

# Successful resolution of signs and symptoms from L4 radiculopathy with spinal manipulation: a case report

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*The management of a patient with L4 radiculopathy with side posture spinal manipulative therapy (SMT) is described. Dramatic improvement both subjectively and objectively followed a short course of SMT of the lumbar spine. This case is used to illustrate aspects of the natural history of lumbar discogenic radiculopathy, safety and effectiveness of SMT for disc herniations, diagnostic imaging, and differentiation of referred vs. radicular pain syndromes. Also included is a short summary of the safety and effectiveness of surgery for lumbar disc herniation. We conclude that side posture SMT in this case was safe and may be effective in the treatment of presumed lumbar spine disc herniation with L4 radiculopathy.*

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*Le traitement par manipulation spinale de la posture latérale (SMT) d'un patient atteint d'une radiculopathie L4 est décrit ici. Un traitement SMT de courte durée de la colonne lombaire était suivi d'une amélioration subjective et objective remarquable. Ce cas permet d'illustrer les aspects de l'évolution naturelle de la radiculopathie d'origine discale lombaire, l'innocuité et l'efficacité de la SMT pour les hernies discales, l'imagerie diagnostique et la différenciation des syndromes de douleur projetée et de douleur radiculaire. Un résumé de l'innocuité et de l'efficacité d'une intervention chirurgicale pour traiter une hernie discale lombaire est également inclus. Nous en concluons que la SMT de la posture latérale dans ce cas était sans danger et peut-être une méthode efficace dans le traitement d'une hernie discale lombaire présumée avec radiculopathie L4.*

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**KEY WORDS :** chiropractic, spinal manipulation, lumbar disc herniation, radiculopathy.

**MOTS CLÉS :** chiropraxie, manipulation spinale, hernie discale lombaire, radiculopathie.

## Introduction

We present a case report of a patient with a presumed lumbar disc herniation causing L4 radiculopathy that resolved with spinal manipulative therapy (SMT). To our knowledge, this is the first reported case of L4 radiculopathy treated successfully with SMT, although there are reports of sciatic radiculopathy responding to various conservative treatment approaches, including SMT.

## Case report

Mrs. MB is a 42-year-old nurse who was referred by her physician to our office with a chief complaint of low back pain (LBP) and radiation of pain and numbness to the right anterolateral thigh. This had been bothering her for about one week and had developed one morning simply after standing and brushing her teeth. She admitted to many episodes of lower backache over a number of years, which she attributed to playing competitive volleyball. Her cur-

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rent symptoms were not improving with time and were progressive; despite her pain, she had not lost any time at her work as a nurse. She was taking Ibuprofen for pain on an as-necessary basis. She also had one session of treatment with a massage therapist, as well as a session of treatment with an acupuncturist, both of which were not helpful. She denied bowel or bladder difficulty and otherwise was generally healthy.

On examination, this is a pleasant lady who was in mild-moderate distress when seen. She could forward flex to knee level with pain noted in her back. Extension movements were full and painless. Lateral flexion to the right provoked LBP as well as numbness of the right anterior thigh. Lateral flexion to the left was full and painless. She had mild tenderness over her mid lumbar spine at the level of L4. Sacroiliac motion tests were normal, and there was no tenderness over her sacroiliac joints. Tests for piriformis syndrome were negative bilaterally. She had diminished deep tendon reflex at the right knee, graded +1 with reinforcement, as compared to +2 and brisk on the left. She had diminished sensation to light touch over the right L4 dermatome. Motor power of all lower extremity muscle groups was normal, except for slight weakness of her right quadriceps on repetitive deep knee bends. She had no evidence of muscular atrophy. Plantar responses were downgoing. Straight leg raising was 90 degrees bilaterally with no signs of sciatic nerve root tension. Femoral nerve stretch test on the right was positive, reproducing pain and numbness. Hip joint movements were full and pain free.

An xray of her lumbar spine was obtained and showed no abnormalities.

This lady was diagnosed as having the clinical signs and symptoms of acute, right L4 nerve root entrapment, including diminished reflex and sensory disturbance, as well as the very early signs of motor weakness of her quadriceps.

A course of gentle lumbar side posture mobilization progressing to gentle manipulation of her lumbar spine was recommended. Manual therapeutic procedures were accompanied by interferential electrotherapy to her right quadriceps.

She was told she could stay at her work, provided that she could monitor her work demands sufficiently to avoid provocation of her symptoms. We also told her that if her symptoms did not show improvement with conservative treatment in six weeks, or alternatively, if her neurologic

deficit worsened, she should cease conservative treatment and consider further diagnostic intervention and/or surgery.

This lady had nine sessions of manipulations/mobilization, as well as electrotherapy. She tolerated all treatment well. Her LBP and leg pain, as well as leg numbness, completely resolved. Objectively, her sensation to light touch returned completely and the right deep tendon knee reflex returned to normal. She had no progression of leg weakness. She had no further provocation signs of L4 radiculopathy. She was discharged with a home exercise program.

