

## Chronic Spinal Pain

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**Sciatica** results when spinal nerve roots are irritated by mechanical compression from a **herniated disk**, or by chemical irritation from the soft jelly-like center of the disk that can leak onto the nerve root. **Spinal stenosis** occurs when a combination of a disk bulge and spinal arthritis narrows the canal in which the nerves travel, causing some of them to become compressed. In all of these cases, the irritated nerve roots become swollen and cause pain in the low back and down the back of the leg. **Epidural steroid injections** place cortisone-like drugs on the bothered nerves. Steroids are anti-inflammatory medications that shrink the nerves back to normal size, reducing or eliminating the pain. Epidural injections in the back are safe because the needle is placed much lower in the back than where the spinal cord ends and therefore is not at all near the spinal cord. The major risk is a .5-1% chance of a spinal headache. Should a first injection fail it is best to have a second under **fluoroscopy** (x-ray), so that the steroid can be guided directly onto the bothered nerves. If an epidural steroid injection eliminates the pain of sciatica, but the pain returns, there is a good chance that surgery in the future will work, because the steroid injection demonstrated that the problem is reversible. A new and very effective treatment for small to medium sized disk herniations is **percutaneous disk decompression**, otherwise known as discectomy without an incision. Patients with sciatica sometimes have small herniations on MRI, and the surgeon does not want to operate because it is so small. The MRI takes a picture with the patient lying down, without any pressure on the spine and disk. Patients often don't have leg pain while lying down. They get pain when they sit, or lift something that causes pressure on the disk making the small protrusion larger which then irritates the nerve root. An MRI with the patient lying down does not capture this increase size caused by increased pressure. The disk decompression needle vaporizes the disk near the herniation. Decreased volume in the disk leads to decreased pressure, eliminating the herniation. The benefit of a percutaneous discectomy is that the epidural space is not entered, and therefore there is no chance of causing "post-laminectomy syndrome," which is often caused by post-surgical epidural scar tissue. Open surgery causes a small hole in the disk resulting in a 5% chance of reherniation through the same disk; the percutaneous method does not create a hole in the disk. The anesthesia for the percutaneous procedure is local anesthesia with light IV sedation; the recovery time is much faster than when an incision is made and general anesthesia used.

**Spinal arthritis** of the neck can cause neck pain, especially when a person looks up or bends their neck backwards. **Whiplash** can cause tiny muscle or ligament tears resulting in spasm that can irritate the occipital nerves that arise in the neck and travel up the back of the head. Whiplash can also cause disruption or irritation of the facet joints (spinal joints) that is not visible on xray or MRI. Both arthritis and whiplash can cause headaches that radiate from the joint problems in the neck. When medication and chiropractic treatments fail to help, steroid injections to the irritated occipital nerves or cervical facet joints can help. If the neck pain and headaches go away but return, longer

lasting pain relief can occur through **Radiofrequency** de-innervation of the facet joints. Radiofrequency is an accurate way of finding and heating the tiny nerve branches responsible for neck pain and headache. The heat does not spread far from the needle tip; therefore nearby larger nerves that travel down the arm are safe. The use of top of the line fluoroscopic equipment also insures that spinal procedures are done with safety and accuracy. Arthritis of the low back can be similarly treated.

**Discogenic** back pain is pain that does not travel very far down the legs, and usually increases with sitting more than walking, and with bending forward more than with bending backward. Sitting and bending forward place a lot of pressure on the disk. Pain does not radiate far down the legs because the nerve roots are not irritated. An MRI will often show a dehydrated disk, and dehydrated disks are prone to developing cracks or tears that can cause the pain. The tears are not always visible on MRI. If many disks are dehydrated, the spine surgeon might order **Discography** to figure out which disk is causing the pain. This procedure involves placing needles into the suspected disks, and injecting contrast dye under pressure. Normal disks will not cause pain, but a torn disk that is pressurized will reproduce the normal pain. The dye will travel into the cracks that will become visible under fluoroscopy or CT scan. The treatment for discogenic pain that fails to respond to braces, physical therapy, and medication is a **fusion**. The spine surgeon removes the disk, and the space is filled by either metal or a bone graft from the hip. **Artificial disc replacements** are in the testing stage at present, and will be FDA approved and available in the next six months to one year. The benefit of disc replacement compared to fusion is that there is a faster recovery period, and the spine will maintain its flexibility. An option for people who do not want surgery or who would like help while waiting for a disc replacement is **intradiscal electrothermocoagulation, (the IDET procedure)**. A wire is placed into the disk percutaneously through a needle (without an incision), and into or along side of any tears or fissures. The wire is then heated causing pain carrying nerve fibres to be destroyed, and, in theory, strengthening of the cartilage fibers around the tear.

Some patients have continued pain after one or more spine operations (**post-laminectomy syndrome**). If further surgery is not possible, many other options are available. Medication often includes an antidepressant for sleep and mood, an anticonvulsant such as Neurontin for knife-like or burning pain down the leg or arm, and for some patients, a long acting narcotic such as the Duragesic patch or methadone. **Transforaminal nerve root specific** epidural injections can be performed directly onto the nerve roots that might be irritated by scar tissue, because this scar tissue reduces the effectiveness of traditional midline epidural injections by blocking the flow of the steroid. If a nerve root specific injection eliminates the back and leg pain, but the pain returns, some patients will then benefit from **epidural lysis of adhesions**. Scar tissue that may not be visible on an MRI can be diagnosed with an **epidurogram**, a radiological study where contrast dye is injected into the tailbone, and scar tissue surrounding nerve roots is identified. In epidural lysis of adhesions, a stiff directable catheter is advanced into and through the scar tissue, and along the bothered nerve root. Poking holes through the scar will reduce pressure and swelling on the nerve by reducing compression and improving blood flow through the swollen nerve. An enzyme that softens scar is injected, along

with steroids that can shrink scar tissue, and reduce swelling. While not a cure, some patients obtain six months or more of pain reduction. For patients with pain refractory to all other treatments, **spinal cord stimulation** can cut the pain in half or more. A stimulator trial is performed using a temporary epidural wire that can be placed without an incision, against the spinal cord. Electric current causes a pleasant buzzing feeling in the back and leg, and blocks pain signals from entering the brain. If the results are excellent, a permanent wire and battery can be placed, under the skin, much like a pacemaker. Spinal cord stimulation is most commonly performed for sympathetic dystrophy, post laminectomy syndrome, and peripheral vascular disease, but newer uses include angina, occipital neuralgia, pancreatitis, phantom limb pain, pelvic pain, and incontinence. Finally, if all else fails, some patients benefit from an **implanted spinal pump** with a continuous infusion of morphine sometimes mixed with bupivacaine, a long- acting anesthetic. The pump must be filled through the skin every one to three months.

**Chronic Pain** can impact every aspect of a person's life and cause immense suffering. Successful treatment is often multi-faceted and can include medical management, cognitive-behavioral psychological therapy, rehabilitative services, alternative treatments, and advanced interventional techniques, when indicated. Through a combination of methods, there is hope for most patients.