Dear Colleague,

I am pleased to introduce the latest edition of Pain Consult, the newsletter for Cleveland Clinic’s Department of Pain Management. Among the topics discussed in this issue are spinal cord stimulation for treatment of chronic pain and complex regional pain syndrome; cooled radiofrequency ablation for long-term relief of some types of chronic back pain; and electrodiagnostic testing for determining course of treatment as well as prognosis.

Since being appointed just a few months ago, I have felt fortunate to lead the Department of Pain Management. Our team of specialists is among the most experienced in the world, and dedicated to helping people with chronic pain return to normal, productive lives. We strive constantly to improve diagnosis, medical management and quality of life for each patient for whom we have the privilege of providing care.

I would also like to take this opportunity to thank my predecessor, David Brown, MD, Chairman of Cleveland Clinic’s Anesthesiology Institute, for serving as interim chair, and to welcome newly-appointed staff members Benjamin Abraham, MD, Barry Jones, MD, Daniel Leizman, MD, Ellen King, MD, Dmitri Souzdalnitski, MD, PhD, and Englok Yap, MD. For a complete listing of our staff and locations, please visit clevelandclinic.org/painmanagement.

I look forward to future editions of Pain Consult as an opportunity to report our achievements, discoveries and continued growth.

Sincerely,

Richard W. Rosenquist, MD
Chairman, Department of Pain Management

About the cover:
Positioning of a spinal cord stimulator lead. SCS articles on pages 3 and 7.
How spinal cord stimulation therapy can provide relief for patients

Benjamin Broestl, 19, was referred to Cleveland Clinic's Department of Pain Management with chronic pain in his left leg, foot and lower left buttock. The patient, who began experiencing chronic pain in his left leg at age 15, also complained that the pain intensified after sitting.

These symptoms are indicative of piriformis syndrome. It was recommended that Broestl receive first-line conservative treatments, including a combination of medications, trigger point injections, behavior modification therapy, and physical therapy and rehabilitation. When these therapies failed to reduce the chronic pain, it was suspected that the sciatic nerve was entrapped in the piriformis muscle and required surgery.

"The surgical procedure abated the pain in Broestl's leg, but the pain in the sole of his foot continued," says Jianguo Cheng, MD, PhD, a pain management specialist in Cleveland Clinic's Department of Pain Management.

A few months after surgery, Broestl began to exhibit classic symptoms of complex regional pain syndrome (CRPS) Type I, formerly known as reflex sympathetic dystrophy (RSD), a neuropathic disorder that was first identified during the Civil War. The temperature in his left leg was lower than in his right leg. In addition, the skin often changed to a dramatic purplish color.

CRPS and its unique symptoms

Accounting for 90 percent of CRPS cases, Type I (RSD) includes symptoms that may develop after non-traumatic events or injuries, such as sprains, fractures and surgery that do not involve specific nerve injuries. It is not known why CRPS Type I occurs in some patients without nerve injuries. However, recently published data suggest that CRPS Type I is related to the loss of small-diameter nerve fibers, countering notions that this disease is generated by the brain or by psychiatric disturbances. CRPS Type II (causalgia) is caused by specific peripheral nerve injury.

In the U.S., CRPS afflicts 200,000 to 1.2 million people and occurs predominantly in women between the ages of 30 and 50. Every year, Cleveland Clinic’s Department of Pain Management treats more than 50 new CRPS patients from all age groups, including children.

Typically, CRPS originates in the upper or lower extremities, though it can occur anywhere in the body.

"The symptoms of CRPS Type I and CRPS Type II are unique," explains Dr. Cheng. "Classic symptoms include allodynia, hyperalgesia, evidence of some type of edema, changes in skin blood flow or abnormal sudomotor activity in the region of pain." Depending on the stage of CRPS, patients may also exhibit muscle dystrophy or loss of function in the affected limb.

The efficacy of SCS

For CRPS patients who do not respond to conservative therapies or more invasive treatments such as sympathetic nerve block injections, the spinal cord stimulator (SCS) has been shown to be an effective long-term treatment, particularly for CRPS Type I patients.

As co-author of an SCS review article recently published in Pain Practice, Dr. Cheng writes: "Considerable medical literature, mostly in the form of case series, has suggested that SCS has a positive effect on CRPS I and results in reduction in pain analgesic use and functional impairment. Around 50 to 60 percent of CRPS patients treated with SCS report that their pain has been reduced by at least one-half."

