Case Study

Improvement in a Patient with Disc Protrusion and Extruded Fragment Following Subluxation Based Chiropractic Care: A Case Study & Selective Review of the Literature

Jonathan Murphy, D.C.[1]
Timothy Morrison, D.C.[2]
Rod Floyd, D.C.[3]
Joel Alcantara, D.C.[4]

1. *Private Practice of Chiropractic, Salisbury, MD*
2. *Private Practice of Chiropractic, Salisbury, MD*
3. *Professor and Senior Clinician, Palmer College of Chiropractic- Florida, Port Orange, FL*
4. *Research Director, the International Chiropractic Pediatric Association, Media, PA, USA and Chair of Pediatric Research, Life Chiropractic College West, Hayward, CA*

Abstract

Objective: To describe the chiropractic care of a patient presenting with complaints of left sided low back pain that radiated down the left leg, down the lateral calf, to the foot and heel.

Clinical Features: A 43-year-old male presented with a chief complaint of left sided low back pain that radiated down the left leg, down the lateral calf, to the foot and heel. The patient had been diagnosed via MRI with a left L4-L5 focal disc protrusion with an extruded fragment. The patient had been recommended to pursue an epidural block or low back surgery. The pain was described as being dull, sharp and numb. Aggravating activities included using heat, lying down and sitting. The patient's numerical rating scale was 8 out of 10 which rendered him unable to work and sleep through the night. The patient had received treatment via prescription drugs prior to the office visit. The patient had been prescribed Advil 200 mg, Percocet 5 mg-325 mg, Valium 5 mg and Tramadol; all of which did not take away the pain. Upon a friend's recommendation, the patient decided to visit a chiropractor.

Intervention and Outcome: The patient was cared for with spinal adjustments characterized as high velocity, low amplitude thrusts and adjunctive therapies over the course of 15 visits over 5 weeks.

Conclusion: This case report provides supporting evidence on the effectiveness of chiropractic care in patients suffering from low back pain due to disc herniation.

Key words: *Chiropractic, disc protrusion, spinal manipulation, adjustment, vertebral subluxation*

Introduction

Low back pain (LBP) is a very common problem in the general population with estimates of its 1 year incidence of a first-ever episode to range between 6.3% and 15.4%, while estimates of the one year incidence of any episode of low back pain range between 1.5% and 36%.[1] A more recent systematic review of the global prevalence of LBP by Hoy and et al.[2] found a mean point prevalence of 11.9 and the 1-month prevalence estimated at 23.2. Studies have found that the incidence of LBP is highest in the third decade of life, and overall prevalence increases with age until the age of 60-65 years and then gradually declines. Common risk factors for LBP include low educational status, stress, anxiety, depression, job dissatisfaction, low levels of social support in the workplace and whole-body vibration.[2]

LBP has an enormous impact on individuals, families, communities, governments and businesses throughout the world. Froud et al.[3] synthesized the qualitative literature on the impact of LBP on people's lives and identified 5 major first order themes from participant-level data. These include the loss of function undermining the ability of the affected individual to perform activities (i.e., domestic chores, valued recreational activities, and to planning ahead). Another involved damaged relationships (i.e., feelings of isolation,

family and cohabitation difficulties, issues surrounding sexual relations, and issues surrounding social interaction), A third theme involved the need to modify work tasks along with fears of losing a job and the interpersonal challenges that arise from the disbelief of co-workers. A fourth involved stigma associated with LBP. Those affective had the need to establish legitimacy, credibility and validation, due to not being believed by family, friends, employers, and health care providers. Finally, there is a change in outlook by those suffering from LBP due to the unlikelihood of receiving an acceptable diagnosis, and poor prognosis than initially expected.

From a chiropractic perspective, LBP is the most common complaint by adults presenting for chiropractic care.[4] The National Board of Chiropractic Examiners (NBCE) Practice Analysis of Chiropractic 2015[5] found that low back or pelvic pain was the single most common chief complaint (i.e., 23.6%) by chiropractic patients. We should acknowledge at this point that patients suffering from LBP are not a homogenous population and subtypes of low back pain[6] are an important consideration. Our interest in this case report is LBP from herniations of the lumbar spine intervertebral disc(s). Given the acknowledgement that spinal adjustments/ manipulation may cause injury on the involved joints or/and disc, we report here the safe and successful use of spinal adjustments in a patient with LBP with radiculopathy concomitant with a magnetic resonance imaging (MRI) confirmed disc protrusion with an extruded fragment.

