

CHIROPRACTIC MANAGEMENT AND REHABILITATION OF A 38-YEAR-OLD MALE WITH AN L5-S1 DISC HERNIATION

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ABSTRACT

Objective: To present a chiropractic treatment plan for a patient with lumbar disc herniation including radicular symptoms below the knee.

Clinical features: A 38-year-old male experienced lumbar disc herniation with radicular symptoms to the lower extremities, below the knee. Etiology of this episode included a traumatic injury which was complicated by chronic degenerative joint and disc changes.

Intervention and Outcome: The treatment regime included chiropractic spinal manipulation, modalities and exercise rehabilitation. Specific rehabilitation exercises were used during various stages of healing in an attempt to stabilize a potential surgical case. Goals of care were to alleviate pain, increase function, and decrease peripheralization related to disc herniation in this case. The patient reached a level of functional biomechanical stability over 15 weeks.

Conclusion: This case demonstrates that with proper management, rehabilitation of a patient with disc herniation can be reached in a short duration of time. (J Chiropr Med 2004;3:145–152)

Key Indexing Terms: Chiropractic; Rehabilitation, Low back pain; Intervertebral Disc

INTRODUCTION

“On the evidence, particularly the most scientifically valid clinical studies, spinal manipulation applied by chiropractors is shown to be more effective than alternative treatments for low-back pain. Many medical therapies are of questionable validity or are clearly inadequate.”¹ Various types of treatment

have been used, such as medication, bed rest, physical therapy, supplementation, acupuncture, manipulation, massage, trigger point therapy and epidural-injection therapy. Therefore, proper management with rehabilitation further facilitates stability and promotes healing, to prevent future injury or exacerbation, and decreasing future health-related disabilities.

Using a functional restoration approach for rehabilitation, including manual chiropractic manipulative therapy, trunk strengthening and stabilization exercises, proprioceptive training and a cardiovascular rehabilitation program, can maximize cost efficiency and minimize treatment time by strengthening the area of injury and restoring function. This approach may prevent future exacerbation and promote a healthier lifestyle.

The following case represents how proper management and treatment is necessary for rehabilitation of acute lower back pain with radicular symptoms and prevention of recurrent episodes. Selection of a patient specific exercise program with specific manipulation of the spine allows for a cost effective management approach. A patient specific selection of spinal manipulation and exercise rehabilitation is ideal for patient progression and an early return to work. Fear avoidance issues with returning a patient back to their activities of daily living may be an issue versus continued passive care. This case report demonstrates that a patient with chronic low back pain and an extruded lumbar disc can be rehabilitated in a relatively short amount of time.

CASE REPORT

History

A 38-year-old Caucasian male presented with complaints of severe low back pain and intermittent radicular pain to the left testicle and posterior leg extending to below the knee. He had a history of multiple episodes of low back pain with general activities of daily living, such as bending, lifting and

twisting. He described his low back injury as an initial sharp pain with constant muscle spasm and reported that the pain reoccurred on an intermittent basis for the previous 7 years, with the duration of pain lasting between 3 weeks to 2 months. Severe episodes had occurred 2–3 times per year over the past 3 years, where typically lost time from work ranged from 3–4 weeks. Extended medical leave was a continued problem with the previous episodes of back pain.

The patient's initial injury occurred approximately 7 years prior after lifting a 100-pound bag of cement. He stated his initial pain was localized to his low back. In the fall of 2003, he re-injured his low back, while he was lifting his 30-pound child. During this event, he felt pain refer into his left leg; this episode resolved in less than a week. Previously, the patient was treated for this condition with traditional medical care including non-steroidal anti-inflammatory drugs, muscle relaxants, and pain medication. Bed rest lasted from 1–2 weeks per episode, along with physical therapy and extended time off from his regular occupational duties lasting greater than 1 month. He had not received chiropractic treatment for his prior injuries. Due to the severity of his condition, he requested a second opinion from a chiropractic physician to review and evaluate his current injury. The patient expressed concern regarding his inability to care for his children during this episode, such as bending down and lifting his infant.

He was employed as a cable technician for a large corporate phone company. He re-injured his low back by lifting and bending phone cables, weighing from 30–50 pounds and placing them into an underground enclosed manhole. The bending, twisting, and moving of the cable resulted in severe low-back pain, left posterior leg pain, and left testicular pain. He presented to the office 1 day following the injury. Prior to presentation, the patient had taken 800 mg of ibuprofen, without significant benefit as he reported his pain as 9 out of 10 on the numeric pain scale, with 10 being severe pain and 0 being no pain.

