



## Traumatic Retrolisthesis of L5 and L5/S1 Extruded Disc Herniation; A Case Report and Review of the Literature

**Babak Pourabbas, Mohammad Ali Effani, Asghar Namdari\***

Department of Orthopedic Surgery, Shiraz University of Medical Science, Shiraz, Iran

**\*Corresponding author:** Asghar Namdari

Address: Fellowship in Spine Surgery, Shiraz University of Medical Science, Shiraz, Iran. Tel: +98 713 623 1410; Fax: +98 713 624 6093  
e-mail: namdarias@gmail.com

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### ▶ ABSTRACT

Traumatic retrolisthesis is a rare injury and may result in intervertebral disc extrusion and nerve root injury. These injuries are highly unstable and require surgery for decompression and stabilization. Traumatic retrolisthesis of L5 with acute L5/S1 disc extrusion associated with nerve root injury has not been reported previously in English literatures. We herein report a case of traumatic retrolisthesis of L5 and extruded disc. A 22 year-old patient presented with lower extremity weakness due to L5/S1 retrolisthesis and traumatic acute L5/S1 disc extrusion after falling of 8 meters height. The patient underwent surgical decompression and reduction with instrumentation. Accordingly complete recovery of neurologic deficit was occurred. Therefore, early decompression of the nerve roots followed by circumferential instrumentation and fusion of the involved segment results in dramatic improvement in neurologic symptoms.

**Keywords:** Traumatic retrolisthesis; Lumbar disc extrusion; Neurologic deficit.

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### Introduction

Traumatic anterior spondylolisthesis is a relatively common injury in lumbar spine and which is reported in the English literatures while traumatic retrolisthesis of lumbar spine is rare. Only few studies on posterior spondyloptosis and retrolisthesis of L5/S1 are reported [1-6]. There are also some reports of traumatic L5/S1 disc herniation in the current literature [7-10] and one case report that showed foraminal disc herniation associated with traumatic L4/L5 anterolisthesis [11]. Another study described radiologic feature of lumbosacral dislocation with

disc herniation [12]. We could not find any report about traumatic retrolisthesis of L5 with acute L5/S1 disc extrusion associated with nerve root injury (Table 1). We herein report a rare case of traumatic retrolisthesis of L5 and extruded L5/S1 disc associated with neurologic deficit which was successfully treated with surgical decompression and instrumentation.

### Case Report

The patient was a 22 year-old labor who had fallen down from 8 meters height and rushed to emergency

**Table 1.** Reports of traumatic lumbosacral retrolisthesis and acute disc herniation in the English literature

Authors	Year	No. of patients	Posterior lumbosacral listhesis	Traumatic disc herniation
Cohn SL <i>et al.</i> [1]	1989	1	+	-
Gertzbein SD [2]	1990	1	+	-
Griffin JB <i>et al.</i> [3]	1980	1	+	-
Mukundala VV <i>et al.</i> [4]	2001	1	+	-
Gabel BC <i>et al.</i> [5]	2015	1	+	-
Meneghini RM <i>et al.</i> [6]	2003	1	+	-
González-Bonet LG <i>et al.</i> [7]	2009	1	-	+
Lee HW <i>et al.</i> [8]	2013	1	-	+
Ando T <i>et al.</i> [9]	1993	1	-	+
Terhaag D <i>et al.</i> [10]	1989	4	-	+