Approximately 3 months later, she returned with a mild attack of acute LBP, without radicular signs or symptoms. This was diagnosed as arising from mechanical right sacroiliac joint syndrome, and responded completely to 3 sessions of SMT. She had not experienced any recurrence of radicular pain.

## Discussion

When dealing with any condition it is necessary to know the natural history of that specific condition in order to determine if treatment is effective. The treatment intervention should alter the clinical course of the condition in less time and/or with less suffering than would occur through the natural history of the condition without any treatment.<sup>1</sup> Bush et al. concluded that a high proportion of intervertebral disc herniations have the potential to resolve spontaneously.<sup>2</sup> A study by Weber et al. found that approximately 60% of patients with lumbar disc herniations did not suffer from back pain after 3 months.<sup>3</sup> Kirkaldy-Willis reported that over a period of 3 month approximately 75% of people who experience a lumbar disc herniation will have their symptoms resolve.<sup>4</sup> Thus, it appears likely that if patients with LBP and radiculopathy from lumbar disc herniation have no treatment whatsoever, over half will resolve spontaneously. Given this, the goal of conservative treatment, including SMT is to reduce pain, decrease the duration and severity of neurologic signs and symptoms, and reduce the risk of chronicity.

Currently, there is only a small amount of clinical research available on the treatment of low back and leg pain with SMT. In a case series by Stern et al., the authors found that 90% of the 59 patients treated with SMT for lumbar spine disc herniations reported improvement of their complaint. They also noted an objective increase in straight leg

raising as well as lumbar spine ranges of motion in 75% of those treated. They concluded that SMT might be a safe and effective treatment for patients with lumbar spine disc herniations.<sup>5</sup> A review of literature by Cassidy et al. found that patients with lumbar disc herniations with leg pain who undergo SMT often experience significant improvement within 4–6 weeks. This review also stated that the LBP should improve first, followed by the leg pain, and that the recovery from a neurologic deficit may take several months.<sup>6</sup>

There have also been several case reports published on the effects of SMT for disc herniations. A case report by Quon et al. showed the treatment of a large central L4–5 disc herniation by side posture rotational manipulation. The patient was treated daily for 2 weeks; at one week his LBP had resolved, and at 2 weeks his leg pain had improved considerably. The interesting aspect of this case was that a follow up CT scan was performed 3 months after beginning treatment which showed there was no change in the size of the disc herniation despite the patient being virtually asymptomatic. The authors concluded that side posture manipulation is not contraindicated in lumbar disc herniations but is an effective treatment option for lumbar disc herniation.<sup>7</sup>

Many chiropractors use not only side posture manipulation, but also other manipulative techniques as well as adjunctive therapies in the treatment of disc herniations. Bergmann and Jungeward presented a case of contained lumbar disc herniation with neurologic deficit that responded to flexion-distraction and manipulation over the course of nine treatment sessions.<sup>1</sup> In this case they used the flexion-distraction until the patient was able to tolerate side posture manipulation. They concluded that there is sufficient evidence to suggest a course of manipulation in the treatment of lumbar disc herniations before a surgical consultation is needed. Hubka et al. followed a similar treatment plan where the patient was treated with flexion-distraction until able to tolerate side posture manipulation. This case study points out that determining the most appropriate manipulative therapy should be based on examination findings, as well as the patients tolerance to pain. Flexion-distraction was used for the first five treatments and side posture manipulation was introduced on the fifth day of treatment when the patient could tolerate the position. The patient was discharged after 16 days of manipulation at which time he was not experiencing low back or

leg pain and his neurologic status was unremarkable.<sup>8</sup> Morris used a variety of therapeutic techniques in a case of an acute S1 radiculopathy stemming from a large L5–S1 disc herniation that resolved following treatment. His treatment included SMT, along with McKenzie extension exercises, trigger point therapy, sensory motor training, and trunk stabilization.<sup>9</sup>

There has been some concern about the safety of SMT for the treatment of lumbar disc herniations. The complications associated with side posture manipulations are very few as compared to the alternative surgical treatment. The major concern to be aware of in treating lumbar disc herniations is the possibility of developing a cauda equina syndrome. The symptoms to look for in a cauda equina syndrome are severe bilateral sciatica, bowel or bladder dysfunction, severe neurologic deficit, and saddle anesthesia. The risk of causing a cauda equina syndrome with manipulation has been estimated to be 1 in many millions.<sup>10</sup> The series of cases presented by Stern et al. did not have any complications in the 59 patients treated, but estimated the risk of complications to be 5% or less, elevated by a small sample size. Peterson states that there is a risk of developing a cauda equina syndrome, but there is a consensus that uncomplicated lumbar disc herniations can be treated effectively with SMT.<sup>11</sup>

