



**29<sup>th</sup>** Annual Gabor Racz  
Advanced Interventional  
Pain Conference and Workshop  
Budapest, Hungary August 24-26, 2026

# Percutaneous Lumbar Decompression

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Dual Board Certified in Pain Medicine and Physical Medicine & Rehabilitation

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Medical Expert, Medico-Legal Evaluations



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# Conflict of Interest

Boston Scientific  
Biotronik  
Guidepoint Consulting  
Medtronic  
Nervonik  
Vivex



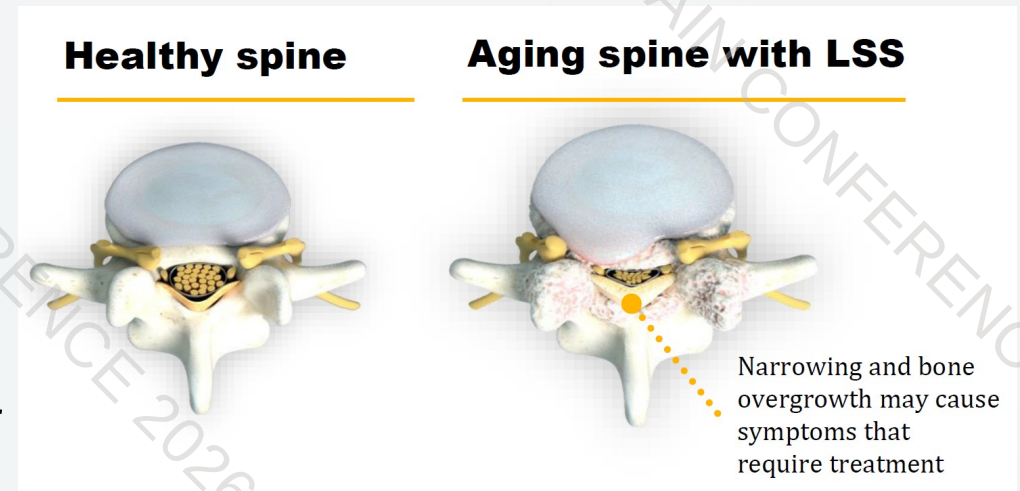
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## Outline

- Defining the problem
- Patient Identification
- Indications
- Evidence
- Procedure

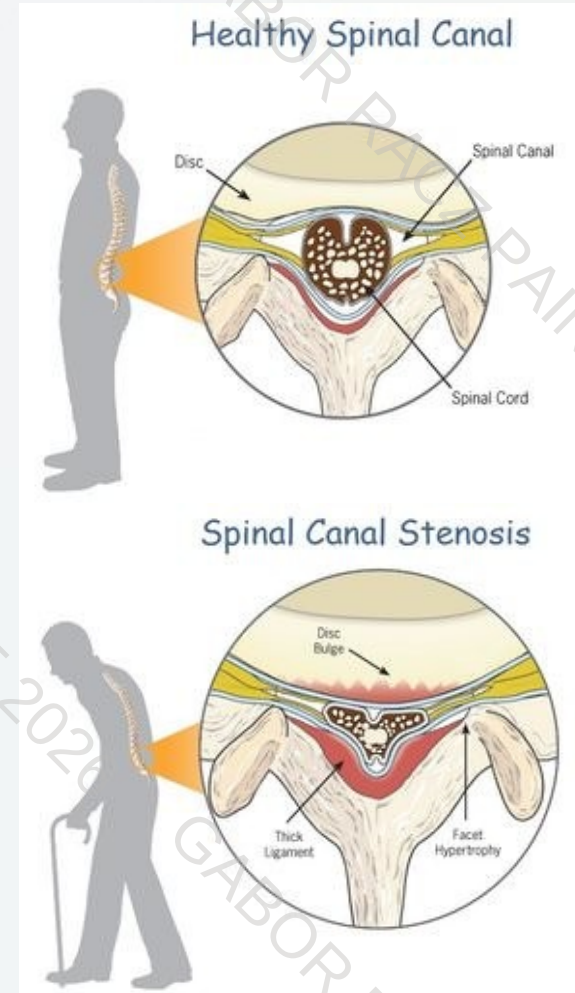
## Lumbar spinal stenosis (LSS) with neurogenic claudication

- Progressive narrowing of the spinal canal typically from degenerative spine disease
- Affects 11% of adults in the US
- Over 20% of adults over 60 years have evidence of LSS
- 80% do not require treatment
- Leading diagnosis for patients undergoing spine surgery over 65 years



# Causes of LSS

- Characteristic “trefoil” appearance
  - Lumbar disc bulges
  - Lumbar facet arthropathy
  - Ligamentum flavum hypertrophy
  - Lumbar spondylolisthesis
  - Trauma
  - Congenital



# Clinical Presentation

- **Aggravated** by standing, walking, laying flat
- **Alleviated** by sitting, bending forward, recliner, fetal position
- Associated with pain, weakness, numbness, and tingling in the legs
- "Shopping cart sign"
- The Zurich Claudication Questionnaire