Case Report

A 43-year-old Caucasian male presented with a chief complaint of left sided low back pain that radiated down the left leg, down the lateral calf, to the foot and heel. The patient had been diagnosed via MRI with a left L_4-L_5 focal disc protrusion with an extruded fragment. The patient had been recommended to pursue an epidural block or low back surgery. The pain was described as being dull, sharp and numb. Aggravating activities included using heat, lying down and sitting. The patient's numerical rating scale (NRS) for pain was 8/10 [0-no pain; 10 maximum pain] that rendered him unable to work and sleep through the night.

Prior treatment was medical care via prescription drugs. The patient had been prescribed Advil 200 mg, Percocet 5 mg-325 mg, Valium 5 mg and Tramadol; all of which provided only temporary and minor relief of pain. Upon a friend's recommendation, the patient decided to visit a chiropractor. On clinical presentation, the patient weighed 175 lbs., was 72" in height with the following vitals: pulse rate=80 beats per minute; blood pressure (systolic/diastolic in mmHg) at 114/86 and heart rate within normal range. The patient's symptoms included left sided low back pain that radiated to the lateral aspect of his leg and calf to the heel. The pain was described as sharp, dull and tingling. Heat and lying down made the pain worse and nothing relieved the pain.

On physical examination, the patient demonstrated a right antalgic lean. This observation was reinforced by the patient's weight distribution on the weigh scales demonstrating 41 lbs. on the left and 136 lbs. on the right. On static digital palpation, muscle spasm, tenderness and edema were noted in the low back ranging from the L_1 vertebral level to the left and right pelvis. Orthopedic and neurological examinations and range of motion (ROM) examination revealed the left side of the L_5 and S_1 dermatomes were reduced compared to the right. Lumbar flexion, extension, left lateral bending and left rotation ROM were decreased with accompanying pain. Kemp's test was positive on the left as well as the Straight Leg Raise beginning at $10^{0.}$ Ely's test was also positive on the left side.

The patient was apprised of the history and physical examination findings and consented to care over a period of approximately 4 weeks followed thereafter by a re-assessment.

On the first visit, the patient received a chiropractic adjustment characterized as high velocity, low amplitude (HVLA) thrusts otherwise known as Diversified Technique.[6] This spinal adjustment was performed at the L_4-L_5 functional spinal unit with the patient lying on their right side, the side of antalgic lean. In addition to spinal adjustment, cryotherapy and interferential current were utilized on the patient. The therapy was targeted at decreasing inflammation in the low back. The patient received care in a similar manner for one month consisting of 15 visits. The treatment frequency was initially five visits per week for the first week, then abated to three visits per week for the next three weeks until the re-examination was performed.

The patient was able to work 12-hour days with only feeling slightly stiff and is able to sleep the entire night without pain on re-examination. He noted that he can sit and lay without pain. On re-assessment, the patient rates his pain NRS scale as 2/10. The patient's lower extremity muscle strength was all rated as a +5. Lumbar ROM was significantly increased. Neurological testing of the lower extremities yielded normal results.

Discussion

According to Simon et al.[7], most lumbar disk herniations improve over time with or without medical treatment. Disk herriations and annular tears may not be symptomatic and are shown to exist in patients without any symptoms. LBP due to disc herniation accounts for 30% of cases and is second only to discogenic low back pain, accounting for 39% of cases, as the most common type of low back.[8] Overall, lumbar disc herniation is one of the most common spinal degenerative disorders leading to LBP associated with radiculopathy. Complicating matters are the findings that disc herniation are present in asymptomatic individuals. Boden et al.[9] performed MRI studies on 67 individuals who had never had low-back pain, sciatica, or neurogenic claudication. Of those who were <60 years old, 20% had a herniated nucleus pulposus and one had spinal stenosis. In the group that was >60 years of age, 36 per cent of the subjects had a herniated nucleus pulposus and 21 per cent had spinal stenosis. There was degeneration or bulging of a disc at least one lumbar level in 35% of their subjects between 20-29 years of age and in all but one of the 60-80-year-old subjects. Jensen et al.[10] performed MRI examinations on 98 asymptomatic people and found that 36% of the 98 asymptomatic subjects had normal disks at all levels.

Fifty-two percent of the subjects had a bulge at a minimum of

one level, 27% had a protrusion, and 1% had an extrusion. Thirty-eight percent had an abnormality of more than one intervertebral disk. In those patients experiencing low back pain due to IVD involvement, treatment can be challenging and have varying results in terms of success.

The goal of care in patients with low back pain due to disc involvement are to: improve pain threshold as quantified by a valid measure such as the NRS for pain and to increase/improve function as demonstrated by a reduction in dependence on caregivers, return to work or increase in activities of daily living.