He stated his pain increased with sitting and he was unable to obtain an upright position. The quality of his pain was consistently dull, but increased to a sharp stabbing pain when attempting to stand upright. The pain radiated to the left buttock, posterior leg, left groin and left testicle. He reported that his

pain increased with extension or while attempting to correct his antalgic posture. The patient denied any change in bowel or bladder function. The patient was asked to complete a history form, a Worker's Compensation Questionnaire, a Revised Oswestry Low-Back Pain Disability Questionnaire and a Numeric Pain Scale. These forms produced a baseline for patient evaluation, determining present disability, and for evaluating the patient's progress during case management through his injury.

Examination

The patient weighed 217 pounds, and was 5 feet 10 inches in height. Posture and gait evaluation revealed left lateral flexion antalgia. Walking and rising from a seated position were difficult and required aided support due to the pain. Lumbar range of motion was assessed with inclinometry as the following: flexion 70°, left rotation 10° resulted in L3-S1 pain with intensity 8/10; extension 10°, right rotation 15°, right lateral flexion 15°, and left lateral flexion 10° resulted in L4-S1 pain with intensity 8/10. All lumbar range of motion reproduced left S1 dermatome paresthesia. Neurological evaluation revealed normal sensory testing using a pinwheel at levels C5-T1 and L4-S1, with the exception of hypesthesia over the left S1 dermatome. Reflexes were examined and were 2+, bilaterally symmetrical at L4-S1. Babinski's sign was absent and motor strength was 5/5 for L4-S1, bilaterally. Severe bilateral spasm and hypertonicity of the quadratus lumborum, multifidus, paralumbar muscles, iliopsoas, and left piriformis were noted. Palpatory tenderness was reproduced through the lumbar spine and left sacroiliac joint.

Orthopedic evaluation included a Kemp's test at 10° extension producing bilateral L3-S1 pain and radicular paresthesia to the left S1 dermatome. Lasegue's test produced left S1 dermatome radiculopathy with severe pain at L3-S1, with left hip flexion at 40° and right hip flexion at 50°. Fajerstajn's well-leg raising test produced L3-S1 pain with S1 dermatome paresthesia. Patrick's FABERE test was positive for low back pain, bilaterally, with pain located at the L3-S1 region with left S1 dermatome paresthesia. Yeoman's test was positive, on the left, producing sacroiliac pain and left S1 dermatome paresthesia. Valsalva's test was positive for L4-S1 pain, localized to the lower lumbar spine. All positive orthopedic tests listed above caused severe sharp pain. Palpatory tenderness was present at the lum-

bar and thoracolumbar spine. Chiropractic subluxation of the left ilium, and lumbar spine were palpated and guarding was noted bilaterally with associated trigger points to the left piriformis and paraspinal musculature.

Plain film upright anteroposterior and lateral radiographs of the lumbopelvis were taken. Figure 1 shows the radiographic findings. Postural alterations were found with left spinal listing and pelvic obliquity with elevation of the left hemipelvis with approximately a 9mm right leg length discrepancy. A left lateral list of the lumbar spine shifted the thoracolumbar junction to the left of midline. A mild, right lumbar scoliosis with right rotation and a diminished lumbar lordosis was noted. There was a flexion malposition of L4 and L5, with apparent reversal of the disc angles L3-L4, L4-L5, and L5-S1. Only four true non-rib bearing lumbar segments were present with transitional characteristics at S1. This demonstrated predominantly sacral characteristics with a hypoplastic S1-S2 disc space and facet