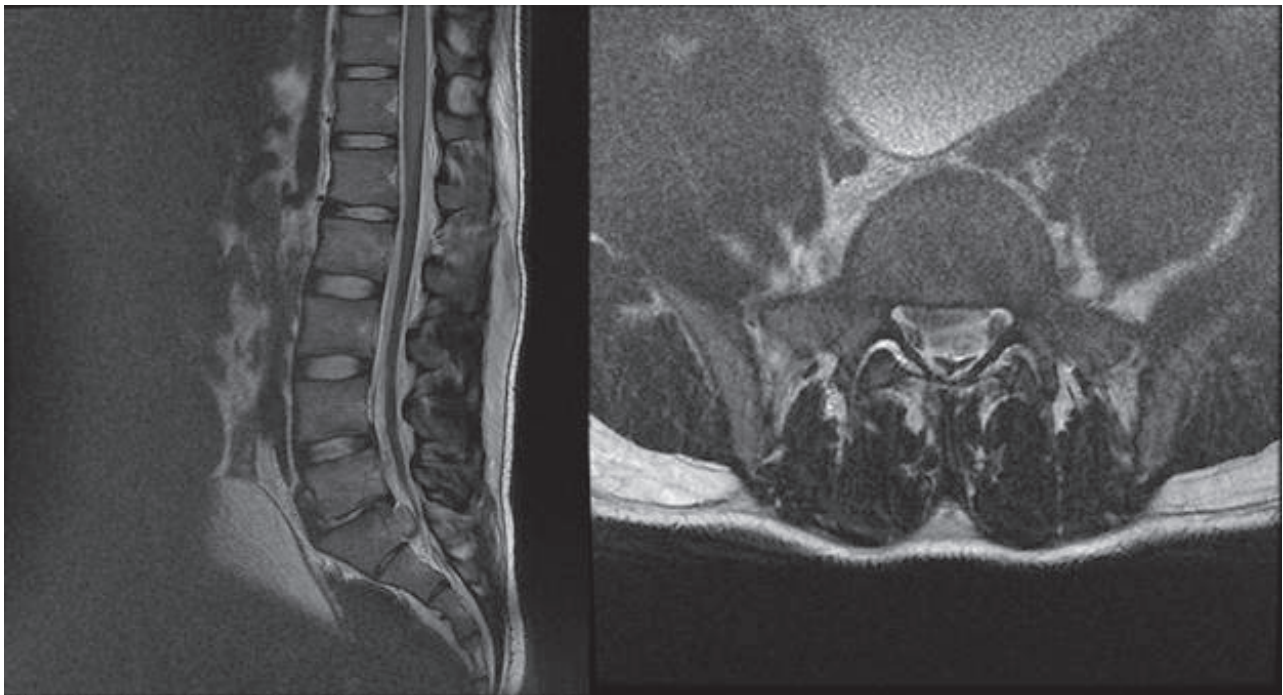
room (ER) with severe low back pain. First diagnostic radiographies in the ER revealed retrolisthesis and fracture of antero-inferior corner of L5 vertebral body associated with some increase in L1/L2 interspinous process distance. Approximately one hour after admission, the patient developed paresthesia in L5 and S1 nerve roots territory, weakness of big toe dorsiflexion (motor power 4/5) and foot plantar flexion (motor power 3/5) as well as radiculopathy in right lower extremity. However, saddle anesthesia or left lower extremity weakness was not detected in physical examination. Bowel and bladder functions were normal. Deep tendon reflexes were also normal except for right Achilles tendon that had hyporeflexia. Lumbosacral CT scan confirmed the diagnosis of L5 fracture and retrolisthesis of L5 on S1 and L5/S1 facet joints widening. There was also a mass like effect in the spinal canal behind the body of S1 (Figure 1). Emergency lumbosacral MRI showed central and right paracentral L5/S1 disc extrusion along with retrolisthesis of L5. It also showed annular tear in L1/L2 disc and hyper signal changes in T2-weighted images in interspinous space

of that level with ruptured supraspinous ligament (Figure 2). The patient was completely asymptomatic prior to the recent trauma and did not report any previous low back pain or radicular symptoms.

Urgent decompression and surgical stabilization was considered due to symptomatic pressure over the L5 and S1 nerve roots. Posterior pedicular screw fixation combined with interbody fusion was planned. After bilateral L5/S1 laminectomy, a very large disc fragment was removed and both S1 and right L5 nerve roots were followed as lateral as possible. Both roots were normal on gross appearance. There was also no evidence of dural tear or cerebrospinal fluid leakage. Followed total discectomy, interbody fusion was performed by Tantalum cage (TM Ardis Interbody System, Zimmer, Warsaw, Indiana, United States) for anterior stabilization and posterior segmental instrumentation by pedicular screw (instinct java system, Zimmer, Warsaw, Indiana, United States) was done. Posterolateral fusion was also done by local and allograft bone (Cenobone, Tissue Regeneration Corporation, Kish, Iran). The standing post operative lateral lumbar radiography

