chairs all day. However you must not be too active. You cannot drive a car while in pain or on narcotics. You must avoid bending, twisting or turning as this could cause the SCS to move. No lifting anything heavier than a gallon of milk. You must leave your bandage on the incision. You may shower the day following surgery but leave the bandage alone, do not remove the bandage and do not submerge the bandage under water. If your bandage comes off on its own, do not attempt to cover it with your own bandage at home. If you start to see any redness or drainage call our office. You must avoid constipation following surgery. Pain medications and muscle relaxers may make you constipated so start taking a stool softener. If after a few days you still have not had a bowel movement, you may need to take a laxative, enema or even a suppository. It sounds trivial, but prolonged constipation will make you feel awful quickly. You need to make an appointment to see Dr. Smith ~2 weeks after surgery.

If you have any questions after surgery, please call our office between 8:30 and 5pm. If you need medications, remember you need to come to our office to pick them up. We cannot legally call in narcotic or muscle relaxing medications to your pharmacy. So if you are getting low on these medications, call our office ahead of time between 8:30 and 5pm Monday through Friday so you can pick up a prescription. If you take your medication more than we prescribe, we will not refill it early.

How Long Will It Take Me To Recover?

Dr. Smith will explain your recovery program. At one month it is possible for you to return to work depending on what type of work and if it can be light duty desk work. Again, you have a chronic pain syndrome and therefore you probably have been taking pain medication for a while. Surgery in these circumstances leads to even more pain which is difficult to control at first. Please be patient with your recovery.

Are There Any Potential Risks Or Complications?

All treatment and outcome results are specific to the individual patient. Results may vary. Dr. Smith cannot guarantee pain improvement even if the trial was successful. It is important to understand the risks to surgery and we have listed some below. Additionally, there may be risks we have not listed.

Risks:

- 1) **Blood loss.** Blood loss is usually very small. But as with any surgery, there is the potential for major or even life-threatening blood loss.
- 2) **Infection.** Even with antibiotics and careful technique, there is still a small risk of developing infection. This could require antibiotics or even further surgery to resolve. Infections may result in residual pain or neurologic deficits including weakness, sensory changes or bowel/bladder incontinence. Unfortunately this could become permanent. Infection may result in having to remove the SCS.
- 3) **Reaction to anesthesia.** Anytime you are given medications you can experience an adverse reaction. Even if given medications you have tolerated in the past, you can develop new reactions.
- 4) **Cerebrospinal Fluid (CSF) leak.** Your nerves sit in a sac, which contains your nerves and spinal fluid. During surgery the sac may accidentally be punctured or opened. When Dr. Smith observes this he will attempt to fix it during surgery. However the fluid may still leak or Dr. Smith may not see it leaking. This may lead to headaches after surgery. At the surgery site a bump under your skin may occur or the fluid may even leak out of the incision. This could lead to infection or other problems requiring further surgery.
- 5) **Damage to the spinal cord or nerves.** The surgery is performed around your nerves. In the process of decompressing your nerves, injury to the nerves can occur including pain, weakness, sensory changes or bowel/bladder incontinence. Unfortunately this could become permanent. It may require additional surgery to improve.
- 6) **Hardware failure.** After surgery the SCS could move or improperly stimulate your spinal cord. This could lead to injury to your spinal cord or weakness, sensory loss, abnormal sensations or bowel/bladder incontinence. Sometimes changing the stimulation without surgery is successful, but sometimes surgically moving or removing the stimulator is indicated and the neurologic dysfunction may not improve.
- 7) **Hematoma.** There is always bleeding during surgery and unfortunately a small amount of blood can collect and press into the nerves. This sometimes requires further surgery to decompress.

- 8) **Progression of spine disease.** The surgery involves removing some bone to insert the SCS. This may result in other spinal levels degenerating faster and need for additional surgery. Additionally, natural arthritis may progress despite the SCS and require additional spine surgery to address these changes.
- 9) **Failure to relieve symptoms.** Dr. Smith will do everything possible to give you the best results with the surgery. However, surgery may not relieve all or any of your symptoms.
- 10) **Reoperation.** As listed above, there are numerous scenarios which may require additional surgery in the future. Whether for reasons listed above or reasons not listed, undergoing surgery now does not preclude you from potentially needing surgery in the future.
- 11) **Death.** As with any surgical procedure, there is a risk of death. This is rare.