Western Regional Center for Brain & Spine Surgery
Comprehensive Neurosurgical Care

Western Neurosurgery REVIEW

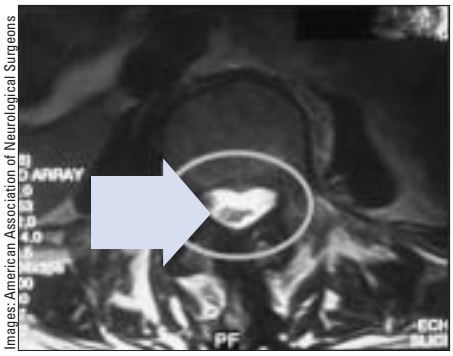
A quarterly newsletter for referring doctors — Summer 1999

Neurosurgical Treatment of the Aging Painful Spine—Part 2

By William D. Smith, M.D.

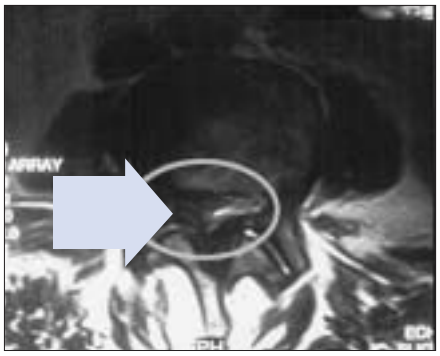
(This is the second of a two-part discussion of spinal stenosis. Part 1 reviewed the range of spinal problems in the aging population, the two forms of spinal stenosis, the causes of this syndrome, and diagnosis. Part 2 covers imaging studies and various treatment options.)

Radiologic investigation confirms the diagnosis of lumbar spinal stenosis and, in general, MRIs are preferred. Some individuals, however, who have pacemakers or other implants are unable to have an MRI. Also, a surprisingly high percentage of the population suffers from significant claustrophobia and has a difficult time undergoing an MRI. Whereas open-ended MRI machines have alleviated this problem somewhat, patients must be counseled that an open MRI will give a less accurate image than a closed MRI. In these patients, very frequently, a CT myelogram will be necessary for a complete confirmatory diagnosis.



Images: American Association of Neurological Surgeons

This MRI shows a normal spinal canal.



Lumber stenosis has caused the narrowing of this spinal canal.

Imaging is critical in the overall treatment of lumbar canal stenosis but, by itself, does not make a diagnosis. Imaging can rule out other differential diagnoses of lumbar canal stenosis. The presence of diminishing dimensions of the spinal canal in and of itself does not result in clinical spinal stenosis.

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Derek Duke, M.D., and Max Carter, Ph.D., PA-C

New Members Join Our Practice

The physicians and staff of the Western Regional Center for Brain and Spine Surgery are pleased to announce that Derek A. Duke, M.D., and Max L. Carter, Ph.D., PA-C, have joined our practice.

Dr. Duke recently completed his neurosurgical and spine training at the Mayo Clinic in Rochester, Minnesota. Originally from southern California, he grew up in the Midwest and obtained his B.A. in Biology from the University of Missouri, Kansas City. Dr. Duke also earned his Doctorate of Medicine with distinction from the University of Missouri, Kansas City School of Medicine. In 1993, he began his postgraduate training at the Mayo Clinic, whose program is one of the premier neurosurgical educational and training sites in the United States. After a year of internship in general surgery, Dr. Duke has spent the past five years completing his neurosurgical and spine residency.

Complex Spine Surgery

Dr. Duke has had very diverse clinical neurosurgical experience comprising both adult and pediatric patients. His particular interest is in complex spine surgery, spending nearly two years of his training in this field. He is well versed in all facets of anterior and posterior approaches to the spine from the craniocervical junction to the sacrum. Dr. Duke has also published both general and text chapters on spinal

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Treatment Pathways for Spinal Stenosis

The first treatment of spinal stenosis is not surgery, but conservative care. Individuals should always first pursue conservative treatments. Whereas conservative treatments are usually not curative, they very frequently can give temporary or more permanent relief. Medications—including analgesics, muscle relaxants, anti-inflammatories, and a short course of oral steroids—often increase patients' comfort mobility as well as flexibility.

Long-term narcotic use is greatly frowned upon. Given that a definitive, acquired anatomical stenosis is present, in lumbar canal stenosis a treatment of epidural steroids in general will only give brief limited relief. In some patients with mild to moderate stenosis, epidural injections can give long-term relief in combination with other therapies. In general, the routine use of epidural steroids in severe lumbar canal stenosis is not standard therapy.