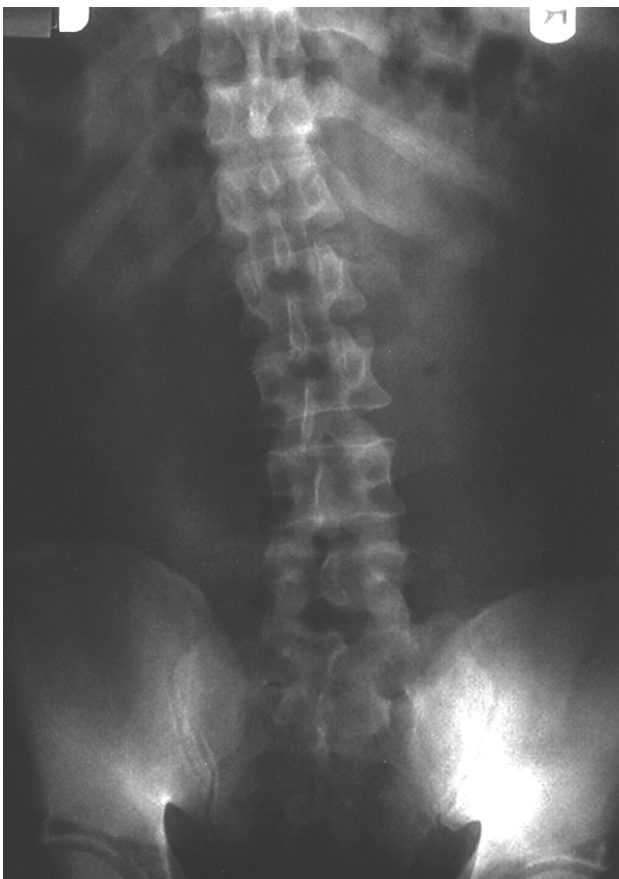


Figure 1. Anteroposterior radiograph of lumbar spine

structures, as well as spina bifida occulta of S1. The 12th ribs were slightly hyperplastic. There was disc space narrowing at L4-L5 and L5-S1 but the remaining lumbar discs were maintained. Schmorl's node formations were diffuse in the thoracolumbar region.

The patient was diagnosed with degenerative disc disease at L4-L5 and L5-S1 with mechanical low back pain including acute moderate-to-severe lumbar and sacroiliac sprain/strain, with subluxation and lower extremity radicular left leg pain. This primary diagnosis was complicated by chronic lumbar biomechanical dysfunction with deconditioned syndrome.

Treatment

The patient was asked to perform right and left lateral flexion wall exercises to help prevent continued antalgic posture (Figs 2A and 2B). Primary emphasis was based on the patient's left lateral flexion antalgia. The exercises were assigned bilaterally due to the pain, antalgic posture, decreased range of motion and significant loss of flexibility during patient presentation. When control of his secondary spasm was achieved, the patient was moved to a wall lumbar spine extension exercise in the upright position (Figs 3A and 3B).

After the antalgic posture and secondary guarding had decreased with the various exercises, side-posture spinal manipulation was completed effectively. The extension exercises allowed for a decrease in the peripheralization of his paresthesia to his left lower extremity and testicle. With continued control of his antalgia, the patient was treated with manual chiropractic manipulative therapy to the lumbar spine and continued passive range of motion exercises to enhance the joint mobility and prevent localized pain with ambulation. Additionally, the patient was placed in a lumbosacral support to aid his posture and to help stabilize his antalgia.

The patient was also treated with interferential and ultrasound therapy to further facilitate healing, decrease inflammation, spasm, pain, and to increase end range of motion. Over the initial 3 days, the patient was asked to use cryotherapy 3 to 5 times per day at home.

By day 3, the treatment was modified based on the patient's improvement. The patient was given

