



# Physician Update

**Part 2 of 2:**  
The High Cost of Unmanaged Hearing Loss on Our Health Care System



Spinal Cord Stimulation For Chronic Pain: A Perspective  
From the Rumford Hospital Pain Management Clinic



# The High Cost of Unmanaged Hearing Loss on Our Health Care System



**By David A. Jardine, Au.D., CCC-A  
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*The cost of hearing health care to the individual is one of the primary reasons people delay treatment for hearing loss.*

The average cost of a hearing aid, including professional services and fees (e.g., hearing testing, counseling, fitting, programming and fine tuning the aid), is \$1,700. (Average price range is \$800 to \$2,500.) For the majority of people, this is an out-of-pocket expense. Unfortunately, the cost of not treating the problem may be significantly greater than the cost of treatment.

Research indicates that people with impaired hearing tend to do poorer academically than their peers with normal hearing. This underachievement in academics can set the stage for a lifetime of unemployment or underemployment. The unemployment rate for people with a severe hearing loss is 15.6%, double that of the normal hearing population (7.8%) and nearly double that of their peers (8.3%) who use hearing aids.

A study conducted by The Better Hearing Institute found that people with hearing loss earn an average of \$12,000 less per year than those with no hearing loss or with treated hearing loss. The study also reported that 33% of individuals with hearing loss have incomes less than \$30,000. Use of hearing aids was shown to reduce the risk of income loss by 65% to 100%, depending on the severity of the hearing loss.

In addition to the direct effect on the individual's economic prosperity, it is noteworthy that hearing loss also has an adverse affect to society in lost tax revenue and productivity. For America's 24 million hearing impaired who do not use hearing instruments, the impact of untreated hearing loss is quantified to be in excess of \$100 billion annually. At a 15% tax bracket, the cost to society could be well in excess of \$18 billion due to unrealized taxes.

It is well known that a lower socio-economic status is highly correlated with delayed health care. It is also correlated with higher participation in state and federally funded health care programs. Encouraging patients to take action to improve their hearing could enable them to live healthier, more productive lives. Moreover, it could be critical to the long-term sustainability of our health care system. The Senate Special Committee on Aging, in

S. Rpt. 107-74, reports that “untreated hearing loss causes significant costs to Medicare and other health programs due to loss in independence, social isolation, depression, safety issues, associated health problems and general decrease in quality of life.” The report further states that “as the wave of seniors begins to experience age-related disability, our current long term care system will not be able to support this demographic shift.” Early identification of hearing loss is important to helping keep people healthy and to controlling medical costs.

### The Healthcare Provider’s Call to Action

The Better Hearing Institute indicates that only 23% of the population who could benefit from management for hearing loss receives help. The three most common obstacles to people obtaining the help they need include: lack of awareness that a problem exists and/or denial of its significance; misperception that hearing aids could not help them; and financial constraints to getting help. Fortunately, most of these obstacles can be overcome through patient education and advocacy.

Hearing loss poses increased risk to personal safety. Noise induced hearing loss is the most common occupational disease and the second most self-reported occupational injury.

Physicians and other health care providers are in a unique position to be a powerful advocate for better hearing. Currently, only 13% of physicians screen patients for hearing loss. Given the importance of problem recognition, the simple act of providing patients with some form of hearing loss measure, whether objective or subjective, could help

identify those patients who are at risk, or in need of help, for hearing loss. Physicians and health care providers are also in a unique position to educate patients on the impact of untreated hearing loss on quality of life and can be very influential in directing them to the proper care they need.

For patients with hearing loss, the majority can enjoy significant benefit from the use of hearing aids. Hearing aids enjoy a very high satisfaction rate. Overall patient satisfaction with new hearing instruments is 77%, placing this product in the top-third of products and services in the United States. Advances in digital technology have dramatically improved hearing aids in recent years, making them smaller, with better sound quality, and more effective at reducing background noise for improved hearing in challenging environments.



Cost can be a significant hurdle to people taking the step toward improved hearing. Research (MarkeTrak 7, 2010) indicates that 68% of the people who have not obtained hearing aids to help them with a hearing loss cite financial constraints as a core reason. To address this problem, the Federal Government is considering “The Hearing Aid Assistance Tax Credit Act”, which may help make hearing aids more affordable for millions of Americans. The Hearing Aid Tax Credit Act would provide a tax credit towards the purchase of each hearing aid of up to \$500 per hearing aid, available once every 5 years. The bill has received significant bi-partisan support. Additional support from constituents “back home” could help secure its passage. Physicians and healthcare providers are encouraged to contact their representative in the House and their senators to express their support for this bill and help make better hearing available to everyone.

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Additional sources of financial assistance for hearing aids currently exist. There are a number of non-profit organizations, such as the Lion’s Club, that provides hearing aids to low income people. Additionally, unions and employers benefit plans (e.g., flex dollar spending programs) and low (or no) interest loans may help remove personal finances as an obstacle to hearing aid acceptance.