Among the most common conservative course of care is the prescription of physical therapy in combination with analgesics. Physical therapy generally is not curative, but can provide temporary or occasionally longer-lasting relief. The patient performs both aerobic exercise and lumbar exercises, which include stretching and strengthening of muscles to increase flexibility.

It is also extremely important to note that other modalities may give brief, local relief, but generally have no meaningful role in the treatment of spinal stenosis. Whereas changing one's lifestyle to include loss of weight in the obese patient as well as increasing muscle strength and aerobic fitness will not reverse spinal stenosis, it very frequently will enable patients to live more comfortably with mild symptoms of spinal stenosis. And the more fit an individual is, the better he or she will be able to tolerate definitive treatment of spinal stenosis (i.e., surgery).

Surgical Pathway

Surgical intervention is increasingly becoming the treatment of choice for many with spinal stenosis. And for a large percentage of patients, long-term pain relief is possible. Operative procedures for lumbar stenosis are some of the most common, highly successful, and proven procedures done within neurosurgery. In general, recovery is quite rapid, even for elderly patients. Most individuals require one to two days in the hospital before being discharged to home. Despite the excellent results of surgery, however, it should not be taken lightly. There are morbidities of surgery, and it is not for every patient. Indeed the art of neurosurgery is in determining not only the most appropriate candidates but also the most effective treatment for each individual.

There are four major surgical options in the treatment of spinal stenosis. The most common procedure performed for lumbar spinal stenosis is a **laminectomy** with over 60,000 being performed annually in the U.S. This is a very simple, standard procedure which can be performed in individuals with bilateral or unilateral symptoms and is generally seen in multilevel disease.

The goal of neurosurgical treatment of lumbar spinal disease is to shorten the cycle of pain and make it less necessary for patients to compromise their lifestyle.

A second option is that of **laminotomy.** This surgery can also be performed either bilaterally or unilaterally. It is thought that, by preserving intraspinous ligaments, the risk of postoperative instability is reduced. This is offset somewhat by an increased rate of recurrent symptoms ten years after surgery.

Foraminotomy is also an option. This is reserved generally for isolated monoradicular disease. **Discectomy** is a final limited option, yet rarely is it needed for stenosis. When a discectomy is performed, the majority of times it results in instability. In the aging spine, with significant dehydration, the disc hardens and calcifies and is extraordinarily important in the overall biomechanics of stability of the spine. By preserving the disc, the incidence of postoperative instability is greatly diminished.

The Question of Spinal Fusion

This brings us to a brief discussion of spinal fusion in the treatment of spinal stenosis. This is undoubtedly one of the major differences between orthopedic and neurosurgical treatments of spinal stenosis. The incidence of fusion in the aging lumbar spine is significantly higher when seen by an orthopedic surgeon versus a neurosurgeon. Indeed, making a decision about who requires a fusion for decompression for lumbar stenosis can be a very difficult and treacherous one. A recent study looking at a large series of patients who underwent simple decompression for lumbar stenosis revealed that 15% of individuals required a re-operation for spinal instability after surgery.

A primary fusion operation is indicated when there is gross movement on flexion/extension views of the lumbar spine. Also, when there is obvious anatomical malalignment such as severe scoliosis or spondylolisthesis, fusion operations are often performed. Less commonly, complete facetectomies need to be performed for adequate decompression, and a fusion operation is often indicated.

When taking all of these factors into consideration, however, certainly less than 20% of all patients presenting with spinal stenosis will require lumbar fusion. This is extremely important when one considers that the morbidity of performing a spinal

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surgery, general surgical trauma, intracranial pressure monitoring, as well as craniofacial deformities.

Dr. Derek Duke and Mrs. Christina Duke with their children, Dylan (left), and Devyn.

Gamma Knife Expertise

In addition to general intracranial neurosurgery, Dr. Duke has had training in the Gamma knife stereotactic radiosurgery unit. We are pleased to announce that our practice will be affiliated with a similar unit scheduled to open in Las Vegas in the Spring of 2000. We are very fortunate to have this technology available in our region since there are only about 40 Gamma knife centers in the United States. Most are affiliated with a university medical center, and thus, we feel especially privileged to have participated in the development of a program such as this in Las Vegas. Dr. Duke's expertise will certainly be valuable in the development of stereotactic radiosurgery in the region.

