



Case Report

Treatment of unilateral L5–S1 locked facet in a pediatric patient

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ABSTRACT

Background: Traumatic unilateral lumbosacral facet dislocations are rare injuries. The majority of cases are treated with open reduction and instrumented spinal fusions. Only less commonly can they be managed conservatively.

Case Description: A 7-year-old unrestrained passenger was involved in a high-speed motor vehicle accident. X-ray/magnetic resonance/computed tomography imaging documented a unilateral L5–S1 facet dislocation and multiple lumbar/sacral fractures. The patient underwent open reduction and temporary L5–pelvic instrumentation without fusion; the instrumentation was removed 10 weeks later at which point follow-up imaging showed preserved lumbosacral stability.

Conclusion: Open reduction with temporary instrumentation without fusion was successfully utilized to treat a unilateral L5–S1 facet dislocation in a 7-year-old child.

Keywords: Facet dislocation, Locked facet, Pediatric spine injury, Spinal instrumentation

INTRODUCTION

Traumatic facet dislocations at the L5–S1 level rarely occur following high-impact trauma.^[3,8] This injury results in disruption of the ligaments involved in hyperflexion and rotation of the spine.^[8] The treatment is usually open reduction with an instrumented fusion.^[4] Here, we describe a 7-year-old male who presented with a traumatic unilateral L5–S1 locked facet. Notably, he was successfully treated with open reduction and temporary L5–S1 instrumentation without fusion; 10 weeks later, once the instrumentation was removed, he demonstrated preserved stability.

CASE SUMMARY

A 7-year-old male presented after a high-speed motor vehicle collision with severe back pain and lumbar radiculopathy, but without a focal neurological deficit or sphincter dysfunction. The lumbar computed tomography showed; spinous process fractures of L1–L3, right transverse process fractures of L3–L5, left L4 lamina and inferior articular facet fractures, bilateral transverse and lateral mass fractures of S1 with a diastases of the left SI joint, and a left L5–S1 facet dislocation

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[Figure 1]. The lumbar magnetic resonance confirmed these multiple lumbar and pelvic fractures without focal thecal sac and/or nerve root compromise. The patient underwent placement of instrumentation from L5–pelvis without fusion to act as a temporary “internal brace” while bony healing occurred; the plan was to remove it 10 weeks later to see if adequate stabilization occurred with preservation of motion.

Surgery

With neuromonitoring and under fluoroscopic guidance, a unilateral L4–S1 exposure was performed on the right side. At surgery, marked posterior tissue disruption was noted involving avulsion of the spinous processes from L3 to 5. There was also significant periosteal stripping of the L3–5 lamina, and the right facet capsule and joint of L5–S1 were disrupted/dislocated. A clamp placed on the lamina of L5 allowed for manual reduction of the dislocation, and placement of a right-sided L5 pedicle screw. Another incision was performed medial/superior to the posterior superior iliac spine of the right ilium, and a right iliac screw was applied (i.e., requiring resection of a small portion of posterior iliac apophysis) [Figure 2]. At surgery, no “fusion” was performed (i.e., involved no decortication or placement of bone graft). The patient was mobilized on postoperative day (POD) 1 and discharged on POD 3 wearing a thoracic-lumbar-sacral orthosis brace, and the upright lumbar X-rays confirmed normal physiologic alignment [Figure 3].

Removal of instrumentation 10 weeks later with X-rays showed adequate alignment

Ten weeks later, the patient underwent removal of all instrumentation on the right side. When followed for an additional 16 months postoperatively, he had no pain, a

normal gait, and flexion/extension X-rays which showed no pathological L5–S1 motion [Figure 4] (i.e., possible spontaneous unilateral L5–S1 facet fusion) [Figure 5].

DISCUSSION

We performed a literature review of unilateral L5–S1 locked facets in pediatric patients. This identified five cases from four reports obtained from PubMed [Table 1].^[2,5,8,10] One case was managed conservatively with a body cast; all other cases warranted open reduction/instrumented fusions. Lumbosacral facet dislocations at L5–S1 are rare injuries attributed to hyperflexion/rotation and are more frequently seen in the cervical spine.^[8] There are several reasons for the decreased incidence of these injuries at the L5–S1 level that includes; larger vertebrae, strong collagenous facet capsules, and more powerful paraspinal muscles.^[6,7,9] However, the lumbosacral junction is more susceptible to this injury due to the relatively coronal orientation of the facet joints at the L5–S1 level versus the more sagittal orientation



Figure 2: Percutaneous placement of rod between L5 and iliac screw.

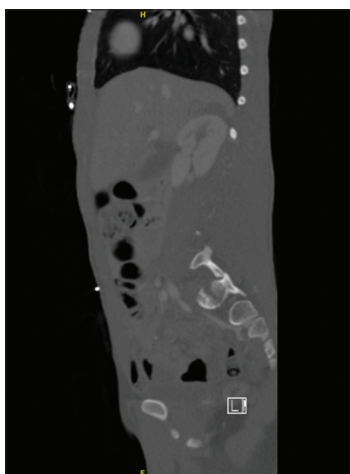


Figure 1: CT abdomen and pelvis with contrast demonstrating left L5–S1 locked facet.

