

# Conservative management of a 31 year old male with left sided low back and leg pain: a case report

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**Objective:** *This case study reported the conservative management of a patient presenting with left sided low back and leg pain diagnosed as a left sided L5-S1 disc prolapse/herniation.*

**Clinical features:** *A 31-year-old male recreational worker presented with left sided low back and leg pain for the previous 3-4 months that was exacerbated by prolonged sitting.*

**Intervention and Outcome:** *The plan of management included interferential current, soft tissue trigger point and myofascial therapy, lateral recumbent manual low velocity, low amplitude traction mobilizations and pelvic blocking as necessary. Home care included heat, icing, neural mobilizations, repeated extension exercises, stretching, core muscle strengthening, as well as the avoidance of prolonged sitting and using a low back support in his work chair. The patient responded well after the first visit and his leg and back pain were almost completely resolved by the third visit.*

**Summary:** *Conservative chiropractic care appears to reduce pain and improve mobility in this case of a L5-S1*

**Objectif :** *La présente étude de cas porte sur la gestion conservatrice d'un patient qui présente une douleur du côté gauche au bas du dos et à la jambe, diagnostiquée comme une hernie discale (ou un disque saillant) L5-S1 gauche.*

**Caractéristiques cliniques :** *Un homme de 31 ans qui travaille dans le domaine récréatif ressent depuis 3-4 mois une douleur du côté gauche au bas du dos et à la jambe, qui a été exacerbée par des périodes prolongées en position assise.*

**Intervention et résultat :** *Le plan de gestion était composé de l'administration de courant interférentiel, d'une thérapie myofasciale et des points déclics des tissus mous, de mobilisations par traction manuelle à basse vitesse et de faible amplitude en position allongée sur le côté et, au besoin, du blocage pelvien. Les soins à domicile comprenaient : l'application de chaleur et de froid, des mobilisations neurales, des exercices d'extensions répétées, des étirements, le renforcement des muscles du tronc, éviter de rester assis pendant des périodes prolongées et utiliser un dispositif de soutien pour le bas du dos dans sa chaise de travail. Le patient a bien réagi après la première visite et la douleur qu'il ressentait à la jambe et au bas du dos avait presque entièrement disparu au troisième rendez-vous.*

**Résumé :** *Les soins chiropratiques conservateurs semblent réduire la douleur et améliorer la mobilité dans ce cas de la hernie discale L5-S1. Il est conseillé de*

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*disc herniation. Active rehabilitative treatment strategies are recommended before surgical referral.*

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**KEY WORDS:** low back pain, rehabilitation, exercise, chiropractic, disc herniation/bulge

*procéder à des stratégies de traitement de réadaptation active avant d'orienter le patient pour une chirurgie.*

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**MOTS CLÉS :** lombalgie, réadaptation, exercice, chiropratique, hernie discale

## Introduction

Low back pain has been reported as the chief complaint for 23.6% of patients presenting to chiropractic offices.<sup>1</sup> Disc herniations that lead to nerve-root compromise account for less than 15% of chronic low back pain cases.<sup>2</sup> Over 95% of lumbar disc herniations occur at L4-5 or L5-S1 levels, and only 2% of herniations require surgery, 4% have compression fractures, 0.7% have spinal malignant neoplasms, 0.3% have ankylosing spondylitis and 0.1% have spinal infections.<sup>2,3</sup> Leg pain is estimated to be found in 25-57% of all low back pain cases and accounts for large costs, disability, chronicity and severity.<sup>4,5,6</sup> Many conservative treatments have been shown to be effective in the management of this condition and are favorable to pursue before considering any surgical interventions, such as: modalities, soft tissue therapy, spinal manipulations or mobilizations, pelvic blocking, McKenzie/end-range loading exercises, lumbar stabilization exercises and neural mobilizations, patient education, reassurance, short-term use of acetaminophen, and nonsteroidal anti-inflammatory drugs.<sup>2,3,7-24</sup> The purpose of this case report is to describe the successful management of a patient with low back and leg pain.

