RESEARCH ABSTRACT

Surgical and Non-Surgical Management of Sciatica Secondary to a Lumbar Disc Herniation

By Steven J. Atlas, MD, MPH; Robert B. Keller, MD; YuChiao Chang, PhD; Richard A. Deyo, MD, MPH; and Daniel E. Singer, MD

Spine, 26(10):1179-1187, 2001

INTRODUCTION

Sciatica is the most common cause of referred leg pain in adult working populations. This condition can be treated conservatively with non-surgical approaches such as physical therapy and medication, or through surgical intervention. However, there is limited knowledge about the relative success of these two approaches. The purpose of this study was to assess the long-term (five-year) outcomes of each approach.

METHODS

The Maine Lumbar Spine Study is a prospective, observational study of patients presenting with sciatica to physicians throughout the state of Maine.

To date:

- **402 patients have completed the five-year follow-up study;**
- **220 patients have undergone surgical intervention (primarily open discectomy) for their back pain; and**
- **182 patients have been treated conservatively with home exercises, physical therapy, bed rest, spinal manipulation, narcotic analgesics or epidural steroids.**

The interventions were not randomly assigned but were decided on an individual basis between the physician and patient. Baseline data were collected in person. A number of validated functional status and patient satisfaction scales were employed to assess the subjects' outcomes. These included the Roland disability scale, the Medical Outcomes Study Short Form 36-item (SF-36) questionnaire, and the Sciatica Frequency Index. Follow-up was obtained by mailed questionnaires at three, six, 12, 24, 36, 48 and 60 months.

The relative advantage of surgery was greatest in early follow-up.

RESULTS

Overall, patients who were treated surgically presented with more severe baseline symptoms and worse functional status than those who underwent conservative management. However, even when results were adjusted for these baseline differences between groups, surgical patients reported better outcomes. The least symptomatic patients did well regardless of initial treatment. The relative advantage of surgery was greatest in the early follow-up and narrowed over the first two years of the study. This was due to the improvements in the non-surgical group over this period. However, at the five-year follow-up, 70 percent of the surgical patients reported improvement in back and leg pain compared with 56 percent of the non-surgical group. Disability and work status were similar between groups at the five-year follow-up.

DISCUSSION

The results of this study support surgical intervention in the treatment of lumbar disc herniation in patients with moderate and severe symptoms. However, most patients with mild symptoms did well regardless of treatment. Therefore, given the risks associated with surgery and the potentially lengthy recovery time, this type of patient might be best served by electing for conservative care.

DRAYER Physical Therapy Institute℠

Leading the Way to Good Health

CORPORATE OFFICE

HUMMELSTOWN, PA
717-220-2100

CENTERS

DRAYER-OWNED

- LEXINGTON BEAUMONT, KY
- LEXINGTON PERIMETER, KY
- MT. STERLING, KY
- WINCHESTER, KY
- ABERDEEN, MD
- BEL AIR, MD
- SPARTA, NJ
- ALTOONA, PA
- CLEARFIELD, PA
- HARRISBURG (HUMMELSTOWN), PA
- HERSHEY, PA
- LEBANON, PA
- LEWISTOWN, PA
- LINGLESTOWN (HARRISBURG), PA
- MECHANICSBURG, PA
- MILFORD, PA
- ROARING SPRING, PA

DRAYER-MANAGED

- CHENANGO BRIDGE, NY
- ENDICOTT, NY
- JOHNSON CITY, NY
- MAINLINE PHYSICAL THERAPY (CRESSON), PA
- ORTHOPEDIC INSTITUTE OF PA (HARRISBURG), PA
- RENAISSANCE HEALTHCARE GROUP (HERSHEY), PA
- UTC REHABILITATION SERVICES (LEXINGTON), KY

RESEARCH MISSION STATEMENT

At Drayer Physical Therapy Institute, we are committed to being life-long learners. We believe that providing the most effective and clinically superior physical therapy stems, in part, from the knowledge gained through quality research.

