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Magnetic resonance imaging of the lumbar spine with axial loading: A review of 120 cases

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Abstract

Purpose

To evaluate the imaging findings of patients with clinical symptoms of lower back pain who underwent magnetic resonance imaging (MRI) of the lumbar spine with axial loading.

Materials and methods

We examined 120 patients by MRI, before and after axial loading, using a compression device that applied 50% of their body weight for a load time of 5 min. The dural sac cross area (DSCA) was examined by two experienced radiologists before and after axial load, and their findings were compared. Degenerative abnormalities within and adjacent to the spinal canal were also analyzed.

Results

A reduction in DSCA greater than 15 mm^2 after axial load was defined as significant, and was found in 81 patients (67.5%) and 138 disc spaces (38.3%). Reduction was most frequent at L4-L5 ($n = 55$). For other disorders, a 9% increase in cases of bulging disc was seen during axial loading, and seven disc spaces showed protrusion/extrusion only after load. Facet joint synovial cysts, foraminal stenosis, and hypertrophy of the flavum ligaments showed almost no differences, pre- and post-load.

Conclusion

For adequate evaluation of lumbar symptoms, examination should be performed with axial loading, especially in cases of suspected spinal stenosis.

Keywords

Magnetic resonance imaging; Lumbar spine; Axial loading; Spinal stenosis

Figures and tables from this article:

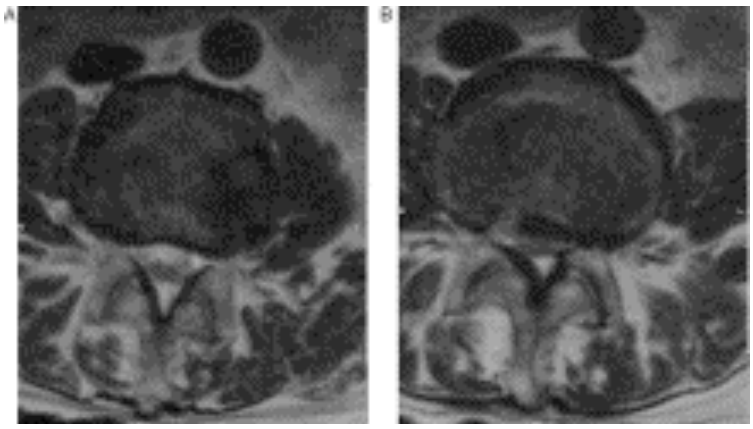

Fig. 1. Reduction of DSCA at normal L4-L5 disc level. (A) Axial T2-weighted spin-echo sequence without (A) and with (B) axial loading. DSCA was 115 mm^2 before loading and 88 mm^2 after that. In addition to a posterior disc protrusion, the post-loading image demonstrates hypertrophy of the ligamentum flavum.

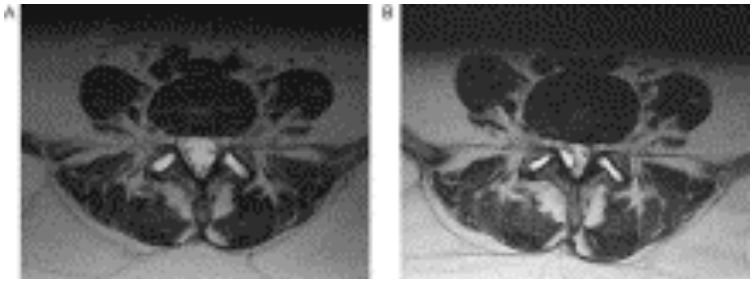

Fig. 2. Development of occult facet joint cyst. (A) Axial T2-weighted fast spin-echo sequence without axial loading. (B) Axial T2-weighted spin-echo sequence with axial loading shows a right facet joint cyst deep in the ligamentum flavum, contributing to the central stenosis.

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