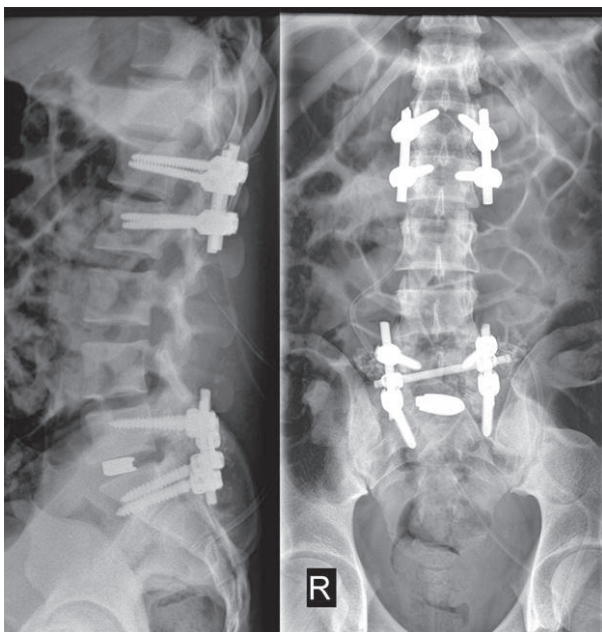


**Fig. 1.** Sagittal and Axial CT-Scan of the lumbosacral region of the patient demonstrating L5 retrolisthesis and soft tissue mass at the posterior aspect of the S1 vertebral body.



**Fig. 2.** Sagittal and Axial MRI of the lumbosacral region of the patient demonstrating central and paracentral L5/S1 disc extrusion with pressure effect of L5 and S1 roots.

revealed gross splaying of L1/L2 interspinous space, which was classified as type B2 fracture (according to new AO classification system) [13]. The patient returned to operation room as elective setting. Gross rupture of supra and interspinous ligaments at this level was detected. L1/L2 level was reduced and fixed by mono-segmental Pedicular screws (URS System, DePuy Synthes, Solothurn, Switzerland) and posterior and posterolateral fusion by allograft (Cenobone, Tissue Regeneration Corporation, Kish, Iran) two days later (Figure 3). The patient had a



**Fig. 3.** Postoperative lateral and anteroposterior standing lumbosacral radiographies of the patient demonstrating posterior fixation and reduction of L5 retrolisthesis with reconstruction of anterior column.

dramatic improvement in neurologic deficit with complete recovery of sensory and motor loss the day following the surgery. He ambulated in the first post-operation day (second operation) and discharged from the hospital three days later. In 1-year follow-up, the patient’s neurologic examination and his radiography revealed complete recovery.

### Discussion

Traumatic retrolisthesis of lumbar spine is a relatively rare clinical entity. There are several reports of anterior listhesis in lumbosacral region. Neurologic deficit is common in complete fracture dislocation but it is not a rule. El Assuity WI *et al.*, [14] reported a case of complete anterior dislocation without neurologic deficit. Posterior listhesis in lumbar spine and lumbosacral junction were also reported as case reports, but most of these cases were actually frank fracture dislocation with significant translation and extreme instability [1-6]. Although some of these cases were associated with paraplegia, none of them was showed with disc extrusion and root palsy. Vialle *et al.*, [15] reported a series of traumatic dislocations of lumbosacral region including 11 cases which none of them was retrolisthesis. True traumatic lumbosacral retrolisthesis is extremely rare and so far, we know this is the first case of traumatic retrolisthesis associated with intervertebral disc extrusion resulting in a segmental radiculopathy. The patient did not report any previous low back pain or radicular symptoms and massive L5/S1 disc extrusion seems to be entirely traumatic and apparently the main cause of associated radiculopathy. Urgent decompression and surgical stabilization was

planned due to symptomatic pressure over the L5 and S1 nerve roots. Considering severe instability subsequent to circumferential nature of the injury, posterior pedicular screw fixation combined with interbody fusion is necessary to restore the integrity of the lumbosacral junction. Acute lumbar disc herniation is a common medical finding but whose relation to trauma is uncertain. There are only few cases in which trauma were clearly the sole cause of disc herniation [7-9]. Terhaag *et al.*, [10] reported only 4 cases confirmed traumatic disc prolapse among 1771 cases of lumbar disc herniation. Traumatic retrolisthesis of the lumbar spine is classified as

type C fracture (according to new AO classification system) and needs operative reduction and fixation for stabilization and neurologic improvement [13].

In conclusion, traumatic retrolisthesis is a rare injury and may result in intervertebral disc extrusion and nerve root injury. These injuries are highly unstable and require surgical decompression and stabilization. Early decompression of the nerve roots followed by circumferential instrumentation and fusion of the involved segment might cause a dramatic improvement in neurologic symptoms.

**Conflict of Interest:** None declared.

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