

# Traumatic Posterior Rotatory Fracture-Dislocation of Lumbo-Sacral Spine

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## ABSTRACT

Fracture-dislocation of the lumbo-sacral spine was an unusual injury<sup>(1)</sup> and was divided into anterior, posterior and lateral types depending on the displacement of the cephalad portion of the spine over the caudal portion. According to the authors' knowledge, only 31 cases of traumatic fracture-dislocation of the lumbo-sacral spine were reported in the English literature. Only 3 previous reports referred to this injury with a posterior displacement<sup>(2)</sup>, which was an even rarer injury. This was the fourth report of this type of injury.

**Keywords:** Lumbo-sacral spine, Posterior-fracture dislocation and open reduction and internal fixation

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## CASE REPORT

A 28-year-old Indonesian man, a migrant worker who worked at a construction site as a labourer was referred to the institution by a general practitioner in April 1998. A heavy truck hit the patient from behind while he was crossing the road at his work place. He suffered a transient loss of consciousness and could not recall the exact mechanism of injury. His main complaints were weakness and loss of sensation of both lower limbs as well as inability to pass water and open his bowels since the accident.

He was fully alert on admission. Multiple abrasions were found over his back and loin. There was a swelling of the lower back. The tone in both his lower legs was flaccid below the knees. The power of his lower limbs were MRC grade 4 in the knee flexors, grade 0 in the ankle and toe muscles. The knee and ankle jerks were absent and the Babinski's response was equivocal. He had complete anaesthesia from L5 and below bilaterally. His bladder was distended and bladder sensation was absent. His anal tone was lax and a 5 cm perianal laceration superficial to the anal sphincter was noted.

The plain x-rays showed a comminuted burst fracture of L5 with L5 dislocated posteriorly on S1 (see Fig. 1). Fractures of the right transverse processes

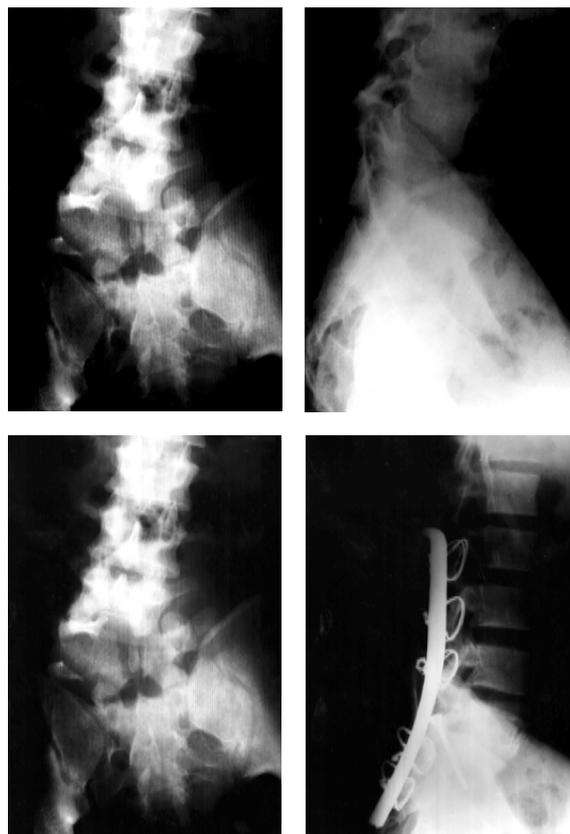


Fig. 1 Pre-operative and post-operative radiographs.

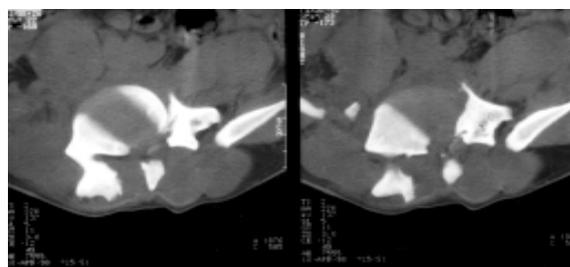


Fig. 2 CAT scan of the lumbo-sacral fracture-dislocation.

of L2 to L5 were also noted. CAT Scan confirmed an extensive comminuted fracture of L5 vertebral body, with the left pedicle, laminae and L5 spinous process and body fragment displaced into the spinal canal (see Fig. 2).

