

# Spontaneous Regression of Two Extruded Lumbar Disc Herniations: A Case Report

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## ABSTRACT

**Objective:** To report spontaneous regression of two extruded lumbar disc herniations in a 31-year-old male, as evidenced by the comparison between the initial and a 13-month follow-up MRI.

**Clinical Features:** A 31-year-old male complained of chronic low back pain that had recently exacerbated. The initial pain had started approximately 13 months ago with a diagnosis of two extruded lumbar disc herniations at L5-S1 based on initial MRI scan. Due to recent exacerbation of the pain, a follow-up MRI was performed and compared with the previous study.

**Intervention/outcome:** The initial MRI of the lumbar spine demonstrated two disc herniations, large left and small right paracentral disc extrusions at L5-S1. A follow-up MRI revealed no evidence of the disc herniations observed in the initial MRI.

**Conclusion:** The comparison between the initial and follow-up MRI studies demonstrates spontaneous regression of both extruded lumbar disc herniations. While not predictable, the

fact that a herniated disc can resolve spontaneously places more emphasis on the role of a trial of conservative treatment.

## BACKGROUND

Low back pain (LBP) is one of the most common health problems, with the lifetime prevalence of non-specific low back pain estimated at 60% to 70% in industrialized countries.<sup>1,2</sup> In the Global Burden of Disease 2010 Study, LBP is the single leading cause of disability and is one of the most common reasons for missed work.<sup>3</sup> Approximately 5% of patients with low back pain is known to be due to disc herniation, yet lumbar disc herniation is one of the most common reasons for back surgery.<sup>1,4</sup>

While the treatment of lumbar disc herniation in relation to its efficacy is still a controversial issue, it is widely accepted that most of the patients' symptoms may improve with conservative treatment when there is no definitive surgical indication such as motor deficit, intolerable radiculopathy, or cauda equina syndrome.<sup>5</sup> Also, compared to conservative treatment, there is higher risk of potentially more serious complications related to spine surgery including wound infection, CSF fistula, wound dehiscence, or failed back surgery syndrome.<sup>6-8</sup> Therefore, surgical intervention is not always considered the initial treatment of choice but rather an option typically chosen after weeks or months of conservative care.<sup>9</sup>

The clinical course of low back pain caused by disc herniation varies as well as the efficacy of conservative treatment. In some patients, the symptoms may last only a few weeks, while in others they may continue for many months or years.<sup>7</sup> Symptoms resulting from lumbar disc herniation may resolve or diminish without any surgical intervention and, in some of these patients, this is accompanied by a reduction of the size of or complete disappearance of disc herniation.<sup>10</sup> This phenomenon is often referred to as spontaneous regression of herniated disc, which may be partial or complete. Recent advances in magnetic resonance imaging (MRI) with improved easy accessibility and affordability have facilitated follow-up studies of intervertebral disc herniation and prospect of spontaneous regression.<sup>11</sup>

It has been shown that spontaneous regression is dependent on a few factors including the size, integrity, and radiological characteristics of the herniated discs.<sup>12</sup> According to Aha *et al.*, there is a positive correlation between the size of the herniated fragment and the likelihood of regression. Also, transligamentous extension of herniated disc fragment through the ruptured posterior longitudinal ligament appears to be an important factor to its reduction in size.<sup>11,13</sup> Spontaneous regression of the herniated disc is more likely to occur with extrusion rather than protrusion, which may be associated with a more pronounced inflammatory response with extrusion.<sup>14,15</sup>

The following two statements support the value of this case report; 1) the evidence that spontaneous regression of a herniated disc occurs places more emphasis on the role of a trial of conservative treatment in the absence of complications warranting surgical interventions for patients who do not prefer early surgical options; 2) Even though spontaneous regression of lumbar herniated disc has been well established and discussed in various studies, little has been reported in chiropractic literature. Especially, concurrent spontaneous regression of

two separate disc herniations at the same level has not been reported in either medical or chiropractic literature.

