LUMBO SACRAL FRACTURE-DISLOCATIONS

A REPORT OF FOUR CASES

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Four patients with lumbosacral fracture-dislocation are presented. The common mechanism of injury was hyperflexion with compression. A rotational element may be implicated in single facet dislocation. Although lumbosacral fracture-dislocations can be managed conservatively, the best method of treatment is open reduction and bone grafting as soon after injury as possible. Only this will ensure complete correction of the deformity and prevent later deterioration.

Lumbosacral fracture-dislocation is an unusual injury. There have been few previous reports and some controversy about the mechanism of injury and aspects of treatment. Eleven cases have been reported since 1940 (Watson-Jones 1940; Evans 1959; Lambert and Billings 1961; Dewey and Browne 1968; Samberg 1975; Fardon 1976; Newell 1977; Zoltan, Gilula and Murphy 1979).

Watson-Jones (1940) suggested forcible hyperextension as the mechanism of injury but Roaf (1960) showed experimentally that a combination of hyperfexion with compression and rotation was necessary. Newell (1977) and Zoltan et al. (1979) reported success with conservative treatment in the unreduced position and Dewey and Browne (1968) tried closed reduction of the dislocation but failed. The only report in the literature of successful open reduction is by Samberg (1975). Some of the earlier cases were not fully documented and the mechanism of injury and the method of treatment were not made clear.

The recent presentation of the first case prompted this review and a search of the records of the Southern General Hospital and the Royal Infirmary, Glasgow, for the past 10 years produced another three cases, two of which were recently reviewed.

CASE REPORTS

Case 1. A 19-year-old man jumped from his overturning fork-lift truck but was trapped in a knee-elbow position beneath it. He sustained a lumbosacral fracture-dislocation with anterior shift of the fifth lumbar vertebra on the sacrum and an associated fracture of the anterior sacral promontory (Fig. 1). The inferior articular facets of the fifth lumbar vertebra and the sacral facets were intact. In addition there were fractures of the left transverse processes of the second and third lumbar vertebrae, bilateral avulsion of the ischial apophyses and a fracture of the pubic symphysis (Fig. 2). There was a midline perineal tear extending from the base of the scrotum to the anal margin but sigmoidoscopy confirmed that it did not involve the sphincter. Neurological examination revealed no abnormality but the patient was unable to pass urine and urethral catheterisation was necessary. There were fractures of the right ninth to eleventh ribs and the patient showed signs of traumatic asphyxia. Because of the respiratory problems, initial treatment for the spinal injury was limited to rest on a turning frame.

Ten days after injury open reduction of the lumbosacral dislocation was performed through a posterior midline approach with the patient prone. The radiological findings of intact fifth lumbar and sacral articular processes were confirmed. The dislocation was then disimpacted by distracting the fifth lumbar vertebral and first sacral spinous processes, thereby temporarily increasing the flexion deformity. The lamina of the fifth lumbar vertebra was then carefully levered out from beneath the posterior sacral arch. The reduction was stable in extension and this position was maintained by wiring between the spinous processes of the fifth lumbar vertebra and sacrum. Cancellous bone chips from the iliac crest were then applied between the spinous processes and laminae. After operation no neurological abnormalities developed and the urethral catheter was removed. The patient was allowed up in a Plastazote lumbar support five weeks after reduction.

Twelve months after the injury the patient was free of pain with a full range of lumbar movements and no neurological abnormality. He had returned to his previous employment. Lumbar radiographs, including views in flexion and extension, demonstrated no instability (Fig. 3).

Case 2. A 32-year-old man was crushed in a flexed position under a loaded fork-lift truck. Injuries included a lumbosacral fracture-dislocation with anterior shift of the body of the fifth lumbar vertebra by one-third of its diameter. There were associated fractures of the sacral promontory and the right fifth lumbar transverse process. He had a perineal laceration without involvement of the anal sphincter. There was impaired sensibility of the skin of the right S1 dermatome, depression of the right ankle jerk and weakness of the right hamstring muscles.