## Case report

A 31-year-old male recreation centre worker presented complaining of left sided low back, gluteal and leg pain that travelled down to his posterior calf for the previous 3-4 months after playing sports at his workplace. He rated the pain as a 3/10 on the visual analogue scale (VAS) and 7-8/10 at its worst (where 0 was no pain and 10 was the worst pain ever experienced). He recalled that when the pain started a few months prior that it had left him "bedridden", but that his mobility had improved since. He stated that the low back pain "came and went" and was constantly "stiff". He identified the left sided leg pain

as constantly "dull" and occasionally "sharp". The aggravating factors included prolonged sitting at work (after 20-30 minutes) and slouching. The relieving factors included stretching, walking and getting up from sitting. He reported taking no medications or supplements. He was a non-smoker, who walked regularly, had an average diet and slept well. He reported no previous traumas, surgeries, illnesses or medical conditions. He recalled a previous incident of mild back pain without leg pain in high school. The organ systems and red flags reviews were unremarkable. He had never seen a chiropractor, but did see his medical doctor annually for check-ups.

The physical examination revealed that the visually estimated lumbar ranges of motion were limited in flexion (by 75%), lateral bending (by 50%) and extension (by 25%). Extension was found to be a relieving position, especially when it was repeated. Postural observation demonstrated increased anterior head carriage and thoracic kyphosis. Motion and static palpation illustrated restricted motion at L2-4. Soft tissue palpation revealed tight and tender bilateral lumbar erector spinae and quadratus lumborum, left sided gluteal, piriformis, iliotibial band and lateral gastrocnemius muscles. The neurological examination was unremarkable in the lower extremities. Gait and heel/toe walking were normal. Positive orthopedic tests that reproduced his pain included Valsalva (patient holds breath and bears down), left sided straight leg raise/SLR (seated and supine) at approximately 45 degrees and Braggard's (SLR plus ankle dorsiflexion) which all reproduced his leg and low back pain.<sup>25,26</sup> Negative orthopedic tests included right sided SLR and Braggard's, and bilateral Bowstring's (palpation of the popliteal fossa for the sciatic nerve), Thomas (supine, flex one knee to the patient's chest), Patrick/Fabere/Distractio (cross patient's ankle over opposite knee into "figure four" position, supine), Thigh thrust (supine with knee bent to 90 degrees

and thrust down into table/patient's SI joint), Gaenslen's (supine, patient's knee to chest and other leg off table and apply overpressure), Obers (side lying, hang top leg off back of table), PA and side SI compression, Ely's (prone, patient's heel to buttock), Hibb's (prone, patient's knee bent to 90 degrees and internally rotate femur), Yeoman's (prone, examiner extends hip and presses down on the ipsilateral PSIS), and Spring/joint mobility tests.<sup>25,26</sup>

The working diagnosis was a left sided postero-lateral disc prolapse/herniation with referral/compromise of the left L5-S1 nerve root. The differential diagnoses included mechanical low back pain and muscular entrapment/piriformis syndrome. The prognosis was rated as moderate, due to the length of time and type of the injury. The plan of management included 1-2 weekly treatments for 2-3 weeks, followed by a re-evaluation. Treatments included interferential current, soft tissue trigger point and myofascial therapy, side posture traction mobilizations (a manual side posture posterior-anterior mobilization with long axis traction and deep flexion avoided) and pelvic blocking was used as necessary.<sup>23,27</sup> Manipulations were not performed due to the patient's request. Home care advice included heat, icing, neural mobilizations/nerve flossing (see Figures 1A & 1B), reassurance, staying active, repeated end range loading extension exercises (10 repetitions every hour, held for 1 second each, see Figure 2), stretching (quadratus lumborum, iliopsoas, gluteal and piriformis muscles), core stabilization exercises, avoiding prolonged sitting by getting up regularly and using a low back support in his chair. A referral was also made to his medical doctor to request imaging.