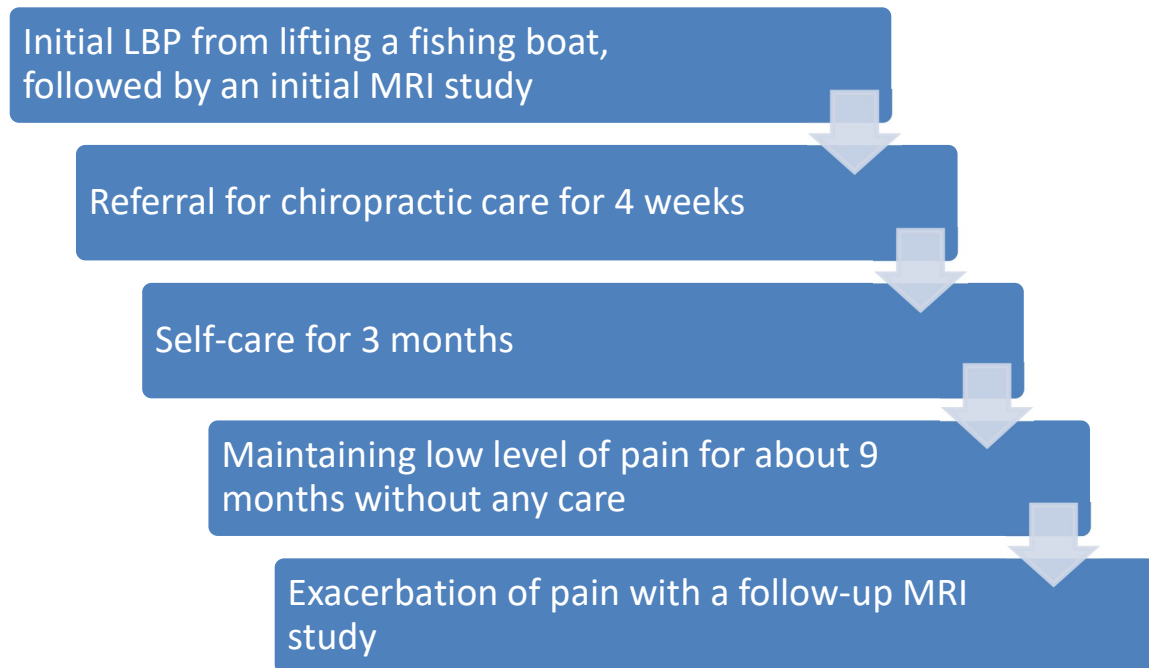
## CASE PRESENTATION

A 31-year-old male presented with intermittent chronic low back pain associated with occasional radiculopathy along the posterolateral side of the left lower extremity and down to the lateral side of the foot, consistent with the S1 dermatomal pattern. Neurologic examination did not reveal sensory impairment or motor weakness even though the patient reported that occasionally he felt he could not use his left leg ‘properly.’

His clinical history was significant only for a sudden initial onset of low back pain approximately a year ago when he was bending down to get into a car. However, he stated that the main precipitating factor for his pain was due to heavy lifting, which was attempting to lift a fishing boat that was struck in a muddy area the day before the onset of pain. The pain was followed by progressive spasms and burning and a tingling sensation radiating from his low back to the lateral side of his left heel. At the time, the patient was seen by a neurologist and diagnosed with two extruded disc herniations of different sizes at L5-S1 based on magnetic resonance imaging (MRI) performed two days after the onset of pain. The patient was referred for chiropractic care and was treated for four weeks. The debilitating low back pain, 10 out of 10 on a visual analog scale (VAS), decreased to ‘somewhat manageable’ level, which is 5 out of 10 on a VAS over the course of chiropractic care and rehabilitative exercises. Due to personal matters and lockdown from Covid-19 pandemic, the patient discontinued chiropractic care, yet continued the prescribed rehabilitative exercises complemented by Yoga, light stretching, kinesio-taping, and occasional application of topical analgesics on the area of pain for approximately 3 months.

For the following 9 months symptoms were reported as manageable with no significant acute exacerbation. However, due to persistent residual discomfort and intermittent and posture-dependent radicular symptoms along the lateral aspect of the left lower extremity in the S1 dermatomal pattern, the patient presented back for chiropractic care. MRI study of the lumbar spine was performed as per the patient’s request and compared with the previous MRI study performed approximately 13 months prior. This timeline is summarized in **Chart 1**.

Chart 1. Summary of the timeline



### Imaging Technique and Findings

The initial MRI included sagittal T2, sagittal T1, sagittal STIR, axial T2, and coronal T2 weighted images of the lumbar spine.

The osseous alignment of the lumbar spine on the sagittal plane demonstrated degenerative spondylolisthesis at L5-S1 along with mild disc space narrowing and disc desiccation.