We are dedicated to the process of conducting and disseminating scientifically sound and clinically relevant research. This will produce evidence to provide our patients with a solid basis of treatment and an optimal healing environment. We are also committed to critically analyzing existing research so that we can make well-educated decisions about integrating this into our own clinical practice.

We believe that our efforts to continually challenge ourselves to evolve professionally are a testament to our leadership, passion, and dedication to the field of physical therapy.

DRAYER
Physical Therapy Institute℠
Leading the Way to Good Health
WINTER 2006
Hummelstown, PA

COVER STORY

Low Back Pain Classifications Direct Clinical Diagnosis

Low back pain is one of the most common diagnoses seen by clinicians. It is at epidemic proportions in the United States, affecting 60 to 90 percent of individuals at some point during their lifetimes. Patients with low back pain incur total expenditures of $90 billion annually – or 60 percent more than individuals without low back pain.

Practice guidelines generally view low back pain as a homogenous entity once medical red flags and nerve root compression are excluded. However, most clinicians recognize there may be differing mechanisms of low back pain. Therefore, not all patients will respond to the same treatment. It is important to classify these mechanisms in patients so that treatments can be matched more closely to an individual's functional deficits.

In the more traditional, pathology-based approach to treatment, identification of the structural pathology (i.e. low back pain) guides the intervention. All patients with this pathology would receive the same treatment. More recently, a classification approach using a cluster of clinical signs and symptoms identified in the patient evaluation directs the clinical approach.

THE CLASSIFICATIONS:

PELVIC ASSESSMENT

The classification process is begun by carefully assessing the pelvis. Pelvic landmarks may be helpful in the treatment and in the overall success of a patient in rehabilitation. Typically, the patient's iliac crests, posterior superior iliac spines, and anterior superior iliac spines are evaluated for symmetry. If each landmark is elevated on one side, the patient may be a good candidate for a heel lift on the opposite side. If one of the posterior landmarks is rotated up or down, and the anterior landmark (on the same side) is rotated in the opposite direction, the patient may have a rotated innominate (pelvic asymmetry). This asymmetry may lead to sacroiliac (SI) pain, which might benefit from joint mobilization. While SI pain may mimic low back pain and may radiate into the leg, it does not usually extend below the knee. Therefore, addressing any SI issues may make the presentation of low back pain symptoms clearer or resolve the patient's complaint entirely.

Low back pain affects 60 to 90 percent of Americans at some point during their lives.

MOST CLINICIANS RECOGNIZE THERE MAY BE DIFFERING MECHANISMS OF LOW BACK PAIN.

FLEXION PRINCIPAL

A typical patient is 60 or older and reports that pain increases through the day and is at its worst in the evening. The patient prefers sitting to standing or walking. In fact, if his symptoms become aggravated with walking, he can relieve pain by sitting. He may present with radiating symptoms, sensory changes, muscle weakness and/or reflex changes. The patient who has degenerative changes in his spine (degenerative disc disease, degenerative joint disease, or spinal stenosis) or severe disc herniation is likely to prefer flexion activities. Flexion tends to reduce the load on these structures. The patient responds best to flexion-biased activities, such as pulling his knees up to his chest, stretching in a chair, or rocking on his hands and knees back toward his heels. Once symptoms have diminished, he should be progressed to a stabilization program.

EXTENSION PRINCIPAL

This patient is usually middle-aged and may have a sedentary job or one that requires repetitive lifting. He reports pain that is worse in the morning but improves as he moves around. He prefers to stand and walk rather than sit. In some cases, he can sit without pain but experiences pain when getting out of a chair. He may present with radiating symptoms that may extend below his knee. Sensory changes, muscle weakness and/or reflex changes might be present. He might have a mild disc bulge or herniation. He would tend to prefer extension-biased activities such as bending backward, pressing up and arching his back while lying on his stomach, or rocking his hips downward while on his hands and knees. These activities tend to move the disc anteriorly and reduce the herniation, thereby reducing the pain. Once symptoms have diminished the patient should be progressed to a stabilization program.

