

Spinal Cord Stimulation

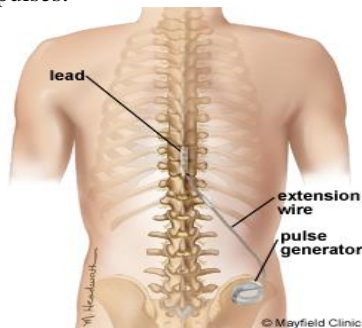
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Abstract—This presentation is about spinal cord stimulation. It is a device surgically implanted in the body to reduce chronic pain. It is a widely used solution for patients that suffer from various painful diseases. It does this by using a pulse generator, a lead wire with electrodes on it, and an extension cord.

A spinal cord stimulator is a device that is surgically placed under the skin that sends a mild electric current to the spinal cord. This current stimulates the spinal nerves to block the feeling of pain. A spinal cord stimulator would be a suitable solution for patients with chronic pain in the lower back, arms, or legs, or suffer from diseases like failed back surgery syndrome or complex regional pain syndrome. Failed back surgery syndrome is when multiple surgeries to control chronic leg pain fail to cure patient. Complex regional pain syndrome is a disease of the nervous system which causes the patient to feel constant burning pain in the foot or hand. It is usually a last resort for patients, when medication and surgery have failed to reduce chronic pain and it is greatly interfering with their lives.

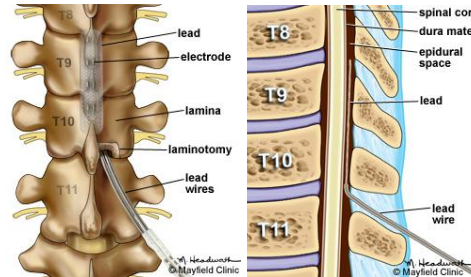
When someone feels pain in a certain body part, it happens because of nerves that carry painful peripheral stimuli connect to the dorsal horn on the spinal cord. So the purpose of the spinal cord stimulator is to conduct an electric current to block those painful signals from traveling into the spinal cord up to the brain.

The most common spinal cord stimulator consists of an implantable pulse generator with a battery, a lead with a number of electrodes, and extension wire that connects the pulse generator to the lead, and a hand-held remote control that turns the generator on and off and adjusts the pulses.



This device is surgically inserted. A small incision is made in the middle of the back, and the lead is placed in the epidural space of the spinal cord. The pulse generator is also placed inside the body, usually in the abdominal or gluteal area. Then, the extension wire is passed under the skin from the spine to the pulse generator. The way that this device works is that the electrodes on the leads block the pain signals from reaching the brain, so instead, the

patient either feels no pain in that certain area or a tingling sensation when pain would normally be felt.



There are certain advantages and disadvantages to this device. Recent results have shown that 40-70% of patients suffering from chronic pain have had good to excellent long term relief, and some were even able to return to work and live a normal, active lifestyle. Spinal cord stimulation also reduces the need for pain medication, which is cheaper and makes life easier for the patient. Also, the patient has full control over the device, so they are able to turn the stimulator on and off and adjust the strength. However, there are many risks, which include spinal fluid leakage, worsened pain in some cases, overstimulation, the leads becoming repositioned, or the stimulation could affect the wrong location. Also, the patient cannot have the stimulator on while doing such tasks like driving or lifting heavy items.

I think that spinal cord stimulation has a bright future, especially because it is already widely used and many people have the device already and have seen promising results. However, I think it would improve this device if the surgery wasn't so risky, because although if it is implanted properly it has great results, if something goes wrong, it can turn the patients situation into something much worse.

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