The most significant finding was a large left paracentral disc extrusion at L5-S1, which measured approximately 11.4 mm x 7.02 mm in transverse and anteroposterior dimensions, extending caudally by approximately 14.9 mm, resulting in left lateral recess stenosis with associated compression on the traversing left S1 nerve root and spinal canal stenosis (**Figures 1 and 2**). At the same level, there was a smaller right paracentral disc extrusion indicated by an arrow in **Figure 3**, which measured approximately 5.1 mm x 4.4 mm in transverse and anteroposterior dimensions resulting in mild right lateral recess and central canal stenosis without significant caudal extension (**Figures 2 and 3**).

Figure 1. Sagittal T2 Weighted Image of Initial MRI



Figure 2. Axial T2 Weighted Image of Initial MRI



Figure 3. Sagittal T2 Weighted Image of Initial MRI



The approximately 13-month follow-up MR images demonstrated no evidence of the previously noted extruded disc herniations in the corresponding locations on sagittal (**Figure 4 and 5**) and axial (**Figure 6**) T2 weighted MR images. **Figure 4** is a comparison between the sagittal T2 weighted image from the initial MRI study demonstrating a large disc extrusion and corresponding sagittal plane from the follow-up MRI study revealing no evidence of the previously noted disc herniation. In a similar manner, the small left paracentral disc herniation is not visualized in the follow-up study on the selected sagittal (**Figure 5**) and axial (**Figure 6**) T2 weighted images.

Figure 4. Comparison of sagittal T2 weighted MR images between the initial and follow-up MRI studies

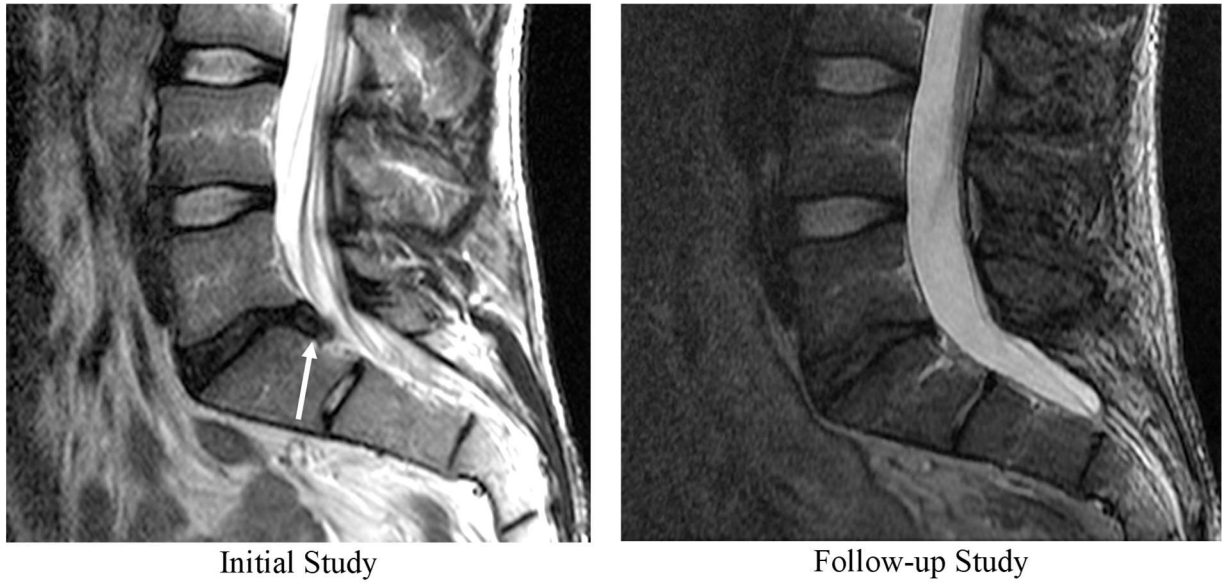


Figure 5. Comparison of sagittal T2 weighted MR images between the initial and follow-up MRI studies