Broestl, the patient who received SCS, is experiencing pain reduction of 50 percent. The therapy has enabled him to reduce his use of medications by approximately the same percentage.

Moreover, the abatement of pain permits patients to tolerate physical therapy and rehabilitation, which is a critical component of ongoing treatment to maintain functionality and range of motion of the extremities. A recent randomized, controlled study showed SCS patients who also underwent physical therapy experienced significant reduction in pain compared with a group of patients who participated in physical therapy but did not receive SCS treatment.

"SCS used to be considered a last-resort treatment," says Dr. Cheng. "However, experience and research have shown that most CRPS patients respond well to SCS therapy, particularly during the early stage of CRPS."

For some older patients who have had CRPS for years, SCS may be less effective. Nevertheless, another treatment option is an implanted intrathecal drug delivery pump, similar to an epidural that delivers anesthetics, muscle relaxants and opioids directly to the nerve roots and spinal cord. In this therapy, a very small amount of medication is required, which limits side effects and other adverse reactions.

For patient referrals, please call 216.444.PAIN (7246) or visit clevelandclinic.org/painmanagement.
Cooled Radiofrequency Ablation

For patients who experience numbness and tingling, muscle weakness, spasms or pain in the limbs, neck or back, Cleveland Clinic’s Department of Pain Management offers electrodiagnostic testing. Daniel J. Leizman, MD, a board-certified physical medicine and rehabilitation specialist and Hong Shen, MD, a board-certified pain management specialist, administer a test that measures electrical activity and function of the nerves and muscles.

The testing is performed in two parts:

• Nerve conduction studies that measure the ability of specific nerves to transmit electrical impulses and, consequently, their level of function. Patients feel a small, brief electrical stimulus.
• Electromyography that examines and measures electrical activity in different muscles. A thin-gauge needle is inserted into these muscles, which may cause some temporary discomfort.

The results of electrodiagnostic testing help to determine appropriate surgical and/or nonsurgical treatment options. The testing also assists in establishing a prognosis for the patient’s specific condition.

In the Pain Management Department, it is customary for physical medicine and rehabilitation specialists to perform electrodiagnostic testing. In addition, Dr. Leizman and Dr. Shen perform interventional pain management for back and neck pain. Dr. Leizman sees patients at Cleveland Clinic’s main campus and Hillcrest Hospital. Dr. Shen sees patients at Lutheran Hospital and Westlake Medical Office.

For patient referrals, please call 216.444.PAIN (7246) or visit clevelandclinic.org/painmanagement.

When patients’ symptoms warrant, electrodiagnostic testing can help clarify the cause of the problem, guide the ordering physician in determining the course of treatment, and establish a prognosis.

Diagnosing the Source of Spine, Muscle and Nerve Pain

“In my practice, anecdotal evidence suggests the majority of carefully selected patients who undergo cooled RFA procedures experience pain abatement greater than 50 percent for six to nine months and up to 12 months,” says Dr. Dews.

Research supports RFA efficacy

Medical research supports the efficacy of cooled RFA. For example, a placebo-controlled pilot study, published in *Regional Anesthesia and Pain Medicine*, compared sham and cooled RFA of the L4-S3 lateral branches in 28 patients with injection-confirmed pathology.

For six months after the procedures, the treatment group reported significant improvement in pain scores, functional capacity and medication usage compared with the control group. In the cooled RFA group, 57 percent of patients continued to report pain relief six months after treatment, while all patients in the placebo group reported no pain relief after six months. In patients who underwent successful procedures, the median duration of pain relief was 7.9 months, according to the study.

“Although patients often significantly reduce, or in some cases eliminate, their consumption of pain and anti-inflammatory medications, they must be self-motivated to continue their physical therapy and other follow-up care that can assist them in continuing to relieve their chronic pain over the long term,” says Dr. Dews.

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Diagnosing the Source of Spine, Muscle and Nerve Pain

When patients’ symptoms warrant, electrodiagnostic testing can help clarify the cause of the problem, guide the ordering physician in determining the course of treatment, and establish a prognosis.

Daniel J. Leizman, MD Hong Shen, MD
Spinal Cord Stimulation; Effective and Safe

Neurostimulation can be a viable alternative for carefully selected patients with chronic pain

Harry Markel, a 55-year-old patient from Ashtabula, Ohio, presented with persistent lumbar back pain that was spreading to his lower extremities during an initial consult with Sameh Yonan, MD, a pain management specialist at Cleveland Clinic’s Department of Pain Management.

