

The Dorsal Root Ganglion In Lumbar Spine Pain Syndromes

The dorsal root ganglion (DRG) is an important structure related to lumbar spine pain and radicular pain.¹⁻⁵ The location of the DRG can vary, and based on its location, can be susceptible to impingement. A recent study,¹ found that proximally located DRGs are prone to irritation from facet hypertrophy and degenerative changes, and changes of the lamina and ligamentum flavum. The DRG may be imaged by several techniques: MRI, CT scan, discography, and myelography. MRI scans are very sensitive in detecting the DRG, most particularly on the axial views. The DRG is analyzed from right to left for asymmetry, indentation, location, and compression, all of which have clinicopathologic implications.

In a study by Hamanishi et al., 12/43 disc herniation cases and 7/21 facet hypertrophy cases were related by asymmetrical location and irritation of the DRG. The DRG was found to have a proximal shift most typically from stretching of the nerve roots posteriorly.

The DRG may be found to occupy one of three locations¹ (Fig. 1):

1. Intraspinal
2. Intraforaminal
3. Extraforaminal

Research has found that DRGs at the L4 and L5 levels were most frequently intraforaminal. The S1 level DRGs were most typically intraspinal. Ganglion indentation which relates to irritation, was most commonly seen in cases of superior facet compression and irritation (70 percent).² DRG indentation was also most common at the L4/L5 levels. In a recent animal study by Chatani et al., mechanical irritation of the DRG caused an increase in substance p, calcitonin gene related peptide (CGRP), and vasoactive intestinal polypeptide (VIP), (vasoactive neuropeptides).⁵ An increase in c-fos was also observed. C-fos is a marker for neuronal activity after peripheral stimulation, and is commonly increased after noxious stimulation, inflammation, and peripheral nerve injury.⁵ They concluded that DRG irritation plays a significant role in acute sciatica/leg pain.

The implications for the DC, is that the most common cause of DRG irritation and indentation is abnormality of the superior facet joint. DCs should review the MRI scans obtained on their patients and be aware of DRG involvement when it exists. Manipulative therapy may help reduce mechanical irritation of the DRG, especially in cases of lumbar facet syndrome where facet imbrication can be observed on lumbar radiographs. It is possible that referred leg pain, often observed in facet syndrome and in both the bulging and degenerative disc case, may be due to DRG irritation.

This topic is certainly an area ripe for clinical research, especially as it relates to chiropractic manipulation.

References

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