

# Spontaneous Regression of Extruded Lumbar Disc Herniation: Report of Two Illustrative Case and Review of the Literature

## Spontan Regrese Olan Ekstrude Lomber Disk Hernisi: 2 Olgu Sunumu ve Literatürün Gözden Geçirilmesi

### ABSTRACT

Although the first reported surgery for lumbar disc herniation was published many years ago, there still remains little agreement for the most effective treatment protocol for symptomatic cases. Many patients with extruded lumbar disc herniation require surgical intervention due to radiculopathy of lower extremities but some neurological symptoms of intervertebral disc herniation may frequently improve with conservative treatment. In this paper, two cases of spontaneous regression of extruded lumbar herniated discs are presented. The disc regressions of two patients were correlated with clinical improvement and documented with follow up MRI studies. Additionally the clinical course of lumbar disc herniation was discussed with mechanisms, features of MRI, immunohistological pathology and treatment options of past clinical studies.

**KEY WORDS:** Spontaneous, Intervertebral, Disc, Herniation, Regression

### ÖZ

Lomber disk hernisi cerrahisine ait ilk yayın yıllar önce yayınlanmış olmasına rağmen, semptomatik olguların en etkili tedavisi konusu hala tartışmalıdır. Ekstrude lomber disk hernili bir çok hasta alt ekstremitelere ait radikülopati nedeniyle cerrahiye gereksinim duymaktadır ancak intervertebral disk herniasyonunun birçok nörolojik semptomu da konservatif tedavi ile düzelmektedir. Bu makalede, spontan regresyon gösteren iki ekstrude lomber disk hernisi hastası sunulmaktadır. İki hastaya ait disk regresyonları klinik iyileşme ile koreledir ve MRG çalışmaları ile dökümanite edilmiştir. Ek olarak lomber disk herniasyonu kliniği; geçmiş klinik çalışmaların mekanizmaları, MRG özellikleri, immünohistolojik patoloji ve tedavi seçenekleri ile tartışılmıştır.

**ANAHTAR SÖZCÜKLER:** Spontan, Intervertebral, Disk, Herniasyon, Regresyon

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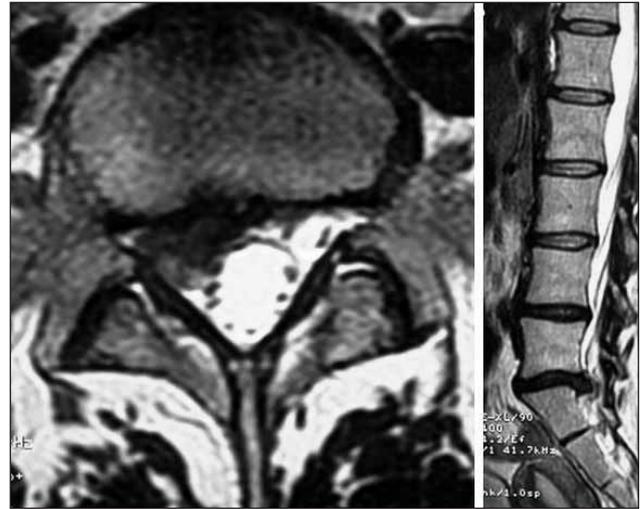
## INTRODUCTION

Although the first reported surgery for lumbar disc herniation was done more than 60 years ago, the exact treatment method still remains doubtful. Some neurological symptoms due to intervertebral disc herniation may frequently improve without surgical intervention (2,3,4,8,13,15,17,19,21) and over a period of time, the size of the disc can be reduced by itself or via nonoperative methods. Many reports have described spontaneous regression of intervertebral disc herniation and conservative treatment is not a rare option for this problem (10,14,20,23).

In this paper, two patients who experienced large extruded lumbar disc herniations are presented. Each of the herniations regressed spontaneously with nonoperative treatment, as demonstrated by magnetic resonance imaging (MRI), with corresponding remission symptoms. The clinical course of lumbar disc disease and radiographic studies of the patients were discussed with mechanisms, features of MRI, immunohistological pathology and treatment options of past clinical studies.

