Lumbar foraminal stenosis

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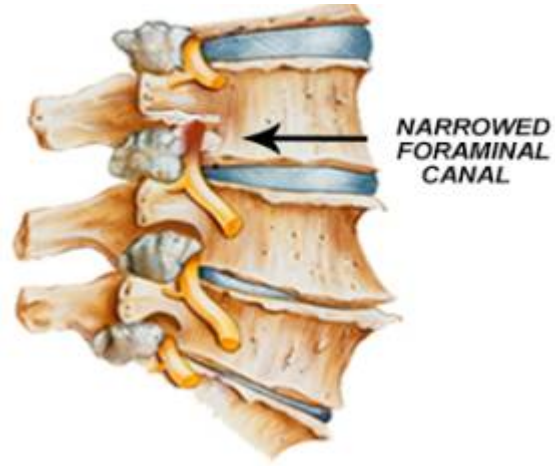

- Diagnostic performance of lumbar spine CT using deep learning denoising to evaluate disc herniation and spinal stenosis
- Clinical efficacy of robot-assisted single-position OLIF with lateral plate combined with posterior unilateral fixation for single-segment lumbar spinal stenosis
- Comparison of the early and medium term efficacy of oblique lateral interbody fusion combined lateral fixation and transforaminal lumbar interbody fusion in lumbar spinal stenosis
- Postoperative Radiologic Changes in Early Recurrent Lumbar Foraminal Stenosis After Transforaminal Endoscopic Lumbar Foraminotomy for Lower Lumbar Segments
- Y-Style Unilateral Biportal Endoscopic Far-Lateral Approach for L5S1 Foraminal Stenosis
- Baastrup's disease in a patient with multifactorial back pain: a case report
- Effectiveness and Safety of Transforaminal Spinal Endoscopy: Analysis of 1000 Clinical Cases
- Magnetic Resonance Imaging Predictors of Surgical Difficulty in Transforaminal Endoscopic Lumbar Discectomy for Far-Lateral Disc Herniation Under Local Anesthesia

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Lumbar foraminal stenosis is defined as the narrowing of the bony exit of the nerve root caused by a decrease in the height of an intervertebral disc, osteoarthritis in the facet joints, cephalad subluxation of the superior articular process of the inferior lumbar vertebra, and buckling of the ligamentum flavum or protrusion of the annulus fibrosus.

Nerve root compression was evident in twenty-one of the 100 foramina, in eight of the ten foramina in which the posterior disc height was four millimeters or less, and in four of the five foramina in which the foraminal height was fifteen millimeters or less. These critical dimensions may be indicators of lumbar foraminal stenosis. However, compression of a spinal nerve root does not always cause sciatica, and the clinical findings must always be taken into account when a diagnosis of stenosis is considered [1)].

Epidemiology

Lumbar foraminal stenosis epidemiology.

Classification

Lumbar foraminal stenosis classification.

Etiology

Lumbar Foraminal Stenosis Etiology.

Clinical features

Lumbar foraminal stenosis clinical features.

Diagnosis

Lumbar Foraminal Stenosis Diagnosis.

Treatment

see Lumbar foraminal stenosis treatment.

Videos

<html><iframe width="560" height="315" src="https://www.youtube.com/embed/eSf0Lj2xjVI" frameborder="0" allowfullscreen></iframe></html>

Cross-sectional studies

A cross-sectional study was conducted, involving 49 patients, wherein measurements of all five lumbar foramina were taken using X-rays and simple magnetic resonance imaging. These measurements primarily focused on the foraminal width and the lower endplate, which were then correlated to establish a foraminal width/lower endplate index.

The foraminal width/lower endplate index < 10% yielded an odds ratio (OR) of 3.07 on lateral

radiography, 3.59 on flexion radiography, and 4.01 on extension radiography. In MRI, an OR of 0.195 was found for the left foramina, while an OR of 3.07 was observed for the right foramina.