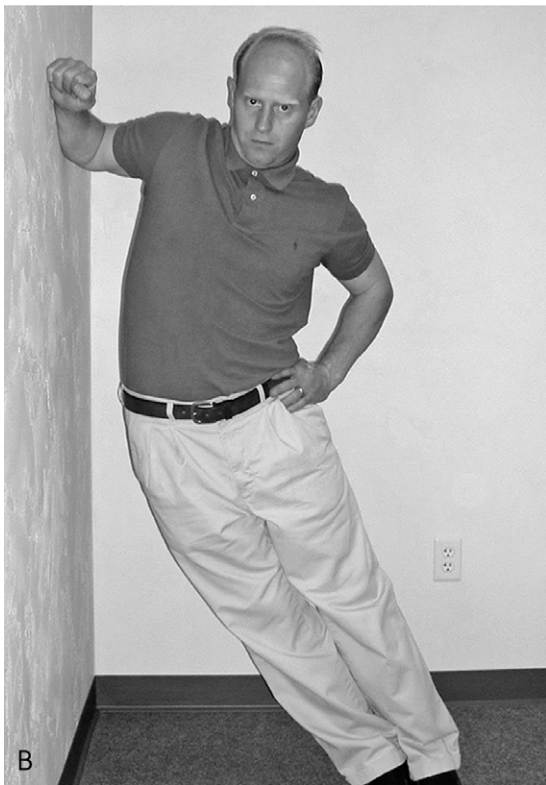
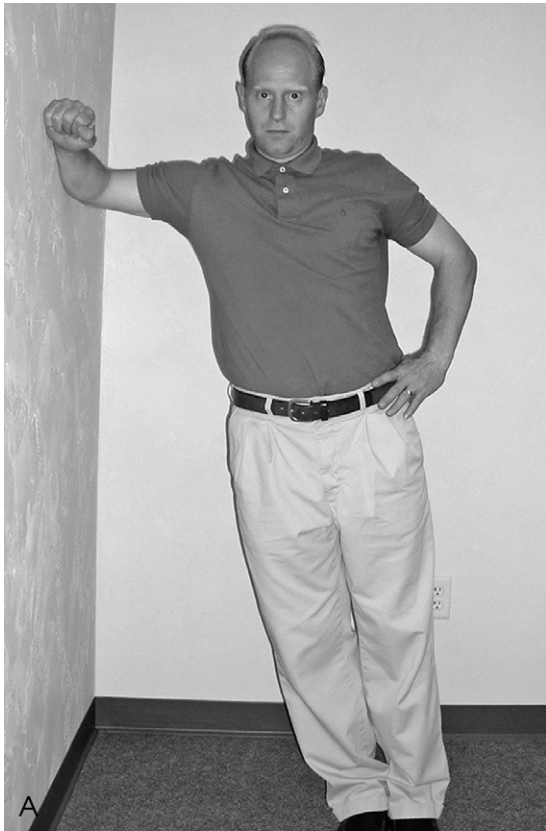


Figure 2a. Left lateral flexion exercise (neutral start position)
Figure 2b. Left lateral flexion exercise (flexion finish position)

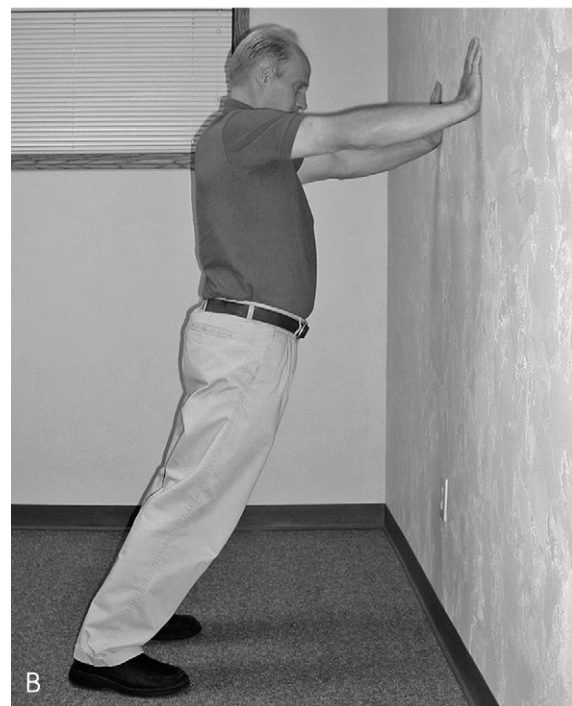
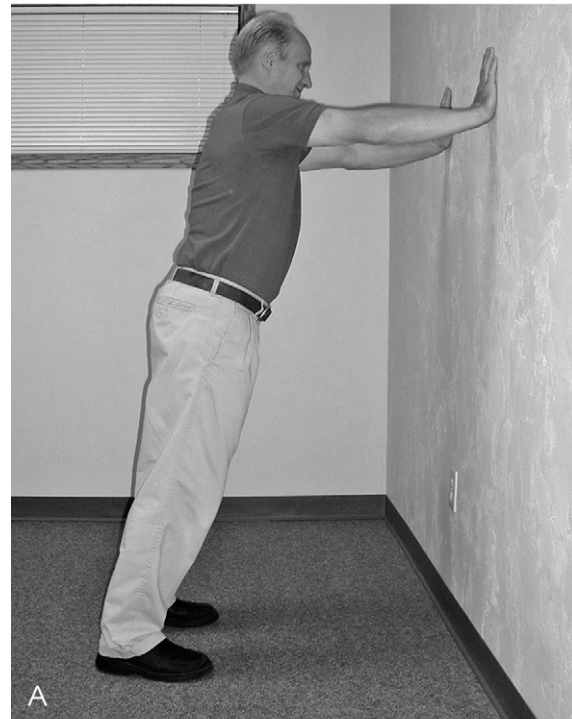