### CASE REPORT 1

A 33-year-old woman with a 7-months history of low back and right leg pain was admitted to our department on October 2007. The patient's history was notable for intermittent low back pain over the previous 3 years. Straight leg raising test was positive on the right side and the neurological exam was normal except for a hypoactive right achilles reflex. The patient was able to ambulate normally but required over the counter analgesics for pain control. MRI of the lumbar spine was obtained after her admission to our department. The large extruded disc fragment was found on the right side of spinal canal at the L5-S1 level on T2-weighted MRI and the dural sac was seen to be compressed by the fragment (Figure 1). After being offered operative treatment, the patient preferred to have conservative treatment that included physical and medical therapy with bed rest. Over the next several weeks, the patient's complaints were resolved and normal achilles reflex was found in next neurological exam. After visiting our outpatient clinic for follow up, MRI of the lumbar spine was performed on June 2008 and total regression of the extruded disc fragment was found without



**Figure 1:** Axial (left) and sagittal (right) T2-weighted MRI of the lumbar spine images show a large extruded disc fragment on the right side at the L5-S1 level (October 2007).

compression of the dural sac and S1 root on T2-weighted MRI (Figure 2). The height of L5-S1 disc space was not reduced significantly compared to other levels and was unchanged from the previous lumbar spine MRI examination.

### CASE REPORT 2

A 44-year-old man with a 6-month history of untreated left thigh and low back pain was admitted to our hospital in April 2007. He also complained of bilateral inguinal pain which spreaded to the scrotum. The neurological exam was normal except decreased sensation of touch and pain in the left ilioinguinal area. T2-weighted MRI of the lumbar spine was performed and a large extruded and

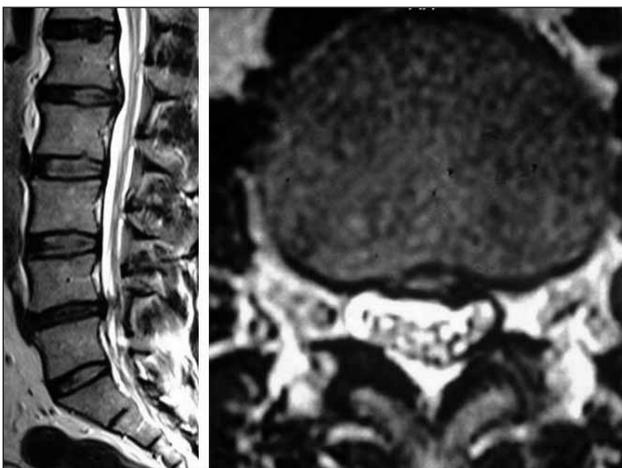


**Figure 2:** Lumbar disc herniation is seen to be resorbed on follow up axial (left) and sagittal (right) T2 weighted MRI of the lumbar spine at the L5-S1 level (June 2008).

upmigrated disc fragment was found at the L1-2 level. The dural sac was compressed and displaced by the fragment (Figure 3). Surgical intervention was offered to the patient but he refused. Then he was referred to the physical therapy and rehabilitation department for conservative treatment. The patient came to our outpatient clinic for follow-up neurological examination on June 2008 without any complaint. On follow up MRI of the lumbar spine, the totally regressed extruded disc fragment was found at the L1-2 level and the dural sac was free of compression (Figure 4).



**Figure 3:** Axial (left) and sagittal (right) T2-weighted MRI of the lumbar spine show a large extruded and up migrated disc fragment at the L1-2 level. The dural sac is compressed and displaced by the fragment (April 2007).



**Figure 4:** On follow-up T2-weighted MRI of the lumbar spine, the totally regressed extruded disc fragment is seen at the L1-2 level and the dural sac is free from compression (June 2008).

## DISCUSSION

The reported 2 patients' case histories demonstrate 2 sequential, independent and spontaneously resolving lumbar disc herniations. As per the patients' choice, each event had nonoperative treatment and as shown on MRI, each demonstrated full remission in both the abatement of radicular symptoms and the radiologic resolution of the intervertebral disc herniations. It has been shown that extruded disc herniations have great potential for regression (2,3,4).