On his second visit, two weeks later, the patient stated he had no pain for the previous two days, which was the longest period of time for the previous 3-4 months he had been pain free. He reported that the pain was "bad" three days prior because he had done a substantial amount of prolonged sitting at work. He had seen his medical doctor, who requested radiographs and magnetic resonance imaging (MRI). He conveyed that the prescribed stretches felt "good". On this visit deep abdominal activation (during daily activities) and the modified curl-up exercise (to be performed daily with 8-10 second holds and building up the number of repetitions slowly, see Figure 3) were added.<sup>9,13</sup> On his third visit, two weeks later, he reported being pain free since the previous visit and only a mild "tightness" in his back. He also recounted having no leg



Figures 1A & 1B *Sciatic nerve neural mobilizations*

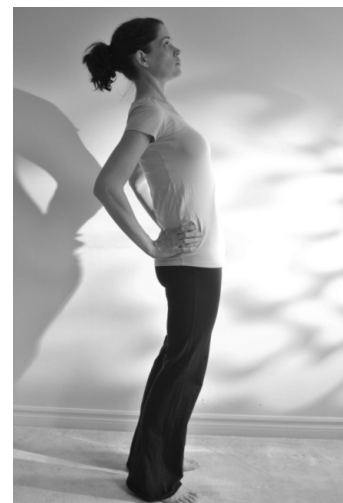


Figure 2 *McKenzie's end range loading extension exercises*

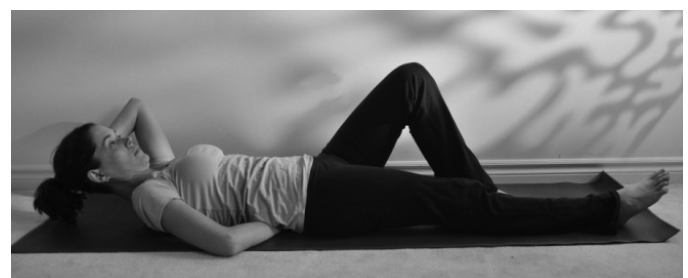


Figure 3 *Modified curl-up*<sup>9</sup>

symptoms, that he was able to sit longer at work and that he had an MRI appointment in two weeks. He stated that he had continued to do his stretching, but had not yet started the core stabilization exercises.

He cancelled his next visit, due to an unrelated illness. On the phone, he reported having no pain and was discharged with follow-up advice given (via e-mail) to increase the difficulty and variety of the stabilization exercises (adding bird dogs and side bridges) and to return for subsequent visits as needed.<sup>9</sup> The MRI report was received a few weeks later and showed mild degenerative disc disease at L4-5 and L5-S1, a mild diffuse L4-5 disc bulge with a central posterior annular tear, a mild to moderate diffuse disc bulge at L5-S1 that touched the left S1 nerve root and mild L5-S1 bilateral neural foraminal stenosis.

## Discussion

In this case, the patient stated that prolonged sitting and slouching aggravated his symptoms. He reported relief with the chiropractic treatment, including repeated extension exercises. Lumbar stabilization exercises were added to build strength and endurance of the surrounding musculature. A short review of the literature on these specific topics is summarized.

Disc herniations have been found to be highly prevalent (20-76%) in the normal asymptomatic population and can be detected on MRI, but physical job characteristics and psychological aspects of work are more predictive of the need for low back pain related medical consultation and work incapacity over long term follow-up.<sup>28,29</sup> Lumbar disc protrusions have been shown to spontaneously resolve or reduce by 20-70% in size by MRI.<sup>29-31</sup> Keskil et al (2004) found complete, spontaneous resolution of large protruded discs without treatment (while neighboring disc protrusions did not), which the authors related to dehydration and regression within the annulus of disc fragments that had not fully migrated out (see Figure 4 for anatomical review).<sup>29</sup> The natural history of disc herniation has been demonstrated as high as 93% resolution in 24 months and from 58-88% in the 10 days to 6 months post injury for lumbar disc herniations with radiculopathy.<sup>31,32</sup> Muscular atrophy in the lumbar multifidus and piriformis muscles has been documented following a lumbar disc injury.<sup>33,34</sup> Hodges et al (2006) reported that 20-60% of chronic low back pain patients have been found to have