Surgery for disc herniations carries a much higher risk of complication and should only be considered as a last resort. Serious complications are rare but may include death, thrombo-embolism, infection, and neurologic complications.<sup>12</sup> Postacchini states that indications for surgery are both absolute and relative. Absolute surgical indications are cauda equina syndrome, presence of severe motor deficits resulting from a large extruded herniation, and patients with intractable pain. He states that all other surgical indications are relative to the presenting patient and should only be considered after 2–3 months of unsuccessful conservative care.<sup>13</sup> Other studies indicate that the long-term prognosis for patients treated conservatively and surgically may be very similar. A 10-year controlled, prospective study by Weber demonstrated that after 4 years there was no statistically significant difference between surgically and conservatively treated patients. After 1 year the surgically treated patients reported better results, but the differences decreased with time.<sup>14</sup> In a retrospective cohort study of 64 patients, Saal and Saal concluded that lumbar herniated discs could be treated non-opera-

tively with a high degree of success.<sup>15</sup> In this study the non-operative treatment consisted of an aggressive physical rehabilitation program which resulted in a good to excellent outcome in 90 of the patients.

In our case, the diagnosis of an L4 radiculopathy was based upon both subjective and objective clinical findings. Our patient complained of LBP as well as radiating pain and numbness following a right L4 dermatomal distribution. Objective clinical findings showed painful and restricted lumbar spine ranges of motion. Right lateral flexion produced leg pain and numbness, which would suggest a posterolateral herniation on the right at the L3–4 level. She had neurologic deficit consisting of a decreased L4 reflex on the right, decreased light touch sensation following an L4 distribution on the right, and mild motor weakness in the right quadriceps muscles. Femoral Nerve stretch test was positive on the right. This test tractions the midlumbar nerve roots (L2,3,4) and a positive test is indicated by radicular symptoms.<sup>16</sup> By combining all of this clinical data we came to conclusion of a lumbar disc herniation

with an L4 radiculopathy. This is similar inclusion criteria used by Stern et al., who followed three criteria for a diagnosis of a lumbar disc herniation; the presence of radiating leg pain, leg or LBP that was reproduced with decreased SLR or femoral nerve stretch test, and restricted and painful lumbar spine flexion and extension.<sup>5</sup>

When a patient presents with leg pain it is imperative that the clinician be able to differentiate between referred pain and radicular pain. A summary of the different diagnostic criteria is presented in Table 1.<sup>17</sup>

It is notable in our case that the presumptive diagnosis of L4 radiculopathy due to a lumbar disc herniation is made on a clinical basis, and is not confirmed by specialized diagnostic imaging. The need for special diagnostic imaging for disc herniations must be considered depending on the presenting circumstances. Recently MRI has replaced CT as the gold standard in the evaluation of spinal disc herniations.<sup>18</sup> Currently MRI data is used to confirm a diagnosis or rule out pathology; it is not indicated in conservative treatment of uncomplicated lumbar disc

**Table 1 Referred Vs Radicular Pain**

Characteristic	Referred Pain	Radicular Pain
<b>Symptoms</b>	Described as achy, deep, boring and difficult to localize.	Described as sharp, electric like, and well localized.
<b>Pain radiation</b>	From facet joints, sacroiliac joints and muscles to the posterior and lateral thigh, and calf.	Follows either a femoral or sciatic nerve distribution. Femoral nerve radiates to anterior thigh and leg. Sciatic nerve radiates to posterior thigh, leg and into the foot.
<b>Sensation</b>	Rarely affected	Diminished sensation follows a dermatomal distribution.
<b>Motor Power</b>	Muscle strength is normal	Muscle weakness and atrophy may result from prolonged duration.
<b>Reflexes</b>	Normal	Diminished deep tendon reflexes frequently.
<b>Nerve root tension tests</b>	Negative	Positive straight leg raise or femoral nerve tension test for radicular pain.

Adapted from Bernard TN, Kirkaldy-Willis WH. Making a specific diagnosis. In: Kirkaldy-Willis WH, ed. Managing low back pain. New York: Churchill-Livingstone, 1988: 209–227.<sup>17</sup>

herniations. Stern et al. state that advanced imaging in Canada is usually only ordered as a surgical planning procedure.<sup>5</sup> That has been our experience as well.

## Conclusion

We believe that this case lends support for the notion that side posture mobilization and SMT, accompanied by electrotherapy, might be a safe and effective treatment for L4 radiculopathy with neurologic deficit, resulting in the resolution of pain and the restoration of normal neurologic function. To our knowledge, this is the only reported case of L4 radiculopathy treated with SMT. Our experience is similar to others regarding the issue of diagnostic imaging not being necessary unless surgery is being contemplated. Surgery should only be considered as a last resort after failed conservative care or if complicating factors, such as cauda equina syndrome, are clinically present. Lastly, when dealing with low back and leg pain, as clinicians it is important to be able to distinguish between referred and radicular pain syndromes based on clinical data.

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