



Predisposition, Poor Ergonomics, Recurrent Lumbar Disc Herniation, and Conservative Care

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INTRODUCTION

I present the following case as a discussion relating to the care of a patient with multiple episodes of lumbar disc extrusion. There has been much written about predisposing factors leading to spinal degenerative changes as well as disc herniation. Studies have looked at many risk factors (1) which include smoking (2), obesity with a BMI greater than 25.7 (4), age, gender, occupation, intensity of physical labor, trauma, and genetic predisposition (3,4,5). With the increasing shift of work and leisure activities to the seated posture, a position which is considered by many lay people to be a restful posture, may actually be a risk factor (6,7).

HISTORY

This patient, a well-nourished Hispanic male, first presented to my office in February 2014, at the age of 19, accompanied by his mother. He is a college student who has not engaged in any organized sports and denies ever having a significant trauma. For entertainment he sits at home playing video games. He related that approximately four months prior to entering the office he developed right-sided lower back pain that he described as a tight ache rated at 6/10, using a visual analogue scale. Approximately 4 days prior to seeking care in my office he went to hug his younger brother and developed an increase in right sided lower back pain with the pain radiating down the back of his right leg which he rated at a 10/10. He describes his right foot as feeling cold. Sneezing and sitting down increases his pain. Standing and laying down decreases the intensity of the pain. He needs assistance walking and rising from the seated position. He denies any changes in bowel or bladder habits. His family history includes that both of his parents have diabetes and that his mother has suffered with back problems her whole life.

EXAMINATION

The patient's orthopedic examination revealed that Dorso lumbar (DL) flexion produced an increase in lumbar spine pain at 30 degrees. DL extension produced an increase in lumbar spine pain at 10 degrees. Toe walk was essentially negative. Heel walk produced right sided lumbar spine and posterior right leg pain. Seated DL circumduction bilaterally produced right sided lumbar spine pain. Bechterew's Test bilaterally produced right lumbar spine and right posterior leg pain. The right Straight Leg Raise at 30 degrees produced posterior right leg pain. The Braggard's Test was essentially negative. The Leg Drop Test produced lumbar spine pain. The Nachlas Test bilaterally produced lumbar spine pain. The right Fluid Motion Test was positive for the right sacro-iliac joint. Paraspinal muscle spasms were noted in the lumbar spine.

The Neurologic exam: The R/L Patella Reflexes were +2. The left Achilles Reflex was +2. The right Achilles Reflex was +1. The dermatomal sensation of the lower extremity using a Whartenberg Pinwheel was within normal limits bilaterally.

Vital Signs: blood pressure 100/62, Pulse of 64 b.p.m., height was 5'8", weight of 230 pounds for a BMI of 35.

SPINAL IMAGING



Figure 1

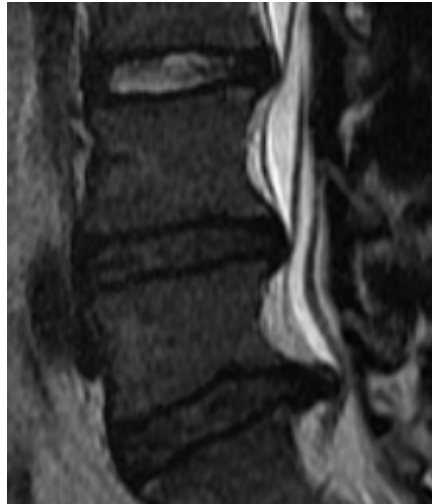


Figure 2

Figures 1 and 2 are sagittal images showing L3-4, L4-5, and L5-S1 disc degeneration and disc protrusions.