At operation on the day of the injury fractures were found of the bases of the inferior articular processes of the fifth lumbar vertebra. Reduction was obtained as in the first patient and stabilised by interspinous wiring and cancellous bone grafting.

The neurological deficit persisted after operation. The patient was allowed up in a plaster spica two weeks after injury and this was
Case 1. Figure 1—Lateral radiograph showing lumbosacral fracture-dislocation. Figure 2—Pelvic radiograph showing fracture of the pubic symphysis and avulsion of the ischial apophyses. Figure 3—Lateral radiograph 12 months after injury.

Case 2. A 54-year-old male welder was crushed in a stooping posture under a heavy load. He suffered surgical shock and his bony injuries included a unilateral left facet dislocation of the fifth lumbar vertebra on the sacrum, fracture-dislocation of the right ankle, and fractures of the left acetabulum, the right transverse process of the fourth lumbar vertebra and the left seventh rib. His left ankle jerk was diminished and he had numbness over the dorsum and lateral border of his left foot. The ankle, rib and acetabular fractures were treated conservatively. Because of poor general condition his operation was delayed for three weeks. Open reduction of the spine was then performed through a posterior midline approach. The radiological findings were confirmed and no fractures of the locked facets were found. There was great difficulty in disimpaction and this was achieved only after excision of the tip of the superior facet of S1. Bone grafting and internal fixation were not performed because the reduction appeared stable. There was only partial recovery of the initial neurological deficit but after five weeks he was up and about in a plaster jacket which he wore for six weeks.

After two years he was working as a patrolman but had moderate pain and minor restriction of lumbar spinal movements. At review 10 years after injury he had retired and still complained of some discomfort. Radiographs showed degenerative changes in the L5–S1 apophyseal joint with one-third forward slip of the body of the fifth lumbar vertebra on the sacrum with some buttressing (Figs 4 and 5). Views in flexion and extension did not reveal any instability.

DISCUSSION

Watson-Jones (1940) described one patient with lumbosacral fracture-dislocation and considered the mechanism of injury to be forcible hyperextension. Roaf (1960) showed experimentally that hyperflexion with compression and rotation was necessary to produce the lesion. All four patients reported here had severe crush injuries with the lumbar spine in flexion. The knee-elbow position had also resulted in perineal lacerations in two cases. In one patient (Case 3), there was a rotational element which may have contributed to the facet dislocation.

Reduction by conservative methods is neither possible nor advisable. Attempts at closed reduction by Watson-Jones (1940) and by Dewey and Browne (1968) proved futile. The operative findings in this review confirm that indirect forces cannot achieve reduction. Dewey and Browne (1968) attempted...
manipulation in traction and flexion and produced increased neurological damage. Newell (1977) and Zoltan et al. (1979) reported good results from accepting the dislocation and treating the patient conservatively, but with the use of this method stability would depend on fibrous healing alone. There is then the risk of slowly progressive displacement from stretching of scar tissue with consequent deformity and secondary degenerative changes.

Holdsworth (1970) believed that pure spinal dislocations without fracture should be treated by open reduction and fusion because ligamentous healing was never sufficiently strong to ensure stability in unreduced dislocations. Burke and Murray (1976) also recommended open reduction and internal fixation for an irreducible thoracolumbar fracture-dislocation. Samberg (1975) reported a good result from open reduction and internal fixation of a lumbosacral fracture dislocation. The displacement required in operative unlocking of the facets is not greater than the displacement which occurred at the moment of injury. It is therefore most unlikely that early careful operative reduction will cause any additional neurological damage (Watson-Jones 1940).

In this series there was no neurological deterioration after open reduction, posterior wiring and bone grafting. Partial facetectomy can be performed if required to minimise the forces and displacement required for reduction. This was done in Case 4 but because no stabilisation procedure was carried out, the patient developed forward subluxation of the fifth lumbar vertebra on the sacrum with degenerative changes at the apophysial joints which was apparent 10 years later at review (Figs 4 and 5). We therefore strongly recommend that lumbosacral fusion should always follow operative reduction of the dislocation.

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REFERENCES