In the end, we all must be more proactive advocates for hearing healthcare. By educating patients about the importance of good hearing, the availability of help and its potential affordability, we can help a significant segment of our population. We can help our patients enjoy healthier, more productive lives through better hearing. Simultaneously, we can help improve the “health” and viability of our healthcare system. Good hearing is good for everyone.

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# Spinal Cord Stimulation For Chronic Pain: A Perspective From the Rumford Hospital Pain Management Clinic



By Daniel Lalonde, M.D., Sally Arsenault, R.N.,  
and Tamera Richard, R.S.A.

*Managing patients with chronic pain remains one of modern medicine's greatest challenges. Pain that is severe, persistent, and unresponsive to medications, physical rehabilitation, psychotherapy, therapeutic nerve blocks, and surgery can be daunting and debilitating for patients and their families.*

Furthermore, chronic pain produces a myriad of adverse physical and psychological effects often leading to the inability to work, preoccupation with pain, depression and a deterioration of family life. Spinal cord stimulation (SCS) is a minimally invasive procedure that offers a viable treatment alternative that has proven to be both clinically successful and cost effective in properly selected patients.

## Mechanism Of Action

Electrical stimulation for the treatment of pain was first documented in 600 B.C. Ancient physicians utilized the electrical powers of the marine torpedo by applying a live fish to the top of the head to relieve prolonged headaches. Despite this long history, the first theory proposed to explain the suppression of pain by electrical stimulation did not appear until 1965 when Melzack and Wall proposed the gate control theory. (Melzack R., Wall P.D. Pain mechanisms: a new theory. Science 1965; 150:171-79.) Melzack and Wall proposed that a "gate" system existed for pain modulation located in the dorsal horn of the spinal cord. It was based on the idea that tactile and vibratory stimulation of the large myelinated A fibers closes the dorsal horn "gate" which inhibits the propagation of pain impulses along the poorly myelinated C fibers due to their shared location in the posterior aspect of the spinal cord. Ultimately closing the "gate" reduces the nociceptive input from the periphery. The core technology that is used in today's SCS system in essence is based on

this theory. A simple example of this theory is seen when one has a headache or accidentally bumps ones knee. Many people will rub their temple or knee, stimulating the large myelinated sensory fibers of the skin. When these areas are stimulated, to some degree they block the sharp pain and inhibit the acute stimuli to the brain. In addition to the gate theory it is presently evident that SCS activates a cascade of different mechanisms (GABA, glutamate, aspartate, substance P and other neuromodulators) to treat different types of pain such as neuropathic and ischemic. In general, these mechanisms seem most dependent on activation of only a few segments of the spinal cord.

The gate control theory motivated Shealy in 1967 to apply SCS as a means to treat patients with chronic intractable pain. (Shealy C.N., Mortimer J.T., Reswick J.B. Electrical inhibition of pain by stimulation of the dorsal columns: preliminary clinical report. Anesth Analg 1967; 46 (4):489-91) Shealy reasoned that sustained electrical stimulation of the dorsal columns of the spinal cord which are easily accessible would keep the gate closed and provide pain relief. This was done by sending small electrical impulses created by a compact generator through thin leads along the epidural space of the spinal canal where pain signals were blocked as they traveled to the brain. It was through these early trials that SCS was developed. As with many early instrumentation devices, initial problems included poorly designed hardware (electrical leads and power generator), inadequate patient selection criteria, and suboptimal surgical techniques (open laminectomy).

With major advances in hardware technology, SCS implantation for the majority of cases has become a minimally invasive procedure that is performed percutaneously in the outpatient setting.

### Indications and Patient Selection

Patients with complex regional pain syndrome (CRPS) and patients with extremity neuropathic pain are the best candidates for SCS. The FDA has approved SCS for chronic intractable pain of the trunk or limbs, including unilateral or bilateral pain associated with failed back surgery syndrome (FBSS), postlaminectomy pain, lumbar or cervical radiculopathy, spinal arachnoiditis and epidural fibrosis, painful peripheral neuropathy and complex regional pain syndrome (CRPS). As neuromodulation technology evolves, new indications are emerging. In our experience, as well as that of other implanters, we have seen significant success in many patients with other chronic pain conditions including: postherpetic neuralgia; post-thoracotomy pain; phantom limb and stump pain; axial lumbar spine pain associated with FBSS; plexopathy; and

addiction. Patients should undergo a thorough evaluation, including a detailed history and physical examination, as well as diagnostic and imaging studies, and a psychological evaluation. A psychological evaluation is crucial and required before SCS implantation to determine whether the patient has a pain indication that is likely to respond favorably to SCS implantation. The pain psychologist will also evaluate the patients for several major contraindications to performing the procedure such as schizophrenia, poorly controlled depression, active drug abuse or addiction to illicit substances or opioids. Conservative measures should be exhausted, including medication trials, interventional procedures, and physical rehabilitation before proceeding to the SCS trial. Lastly, in most cases a neurosurgical consultation is required to make sure the patient's condition does not require a surgical intervention. If the patient has failed extensive conservative treatment options and surgery is not indicated then obtaining approval from the insurance company is essential. The cost effectiveness of SCS in the treatment of chronic pain is well documented and subsequently well understood by the insurance industry.