Chiropractic care (i.e., spinal adjustments with adjunctive therapies) is popular among adult patients with low back pain.[4,11] Specific to those patients with intervertebral disc herniations, a number of publications document the effectiveness of chiropractic. These include 7 case reports, 2 prospective observational cohort studies and 2 randomized, controlled clinical trials (RCTs) (see Table 1). As the reader can surmise, these manuscripts describe a one-sided point of view (i.e., safety and effectiveness of chiropractic) with the literature lacking in the documentation of adverse events and failure of care. Such documentation can also inform clinical practice. Cassidy et al.[23], based on back pain patients seen at a university hospital and a review of the literature concluded that patients with lumbar intervertebral disk herniation cared for by side posture manipulation is both safe and effective.

Troyanovich et al.[24] reviewed specific aspects of the examination, history, imaging, and treatment of patients with suspected intervertebral disk lesions and to provide guidelines for conservative management, imaging, and relative and absolute indications for surgical referral. According to the authors, patients should be screened for "red flags" (fever, history of cancer, unexplained weight loss, urinary tract infection, intravenous drug use, saddle anesthesia, or prolonged use of corticosteroids) to determine the appropriateness of conservative care and specifically, contraindications to spinal adjustments. The authors promote the use of MRI over computed tomographic scanning due to it excellent delineation of soft tissue structures, direct multi-planar imaging, and excellent characterization of medullary bone. According to Troyanovich et al.[24], provocation computed tomography-diskography is an invasive procedure and should be reserved only for patients with normal MRI findings yet continue to experience severe pain despite conservative treatment approaches.

Both conservative and surgical interventions have been shown to be effective in the treatment of discogenic and radicular pain syndromes. Oliphant[25] performed a qualitative systematic review of the risk of spinal manipulation in the treatment of lumbar disk herniations (LDH) and to estimate the risk of spinal manipulation causing a severe adverse reaction in a patient presenting with LDH. From the published data, Oliphant estimated the risk for an adverse event to be less than 1 in 3.7 million. Rubinstein[26] addressed the benign and serious risks associated with chiropractic care for subjects with neck or low-back pain. According to the author, most adverse events associated with spinal manipulation are benign and self-limiting. The incidence of severe complications following chiropractic care and manipulation is extremely low and the best evidence this far suggest that chiropractic care is a useful therapy for subjects with neck or low-back pain for which the risks of serious adverse events should be considered negligible.

Despite the reassuring finding by Oliphant[25] and Rubenstein26, chiropractic care (or any healthcare intervention) is not without risk. Boucher and Robidoux[27] examined 6 cases where chiropractors in Canada were sued for allegedly causing or aggravating lumbar disc herniation following spinal manipulation. The safety of spinal manipulation, insofar as it relates to intervertebral disc (IVD) herniation in terms of its presence or causality remains a matter of debate. It is thought that a change in the axis of rotation of the lumbar vertebrae during side posture manipulation results in a shearing force through the disc resulting in annular tearing. Conversely, it is argued that this is unlikely given that the lumbar spine rotational motion is limited to only $2\text{-}3^0$. Others posit that perhaps the IVD must already be fragmented and fissured to exacerbate the symptoms of disc herniation or cauda equine syndrome.[27] According to Boucher and Robidoux[27], failures on the part of the chiropractic resulting in a verdict of negligence included a lack of informed consent, failure to make an appropriate diagnosis and the choice or application of spinal manipulative technique. Informed consent is a necessary component of biomedical ethics while the current evidence indicates poor diagnostic performance of most physical tests used to identify lumbar disc herniation.[28] This case report described a patient with LDH receiving HVLA-type spinal adjustments without adverse consequences. Continued documentation in the care of such patients will inform clinical care protocols and research designs involving patients with IVD herniations with chiropractic care.

In closing, confounders such as the lack of a control group, spontaneous remission, self-limiting course and natural history, subjective validation, and expectations for clinical resolution on both the part of the patient and healthcare providers make generalizations difficult in case reports. However, the description of the clinical encounter such as in the case reported is epistemologically in harmony with the clinical experiences of chiropractors and thus form the basis for generalization. Case reports provide an affirmation and an increase in conviction that chiropractic can “help” with similar patients.

Conclusion

This case report described the successful chiropractic care of a patient with a chief complaint of low back pain associated disc protrusion at the $L_5\text{-}S_1$ functional spinal unit. We encourage further research to examine the safety and effectiveness of chiropractic care in such patients.

