

Traumatic dislocation of the lumbosacral joint in two cats

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Summary

The clinical and radiological features, surgical treatment, and outcome of two cats with traumatically induced dislocation of the lumbosacral joint are described in this report. The dislocation of the lumbosacral joint was concurrent with dorsal luxation of the articular facets in both cases. Open reduction, followed by stabilization with a dorsal suture sling, resulted in a good clinical outcome.

Keywords

Lumbosacral, dislocation, luxation, cat

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Introduction

Spinal injuries at the lumbosacral junction in cats are rare. Injuries in this area of the spine possibly result in ischiatic nerve deficits, paralysis of the tail, and bladder dysfunction. Based on a clinical impression, fractures of the seventh vertebral body or transverse fractures (type III) of the sacrum (1, 2) are most common. Traumatic dislocation of the lumbosacral joint has not been described in small animals, but there are several case reports in the human literature. Affected human patients usually have sustained high-velocity trauma, and concurrent injuries are common (3–5). Dislocation of the lumbosacral joint can be the result of luxation or fracture/luxation of the articular facets (6–10). The condition is usually treated surgically (5, 11, 12).

This report describes clinical and radiographical features, and the treatment of two cats with traumatic dislocation of the lumbosacral joint.

Case 1

A four-year-old, male neutered European Shorthair cat was referred from a private veterinarian to our hospital after being hit by a car. Upon general clinical examination the cat showed tachycardia (200 bpm), had two open wounds in the perineal area, and a fracture of the right tibia could be palpated. It was able to stand on three legs. The neurological examination revealed tail paralysis, but the spinal reflexes, the perineal reflex, and the anal tone were considered normal. The bladder was small. The cat was markedly anaemic with a packed cell volume of 18%. Blood chemistry showed

mildly elevated glucose, ASAT and ALAT serum levels, and mildly reduced total protein and albumin levels. Whole body radiographs revealed mild pneumothorax and lung contusion, and a dorso-lateral lumbosacral dislocation (Fig. 1). An avulsion fracture of the left ischial tuberosity, and a closed and mildly comminuted fracture of the left tibia were additionally diagnosed.

The cat was cardiovascularly stabilized with intravenous fluids. Cefazolin^a 22 mg/kg every eight hours and buprenorphine^b every four hours were administered, and the cat was kept in an oxygen cage over night. Surgery was performed the following day. The patient was intravenously premedicated with 0.2 mg/kg midazolam^c and 7 mg/kg propofol^d. Anaesthesia was maintained with isoflurane^e delivered in 100% oxygen. Pain relief was addressed intravenously with 5 µg/kg/h fentanyl^f during surgery. A dorsal midline surgical approach was performed to access the lumbosacral area. The supraspinous and interspinous ligaments were found to be disrupted. The facet joints were luxated bilaterally, and the sacrum was twisted to the right in relation to the seventh lumbar vertebra. Reduction of the joint was performed using pointed reduction forceps on the spinal processes of the seventh lumbar vertebra and the sacrum. After distraction of the articular facets by flexing the lumbosacral joint, torsion was applied to achieve normal position of the facet joints. After reduction, the joints did not have a tendency to luxate again. Additionally, a poly-

^a Kefzol, Teva Pharma, Aesch, Switzerland.

^b Temgesic®, Essex Chemie, Stans, Switzerland.

^c Dormicum, Roche, Reinach, Switzerland.

^d Propofol, Fresenius Kabi, Stans, Switzerland.

^e Forene®, Abbott, Baar, Switzerland.

^f Sintenyl®, Sintetica, Mendrisio, Switzerland.



Fig. 1 Case 1 at presentation: A dorsal and right lateral subluxation of the sacrum can be seen. Note the malalignment of the dorsal spinous processes of the sacrum in relation to those of the lumbar spine on the ventrodorsal radiograph.

propylene sling 2-0 (Prolene, Ethicon, Spreitenbach, Switzerland) was anchored in a figure-of-eight pattern through the spinous processes of the seventh lumbar and second sacral vertebrae to provide additional stability and prevent hyperflexion of the joint. The holes were drilled with a 0.8 mm Kirschner wire at the base of the spinous processes to anchor the suture adequately (Fig. 2). The dorsal fascia was closed with an interrupted cruciate suture pattern using polydioxanone 4-0 (PDS, Ethicon, Spreitenbach, Switzerland), the subcutaneous layer with simple interrupted sutures using PDS 4-0, and the skin with simple interrupted sutures using polyamide 4-0 (Supramid, Braun, St. Gallen, Switzerland). The fractured tibia was fixed using a medial 12 hole 2.7 mm DCP. Pain relief was achieved with buprenorphine for three more days after surgery.