He was scheduled for urgent open reduction and internal fixation of the L5-S1 fracture-dislocation but this was delayed as his renal function was abnormal

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with markedly elevated urea (86.5 mg/dl), creatinine (1569 mmol/l) and potassium (7.5 mmol/l). His ECG showed tall t-waves which disappeared upon electrolyte correction. Urgent ultrasound showed small sized kidneys which were echogenic with poor corticomedullary differentiation particularly worse on the right side suggestive of acute on chronic renal failure. No calculi or hydronephrosis was detected. The patient underwent peritoneal dialysis for 2 days which alleviated his renal dysfunction.

On the 4<sup>th</sup> day of admission, he had open reduction and posterior fusion with stabilisation with a Hartshill rectangle. The surgery was performed with the patient in the prone position through a midline dorsal incision. Intra-operative findings confirmed the radiological features. The L5-S1 disc and annulus fibrosus were disrupted circumferentially. The right half of L5 vertebral body was rotated around the right L4/L5 facet joint and displaced posteriorly tenting the aural sac anteriorly. The left half of the L5 vertebral body was displaced posteriorly but remained in front of the aural sac.

Part of L5 vertebra was excised to aid in the reduction of the vertebrae and a Shanz screw was inserted on the right pedicle of L5 to steer the vertebra towards its anatomical position. A 4.5 mm AO cortical screw was inserted transarticularly across the right L5/S1 joint to stabilize the reduction. A Luque rectangle, cut at the distal end, was fitted into holes made in the sacrum and secured to the spine by sublaminar wires. Cancellous bone chips from the posterior iliac crest were applied to the decorticated surfaces.

Post-operatively, his neurological status did not improve and bladder and bowel functions were not restored. However, his renal function had gradually returned to normal. His perianal wound healed with daily dressing without the need for a prophylactic colostomy. After a week of rehabilitation, he was discharged. The patient failed to attend our follow-up clinic thereafter as he had returned to his country of origin.

## DISCUSSION

The exact mechanism of injury of lumbo-sacral dislocation remained controversial. Watson-Jones<sup>(3)</sup> proposed that forceful spinal hyperextension was the cause of lumbo-sacral fracture dislocation whereas Roaf<sup>(4)</sup> proved experimentally that hyperflexion with compression and rotation were important elements for the above lesion to occur.

According to Herron and Williams<sup>(5)</sup>, fracture-dislocation of the lumbo-sacral spine was frequently associated with fractures of adjacent spinal elements like transverse processes of the spine. This was an important

tell-tale sign which should direct the doctor's attention towards lumbosacral fracture dislocation in a patient with major trauma. In this case, we noted that the patient had fracture of the L2 to L5 transverse processes.

Other helpful radiological signs included obliquity of L5 over the sacrum on AP roentgenograms, increased interspinous distance, a sharp kyphosis of L5 on S1, often with narrowing of the anterior height of disc space on lateral roentgenogram. Perched or fractured facets and widening of the contralateral facet joint on oblique views were also suggestive signs. Tomograms and CAT scan could delineate the fracture pattern. The "naked facet" sign in CAT scan was indicative of facet disruption<sup>(7)</sup>. In our case, CAT scan was helpful in demonstrating that half the vertebra body had rotated around the right L4/L5 facet joint to lie behind the dural sac.

Historically, cases which were treated conservatively had been reported. Reduction by conservative methods was neither easy nor advisable. Proponents of surgical management advised that closed methods of treatment could result in late neurological compromise or aggravate the existing neurological deficit, and caused chronic spinal instability. Attempts at closed reduction by Watson Jones<sup>(3)</sup> proved futile. Dewey and Browne<sup>(7)</sup> attempted manipulation in traction and flexion and produced worse neurological damage. Newell<sup>(8)</sup> had achieved good initial results with non-operative treatment but stated that the risk of slow progressive displacement from stretching of scar tissue with consequent deformity and secondary degenerative changes always remained.

On the other hand, operative treatment was the current treatment of choice for lumbo-sacral fracture dislocation. Connolly<sup>(7)</sup> and Samberg<sup>(9)</sup> reported good results with early open reduction and internal fixation with postero-lateral fusion of the lumbo-sacral spine. The displacement at the time of operative reduction was usually not greater than displacement occurring at the time of injury. For this reason, it was most unlikely, that early operative reduction would cause additional neurological damage. Hence, it would seem that early operative reduction and internal fixation was the current recommended treatment for this type of injury.

In summary, posterior fracture dislocation of the lumbo-sacral junction was a rare injury. In addition, there was a rotatory component to this lumbo-sacral fracture dislocation which we believe, have not been described previously. As far as we know, the method of using a combination of partial vertebral resection and Shanz screw in the pedicle as a joystick to execute safe and controlled reduction of the vertebrae body had never been previously described in the literature.

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