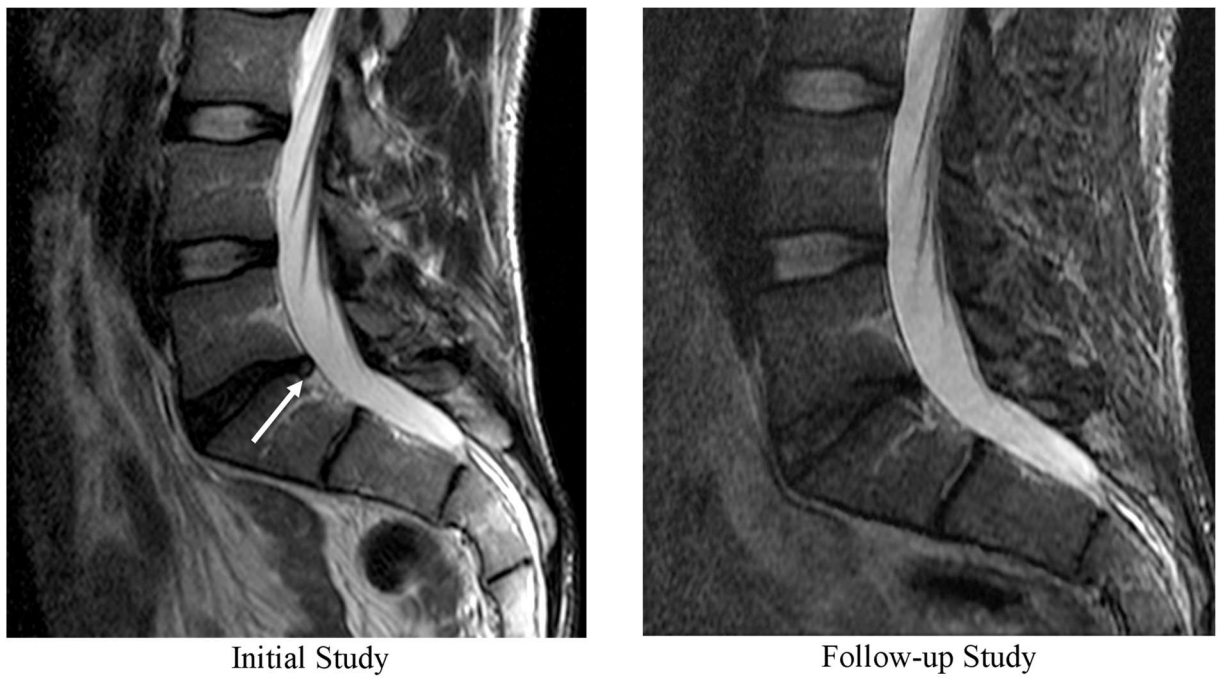
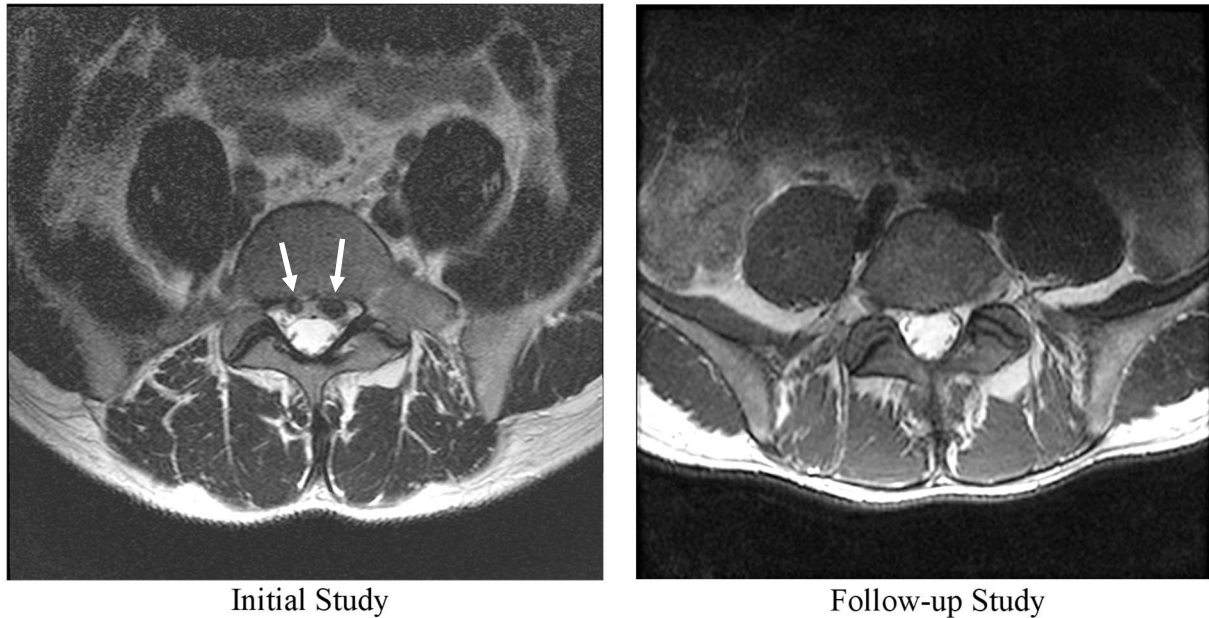