Postoperatively, the cat continued to display tail paralysis, reduced anal tone and perineal reflex, proprioception deficits and a plantigrade stance of both hind limbs. After two days it started to move its tail, and the other neurological deficits also disappeared. After 10 weeks it had completely recovered. A clinical re-examination after four years revealed neither orthopaedic nor neurological abnormalities, but according to the owner the cat did not climb trees anymore. The radiographs showed mild degenerative changes around the lumbosacral joint (Fig. 3).

Case 2

A five-year-old, male neutered European Shorthair cat was submitted to our hospital, because it was found on the street non-ambulatory. A motor vehicle accident was suspected. The cat was in shock and very painful in its pelvic region. A neurological examination revealed tail paralysis with a loss of deep pain in the distal part. The spinal reflexes, the perineal reflex, the anal tone and bladder function were considered to be normal. Haematology and blood chemistry were normal. Whole body radiographs of the cat revealed a lumbosacral left dorso-lateral dislocation, a fracture of the right ilial wing, a dislocation of the left sacroiliac joint, multiple pelvic floor fractures and a complex fracture of the right femur (Fig. 4). A fracture of the right sacral wing was also suspected, but not clearly seen on the radiographs.

Administration of intravenous fluids, analgesics, antibiotics and anaesthetic agents are given as described in case 1. The cat was operated upon the next day. A dorso-midline approach to the lumbosacral joint was performed. As in the first case, the supra- and interspinous ligaments were found to be ruptured and both facet joints were luxated. The sacrum was twisted to the left. Reduction was performed using pointed reduction forceps placed on the lateral aspect of the fa-

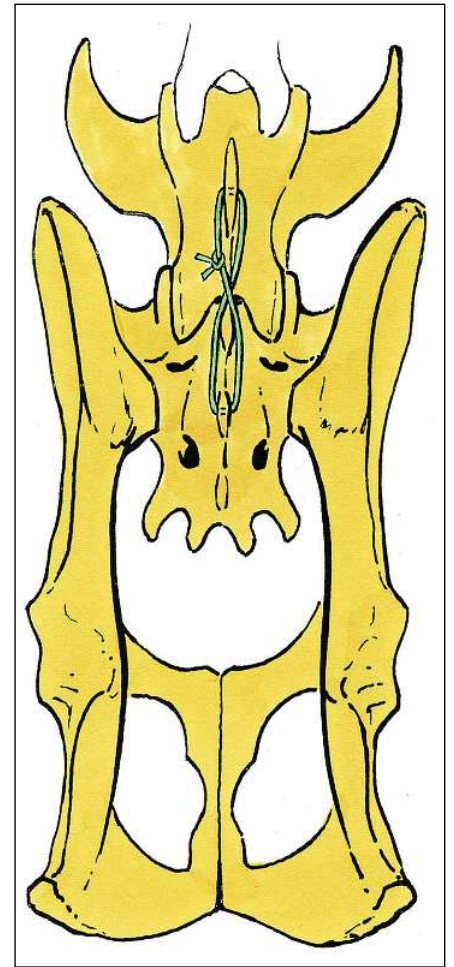


Fig. 2 A suture sling was anchored in a figure-of-eight pattern through the base of the spinous processes of the seventh lumbar and second sacral vertebrae to prevent hyperflexion of the joint.

cets of the sacrum, and around the lateral lamina of L7. Reduction was only achievable with the lumbosacral joint in full flexion. The lesion was found to be stable after reduction, but a suture sling using PDS 2-0 was anchored between the spinous processes of L7 and S2; this was done in order to prevent hyperflexion of the joint and thus reduce the risk of relaxation. The concomitant pelvic injuries and the open wound in the perineal region were treated conservatively. The femoral fracture was stabilized with an external skeletal fixator in 'tie-in' configuration.

The cat was able to stand two days postoperatively. Deep pain and motor function of the tail came back within seven days. The follow-up radiographs after six months

showed normal position of the lumbosacral joint on the laterolateral radiograph, but slight axial deviation on the ventrodorsal view (Fig. 5). Orthopaedic and neurological examinations were normal.