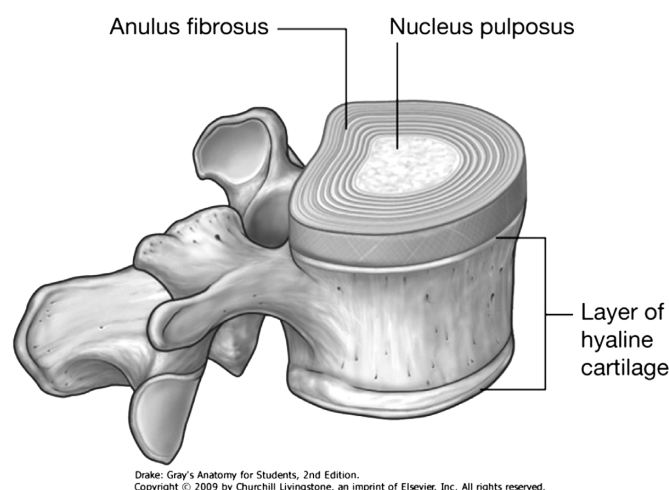


Figure 4 Lumbar vertebrae and intervertebral disc

paraspinal muscle atrophy and abnormalities (30% reduction in cross-sectional area, fiber change and increased intramuscular fat).<sup>33</sup> One-year prognosis in low back pain patients with and without radiculopathy is associated with baseline disability and pain, diffuse tenderness, worrying and health anxiety, compensation claim, fear avoidance, and baseline exercises habits.<sup>35</sup> In patients with back plus leg pain, duration of pain and forward flexion have shown statistically significant associations with one-year disability.<sup>35</sup>

## Sitting and Slouching

Sitting has been shown to increase intradiscal pressure in the nucleus pulposus by approximately 40% when compared to standing.<sup>36-38</sup> A slouched posture while sitting has long been discussed as a cause or aggravator for back pain.<sup>10,36-39</sup> Slouching results in backward rotation of the sacrum (in relation to the ilium), dorsal widening of the L5-S1 disc and strain on the iliolumbar ligaments but the addition of lumbar backrest support eliminates these movements.<sup>11</sup> Co-contraction of the deep stabilizing muscles of the spine while sitting has been shown to reduce the lumbar curve and increase the sacral angle.<sup>36,37</sup> Maigne et al. (2003) found that chronic low back pain sufferers who demonstrated position-related pain onset and relief (pain with sitting and relieved by standing) have higher rates of radiologic instability (loss of the ability of the spine under loads to maintain its displacement pattern so

there are no deficits, deformity or pain) and anterior loss of disc space in flexion when compared to controls.<sup>40</sup> Patients with discogenic pain have demonstrated increased pain with sitting.<sup>10</sup> Prolonged loading decreases disc hydration, while rapid fluctuations of load (such as between flexion and extension) has not been shown to affect disc hydration.<sup>41</sup> Changes in segmental lumbar motion relate to the degree of degeneration when measured in supine and seated MRI in subjects with discogenic chronic low back pain.<sup>42</sup> Wilke et al (1999) concluded that constant position change promotes fluid flow in the disc, including leaning forward while seated in a chair increases intradiscal pressures when compared to leaning back or slouching, while sitting with the back consciously straightened increased the pressure by approximately 10%.<sup>39</sup> Sleeping for seven hours increased the intradiscal pressure by 240%, which concurs with reports that discs may prolapse more easily after longer periods of sleep.<sup>39</sup> Snook et al (2002) reported that discs were more susceptible to intra-annular prolapse when fully hydrated.<sup>43</sup> When subjects reduce or eliminate early morning lumbar flexion and maintain a “straight back”, they report a reduction in pain intensity, number of “days in pain”, as well as improvements in disability, impairment and medication usage.<sup>43</sup> Callaghan & McGill (2001) demonstrated that standing allows the passive tissues of the lumbar spine to “rest” from the strain they sustain in a seated position, therefore regularly getting up from sitting and changing positions promotes a favorable clinical outcome.<sup>44</sup> It has also been demonstrated that with a greater amount of extension, the load is shifted to the facets which unloads the discs and helps to combat the normal spinal height loss over the course of a day, but that with flexion, there is no such osseous structure to do the same.<sup>45,46</sup>

