

**DEFINITION**

1. Lumbar spinal stenosis is the term given to a condition in which the lateral or antero-posterior diameter of the spinal canal is abnormal, with or without a change in the cross-sectional area. This causes compression of the cauda equina (the tail end of the spinal cord).

**ANATOMY**

2. The spinal canal is found behind the articulated vertebral bodies between which are the annulus fibrosus and its disc, the posterior longitudinal ligament, and the posterior elements made up of the pedicles, the facet joints, the lamina and spinous processes and their ligaments, especially ligamentum flavum. Normally, the canal is circular in the upper lumbar spine, triangular or trefoil in the lower lumbar spine, and is smallest opposite L4.
3. The nerve root canal is part of the spinal canal. The roof of this canal is formed by the ligamentum flavum and the superior articular facet and the adjacent lamina. The floor is formed by the annulus fibrosus and the posterior surface of the vertebral body. The medial wall is the dural sac. The lateral wall is formed by the medial side and then by the inferior aspect of the pedicle.
4. The lower limit of normal anteroposterior diameter is reported as being between 10 and 15 mm. In the population there is a great variation in the dimensions of the spinal canal. At one end of the scale there can be an enlarged canal in which even a herniated lumbar disc might not precipitate symptoms. On the other hand a spinal canal might be very narrow and any slight change in its diameter secondary to degeneration may precipitate severe symptoms.

**CLINICAL MANIFESTATIONS**

5. There is no clinical presentation applicable to all cases. Indeed, spinal stenosis can exist with no physical findings at all.
6. A classic pattern of stenosis is that of cauda equina claudication in which the patient presents with pain in the buttocks or lower extremities after walking, this being relieved by sitting forward or lying for 20 minutes or so. Hypoaesthesiae or paraesthesiae are often precipitated by exercise. Walking uphill can usually be done with ease and cycling with no difficulty. Neurological findings are not consistent but often include muscle weakness, areas of sensory loss and imbalance.
7. In some cases where there is root entrapment in the lateral recess, the clinical picture is one of claudication with sciatica. The sciatica is often bilateral but even so neurological signs tend to be minimal.

## AETIOLOGY

8. Spinal stenosis is usually classified into one of four aetiological patterns -
  - 8.1. **Congenital or Developmental Stenosis.** There is uniform narrowing throughout the lumbar canal. The main pathology is an abnormal neural arch with heavy lamina which may be twice the normal thickness of 4 to 5 mm. The lamina may be foreshortened or overlap and end in enlarged facet articulations. This type of stenosis can also be found in achondroplastic dwarfism and in Paget's disease.
  - 8.2. **Degenerative Spinal Stenosis.** This is basically an arthropathy with degenerative change which impinge on the foramen or the lateral recess. As the disc degenerates, losing its elasticity and height, the annulus fibrosus bulges into the canal and the vertebral bodies approach one other, leading to osteophyte formation at the margins and subluxation of the facets. The nerve root as it emerges through the intervertebral canal can be trapped between the pedicle and the superior facet. Osteophytic outgrowth often adds to the compression. The aetiology is that of the underlying arthropathy.
  - 8.3. **Spondylitic Stenosis.** While spondylolisthesis, which may be due to a congenital defect, acute fracture or stress fracture of the pars interarticularis, can occasionally entrap a nerve root, degenerative or pseudo-spondylolisthesis produces a picture of spinal stenosis. It is a backward slip of a poorly developed posterior facet with an intact neural arch. It is more commonly seen in females after the age of 40 and usually affects the L4-5 level.
  - 8.4. **Iatrogenic Stenosis.** This arises as a complication of spinal surgery, such as laminectomy or spinal fusion.

## CONCLUSION

9. Lumbar spinal stenosis is compression of the cauda equina due to narrowing of the spinal canal. Its causes include congenital narrowing, trauma, spondylosis, spondylolisthesis, skeletal disease such as Paget's disease, and spinal surgery.

## REFERENCES

Duthie Robert B and Bentley George. Mercer's Orthopaedic Surgery. 8<sup>th</sup> Ed. 1983. Edward Arnold. p830-837.

Adams John Crawford and Hamblen David L. Outline of Orthopaedics. 11<sup>th</sup> Ed. 1990. Edinburgh. Churchill Livingstone. p194-195.

December 1992