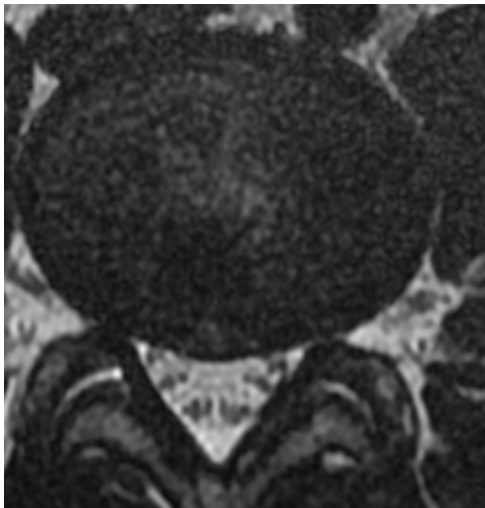


Figure 3: L4-5 central disc protrusion

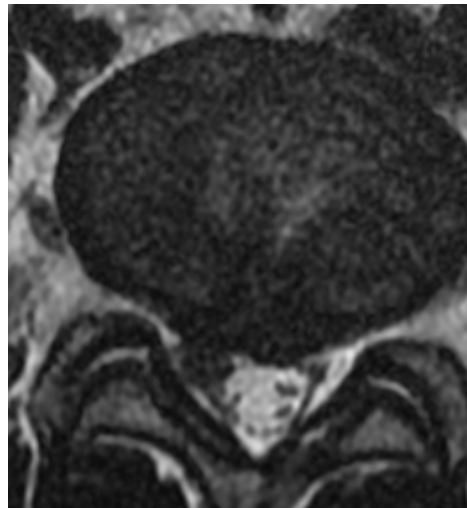


Figure 4: Right paracentral L5-S1 disc herniation

Two lumbar spine films were taken which revealed the following: essentially negative for evidence of recent fracture or gross osteopathology as visualized. The L4-L5 disc space is mildly thinned. The lateral film reveals posterior weight bearing of the lumbar spine. The A-P film reveals a lateral flexion subluxation at the L4-L5 joint level with the inferior wedge located on the right, with the lumbar spine leaning to the right from L4 cephalad. There is a pelvic obliquity with a lower left iliac crest.



A lumbar spine MRI performed on February 15, 2014, (See Figures 1-4.) revealed the following: At L3-4 there is a small right paracentral disc herniation and mild facet arthrosis resulting in a mild central canal stenosis. At L4-5 there is mild disc degeneration accompanied by a small central disc herniation and mild diffuse disc bulge. There is mild facet arthrosis which along with the mild disc herniation contributes to a mild central canal stenosis. The diffuse disc bulge contributes to a mild bilateral foramina stenosis. The L5-S1 level has mild disc degeneration and a diffuse disc bulge. There is a medium sized right paracentral disc extrusion which narrows the right S1 lateral recess compromising the right S1 nerve root. There is a mild bilateral foramina stenosis due to the disc bulge.

DIAGNOSIS

Protrusion of the L5-S1 disc resulting in a grade 3 sciatic neuralgia (in grade 3 sciatica the pain extends below the knee), paresthesia and paravertebral muscle spasm.

TREATMENT

The patient and his mother were informed of the significance of his examination, x-rays, as well as MRI findings. They were given care options, including medical care, neurosurgical consult as well as chiropractic care. I discussed with them the possible complications to chiropractic spinal manipulation. I discussed the use of a Cox® Spinal Decompression Adjustment to the lumbar spine, that I would need his feedback as I test his tolerance. I discussed what reactions he may experience from the procedure. He and his mother understood the communication and elected to undergo a course of chiropractic care. I recommended a treatment frequency of three times per week for four weeks with a re-evaluation to be performed at the conclusion of this trial of care to assess the patient's progress and need for future care. My goal was to see a 50% improvement in the patient's pain scale and function over the course of one month.

Protocol 1 Cox® Technic Decompression of the lumbar spine was performed using a Cox® 7 adjusting table, contacting the L5 spinous process, using long Y-axis for five 4-second motions with cephalad pressure stabilization, was repeated three times with trigger point therapy applied to the surrounding soft tissue between each set. Protocol 1 was performed for eight visits in conjunction with trigger point ultrasound (ultrasound combined with high volt galvanic electrical muscle stimulation) over the lumbar paraspinal musculature.

The patient was feeling approximately 50% improved over his initial complaints on the ninth visit and was started with Protocol 2 Cox® Decompression of the lumbar spine. Protocol 2 involves contacting the spinous processes of the individual lumbar spine, applying cephalad pressure, and placing the vertebral motor unit through its full range of motion bilaterally with a circumduction motion one side at a time. The adjunctive modality was changed from trigger point ultrasound to high volt galvanic along with hydrocollator therapy. At his 12th visit, a re-examination was performed with the patient relating that he felt 80% improved with his pain scale being a 3/10 using a visual analogue. While the right Bechterew's Test and Straight Leg Raiser still produced posterior right thigh pain, the R/L Seated DL Circumduction Tests, R/L Nachlas test and Ely's Test were essentially negative. The R Fluid Motion Test was positive for the right SI joint. The R Achilles Reflex was +1. The Dorso-lumbar Flexion had increase 10 degrees to 40 degrees, and the Posterior Dorso-lumbar extension increased to 20 degrees.

The patient's treatment frequency was reduced gradually over time with him being discharged from active care on May 12, 2014. Since the patient had multiple levels of degenerative changes in addition to



lumbar disc bulges and herniation, I had recommended that he continue with a maintenance program to include spinal exercises as well as periodic spinal adjustments. He maintained a spinal adjustment program for another five months and then elected to discontinue care.

