



Spinal Cord Stimulation

An Exciting Option in Pain Management

By Sarah Storey Smiles / Reprinted from Healthy Cells Magazine, July 2007

In the early 1960's, psychologist Ronald Melzack and neuroscientist Patrick Wall put forth the gate control theory of pain, which described how an individual perceives pain. Earlier scientists already understood that the experience of pain occurs when pain messages are sent from nerves near an injured body site to the spinal cord and on up to the brain. However, the gate control theory stated that pain messages encounter "nerve gates" in the spinal cord before they can reach the brain. When the gate opens, pain messages get through to the brain and can result in intense pain. When the gate closes, pain messages are blocked from reaching the brain, preventing the sensation of pain.

The gate control theory of pain provided the initial scientific basis for spinal cord stimulation, or neurostimulation, a highly effective treatment option for many people struggling with chronic pain. Demaceo Howard, M.D., medical director of the Methodist Medical Center Pain Management Clinic, has used neurostimulation for over 10 years to help hundreds of patients reduce chronic pain and enjoy a better quality of life. Dr. Howard, a certified Diplomate of the American Board of Pain Medicine (DABPM) and a fellow of Interventional Pain Practice (FIPP), devotes 100 percent of his medical practice to pain management, working with his colleague, W. Keith Barnhill, PH.D., CRNA (Certified Nurse Anesthetist), and Diplomate of the American Academy of Pain Management.

What is Neurostimulation?

Neurostimulation is the stimulation of the spinal cord or peripheral nerves (nerves outside the spinal cord, including nerves in the lower spine region) by tiny electrical impulses. An implanted lead, a flexible insulated wire, is placed near the spinal cord. The lead, powered by a bat-

tery, sends out a current that blocks, or closes, the "gate" on pain messages to the brain, replacing pain with a mild, pleasant tingling sensation.

In the 1980's, spinal cord stimulation became a fully implantable and programmable therapy. The technology grew from cardiac pacemaker systems. One of the manufacturers of spinal cord stimulation devices calls the Neurostimulator a "pain pacemaker."

"The practice of Neurostimulation blossomed in the early 1990's, and with the advent of implanted, programmable Neurostimulation devices, the patient is given the convenience of changing the settings on their device," Dr. Howard said. "This programmability has a profound effect at controlling pain. The patient's ability to vary the stimulation experience has been associated with greater patient satisfaction with the therapy."

When is Neurostimulation Used?

"In the U.S., the number one reason for implantation is spinal pathology (abnormality) that causes back, neck, or extremity pain," Dr. Howard said. "The majority of these patients have had previous back surgery (or epidural steroid injections) and have continued to experience pain or have had a return of their pain symptoms." For other patients, neurostimulation presents a possible alternative to surgery. By controlling pain, the device can also help some people approach physical therapy more aggressively.

Spinal stenosis, an arthritic narrowing of the lumbar (lower back) or cervical (neck) spinal canal that causes compression of nerves and interferes with blood flow to the spinal cord, is a common spine pathology that may be treated with neurostimulation. Evidence suggests that neurostimulation therapy improves blood flow to the spinal cord," Dr. Howard explained.

The Neurostimulation Trial

Before a patient decides to have a neurostimulation system implanted permanently, a neurostimulation trial is performed. "One advantage of this therapy over others is that we can test it before it's actually used long-term," Howard explained. The test trial begins with the patient coming to the outpatient procedure room, where Dr. Howard places a stimulating lead in the epidural space under the guidance of "live" or real-time, x-rays, administered by a registered radiology technologist. A registered nurse who specializes in pain management and a certified surgical technologist assist Dr. Howard in the minimally invasive procedure.

"Twilight anesthesia" is used during the trial, enabling the patient to be awake during the procedure. As Dr. Howard moves the stimulating lead inside the epidural space that surrounds the spinal cord, he asks the patient questions about the location and intensity of the stimulation, or tingling sensation. This process continues until the patient provides feedback that the best pain coverage has been achieved.

The end of the lead is taped to the patient's skin and plugged into a small rechargeable lithium battery outside the body. Before going home the same day of the procedure, the patient is given instructions on how to use a controller device about the size of a cell phone. During a trial period that lasts 7 to 10 days, the patient uses the controller to adjust the settings on the battery, turning the intensity of the stimulating current up or down and even adjusting the area of pain coverage. "The patient has control over the stimulation settings," Dr. Howard said.

Neurostimulator Implantation and Success Rate

"A trial is considered successful if it reduces pain by at least half or more," Dr. Howard explained. "In many successful trials, patients will experience close to or complete pain

relief. If this level of pain reduction is achieved, then the decision is in the patient's hands whether or not to have the device implanted permanently."

If an individual decides to have the pain pacemaker implanted, the battery is placed inside a small internal "pocket" in the lower back during a second outpatient procedure. The battery, about the size of a pocket watch, may be felt as a small bulge under the skin. (A rechargeable battery that may last as long as nine years is an option.) The patient simply touches the controller to the area on the lower back where the device is implanted to program the intensity of the current.

Follow-up includes a routine yearly office visit, as well as physical therapy starting six weeks to two months following implantation. Dr. Howard said he also encourages weight loss, if needed, a healthy diet, and lifestyle changes to help promote long-term pain management.

Dr. Howard said the success rate of his neurostimulation-tested patients is 95 percent. (The national average is 75 percent.) "The devices are proven to pay for themselves after just two years or less," he explained. "Third parties pay for this device because it can lead to a greater than 50 percent reduction in pain medications, decreased office visits, and other interventional pain management procedures. Total healthcare expenditures are reduced."

"It's phenomenal that something this simple works so well for people who have suffered for so long. Many patients eliminate their pain medications completely and return to a more normal lifestyle. We're talking about reducing a person's pain by half without any medication side effects,"

For more information, call the Methodist Pain Management Clinic at (309) 672-5950 or the Advanced Pain Management Institute at (309) 692-1539