Figure 3a. Wall extension exercise (neutral start position)
Figure 3b. Wall extension exercise (extension finish position)

stretches with a therapy ball. Exercises utilized lengthening of the hip flexors, supine trunk rotation, kneeling trunk stretch, lateral pelvic rocks, and trunk flexion over the therapy ball. Supine knee to

chest and abdominal bracing facilitated progression and continued emphasis on prone back extensions decreasing the associated referred lower extremity symptoms and pain. Exercises consisted of 2 sets of 10 repetitions at a frequency of twice per day, always dependent of patient tolerance and ability.

At day 8, the rehabilitation plan progressed to active stretching exercises using proprioceptive neuromuscular facilitation (PNF) to bilateral hamstrings, hip flexors, gluteus maximus and medius, and iliopsoas musculature. The implementation of an active strengthening regime included "dead bug" exercises,² supine pelvic rotation with feet on the floor, abdominal crunches with bracing and twisting, and side pelvic raises. Similar sets, repetitions, and frequency were recommended with consistent increases dependent on physical strength changes. After day 3, the patient applied alternating hot and cold therapy daily.

Initially, the treatment plan continued 3 times per week for 10 days with re-evaluation at day 10. Chiropractic manipulation therapy using manual side posture technique was performed on each visit. Trunk-strengthening with extension and "dead-bug" exercises were used throughout the patient's first month of treatment promoting continued strength gains, range of motion and decreasing the peripheralization of pain. Continued use of the PNF technique was used to gain flexibility, coordination and strength.^{3,4}

At day 10, a reexamination was completed prior to the patient returning to work under light duty restrictions. Lumbar range of motion had improved significantly with flexion 80°, extension 10°, left rotation and left lateral flexion 15° right lateral flexion 20° pain intensity was 5–6/10, localized to the L4-S1 region with left S1 radicular symptoms. Right rotation was 20° with pain 4/10 to the L4-S1 region. Neurological examination testing L4-S1 motor strength, reflexes, and dermatome sensitivity in the lower extremity were all within normal limits, except, the left S1 dermatome that was decreased to light touch (hypesthesia). Palpatory tenderness with subluxation was noted to the left ilium and lower lumbar spine. Bilateral moderate spasm with hypertonicity was present at the paralumbar, quadratus lumborum, multifidus, iliopsoas, and left piriformis. Orthopedic spinal examinations were positive to the left side predominately. Positive Yeoman's test resulted moderate left sacroiliac pain. Positive Brag-

gard and Bechterew tests demonstrated increased moderate lower back pain at L3-S1. Laseague's test was positive on the left with 50° left leg flexion and 60° right leg flexion; moderate pain was reproduced to the L4-S1 area. The noted orthopedic tests reproduced left S1 dermatome radicular symptoms. Valsalva's maneuver was moderately painful at L4-S1. The patient was able to ambulate with only mild pain, and gait was unguarded and without antalgic posture.

The patient returned to work with light duty restrictions. The treatment plan continued on a 2 visit per week for 3 weeks. The treatment plan was altered with manual chiropractic manipulative therapy, interferential therapy, and continued progressive rehabilitation exercises. Trunk strengthening included therapy ball techniques with seated oblique and abdominal curl up, prone alternation of arm and leg extensions (superman exercises), trunk extension lift, core stability with bridging, table top, and stability walk-out.⁴

The patient gained range of motion with approximately a 50 % reduction in his pain and paresthesia and palpatory tenderness had decreased. The patient was placed into a light-duty position within his company for 2 weeks, after 9 days of total temporary disability.

At 1 month (13 treatment visits), the patient's pain had decreased by approximately 80 %. The pain intensity was approximately a 2–3/10. Spasm was mild to moderate to the lumbar spine and pelvic musculature. Dermatome sensation returned to within normal limits. Orthopedic evaluation demonstrated positive left Kemp's test at 20° extension, positive left Laseague's test with 50 ° flexion of the left leg, and 60° flexion of the right leg, pain 3 out of 10 to L4-S1. The Kemp's and Laseague's test reproduced mild radicular symptoms to the S1 dermatome above the posterior knee.