REINJURY, PROGRESS, OUTCOME

On July 10, 2017, the patient returned to my office stating that he had been doing well until about a month prior. He developed lower back pain, more to the right than left, which he rated at a 7/10, with an occasional pain down the back of his right thigh, which he rates at a 5/10. The week prior to entering the office he began to notice that the bottom of his right foot and great toe were numb. All of these symptoms seem to have coincided with the patient beginning to work part time as a clerk in a retail store. He continues to take college classes and spends most of his free time gaming on his computer. His posture while gaming is admittedly poor. He sits slouched without any back support.

Updated History

An addition to the family history includes his younger brother who is now having lower back pain and dysfunction.

Updated Examination

Examination revealed that the left lateral DL bending produced right-sided lumbar spine pain. The left seated DL Circumduction produced right sided lumbar spine pain. The Ely's Test bilaterally produced right sided lower back pain. The right Fluid motion Test was positive for the right SI joint. The Straight Leg Raise, Leg drop Test, Toe walk/Heel walk were all essentially negative.

Paraspinal muscle spasm of the lumbar spine was noted bilaterally.

Neurologic evaluation revealed that the Patellar reflexes were +2 bilaterally, the Left Achilles was +2 and the right Achilles was 0. Using a Whartenberg pinwheel the left L4 and right S1 dermatomes were hypoesthetic.

Updated Diagnosis

My diagnosis is a possible herniated lumbar intervertebral disc resulting in sciatic neuralgia, hypoesthesia and paravertebral muscle spasm.

Updated Treatment Plan

I explained to the patient that he has irritation to the lumbar nerve root which is most likely the result of a herniated disc. We discussed that I will need to precertify an MRI of the lumbar spine for him and that we can initiate conservative care while we obtain the MRI. I informed him that I would adjust his spine using the Cox® Technic and reiterated the possible complications to spinal manipulation as well as what reactions he may experience. I refreshed his memory that I will need his feedback as I test his tolerance to the Cox® adjustment. He understood the communication and elected to undergo a course of care. I recommended a treatment frequency for three times per week for four weeks with expectations that we achieve a 50% improvement in symptomatology.

Treatment, Progress, Outcome

The patient was tolerance tested and was adjusted Protocol 1 using The Cox® 7 Table with a manual contact at the L3 vertebrae. Adjunctive modalities of electrical muscle stimulation and hydrocollator therapy were also used preparatory to the adjustment to aid in reducing the paravertebral muscle spasms. By July 31, 2017, the patient had no leg pain and he reported his back pain at 3/10 with the pain being about 25 % of the day. The patient's treatment was changed to Protocol 2 of the Cox® Technic.

On August 4, 2017, the patient woke up with an increase in lower back pain, which he described as a constant ache and tightness rated at an 8/10, as well as bilateral leg pain that he rated as a constant ache rated at 3/10. He related that the previous night he was rearranging the store where he is employed, moving display tables, racks and garments. The patient's treatment was changed to electrical muscle stimulation with ice packs, and Protocol 1 of the Cox® Technic to the lumbar spine, with a manual contact at L3.

Updated Imaging

On August 8, 2017, an MRI of the lumbar spine was performed which revealed the following: from T12-L1 disc space to the L2-L3 disc space there is no evidence of disc disease, central canal stenosis or foraminal stenosis. The findings of the L3-L4 disc space are unchanged from the MRI of 2014 revealing a small right paracentral disc herniation and facet arthrosis resulting in a mild central canal stenosis. The L4-L5 disc level had deteriorated further since the MRI of 2014. There is a broad disc bulge with a superimposed central disc extrusion which contacts and possibly impinges upon both descending L5 nerve roots. There is bilateral facet hypertrophy and ligamentum flavum hypertrophy which also contribute to a moderate central canal stenosis. The L5-S1 disc extrusion seen on the 2014 MRI which was compromising the right S1 nerve root has resolved. There is a concentric disc bulge with a central disc protrusion, which combined with facet and ligamentum flavum hypertrophy contribute to a mild central canal and bilateral foraminal stenosis.



Figure 4

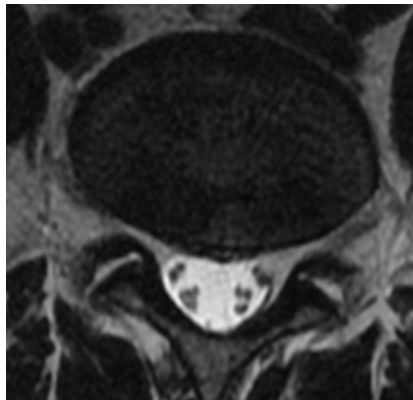


Figure 5

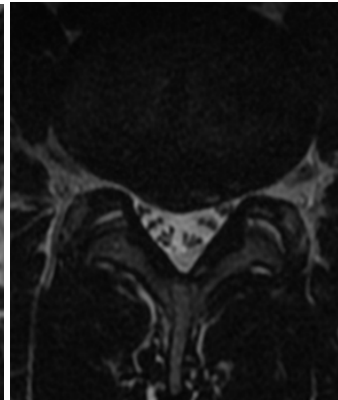


Figure 6



Figure 4: Note the decrease in the L5-S1 disc herniation as seen in the 2014 study in Figures 1,2 and 3 and the L4-L5 disc herniation is present.

