

[2003 Fall A17] Treatment of chronic low back pain with selective nerve stimulation

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Spinal Cord Stimulation (SCS) is effective for treating a variety of chronic pain conditions. However, particular pain areas such as the lower back are still difficult to treat. Recently, new SCS techniques have been described which involve a cephalocaudal (retrograde) approach to the spinal cord and stimulation of specific nerves.⁽¹⁾

A 60 year old man presented with a two year history of low back pain after two lumbar spine surgeries. His pain had not responded to physical therapy, epidural injections, and other conservative measures. His medications included transdermal fentanyl at 100 mcg/hr. Fluoroscopically-guided bilateral L2 transforaminal injections of bupivacaine significantly decreased his pain for 4 hours. Repeat injections one week later confirmed the result. An SCS trial was arranged. Two epidural introducer cannulae were inserted on either side of the midline and directed medially toward the contralateral L2 neuroforamen under fluoroscopic guidance. Trial electrode leads (Pisces Quad; Medtronic, Minneapolis, MN.) were threaded to each L2 foramen. (Fig. 1) Excellent coverage of the painful areas was obtained. A 5 day trial provided consistent 75-80% pain relief and increased activity level. Three weeks later, the leads were again placed and connected to an internal pulse generator (Itrel-3, Medtronic). After 1 year of follow-up, the patient continues to have more than 80-90% pain relief from SCS and uses no analgesics. He uses the stimulator 3 to 4 hours each morning.

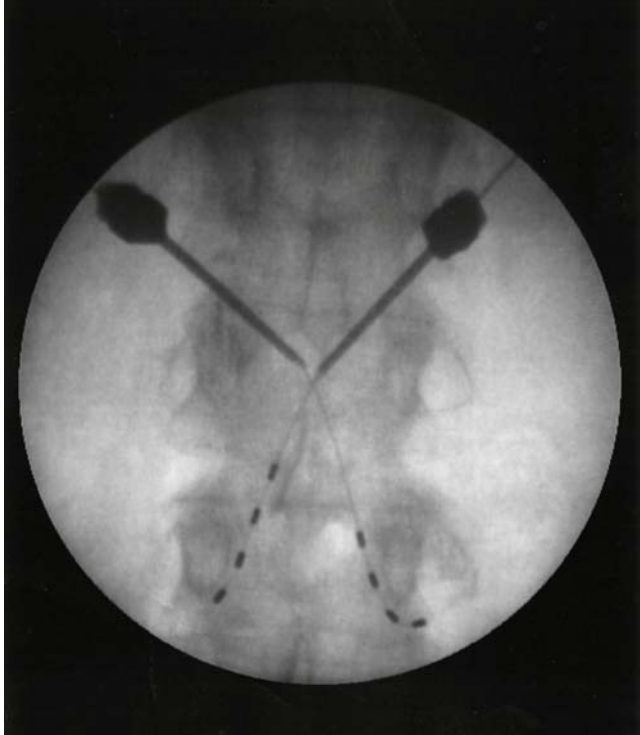
The standard SCS technique involves the cephalad advancement of an electrode in the midline epidural space until it lies over the desired location for stimulation. Limitations to successful long term outcomes are often secondary to inadequate or incomplete paresthesia distributions. Lead migration often changes the pattern of paresthesia. Insufficient paresthesia may also be due to the relatively large distance between the electrode and the spinal cord in the midline epidural space where there is a larger CSF volume.

This method of selective nerve stimulation may provide a more effective and consistent paresthesia pattern because of certain anatomic advantages. The electrodes are positioned near the nerve roots over the more lateral laminae of the dorsal columns. There is less CSF volume in this area so the electrode is closer to the neural targets thus providing stronger stimulation with less voltage. In addition, the neuroforaminal inlet provides a more secure location thus decreasing the possibility of lead migration.

In summary, once the dermatomal pattern of pain was confirmed with bilateral L2 nerve blocks, effective treatment of this patient was possible with selective nerve stimulation. After one year of SCS therapy, the patient reports significant pain relief and increased activity level.

References

1. Alo K, Holsheimer J: New Trends in Neuromodulation for the Management of Neuropathic Pain. *Neurosurgery* 50: 690-704, 2002



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