### Mechanisms of Spontaneous Disc Regression

The literature contains several reports of the spontaneous regression or disappearance of herniated intervertebral discs without surgical management. Regression of herniated discs has been described at different levels and with various clinical presentations, including lumbar radiculopathy (7,8,13,21). The exact mechanism of spontaneous disc regression remains unknown. Three popular mechanisms are present in the literature. The first hypothesis states that the herniated disc retracts back into the intervertebral space and protrudes through the annulus fibrosus but is not separated from it. The second hypothesis states that the disc regression is due to gradual dehydration and shrinkage. The last hypothesis takes into account enzymatic degradation and phagocytosis of cartilaginous tissue due to inflammatory reaction and neovascularization of disc herniation (9,13,21). It seems that vascular supply plays a major role in resorption of the disc material (2,3). The vascular mechanism of the resorption is the local reaction around the disc fragments, proliferation of the blood vessels and migration of the phagocytosis of the disc material. On the other hand, production of matrix proteinases and increased cytokine levels play a role in the spontaneous regression process (10, 20).

### Features of Magnetic Resonance Imaging

Magnetic resonance imaging (MRI) is a current technique to document the regression of herniated intervertebral disc fragments. Several studies with lumbar spine MRI have demonstrated that the largest lumbar disc herniations are most likely to show the greatest regression in size over time (2,16,17). Rim enhancement on MR images has been reported to be related to the accumulation of contrast material within the vascularized granulation tissue surrounding the avascular sequestered disc

(14,20,23). According to the current studies of extradural lumbar disc herniation, a herniated mass that shows rim enhancement on Gd-enhanced MR images disappears or markedly decreases in 75-100% of cases (14,20,23). Furthermore, when rim enhancement is evident on Gd-enhanced MR images, there is possibility of spontaneous regression even though the herniated mass may be within the intradural space (20).

### Immunohistological Pathology

Intervertebral disc herniations act as foreign bodies in the epidural space. Several immunohistological studies have demonstrated that the immune system attempts to remove the invading disc tissue (6,11,12,17). Hirabayashi et al reported that vessels from the epidural fat infiltrate the disc material. Accompanying the vessels are granulation tissue and the eventual transformation into scar tissue (11,17). Doita et al demonstrated that significant levels of endothelial growth factor in the extruded discs, as compared with smaller protruded discs, presumably enhance the proliferation of endothelial cells (6,17). In an animal study by Haro et al, knockout mice were used to demonstrate that macrophage induction of a chondrocyte enzyme (matrix metalloproteinase-3) plays a key role in disc resorption though several mechanisms (17). These studies have showed that macrophages play a vital role in both resorption and cytokine signaling to promote endothelial cell proliferation and neovascularization.

### Clinical Studies

Among the patients choosing nonoperative treatment, some may eventually require operative intervention for unremitting or progressive symptoms. The Weber study estimated this number to be as high as 25% after 1 year (17,22). In the larger Maine Lumbar Spine Study, it was shown that 15% of patients initially treated nonoperatively crossed over and underwent surgical intervention for the treatment for their intervertebral disc herniations by 3 months (1,17). As in prior studies, Buttermann found that larger presenting disc herniations (especially sequestered and extruded types) demonstrated a greater percentage of decrease in size (5). In his study, he found that patients who were successfully treated nonoperatively and whose pain decreased significantly within the first 6 weeks had a larger number of resorbed extruded and sequestered disc herniations on follow up MRI.

Patients who improved during the first 6 weeks may experience more rapid regression of their disc herniation with concomitant decrease in nerve root inflammation and pain (5).

In a retrospective cohort study, Saal and Saal demonstrated that lumbar disc herniation with radiculopathy can be successfully treated with nonoperative procedures resulting in "good to excellent" outcomes for approximately 90% of patients (17,18). In another study, Takada and Takahashi reported that the time taken for spontaneous regression of the herniated mass by >50% varied from 3 to 12 months (3).

### CONCLUSION

In our two cases, the regression of herniated discs may be due to the high water content of larger fragments and their dehydration/shrinkage and inflammation assisted resorption. Although the clinical improvement of our patients was demonstrated with radiological regression, it sometime does not correlate with morphological or radiological changes in different patients. This discrepancy may be explained by the progressive reduction of pressure of the herniated fragments on neighboring neural structures and the increasing of inflammatory response that accompanies the herniation.

Medical management may reduce the clinical symptoms, particularly pain, and radiological intervention may provide morphological regression of extruded disc fragments. These case reports confirm earlier findings demonstrating that a large lumbar disc herniations can be managed successfully by nonoperative methods. Although the successful management of these patients by nonoperative treatment has been demonstrated, many aspects of the disease process remain unknown. Finally, conservative treatment may be the best option when radiculopathy is acceptable and cauda equina syndrome is absent.

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