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Reference	**Age/Gender**	**Design**	**Intervention**	**Intervention & Outcome**
Hession et al.[12]	16-yr-old Male	Case Report	Flexion distraction Rotational (HVLA) manipulation Adjunctive paraspinal muscle stimulation	Flexion distraction and rotational manipulation with adjunctive paraspinal muscle stimulation resulted in early improvement and apparent long-term resolution of this patient's symptoms.
Coxet al.[13]	38-yr-old Female	Case Report	"Distraction type" spinal manipulation Electrical stimulation Exercises Nutrition advice Low back wellness class	The patient was cared for with "distraction type" chiropractic manipulation, electrical stimulation, exercises, nutrition advice and low back wellness class resulting in complete relief of sciatic pain and nearly complete relief of low back pain.
Polkinghorn and Colloca[14]	26-yr-old Male	Case Report	Activator Methods	The patient was cared for with mechanical-force, manually assisted short-lever adjusting procedures (i.e., Activator Methods) resulting in the patient's symptoms resolving within 90 days of treatment. No residuals or recurrences were noted at1year follow-up.
Bergmann and Jongeward[15]	48-yr-old female	Case Report	Flexion-distraction HVLA SMT	The patient was initially treated with ice followed by flexion-distraction therapy over the course of three visits. Once she was in less pain, side posture HVLA manipulation was added to her care. Nine treatments were required before she was released from care.
Crawford and Hannan[16]	35-yr-old male	Case Report	HVLA SMT	The patient was cared for with spinal manipulation with CT scan examination after clinical resolution about 2 months later revealed reduction in size of the IVD herniation.
Paulk and Harrison[17]	23-yr-old female	Case Report	Chiropractic Biophysics Protocol	The patient cared for with mirror-image chiropractic adjustments, 3-point bending lumbar extension traction, and postural exercises. The patient responded well with a complete resolution of her symptoms and a restoration of her lumbar lordosis.
Santilli et al.[18]	N=102	RCT	HVLA SMT versus sham SMT	A total of 64 men and 38 women aged 19-63 years were randomized to manipulations (N=53) or simulated manipulations (N=49) and assessed at admission and at 15, 30, 45, 90, and 180 days for pain relief. Manipulations appeared more effective on the basis of the percentage of pain-free cases, the number of days with pain and number of days with moderate or severe pain. Patients receiving manipulations had lower mean VAS scores. No significant differences in quality of life and psychosocial scores were found.
Excoffon and Wallace[19]	57-yr-old male	Case Report	HVLA SMT Physiotherapy modalities Rehabilitative exercises.	The patient was cared for with spinal manipulation, physical therapy modalities, and rehabilitative exercises.

McMorland et al.[20]	N=40	RCT	Surgical microdiskectomy versus HVLA SMT	The investigators found significant improvement in both treatment groups compared to baseline scores over time. After 1 year, follow-up intent-to-treat analysis did not reveal a difference in outcome based on the original treatment received. However, 3 patients crossed over from surgery to spinal manipulation had failed to gain further improvement. Eight patients crossed from spinal manipulation to surgery improved to the same degree as their primary surgical counterparts. Sixty percent of patients with sciatica who had failed other medical management benefited from spinal manipulation to the same degree as if they underwent surgical intervention. Of 40% left unsatisfied, subsequent surgical intervention confers excellent outcome. Patients with symptomatic LDH failing medical management should consider spinal manipulation followed by surgery if warranted.
Peterson et al.[21]	102 age- and sex-matched patients	Prospective observational study	Nerve root injections (NRI) or HVLA SMT	Numerical rating scale (NRS) pain data was collected before treatment and one month after treatment along with the Patient Global Impression of Change scale. No significant differences for self-reported pain or improvement were found between the 2 groups. "Improvement" was reported in 76.5% of SMT patients and in 62.7% of the NRI group. Both groups reported significantly reduced NRS scores at 1 month.
Leemann et al.[22]	148 patients (age range:18 and 65 years)	Prospective observational cohort study	HVLA SMT	Outcomes included the patient's global impression of change scale for overall improvement, the NRS for LBP, leg pain, and the Oswestry questionnaire at 2 weeks, 1, 3, and 6 months, and 1 year after the first treatment. Significant improvement for all outcomes at all time points was reported. At 3 months, 90.5% of patients were "improved" with 88.0% "improved" at 1 year. Although acute patients improved faster by 3 months, 81.8% of chronic patients reported "improvement" with 89.2% "improved" at 1 year. There were no adverse events reported.

Table 1. Summary of publications on the chiropractic care of patients with low back pain and disc herniation(s).