Continued on Page 2

Continued from cover story

LUMBAR SEGMENTAL INSTABILITY

This classification may affect a patient at any age. As he ages, the patient reports more-frequent episodes of low back pain of increasing duration. Pain typically is associated with bending forward or returning to an upright position. The patient might exhibit an instability "catch" requiring a maneuver to get upright. He might seek chiropractic care or self-mobilize to help relieve symptoms and might report an occasional episode of "giving way" in his leg. He will respond well to an abdominal and back stabilization program. As an adjunct, high-intensity electrical stimulation to help strengthen the low back musculature might help prevent a recurrence of symptoms.

TRACTION

When a patient does not seem to fall into one of the above categories, or if other treatments do not seem to help, traction may be useful. It seems to be most helpful in cases of significant disc pathology or nerve compression. This is related to the resulting increase in vertebral joint space and reduction of load on the disc and nerve root. As traction is a passive modality, it should be used in conjunction with active therapy once the symptoms have been reduced.

SUMMARY

Successful outcomes depend upon careful screening during the subjective and objective exam. The classification, determined by careful evaluation, should guide the therapist to the optimal treatment approach.

CASE STUDY

Treating Low Back Pain

PATIENT HISTORY

The patient is a 47-year-old male accountant presenting with a diagnosis of acute lumbar strain with radiculopathy. His family physician referred him to physical therapy four days after the patient's injury. The patient reported that he shoveled snow the day before the presentation of his symptoms. He woke up the next morning with acute low back pain and pain to the back of the left knee. He reported a history of moderate-level low back pain, which he attributed to his sedentary job. He also described a chronic painful left knee, which felt unstable at times. He reported a low back pain level of 8/10 regardless of position. Radiographs were negative. Prescribed pain medication and muscle relaxants were of little help. The patient appeared to be anxious about his condition as it was the middle of tax season and he "didn't have time for this."

The patient reported that he shoveled snow the day before the presentation of his symptoms.

PHYSICAL EXAMINATION

The patient stood with a right lateral shift evident. He further demonstrated difficulty shifting his body weight onto his left leg during stance and gait. Trunk range of motion was significantly limited and painful in all directions. Trunk flexion was associated with increased leg symptoms. Manual muscle testing revealed deficits in strength in the left hip abductors, hamstrings, quadriceps, and ankle dorsiflexors. Trunk strength was not assessed because of pain. Sensation to light touch was reduced over the lateral thigh and lower leg on the left. Deep tendon reflexes were equal bilaterally. Special tests revealed a positive Straight Leg Raise test on the left. Palpation revealed tenderness at L4-S1 spinous processes and the surrounding musculature. The left PSIS, piriformis and ischial tuberosity were tender to the touch. No instability was noted upon examination of his left knee.

TREATMENT

The patient's subjective history and subsequent physical exam revealed an overuse flexion with right rotation injury. Trunk flexion movements increased leg symptoms. We suspected a posterior disc derangement with lateral component. For these reasons, extension was the directional preference of treatment for this patient, with our primary focus on centralizing his leg symptoms. We initiated the patient's treatment in the prone position. Ultra-sound was performed and followed with gentle posterior-to-anterior joint mobilization of involved lumbar spine and sacrum. The patient noted a decrease in his leg symptoms after the mobilization techniques but described an increase in his low back symptoms. Electric stimulation with ice was performed in the prone position. The patient was instructed to assume the prone position for at least five minutes each hour until he was seen the next day.

At the next treatment, the patient described improvement in his leg symptoms but consistent low back pain of 7/10. He reported that the prone position was becoming more comfortable. The same treatment was repeated on days two and three with home exercise prescribed. By the end of the third treatment, the patient was able to stand and walk with more ease but described consistent low back pain level of 5/10. During the fourth treatment, more aggressive posterior-to-anterior mobilizations were performed. The patient was instructed to press up onto his elbows in the prone position five times each hour until his next visit.