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post-herniorrhaphy groin pain. Lastly we have developed a strong interest in utilizing peripheral neurostimulation for the management of chronic intractable cervicogenic headache (occipital nerve stimulator) and disabling pain from pancreatitis (splanchnic nerve stimulation).

As in any treatment, the success of SCS depends on appropriate patient selection. It is vital that the patient is motivated, psychologically stable and free from narcotic

### Stimulator Trial

Before proceeding with permanent SCS implantation, a stimulator trial is warranted. The trial allows the patient to evaluate the SCS analgesic activity in their everyday surroundings. The goal of the trial is lead placement that achieves a paresthesia covering the entire area of pain including back, hip, buttock and leg(s) or neck, shoulder and arm(s). The SCS trial is a brief procedure that is minimally invasive and reversible (similar to placing an epidural catheter) and can positively predict a long-term outcome in the majority of patients. A trial of three to five days generally provides sufficient information and is short enough to reduce the risk of infection. The procedure generally involves implanting one or two leads percutaneously through an introducer needle under fluoroscopy into the epidural space in the thoracic or cervical spine that corresponds to the areas of pain. The leads exit the skin

and are connected to a pulse generator that is external to the body. Once the generator is turned on, the impulses are sent with varying intensities to different electrode positions on the leads. The patient will sense paresthesias (tingling or buzzing) while a programmer adjusts the settings to provide the “optimal coverage” over the painful areas. Such trials are critically informative and will indicate how comfortable the patient will be with SCS system and which lead locations and stimulation settings will be most effective. It is crucial that the technical aspects of the trial be performed optimally because permanent implantation will depend on a successful trial. The criteria for a successful SCS trial include an overall 80 percent or more reduction in pain, a decrease in analgesic intake, and importantly a significant functional improvement of activities of daily living both inside and outside the home. During the three to five day trial the patient is instructed not to drive (in case the lead moves laterally and stimulates a nerve root) and avoid excessive bending or twisting of the lower back (minimize lead migration). In order to advance to the permanent implant, the patient must consistently experience at least 80 percent pain relief during the trial and satisfy the remaining criteria. Keep in mind that generally in pain management at the very most goals of pain benefit are in the 50 percent range and even 30 percent is considered satisfactory particularly in patients with FBSS.

### Permanent Implantation

Patients must successfully complete a screening trial before being considered as candidates for implantation of a permanent SCS system. Permanent stimulator placement technique is similar to that for the trial but is done in the operating room. The significant difference is that the power generator is implanted, like a pacemaker, in a subcutaneous pocket usually located in the upper and outer quadrant of the buttock. Under local anesthetic and IV

sedation, a small skin incision is made along the cervical or lumbar insertion site. Tissue dissection is performed until superficial lumbar fascia is encountered. The SCS lead is secured through specialized anchoring device and sutured to the fascia and the supraspinous ligament. The pocket for the implantable pulse generator (IPG) is made in the upper gluteal area. The SCS lead is then tunneled and connected with the IPG. The skin and subcutaneous tissues are closed in layers. Upon discharge patients should avoid any vigorous activity for the first six to eight weeks following permanent implantation to help prevent lead migration and to allow for epidural scar tissue formation.

### Conclusion

Neurostimulation has many benefits over alternative pain management therapies. First, with advances in technology, SCS has become a minimally invasive percutaneous procedure and subsequently much less disruptive to normal tissue because it does not ablate pain pathways or result in anatomic change. As an augmentative procedure, SCS is reversible and offers patients the opportunity of undergoing a screening trial. The clinical efficacy of this intervention has been well documented in the literature. When applied to carefully selected patients, neuromodulation offers significant long-term relief of pain and suffering, increased functional status, a reduction of oral medication intake, and improvement of patient’s day-to-day activities. Lastly, unlike the numerous side effects of the various drug therapies and the risk of opioid dependence and addiction, most complications seen with SCS are minor, consisting of lead migration.

**Daniel Lalonde, M.D., Sally Arsenault, R.N., and Tamera Richard, R.S.A., serve patients at the Central Maine Pain and Headache Center at Rumford. Anyone with questions regarding this article should contact the Central Maine Pain and Headache Center at Lewiston, 207-795-2929.**