### **Assessment and Treatment**

Surgical procedures have demonstrated limited clinical success, but these failures have led to improvements in detection, imaging, diagnosis and treatment of disc injuries.<sup>47</sup> Alternatively, conservative treatment is less invasive and outcomes are comparable to surgery for pain relief, quality of life and return to work for long-term.<sup>47</sup>

This case study focused on two accepted rehabilitation methods that exist for treatment of low back pain. The first includes a lumbar stabilization program that emphasizes maintaining a neutral spine position with daily

activities, trunk muscular endurance training and overall functional capacity.<sup>9,11-13,47</sup> This method of stabilization rehabilitation has been shown to be 80-98% effective in patients with herniated nucleus pulposus and extruded discs.<sup>48</sup> The predictors of clinical response to stabilization exercises include age, straight-leg raise, prone instability test, aberrant motions, lumbar hypermobility, and fear-avoidance beliefs.<sup>9,27,51</sup> There are two main strategies for abdominal activation (ie/ bracing vs hollowing), but abdominal bracing has been shown to be the most effective for lumbar spine stability.<sup>9,13</sup> McGill has researched many lumbar spine stabilization exercises that “spare the spine” by using the correct technique and optimal progression.<sup>9</sup> When combined with abdominal bracing, the modified curl-up, side bridge and bird dog help to create a “muscular corset” to protect the spine against daily challenges.<sup>9</sup> Other “low-tech” stabilization exercises for low back pain with leg pain include swiss ball exercises, pelvic tilts with bridging, abdominal crunches, prone extension exercises, side-ups, and wall squats, post-isometric stretching techniques, upper body stabilization exercises, and proprioceptive exercises.<sup>11</sup>

The second treatment and assessment method recommended in this case report was introduced by McKenzie and depends on the patient’s response to end-range lumbar spine movements.<sup>2,10,12,14,52</sup> A ‘directional preference’ can sometimes be found when performing end-range movements, where patients can be categorized with centralization of pain (pain receding towards the lumbar spine) or peripheralization (pain spreading into a radicular pattern more distally).<sup>10,12,13,47,52</sup> Patients are then given exercises in the direction that creates centralization, while peripheralizing movements are taught to be avoided.<sup>47</sup> This method has been shown to be twice as effective as traction and back schools at alleviating pain, while favorable outcomes have been shown in 80-98% of low back pain patients.<sup>48</sup> Specific extension movements can cause anterior migration of nuclear tissue, while the neural arch reduces forces on the posterior annulus and therefore relieves pain.<sup>46</sup> The repetition of the extension movements may also assist in rehydrating and unloading the disc, theoretically causing “centralization” of patient’s symptoms.<sup>46</sup> Rapala et al (2006) concluded that McKenzie assessment could successfully differentiate discogenic from non-discogenic pain.<sup>14</sup> Centralization has been shown on MRI to imply an intact annulus and has 89% specificity