The patient’s pain was so severe that it significantly impeded his daily function and his ability to work. After failing to respond to other therapies, Dr. Yonan treated Mr. Markel with spinal cord stimulation (SCS), which abated his chronic pain by up to 80 percent.

“For the first time in years, I took a 60-mile spin on my motorcycle,” says Mr. Markel. “I feel pretty good. I’m not bent over anymore. I’m not in pain with every step I take anymore because I have this SCS device.”

“SCS has become an effective and safe modality to treat chronic pain for carefully selected patients who do not respond to other medical therapies,” says Dr. Yonan.

The origins of SCS

The concept that stimulation of the peripheral nervous system can reduce chronic pain was initially proposed by Melzack and Wall’s gate control theory of pain in 1965. The theory suggests a dorsal horn gate of the spinal cord regulates the transmission of pain signals. The gate opens when small-diameter fibers are more active than large-diameter fibers throughout the peripheral nervous system. The gate closes when large-diameter fibers are more active than small-diameter fibers. This eventually led to the idea that the application of electrical stimulation would stimulate the large-diameter fibers and close the gate, which in turn could block pain signals.

The first SCS was developed in the early 1970s. It has since undergone numerous technical and clinical advancements, and was approved by the U.S. Food and Drug Administration in 1989.

The efficacy and safety of SCS has been established. For example, a study published in the Journal of Neurosurgery that reviewed 68 studies over a 20-year period concluded that SCS had a “positive, symptomatic, long-term effect in cases of refractory angina pain, severe ischemic limb pain secondary to peripheral vascular disease, peripheral neuropathic pain, and chronic low back pain.”

Studies show SCS can reduce chronic pain by as much as 50 to 80 percent, significantly improve the levels of functionality of the patient’s physical activity and substantially decrease the patient’s consumption of daily medications for pain management.

Patient selection important

Cleveland Clinic’s Department of Pain Management utilizes an extensive process to determine whether a patient is an appropriate candidate for SCS therapy.

Mr. Markel’s case is a good example of the process that patients undergo. As mentioned previously, he presented with debilitating chronic pain that affected his daily function and his ability to work. He reported previous surgery to correct a deformity due to spinal stenosis. However, the chronic pain persisted and intensified following the procedure.

After a complete physical examination, a comprehensive review of the patient’s medical history and standard diagnostic tests were performed, Mr. Markel first underwent conservative and midlevel treatments, which included a combination of pain management drugs and non-steroidal anti-inflammatory medications, lumbar epidural steroid injections and physical therapy. The patient, however, did not respond favorably to these therapies.

Patients who fail conservative and midlevel treatments are considered potential candidates for SCS. However, they must first undergo a psychological evaluation to rule out secondary factors that may be contributing to the patient’s chronic pain and to determine the patient’s ability to comprehend and work with the device.

If the psychological evaluation is satisfactory, the patient is scheduled for a seven- to 10-day trial stimulation to assess whether the SCS provides adequate pain relief. “Although pain is a relative experience for each patient,” says Dr. Yonan, “adequate pain relief is generally defined as pain abatement of 50 percent or greater during the trial stimulation period. Instead of pain, patients typically experience a tingling sensation.

“Although pain reduction is an important factor in assessing whether the patient is responding favorably to SCS therapy, we also consider whether the patient is experiencing an improvement in daily function and is able to begin reducing daily consumption of medications, which are important factors for the patient’s quality of life,” says Dr. Yonan.

The SCS procedure

The SCS procedure is performed using a local anesthetic and a sedative. The 45-minute outpatient procedure is performed percutaneously, using fluoroscopic guidance to position leads in the midline posterior epidural space. After the lead’s tip is positioned in the epidural space, the lead is sutured to the skin and connected to a small generator that is carried by the patient. Preset programs generate electrical currents to target areas of pain. If the patient responds favorably during the trial period, the battery-powered SCS is implanted permanently under the skin in the lower abdominal region.

“As with all surgical procedures, there are potential risks and complications. However, there are no unique risk factors with the SCS surgical procedure,” says Dr. Yonan.

Mr. Markel’s chronic pain reduction of up to 80 percent has restored his daily function and allowed him to return to full-time work. Moreover, the patient has reduced his daily medication consumption by more than 50 percent and is being weaned off pain management medications.
New Staff

The Pain Management Department welcomes the following new staff members:

Our pain management specialists are available at over 20 area locations. For a complete list of physicians and their locations, visit clevelandclinic.org/painmanagement.