Figure 5: This axial L5-S1 level shows the resolved disc herniation seen on the 2014 study which was compromising the right S1 nerve root.

Figure 6: This axial L4-L5 disc reveals the continued disc degeneration since the 2014 study with the broad based disc bulge and superimposed central disc extrusion which possibly contacts both L5 nerve roots.

Continued Treatment, Progress, Outcome

On August 11, 2017, the patient's leg pains had resolved and his lower back pain had reduced to 4/10. He was again moved to Protocol 2 of the Cox® Technic. By September 6, 2017 the patient's pain level was reported at 1/10 with a duration of between 0 to 25% of the day.

During the course of this patient's care he was advised on proper sitting, bending, and lifting ergonomics. He was also given and instructed on a home based stretching program and was advised to maintain a daily stretching regimen.

On September 11, 2017, he was dismissed from active care and was instructed, given his past history, spinal degenerative changes, as well as disc protrusions, to maintain his spinal health with periodic spinal adjustments. Currently the patient has maintained office visitation about one time every three weeks. He continues to do well and has not reported a pain level exceeding 1/10.

DISCUSSION

This case demonstrates that Cox® Spinal Decompression adjustments to the lumbar spine are highly effective in managing nerve root irritation secondary to herniated nucleus pulposus of the lumbar spine. This case also illustrates that disc extrusions can resolve with conservative care as is witnessed by comparing the L5-S1 disc extrusion noted on the 2014 MRI with resolution noted on the subsequent 2017 MRI.

A challenge we see as providers in our patient populations is lumbar spine disc herniation in young males who are not what society would consider the typical candidates for such health issues. Young males are considered to be healthy, strong and active. What is becoming more common is that young males are deconditioned, overweight and spend an inordinate amount of time sitting, with poor posture, for hours, playing video games. This patient in particular admits to maintaining a very slouched sitting posture for hours. His choice in leisure activities, gaming, does not involve cardiovascular fitness, which may also contribute to deconditioning and obesity.

Nachemson's original research of pressures exerted on the lumbar discs in various postures revealed that the slouched seated posture exerts more of a load on the lumbar discs than standing (8). These results were corroborated by Hans-Joachim Wilke, et. al some 20 plus years later (9). While it can be readily accepted that poor sitting postures alone may cause stress to the lumbar spine, those following the gaming industry also note the pain and suffering in those who are frequent gamers (6, 10). It has been found that prolonged sitting for four hours without any breaks, similar to the activities engaged in by gamers, causes a reduction in the disc height of L4-L5 (7). There have been attempts at reducing back stress and ultimately pain from gaming by designing better "gaming chairs."



What Penn State's Department of Orthopedics found is that "prolonged sitting of as little as four hours may also be a factor in increasing pressures of the L4-5 disc. These changes in pressures over a sustained time period may lead towards the disc degeneration cascade (7)." These pressure changes were noted in reductions in the disc heights measured through pre and post MRI scans. These are the same postures we find many young men maintaining while playing video games. This study also found that if the subjects "would arise out of the chair every fifteen minutes and engage in 5 seconds of lumbar flexion, 5 seconds of lumbar extension, 5 seconds of lumbar bending to the right and then 5 seconds of lumbar bending to the left before then returning to a seated position," they did not experience the disc height reductions.

There is not much in the medical literature currently addressing the spinal health issues of gamers. What has been mentioned in the medical literature is relating to "joy stick thumb," "Playstation thumb" (2004 Case study in the Lancet, of a 10 year old boy who developed a blister and numbness from using a video controller), or "Wii fracture" (*New England Journal of Medicine*, 2010 case study of a fifth metatarsal fracture from falling off a Wii balance board.) In 2002 Nintendo began to offer a glove to help prevent injuries associated with using the joystick (11).

This patient presents with several factors which may have contributed to his condition. He has a family history of back problems, his BMI is 35, his choice in leisure activities is video gaming and he has a past history of disc prolapse. Whether his sitting posture alone is the root cause of his spinal degeneration, or that he has a genetic predisposition to spine problems, patients with such complications should maintain regular spinal check-ups in addition to maintaining good spinal hygiene and proper ergonomics.

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