in relation to positive discography, while peripheralization or the inability to identify a pain-centralizing movement implies a sequestered, disrupted or extruded.<sup>15,47-49</sup> Repeated end-range or pain-response based assessment (McKenzie assessment) is supported in the evidence for diagnostic and therapeutic care in patients with low back and leg pain.<sup>10</sup> Wetzel and Donelson (2003) determined that “centralization” predicts successful response to conservative care, aggravation of symptoms with testing predicts a poor response to conservative/non-surgical care and those who are unaffected by testing are likely to have pain that is nondiscogenic.<sup>10</sup> The McKenzie method includes categories of “postural” syndrome, “derangement” syndrome (80% of cases) and “dysfunction” syndrome (3-6% of cases).<sup>16,30</sup> The author states that adherent nerve root (ANR) is a subgroup of the dysfunction syndrome and includes: recent sciatica history, 6-8 weeks of symptoms, intermittent leg pain, limitation of flexion in standing and consistent relieving movements.<sup>30</sup> The successful treatment involved neural stretches (with supine flexion exercises), lumbar extensions, and postural correction in sitting (with a lumbar roll).<sup>30</sup> Scannell and McGill (2009) demonstrated evidence of disc prolapse with repeated flexion and re-direction of the displaced nucleus with repeated extensions, which they theorized may support the success of the McKenzie derangement syndrome.<sup>50</sup>

Neural mobilizations are another possible therapy for lumbar disc herniations with referral.<sup>16</sup> A literature review found limited evidence in the number and quality of studies for this treatment modality, but with further research it may show promise.<sup>17</sup> It has been proposed that neural mobilizations help to “...restore the dynamic balance between the relative movement of neural tissues and surrounding mechanical interfaces, thereby allowing reduced intrinsic pressures on the neural tissue and thus promoting optimum physiologic function...” which helps to facilitate “...nerve gliding, reduction of nerve adherence, dispersion of noxious fluids, increased neural vascularity, and improvement of axoplasmic flow”.<sup>17</sup>

Chiropractic therapy, including spinal manipulation, has also been included in many treatment strategies for low back pain. Recommended chiropractic treatment and rehabilitation for patients with disc bulges/herniations or “sciatica” has included spinal manipulative therapy, mobilizations, mechanical traction, interferential elec-

trical stimulation, cold laser, patient education and active care, including stabilization exercises, prone press-ups or McKenzie therapy.<sup>3,7,11,15,18,20,23,24,51,53</sup> Spinal manipulative therapy (SMT) and mobilization have been found to have moderate evidence acute and chronic low back pain for short-term pain relief, but have similar or better pain outcomes when compared to placebo, sham manipulations and other treatments.<sup>54,55</sup> McMorland et al (2010) endorsed manipulation as a first-line treatment when compared to microdiscectomy for the treatment of sciatica secondary to lumbar disc herniation.<sup>21</sup> Paskowski et al (2011) reported positive results for a multidisciplinary care of low back pain patients and included recommending patients to remain active, quit smoking, exercise, give them reassurance, minimize unnecessary x-rays and imaging, as well as appropriate timing of surgery and injections.<sup>22</sup>

### Summary

This case demonstrates positive results for the treatment of a sub-acute lumbar disc injury with conservative care. It should be noted that results cannot be extrapolated to other cases, since this is only a single case report and the rapid resolution of this patient’s symptoms could be due to the natural history of the condition or the use of multiple interventions. Sitting and slouching have been shown to aggravate low back pain, especially when a disc injury is involved. Standing and extension exercises have been shown to help combat this. There are many reports of asymptomatic disc herniations and spontaneous resolutions, as well as muscular atrophy associated with this type of injury. The prognosis of disc herniation related low back pain relates to the extent of radiation, duration of pain and other psychosocial factors. Recommended conservative care includes spinal stabilization exercises, McKenzie assessment and treatment, neural mobilizations and chiropractic modalities, including spinal manipulative therapy. Conservative management may decrease pain and increase function for the treatment of lumbar disc injuries. Active patient participation in rehabilitative care is recommended before surgical referral.

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