Approximately 6 weeks into treatment, the patient suffered a re-injury while slipping in mud during a regular-duty work schedule. The patient's pain was concentrated to the left posterior leg and lower lumbar spine. The second injury, although not as severe as the first, caused an inflammatory reaction. This resulted in alteration of the treatment plan, which included spinal traction and continued chiropractic

manipulative therapy to the lumbar spine, with a frequency of 1 visit per week for 6 weeks. Exercises were implemented to patient tolerance, which included bridging exercises and various strengthening exercises for the pelvic girdle. Stretching exercises including PNF were also performed. A magnetic resonance image (MRI) was ordered 6 weeks into care, due to the re-injury and continued paresthesia.

MRI findings revealed a left extruded L5-S1 disc that extended superior and posterior to the L-5 vertebral body. The disc filled the left neural foramina. Mild bulging was noted at the L4-5 disc (Figs 4 and 5). Thus, the prior clinical objective orthopedic, neurological, and examination findings were confirmed with the MRI imaging. Following the MRI findings, the treatment plan emphasized the continuation of the McKenzie-based extension exercises and spinal manipulation to prevent the peripheralization of the patient's symptoms.

Reevaluation of the patient, at 9 weeks, showed the patient had a reduced pain level to 2/10, and he regained endurance and range of motion. A functional capacity test was completed, to evaluate overall strength, mobility and coordination. The patient remained unrestricted at work and changes in the treatment plan were altered after testing of his functional motor system with specific exercises given to address specific deficiencies found on the functional capacity test.

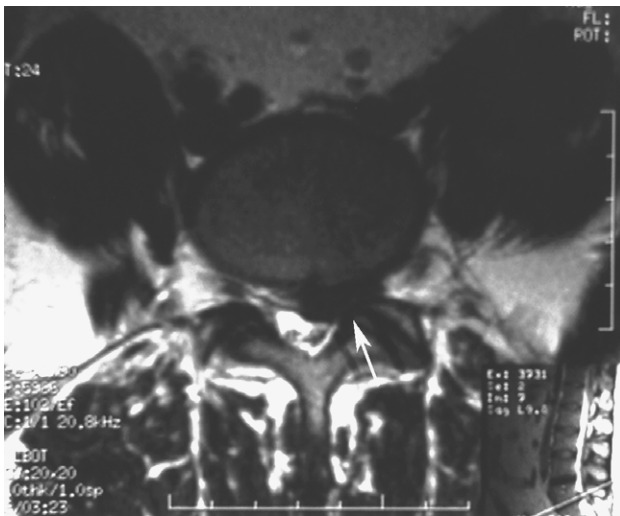


Figure 4. T1-weighted axial lumbar spine MRI showing far lateral disc herniation at L5-S1 (marked area).



Figure 5. T1-weighted sagittal lumbar spine MRI demonstrates large extruded disc herniation (marked area).

Outcome assessment tools were repeated on a regular basis. After 1 week from the original presentation, a Revised Oswestry Low-Back Disability Questionnaire scored a 48, at 6 weeks following his re-injury the Oswestry score decreased to 36. At 9 weeks, the Oswestry score decreased to 10. It is recommended that the cut off score may vary for return to work or discharge from care depending upon the particular patient. Erhard et al suggest that a score should change by 11% for a patient with uncomplicated low-back pain.⁵ Due to the patient's continued improvement, he was able to lift a 100-pound ladder, with mild pain by the eighth week of care. However, he continued with intermittent mild paresthesia to the posterior leg and occasionally to the left testicle.

Following the evaluation, the patient was trained using various balance board proprioceptive tech-

niques, to improve his functional capacity and joint proprioception. At 10 weeks, the patient had improved approximately 90%. The patient was referred to an anesthesiologist for an epidural injection related to continued residual pain and paresthesia. While undergoing a series of 2 epidural injections, over a period of 2 weeks, the patient progressed with continued treatment and rehabilitation in our office at 1 visit 2 week frequency for 6 weeks.