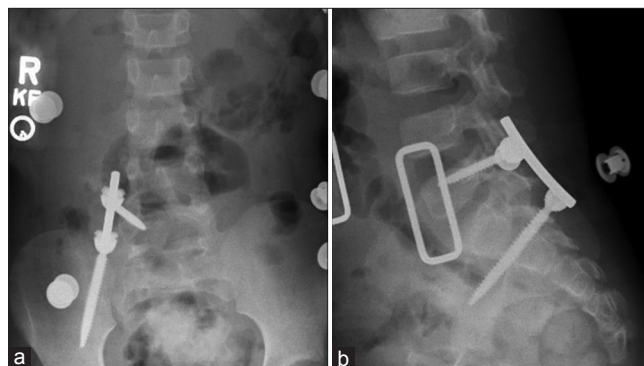


Figure 3: Upright lumbar spine X-ray with LSO brace in place showing final instrumentation placement. (a) Anterior-posterior X-ray. (b) Lateral X-ray.

Table 1: Previous cases of pediatric unilateral L5–S1 facet dislocations.

Author, year	Age/sex	Mechanism of trauma	Injury to lumbosacral spine	Treatment	Follow-up from surgery	Outcomes (persevered motion at joint, spontaneous unilateral fusion, etc.)
Zoltan <i>et al.</i> , 1979	12/M	BA	L L5–S1 FD Fx L1–L5 TP Fx R L5 TP	CONS	24 months	Fused. Residual pain with activity
Kramer and Levine, 1989	13/M	Ped-MVA	L L5–S1 Sublux/FD L L1–L5 TP Fx	Open PLF	12 months	Fused (X-ray). Asymptomatic
Connolly <i>et al.</i> , 1991 (Case 1)	16/F	Fall	L L5–S1 FD S SAP BilS Ped Fx Type III GS Fx S1–S2 L5 Bil PD	Open PLF	12 months	Fused (X-ray). Asymptomatic
Connolly <i>et al.</i> , 1991 (Case 2)	16/F	MVA	R L5–S1 FD/Fx	Open PLF	12 months	Fused (X-ray) Some pain
Szentirmai <i>et al.</i> , 2008	14/F	MVA	L5–S1 AntSp Unilat S FD Iliac wing Fx multiple L TP Fx	OPEN PLF+SI Screw percutaneous	24 months	Asymptomatic with no restriction to activity
Current case	7/M	MVA	Unilateral LS FD Multiple Fx LS	Open right side L5-S1+Screws. no fusion. removed 10 weeks Later	16 months	Preserved motion at the lumbosacral junction

BA: Bicycle accident, Ped-MVA: Pedestrian hit by a Motor Vehicle, MVA: Motor vehicle accident, CONS: Conservative treatment, Open-PLF: Open reduction + Posterolateral Fusion, LS: Lumbosacral, TP: Transverse processes, FD: Facet dislocation, L: Left, R: Right, Fx: Fractures, S: Sacral, SAP: Superior articular fracture, Ped: Pedicle, GS: Green stick (Fracture), Bil: Bilateral, PD: Pars defect, AntSp: Anterior spondylolisthesis, L: Lumbar, M: Male, F: Female

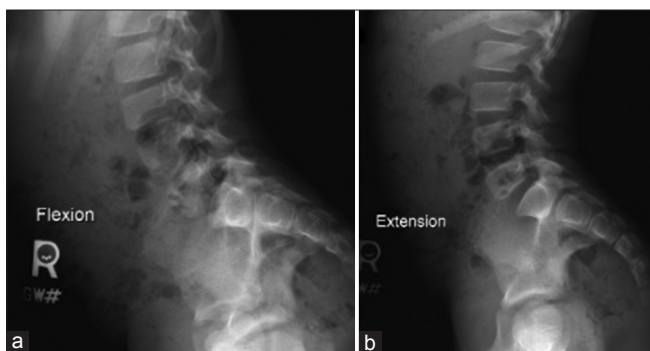


Figure 4: Flexion (a) and extension (b) X-rays revealing no abnormal motion at L5-S1.

of facets at higher lumbar levels.^[1] In addition, pediatric patients are likely at greater risk for these injuries due to ligamentous laxity and/or a lower bone/cartilage ratio.^[7] The typical treatment for unilateral lumbar facet dislocation has involved open reduction and fusion (i.e., anterior instrumented fusions, posterior instrumented fusions, and combined circumferential fusions), as only rarely can they be successfully treated conservatively with bracing alone.^[4] In the pediatric population, temporary instrumentation without fusion has rarely been reported to result in satisfactory clinical outcomes while preserving the range of motion.



Figure 5: Lumbar X-ray showing no acute osseous findings and a subtle tilt to the left.

CONCLUSION

A 7-year-old male with a unilateral L5–S1 lumbosacral facet dislocation was effectively treated with open reduction and temporary instrumentation without fusion (i.e., unilateral L5 pedicle and iliac screw placement without bony decortication

or graft placement). Ten weeks later, once the instrumentation was removed, the patient remained asymptomatic, and demonstrated adequate X-ray documented stability.

Declaration of patient consent

Patient's consent not required as patient's identity is not disclosed or compromised.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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