Benjamin Abraham, MD

Benjamin Abraham, MD, is now seeing patients at Elyria Family Health and Surgery Center and Marymount Hospital. A graduate of State University of New York – Upstate Medical University in Syracuse, New York, Dr. Abraham served his anesthesiology residency and pain medicine fellowship at Cleveland Clinic.

His specialty interests include interventional pain management for back and neck pain, degenerative spine disease/failed back surgery syndrome, spinal cord stimulation, neuromodulation for chronic pain, peripheral vascular disease/non-healing ulcers of the extremities, peripheral neuropathy, myofascial pain/fibromyalgia, minimally invasive lumbar decompression (MILD) and abdominal pain.

M. Barry Jones, MD

M. Barry Jones, MD, is now seeing patients at Cleveland Clinic’s main campus. A graduate of Robert W. Johnson Medical School, University of Medicine and Dentistry of New Jersey in Piscataway, New Jersey, Dr. Jones served his anesthesiology residency at the Washington University School of Medicine in St. Louis, Missouri.

His specialty interests include acute and chronic pediatric pain, interventional pain management for back and neck pain, CRPS/RSD, neuropathic pain, chronic headache, musculoskeletal and abdominal pain syndromes, neoplasm and end-of-life related pain, medical hypnosis, mindfulness practices, and integrative medicine.

Daniel J. Leizman, MD

Daniel J. Leizman, MD, is now seeing patients at main campus and Hillcrest Hospital. A graduate of Ohio State University College of Medicine in Columbus, Ohio, Dr. Leizman served his physical medicine and rehabilitation residency at the Medical College of Wisconsin in Milwaukee, Wisconsin.

His specialty interests include spine care, musculoskeletal injuries, degenerative joint disease, sports medicine, exercise prescription, complementary and alternative medicine, wellness, electrodiagnostic testing (NCS/EMG), interventional pain management for neck and back pain, impairment and disability evaluation.

Ellen W. King, MD

Ellen W. King, MD, is now seeing patients at main campus and Fairview Hospital. A graduate of the University of Iowa Carver College of Medicine in Iowa City, Iowa, Dr. King served her anesthesiology residency at Beth Israel Deaconess Medical Center, Harvard Medical School in Boston, Massachusetts. She also completed a pain medicine fellowship at the University of Pennsylvania in Philadelphia, Pennsylvania.

Her specialty interests include interventional pain management for back and neck pain, cancer pain, pediatric chronic pain, spinal cord stimulation, CRPS/RSD, phantom limb pain, and neuropathic pain.

Richard W. Rosenquist, MD

Richard W. Rosenquist, MD, is now seeing patients at Cleveland Clinic’s main campus. Dr. Rosenquist received his medical degree from Northwestern University in Chicago, Illinois, where he continued his residency training. He completed a fellowship in regional anesthesia/pain and critical care at Grady Memorial Hospital/Emory University in Atlanta, Georgia.

His specialty interests include myofascial pain, CRPS/RSD, neuropathic pain, cancer pain, sports-related pain, low back pain, acute postoperative pain, and regional anesthesia and analgesia.

Dmitri Souzdalnitski, MD, PhD

Dmitri Souzdalnitski, MD, PhD, is now seeing patients at South Pointe Hospital. A graduate of Irkutsk State Medical University in Irkutsk, Russia, Dr. Souzdalnitski served his internal medicine residency at Good Samaritan Hospital in Baltimore, Maryland, and his anesthesiology residency at Yale-New Haven Hospital in New Haven, Connecticut. He also completed a pain medicine fellowship at Cleveland Clinic.

His specialty interests include interventional pain management for back and neck pain; joint, tendon, and muscle pain, thoracic pain, headaches, chronic postoperative pain, CRPS/RSD, peripheral painful neuropathy, minimally invasive spine procedures and neuromodulation.

Englok Yap, MD

Englok Yap, MD, is now seeing patients at Beachwood Family Health and Surgery Center and Hillcrest Hospital. A graduate of Jefferson Medical College in Philadelphia, Pennsylvania, Dr. Yap served his anesthesiology residency and pain medicine fellowship at Cleveland Clinic.

His specialty interests include interventional pain management for back and neck pain, shingles, long-term pain following chest wall surgery, CRPS/RSD and musculoskeletal pain.
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