At the beginning of the next week, the patient called to report that he was feeling much better and was required to return to work. He said he would be out of town for several days for business. He was reminded of the importance of his home exercise program as he would be sitting for long periods of time at work. He resumed therapy later that week with a return of his leg symptoms and an increase in his low back symptoms. He reported being unable to perform the exercises as often while traveling for business. We discussed the return of his symptoms in light of the chronic flexed position he was in, both at work and while driving. The remainder of the week involved resuming the treatments that brought about previous symptom relief and a greater emphasis on patient education. The patient was reminded to use a lumbar roll during sitting and to take frequent breaks during his work day. He was instructed to perform standing back bends, which he could now do with greater ease, and take brief walks around his office.

The third week of rehabilitation was marked by further reduction in his symptoms during daily activities. However, the patient complained that he was experiencing back symptoms that progressed to include leg symptoms when he sat for more than 10 minutes. We explained that this was likely due to the lack of appropriate trunk strength needed for prolonged sitting. Additional strengthening and stretching of his trunk and lower extremities was prescribed. Lumbar stabilization was emphasized during the fourth and fifth rehabilitative weeks.

By the end of the sixth rehabilitative week (17 sessions), the patient was pain-free and "better able to handle the long hours of sitting than ever," he said. He no longer experienced instability or pain in his left knee. He demonstrated good performance with his extension exercises and lumbar stabilization program.

He was discharged on his 17th visit and provided with a home exercise program. He was contacted one month after discharge to assess his progress. He reported having stopped his exercises, only to have his symptoms return. Once he resumed his home program, his symptoms resolved. He now realizes the importance of his exercises.

THIS CASE DEMONSTRATES THE IMPORTANCE OF A TARGETED REHABILITATION PROGRAM THAT IS ADJUSTED AS THE PATIENT'S STATUS CHANGES.

SUMMARY

This case demonstrates the importance of a targeted rehabilitation program that is adjusted as the patient's status changes. It also demonstrates the successful resolution of chronic low back pain when managed properly with good patient compliance.

Q&A:

About Sciatica

Sciatica presents as pain along the distribution of the sciatic nerve, which can cause pain in the buttocks and/or posterior thigh, calf and foot. This pain may occur in one or both legs, with one-sided symptoms being the most common. Leg pain is often dull in nature but also can be sharp, tingling, burning or present as numbness. The pain can be constant or intermittent.

HOW DO I KNOW I HAVE SCIATICA?

People who have sciatica often tend to be more than 30 years old. They may or may not have any history of low back and/or leg pain. They may or may not be able to recognize a prior definable injury. Sciatica can be difficult to diagnose as the symptoms often parallel those of osteoarthritis of both the hips and knees. Vascular disease of the lower extremity also needs to be ruled out when making a diagnosis of sciatica.

WHERE DOES THE PAIN IN MY LEG COME FROM?

Pressure on or around the sciatic nerve can cause the associated leg pain at any given point along the distribution of the sciatic nerve. Although it is the most common, the sciatic is not the only nerve root that can be affected. Pressure on the nerve root can come from trauma, swelling, muscular spasm, poor flexibility and/or posture, disc protrusion in the low back region, or spinal stenosis.

WHAT ARE MY TREATMENT OPTIONS?

The goal in treating patients with sciatica is to determine the direct cause of the nerve root compression and treat the cause, not the symptoms. The course of treatment directed by your physician is likely to involve oral non-steroidal anti-inflammatory medication and physical therapy as a first line of defense. In more severe cases, chronic compression of the nerve can lead to sensory, motor and/or reflex changes. This will necessitate the need for further physician intervention. A treatment course of pain management, epidural injections and surgery may be indicated when the severity of pathology warrants a more aggressive approach.

WHAT SHOULD I EXPECT IN PHYSICAL THERAPY?

Your physical therapist will evaluate you and, in conjunction with your physician, develop a treatment plan to address the direct cause of your sciatic leg pain. Depending on the severity of your condition, your therapist will focus on decreasing your leg pain. Treatments may include the use of various modalities including manual/mechanical traction, aquatic therapy, thermal therapies and electrical stimulation. It is also likely that any hip and low back range-of-motion deficits will be addressed with manual therapy. Core stabilization exercises will be included as you progress through treatment. Any postural problems, balance and/or gait dysfunction will be a part of treatment. It is imperative that you complete any exercise program and attend all physical therapy appointments.