Discussion

Vertebral fractures and luxations account for six percent of feline fractures at our institution. Most of these fractures or luxations involve the sacrococcygeal junction, followed by fracture/luxations of the lumbar spine (1). Fractures of the thoracolumbar spine have been described to occur most commonly at the lumbosacral junction in one report (13), and between the second and sixth lumbar vertebra in two others (14, 15). Spinal lesions involving the lumbosacral junction are rare in cats, and not well described. Traumatic lesions are generally fractures of the seventh vertebral body or fractures of the sacrum. There is one report of a cat with a lumbosacral disc herniation (16). Dislocation of the lumbosacral junction was only encountered in two cases over a three-year period, and has not been described in veterinary literature to our knowledge.

In the human literature, approximately 30 cases of traumatic lumbosacral dislocation have been described in several case reports. It is a rare lesion characterised by a dislocation of L5-S1 with L5 slipping, more common towards anterior than posterior (7). Most of the patients have concurrent fractures of the articular facets (6, 7), but cases with bilateral (8, 9) or unilateral (10) luxation of the articular facets without a fracture have also been described. The condition is caused by high-velocity trauma, and affected patients have usually sustained a number of concurrent injuries (3–5). The mechanism of injury of lumbosacral dislocation is discussed in human literature, but the most likely explanation is trauma resulting in hyperflexion with subsequent distraction of the facet joints (17), combined with rotational shear forces (8). Rotational forces can additionally result in rupture or avulsion of the intervertebral disc (3). The diagnosis can be missed, because the condition is rare (4, 18), and can be mistaken for



Fig. 3 Case 1 four years following surgery: Moderate degenerative changes in the lumbosacral joint are present.



Fig. 4 Case 2 at presentation: Dorsal and left subluxation of the lumbosacral joint, a fracture of the right ilial wing, left iliosacral luxation, a fracture of the right pubis and ischium, and a fracture of the right femur are present.

non-traumatic spondylolisthesis radiographically (3). Because of its rarity, the surgical strategy of lumbosacral traumatic dislocation remains controversial (7). There are single case reports about non-treated or conservatively treated lumbosacral dislocations with good results (9, 19). Conservative care in two cases resulted in severe deformity and pain and required late reconstruction (12). Open reduction and internal fixation with posterior stabilization has been the method of treatment most frequently reported (5, 11,

12). Long-term prognosis is good, with most of the patients being free of clinical signs and returning to normal activity.

Care should be taken also in cats not to miss the diagnosis, as both of the cats in our report had concurrent trauma to the pelvis and hind limbs, and only minor neurological deficits. The sacrum was only slightly dislocated dorsally on laterolateral radiographs, and the most obvious radiological sign was malalignment of the dorsal spinous processes of the lumbar versus the sacral spine.



Fig. 5 Case 2 six months following surgery: Position of the lumbar-sacral joint is normal on laterolateral radiographs, but slight axial deviation is seen on the ventrodorsal view.

The spinal cord of the cat ends at the level of the seventh lumbar to first sacral vertebrae (20, 21). The conus medullaris and the nerves of the cauda equina can such be compressed or damaged in presence of dislocation of the lumbosacral junction. Corresponding neurological deficits include sciatic nerve paralysis, bladder dysfunction, and tail paralysis. Compression of the L7 nerve root in the L7/S1 intervertebral foramen also seems to be a logical consequence. However, only mild neurological deficits were encountered in the two cats, possibly because spinal canal narrowing and subsequent compression of spinal cord and nerves was not severe. Both cats in the present case report had disruption of the supra- and interspinous ligaments and bilateral luxation of the articular facets without concurrent fractures. The supra- and interspinous ligaments act as a tension band between the dorsal spinous processes. Their disruption supports the theory that excessive flexion is part of the aetiology for lumbosacral luxation. Open reduction could only be performed after creating marked flexion of the lumbosacral junction to distract the facet joints, corresponding to the proposed mechanism of the trauma. The lesions were considered to be relatively stable before reduction intraoperatively in both cats.

Although conservative treatment would theoretically be an option for relatively

stable spinal fractures/luxations with absence of neurological deficits, we recommend open reduction of the highly functional lumbosacral joint. Even though we do not have any comparison to conservatively treated cases in small animals, the development of chronic pain seems likely with a permanently luxated lumbosacral joint. Open reduction of the lesion could also prevent further potential compressive or ischemic injury of the L7 nerve roots and/or the cauda equina. Because the lumbosacral joint also seemed stable after reduction in both cats, surgical stabilization was only performed with a dorsal suture sling, which was mainly aimed to prevent hyperflexion and relaxation. In the presence of concurrent fractures of the articular facets, fixation of the lumbosacral joint should probably be performed additionally. A dorsal laminectomy could be indicated for exploration and decompression of the lumbosacral nerves in cases with more severe neurological deficits.

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