Cauda equina nerve roots lack epineurium and perineurium and only have a thin endoneurium root sheath, making them more susceptible to compression forces when compared with peripheral nerves. The syndrome can result in permanent motor deficit and bladder, bowel and sexual dysfunction. It represents a true spinal emergency and requires urgent surgical decompression. The outcome for patients who undergo surgical decompression within 24 hours of the onset of loss of bladder or bowel control is significantly better than that of those who undergo surgery beyond this 24-hour period.

Cauda equina syndrome classification

The key classification of CES (*Table 37.7*) is into cases where there is still executive or voluntary control of the bladder (CES-I) and cases where there is bladder retention and overflow incontinence (CES-R). CES-I cases are considered to be more urgently in need of decompression to prevent deterioration to CES-R. Most surgeons now believe that continued compression causes a continuous deterioration in function and therefore early decompression is of benefit.

Summary box 37.4

Cauda equina syndrome

- Commonest presenting symptoms: perineal numbness, alteration in bladder function and sensation leading to painless urinary retention, overflow incontinence and faecal incontinence
- Urgent investigation with MRI is required for all suspected cases
- Confirmed CES requires surgical decompression within 24 hours to achieve optimum outcomes

Lumbar disc herniation

Symptomatic lumbar disc herniation occurs during the lifetime in approximately 2–4% of the population. Risk factors include family history, male gender, age (30–50 years), heavy lifting or twisting, stressful occupation, lower income and cigarette smoking.

Over 90% of lumbar disc herniations occur at the L4/5 or L5/S1 levels. A posterolateral disc protrusion will affect the **traversing** root, e.g. an L4/5 disc protrusion will affect the L5 nerve root. A far-lateral disc protrusion (extraforaminal) will affect the **exiting** nerve root, e.g. a far-lateral L5/S1 disc protrusion will affect the L5 nerve root. Symptoms typically commence with a period of back pain followed by sciatica. There may be paraesthesia, motor weakness, loss of reflexes and a reduction in SLR.

For simple sciatica, a period of 6–12 weeks of conservative treatment is advised. Up to 70% of patients will settle within this period. A trial of pregabalin (GABA analogue) and/or a transforaminal epidural steroid injection may be helpful. Microdiscectomy is the standard surgical intervention for those in whom conservative treatment has failed. The procedure is carried out in the prone position with radiographic confirmation of the correct level. Loupes with a headlight or use of the operating microscope greatly facilitate the procedure. A 3- to 4-cm incision is made with a unilateral take down of the multifidus. The spinal canal is entered via removal of the ligamentum flavum under the lamina. The thecal sac and traversing nerve root are identified. The dura and nerve root are retracted medially and the offending disc prolapse incised via a transverse annulotomy. The disc fragment is removed and the disc space cleared of any remaining nuclear material with rongeurs and multiple washouts of the disc space. The wound is closed. Patients are generally discharged the next morning.

Spinal stenosis

Spinal stenosis may be defined as any type of narrowing of the spinal canal, nerve root canal or intervertebral foramen. The resultant nerve root compression leads to nerve root ischaemia, presenting with back, buttock or leg pain provoked by exercise. Spinal stenosis may be congenital, as is the case in achondroplasia, or acquired, as is the case for degenerative types (commonly presenting between 50 and 70 years of age). The narrowing is caused by facet joint hypertrophy, disc bulging and ligamentum flavum thickening.

Symptoms of spinal claudication can be distinguished from vascular claudication because they are frequently associated with neurological symptoms, are often worse in extension and pedal pulses are present on clinical examination. Symptoms progress in approximately 20–33% of patients who receive no treatment. The condition may be treated successfully by surgical decompression alone with preservation of the facet joints.

Summary box 37.5

Spinal stenosis

- Extremely common condition in the 50- to 70-year age group
- Classic symptoms: back, buttock, thigh and calf pain
- Provoked by walking and extended posture
- Relieved by flexed posture
- Symptoms progress in up to one-third of untreated patients

Discogenic low back pain

Discogenic low back pain has been defined as a continuum of diagnostic categories (internal disc disruption, degenerative disc disease, segmental instability) reflecting various stages of degenerative pathology affecting the intervertebral disc. Not all degenerate discs are painful. Patients typically present with chronic relapsing episodes of low back pain between the ages of 40 and 60 years.

A recent study has compared rehabilitation with spinal fusion for discogenic pain. Both groups reported reductions in disability, with the authors strongly recommending a course of rehabilitation **before** surgical intervention. For those who fail to improve with conservative measures, provocative lumbar discography (*Figure 37.1*) may help to identify the source of pain, and surgery in the form of a lumbar spinal fusion (*Figure 37.3*) or lumbar disc replacement (*Figure 37.4*) may be considered.