Family Life and Interests

Dr. Duke and his wife, Christina, have two boys, Dylan (3 years) and Devyn (1 year). Christina also grew up in the Midwest and received her undergraduate degree from the University of Kansas, Lawrence in Medical Records Administration. She went on to earn a Master's degree in Health & Human Services Administration from St. Mary's University, in Minneapolis, Minnesota.

In their leisure time, Dr. and Mrs. Duke's hobbies include cooking and bicycling, but they most enjoy activities with their children. The family is very active in their church and are ardent advocates of several charities, including the Make-A-Wish Foundation and Gift of Life.

In addition to his medical interests, Dr. Duke has developed computer software for the National Board of Basic Science Review programs and has served as an instructor for the practical course of database computer skills for the Congress of Neurological Surgeons. Dr. Duke also plays chess, both in the traditional mode and online.

Dr. Duke joined our practice in the middle of July. In addition to his practice in Las Vegas and Henderson, Dr. Duke will also lead the development of our Needles, California office, our seventh regional community neurosurgical clinic.

Max L. Carter, Ph.D., PA-C

Max L. Carter, Ph.D., PA-C,

Max L. Carter, Ph.D., PA-C, was born in Tipton, Indiana. After graduating from Purdue University with a B.S., he attended the University of Wisconsin, Madison, where he earned his doctorate in endocrinology/ reproductive physiology. During the years that followed the acquisition of his doctoral degree, Max began a career in research that varied from investigational research of interleukin 2 therapy for cancer treatment to polymer research for plastic production with Exxon Chemical Company.

Clinical Training

In 1991, Max entered the Physician Assistant program at the College of Osteopathic Medicine of the Pacific in Pomona, California. His clinical training included a preceptorship in neurosurgery at Wayne State School of Medicine in Michigan. There Max worked and studied with Dr. Fernando Diaz, who is recognized as one of the premier cerebrovascular surgeons in the United States. Max received additional surgical training at the Mayo Clinic and also trained at Martin Luther King hospital in south central Los Angeles in trauma surgery. He received his Physician Assistant degree in 1993.

Level 1 Trauma Expertise

In 1997, Max joined the faculty of the University of California, San Francisco University Medical Center in Fresno, California as a Clinical Instructor in Neurosurgery. At this Level 1 Trauma facility, he was involved in all aspects of both inpatient and outpatient care as well as participating in both intracranial and spinal surgeries.

Patient Care

Max joined us June 1st, and he has already begun seeing patients in our Las Vegas office. He will soon be involved in the care of both our clinic and hospital patients. He will be on staff with our practice when we join University Medical Center in mid-August, assisting in our neurosurgical patient care as well as in their Level 1 Trauma Center.

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Western Neurosurgery Review

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Comments, questions, requests to be added to our mailing list, and requests for back issues of our newsletter are welcome and may be directed to Nafija Mujic by calling (702) 737-1948 or (800) 334-0878. Our fax number is (702) 735-0736. E-mail: WRCBSS@aol.com.

fusion operation is three to four times that of performing a simple decompression in the same patient. Many of the simple complications seen in spinal fusion operations can become catastrophic in the elderly patient, and with the vast majority of patients presenting with lumbar stenosis falling within the elderly group, extreme caution is warranted.

Short-term and Long-term Results

There have been many studies which have measured the short- and long-term results of spinal stenosis surgery. Short-term results have shown that over 95% of patients are able to return to their pre-morbid lifestyle with little to no pain. This is certainly a remarkable overall result. In longer-term follow-up studies of up to five to ten years, there remains a 75% overall patient satisfaction rate. Of the patient failures, the majority of these are from either recurrent stenosis or stenosis which has developed at a different level.

Short-term results have shown that over 95% of patients who have had spinal stenosis surgery are able to return to their pre-morbid lifestyle with little to no pain.

Operative treatment requires a balanced consideration. Lifestyle issues should be considered. This would include a realistic assessment of the patient's severity of pain as well as his or her tolerance. Obviously, compromise of the patient's lifestyle should be considered. Elderly patients who characterize their lifestyle goals as sedentary—for example, as sitting in a rocking chair visiting with their family—most likely would not be as immediate a surgical candidate as an individual who wishes to continue in activities such as jogging, bicycling, swimming, and playing golf. Individuals with neurologic deficits should also be considered for immediate neurosurgical evaluation.

Age itself is not a contraindication for surgery. Healthy and active 90-year-old individuals can benefit from a simple decompression. Much more meaningful consideration should be given to the patient's overall general health, medical history, and physical condition. The goal of neurosurgical treatment of lumbar spinal disease is to shorten the cycle of pain and make it less necessary for patients to compromise their lifestyle.