Figure 6. Comparison of axial T2 weighted MR images between the initial and follow-up MRI studies



## DISCUSSION

This case report describes regression or disappearing of disc herniations without surgical intervention over a 13-month period of time based on the initial and follow-up MRI studies. While some studies report that the relationship between spontaneous regression of the herniated disc and clinical improvement has not been clearly accounted for, other studies have shown maximal clinical improvement within one year, and the decrease in size of the herniated disc continued thereafter.<sup>6,15,17</sup> Even though the exact timeline when regression of a herniated disc starts occurring is not clear, according to the study by K Oktay et al, the five selected cases showed follow-up MRI studies demonstrating regression of a herniated disc between as early as 3 months and as late as 12 months. In addition, in this study it was noted that the radiographic changes often followed clinical improvement (relief of pain).<sup>9</sup> It appears that the larger the herniated disc the longer it may take to spontaneously regress and achieve clinical recovery.<sup>8</sup>

Spontaneous regression of herniated disc tissue is well documented clinically. However, the underlying mechanisms remain unclear. One theory proposes that the herniated disc fragment decreases in size due to gradual dehydration and shrinkage, which may explain the decrease of signal intensity of the disc in follow-up MRI studies. A second theory suggests that the herniated nucleus pulposus may retract back into the intervertebral disc space which can be due to the tension applied by the posterior longitudinal ligament or decreased intradiscal pressure. However, this theory may fail to explain spontaneous regression of the herniated disc that has protruded through the annulus fibrosus and separated from it. Another theory, the most extensively studied with histological and clinical evidence to



support it, proposes inflammatory reaction as a cause of the gradual resorption of the herniated disc in association with production of proinflammatory cytokines with potent chemotactic activity resulting in macrophage infiltration and phagocytosis and enzymatic degradation.<sup>10,18</sup> The initial response is triggered by extruded nucleus pulposus into the epidural vascular space of the spine because the immune system recognizes the extruded nucleus pulposus as a foreign body. Depending on the clinical condition of each patient, it is suggested that one specific mechanism or different combinations of the three may operate in spontaneous regression of the herniated disc tissue.<sup>19</sup>

Generally, the management of herniated lumbar disc can be mainly divided into two options, conservative (non-operative) and operative treatments depending on the type of disc herniation and clinical symptoms and signs. Typically, extruded disc herniation poses more concern to both clinicians and patients, resulting in early surgical intervention at times due to pain even though there are no absolute indications for surgery.<sup>6,20-22</sup> Yet, spontaneous regression is more commonly associated with extruded disc herniation. Numerous studies have reported excellent recovery and prognosis of acute sciatica/radiculopathy due to disc herniation in the absence of indications for surgical interventions. Therefore, considering the risk of postoperative complications and the possibility of spontaneous regression of the herniated disc, conservative care should be considered as an initial approach in the management of those with herniated discs.

## **CONCLUSION**

This case report presents spontaneous regression of two separate extruded lumbar disc herniations without surgical intervention based on comparison between the initial and 13-month follow-up MRI studies. This finding is significant in several perspectives. First, there is limited study regarding the natural history of the physical aspect of lumbar herniated disc in chiropractic literature. This may be the first case presentation in medical and chiropractic literature reporting spontaneous regression of two disc herniations at the same level. Secondly, the fact that a herniated disc can regress without surgical intervention may encourage clinicians to re-evaluate the value of conservative management of herniated discs in the absence of indications for surgical interventions, including but not limited to, significant neurologic deficit, progressive motor deficit, cauda equina syndrome, and severe unremitting leg pain despite conservative therapy.

## **LIMITATIONS**

The primary limitation is the diagnostic imaging findings and outcomes represented in this case may not necessarily apply to other patients. Secondly, because of the retrospective nature of this study, it fails to give progressive information such as when regression of the disc herniations began and how long it may have taken to reach complete resorption. Further organized higher level studies with larger sample sizes are warranted.

## **CONSENT**

Written consent for publication was obtained from the patient.

## COMPETING INTERESTS

The authors declare that they have no competing interests.

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