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Special Features of Lumbar Spinal Canal Stenosis

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Editorial

Functional spinal canal stenosis is a treatable cause of mechanical back pain with or without claudication or neurological deficit. Spinal canal is the osteo-ligamentous canal which contains the spinal cord. This canal with its contents can be compared to a passage and passenger. A functional canal compromise occurs either due to decrease in size of the passage, due to increase in size of the passenger or space occupying lesion. It was found that some adults also develop progressive neurological deficits and low back pain in their latter part of life. It is due to acquired spinal canal stenosis due to degenerative spinal changes. Functional lumbar canal stenosis Lumbar canal stenosis can be defined as an anatomical or functional narrowing of the osteoligamentus vertebral canal and/or the intervertebral foramina causing direct compression or indirect compromise of dural sac, the caudal nerve roots and their vasculature, enough to cause symptoms or signs. Schonstrome and others from Gothenberg quantitatively studied the changes in the dimension of the spinal canal in physiological flexion and extension.

They found that from flexion to extension the average reduction in the dimension, ranged from 12% to 30%. The majority of our daily activities are carried out by dynamically loaded spine in sagittal plane and therefore changes occurring during flexion, extension and by loading must be kept in mind. During flexion the laminae of the two adjacent vertebrae move apart and inter laminar space widens, producing lengthening and thinning of the ligamentum flavum. Dynamic changes in the lateral recess are less marked than in the central portion of the central canal. They are caused by bulging of the poster lateral annulus with or without disc, into the subarticular portion of the lateral recess. Rotational forces affect the subarticular portion of the lateral recess. Most of the patients are comfortable while they are lying down and have stenotic symptoms precipitated by dynamically loading the spine during standing, walking etc. There are two common types of clinical presentation of stenotic symptoms on loading. The first group of patients have well-localized radicular symptoms and signs, often involving a single root, and their symptoms are produced almost immediately or within a few minutes on spinal loading. The other group of patients complains of ill localized symptoms, which are produced after prolonged walking or standing.

The degenerative process involving the disc begins as early as the late teens or early twenties. Initially, an increase in the water content of the nucleus purposes predisposes it to generalized bulges or focal herniation through the cartilaginous endplates of the adjacent vertebra (Schmorl's node). With time, the nucleus pulposus undergoes progressive dehydration which results in loss of height of the disc space. With further loss of water and proteoglycans, the disc becomes brittle and fibrotic and is unable to provide the necessary elasticity for proper support of the vertebral column, a process known as disc desiccation. A reliable indicator of disc degeneration is the presence of intradiscal gas, which is referred to as vacuum phenomenon and may be visualized by plain radiographs or CT. The gas is predominantly nitrogen and is unusual in an infected disc space. Early disc desiccation presents as loss of signal intensity on T2 weighted images. Sagittal images are helpful in determining the degree of disc space narrowing. Magnetic resonance imaging also detects marrow changes within endplates adjacent to degenerative discs. Spondylosis is usually seen in association with facet joint degeneration, and multilevel disease is the rule. Degenerative spondylosis is the most common cause of spinal canal stenosis in adults.

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