At week 15, the patient was re-examined. Dermotome, motor strength, and reflexes at L4-S1 were symmetrical and equal bilaterally. Range of motion measured flexion at 85°, extension at 25°, and left lateral flexion at 30°, with pain 2/10 at end range of motion. Right and left rotation and right lateral flexion measured 30°, with no indication of residual pain. Muscle hypertonicity was mild to the bilateral paralumbar, left piriformis, and left iliopsoas. Palpatory tenderness was 2/10 to the L4-S1. Chiropractic subluxation was noted at L3-L5 and left ilium. Orthopedic examination demonstrated positive left Kemp's test at 20° of extension and positive left Laseague's test with 60° left leg flexion, and 70° right leg flexion, both tests caused L3-S1 pain, a 2/10 with no noted leg paresthesia. Yeoman's test was positive, on the left, with pain a 2/10, to the left sacroiliac joint.

On the last visit, the patient was treated with chiropractic manipulative therapy and released from care. The patient's rehabilitation management consisted of 23 clinical visits over a 15 week period, including a moderate re-injury at 6 weeks. Throughout treatment, the patient was engaged in an acute case approach that included cardiovascular endurance program of walking for 1 to 3 miles daily, depending on the patient's tolerance, capabilities, and level of improvement.

After 1 year, the patient reported intermittent stiffness to the lumbar spine and no longer had radicular symptoms. He continues with good compliance a home cardiovascular program and rehabilitation exercises. On the last visit date, these exercise techniques were further reviewed and emphasized with the patient to promote a continued home rehabilitation program, which included trunk strengthening, cardiovascular endurance, and strengthening/stretching exercises to prevent further exacerbation. His continued rehabilitation program included chiropractic manipulative therapy to control joint dys-

function at one visit per month. Continued strengthening and stretching exercises to prevent secondary deconditioning as well as musculature inhibition or weaknesses were emphasized and encouraged at each office visit.

DISCUSSION

This patient's case was evaluated by using both a qualitative and quantitative perspective. Multiple patient questionnaires measured various levels of functional capacity and disability as it relates to the patient's low back pain and the effectiveness of treatment.

A detailed history, examination and continued review of treatment protocols were utilized to treat a disc derangement. An active role in functional restoration of this patient's injuries will facilitate an expedient return-to-work as it did in this case. A common complaint of peripheralization of disc derangement may radiate to the testicle, groin, or lower extremity as noted here. There is a clinical observable fact known as "centralization," where pain relocation from the most distal region moves to a proximal or central direction.

The centralization phenomenon was used as an indicator of the appropriateness of a given chiropractic side-posture spinal manipulation maneuver.⁶ This is a mechanical evaluation protocol described by McKenzie. In a randomized trial regarding posterior derangement the author suggested that repeated movements performed during a patient examination that decreased the patient's complaint were utilized as therapeutic exercises.⁷ The centralization of a patient's symptoms can be an indication of successful treatment outcome, the direction in exercise regime, and early predictor of the need for surgical treatment.⁸

With a sequence of rehabilitation techniques utilizing manual chiropractic manipulative therapy, rehabilitation exercises and physiotherapy modalities, treatment may restore a severely disabling injury and prevent future reoccurrence as noted in this case.

Previous allopathic treatment continued to result in recurrent low back pain and stabilization of a deconditioned patient was never appropriately addressed. Injuries resulting in low back pain can result in radicular symptoms to leg, groin, and testicular area

and prompt work related disability as noted in this case. Proper management through active care rehabilitation and physician involvement is essential in restoring patient function, reduce pain, and minimize disability.

This case represents how management and treatment is necessary for rehabilitation of acute lower back pain with radicular symptoms and prevention of recurrent episodes. Selection of a patient specific exercise program with manipulation to the spine may allow for a cost effective management approach. Reevaluation of the patient's physical progression or regression each visit is crucial for the assessment in a successful rehabilitation program.

Since this is only a case study, extrapolation of results of this case should not be made. Future studies including larger populations and control groups may add additional information to the understanding of the management of discogenic low back pain with corresponding radicular symptoms. These controlled studies could use a treatment plan including chiropractic manipulation, modalities and exercise rehabilitation to demonstrate the combined effectiveness of all components involved in this study.

CONCLUSION

This particular case represents rehabilitation of a patient with chronic, recurrent low back pain and left leg radicular symptoms secondary due to an extruded disc. A continued progressive rehabilita-

tion program utilizing chiropractic manipulative therapy and various strengthening and stretching exercises alleviated pain, increased function, and decreased peripheralization related to disc herniation in this case. The patient reached a level of functional biomechanical stability and demonstrated that with proper management and treatment, rehabilitation of a disc herniation can be reached in a relatively short duration of time.

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