This study paves the way for further exploration of preoperative and postoperative clinical outcomes across various surgical decompression methods guided by the FW/LE index. To enhance decision making, it is recommended to conduct research comparing pre- and postoperative clinical findings in individual patients, considering their FW/LE index measurements [2].

Case series

In total, 230 men and 207 women (mean age 66.8 (SD 8.3)) were included. All patients underwent an MRI including T1- and T2-weighted sequences. The grade of foraminal stenosis was dichotomized into none to moderate (0-1) and severe (2-3) categories using the Lee classification for Lumbar Foraminal Stenosis. The Oswestry Disability Index (ODI), Zurich Claudication Questionnaire (ZCQ), and numeric rating scale (NRS) for back and leg pain were collected at baseline and at a 2-year follow-up. The primary outcome was a reduction of 30% or more in the ODI score. Secondary outcomes included the mean improvement in the ODI, ZCQ, and NRS scores. We performed multivariable regression analyses with the radiological variates foraminal stenosis, Pfirrmann grade, Schizas score, dural sac cross-sectional area, and the possible plausible confounders: patients' gender, age, smoking status, and BMI.

The cohort of 437 patients presented a high degree of degenerative changes at baseline. Of 414 patients with adequate imaging of potential foraminal stenosis, 402 were labeled in the none to moderate category and 12 in the severe category. Of the patients with none to moderate foraminal stenosis, 71% achieved at least 30% improvement in ODI. Among the patients with severe foraminal stenosis, 36% achieved at least 30% improvement in ODI. A significant association between severe foraminal stenosis and less chance of reaching the target of 30% improvement in the ODI score after surgery was detected: OR 0.22 (95% CI 0.06, 0.83), p=0.03. When investigating outcomes as continuous variables, a similar association between severe foraminal stenosis and less improved ODI with a mean difference of 9.28 points (95%CI 0.47, 18.09; p=0.04) was found. A significant association between severe foraminal stenosis and less improved NRS pain in the lumbar region was also detected with a mean difference of 1.89 (95% CI 0.30, 3.49; p=0.02). No significant association was suggested between severe foraminal stenosis and ZCQ or NRS leg pain.

In patients operated with posterior microsurgical decompression for LSS, a preoperative severe lumbar foraminal stenosis was associated with a higher proportion of patients with less than 30% improvement in ODI.

Trial registration: The study is registered at ClinicalTrials.gov (22.11.2013) under the identifier NCT02007083 [3].

Case reports

A 28-year-old elite football player from the leading Russian football club is the focus of this case study. Patient complained of constant low back pain radiating to the posterior surface of the right thigh and limited mobility in the lumbar spine.

Diagnosis: The patient was diagnosed with degenerative stenosis of the spinal canal at the L5 to S1

level, L4 to L5 disc herniation, spondylolysis, and anterolisthesis of L5 vertebra.

Management and outcomes: Two-stage surgery of combined lumbar spine pathology was performed in May 2021. The first stage of surgical treatment included the spinal and foraminal canals decompression at the L4 to L5 and L5 to S1 levels, as well as posterior fusion with rigid pedicle screws. The second stage involved the subsequent replacement of the rigid to dynamic semirigid rods as signs of the bone defect healing appeared. The athlete returned to team training 6 months after the first stage of surgery and was able to play football at the elite level without restrictions 1 year after the first stage and just 30 days following the second stage of surgical treatment. The athlete continues his career as of the last manuscript's revision.

This method holds potential as an effective approach in the treatment of combined lumbar spine pathology among elite athletes [4].

1)
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2)
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3)
Aaen J, Banitalebi H, Austevoll IM, Hellum C, Storheim K, Myklebust TÅ, Anvar M, Weber C, Solberg T, Grundnes O, Brisby H, Indrekvam K, Hermansen E. Is the presence of foraminal stenosis associated with outcome in lumbar spinal stenosis patients treated with posterior microsurgical decompression. Acta Neurochir (Wien). 2023 Jul 5. doi: 10.1007/s00701-023-05693-5. Epub ahead of print. PMID: 37407851.
4)
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