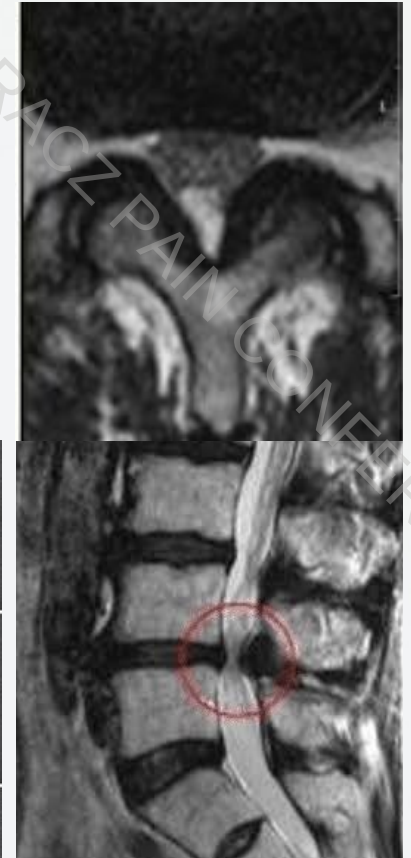
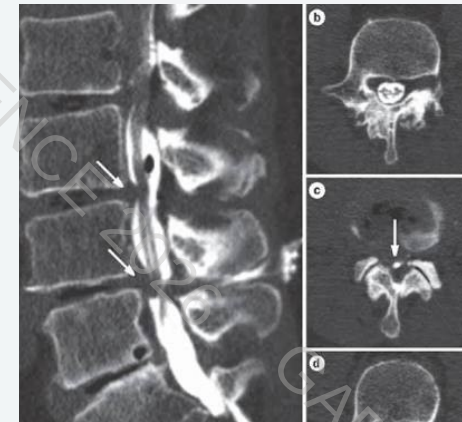
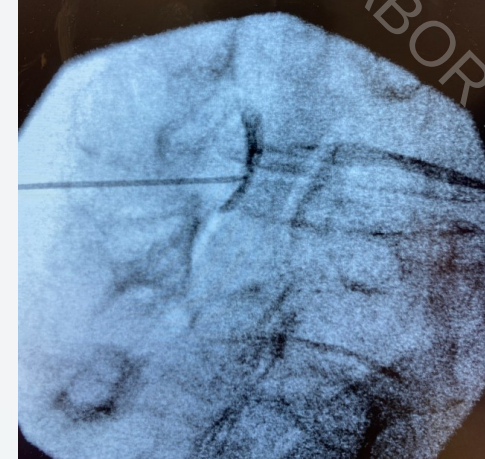


**References:**

1. Kalichman L, Cole R, Kim DH, et al. Spinal stenosis prevalence and association with symptoms: The Framingham Study. Spine J. 2009;9(7):545-550. doi:10.1016/j.spinee.2009.03.005
2. Comer CM, Conaghan PG, Tennant A. Internal construct validity of the Swiss Spinal Stenosis questionnaire: Rasch analysis of a disease-specific outcome measure for lumbar spinal stenosis. Spine (Phila Pa 1976). 2011 Nov 1;36(23):1969-76. doi: 10.1097/BRS.0b013e3181fc9daf. PMID: 21289573.

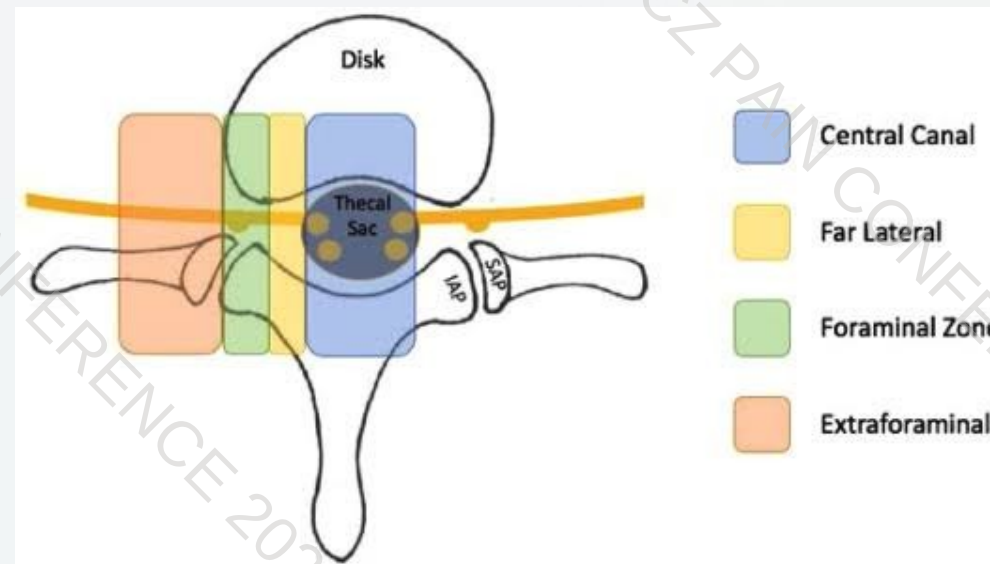
# Imaging

- Plain view xray with flexion extension
- Fluoroscopy with epidurogram / myelogram
- CT myelogram\*
- MRI\*



# Classification of LSS

- Types of stenosis
  - Central canal
  - Lateral recess
  - Foraminal
  - Extraforaminal

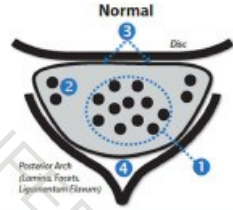


# Classification of LSS (cont)

## • Grading of LSS

- Lurie
- Lee
- Schizas
- Miskin-Mandell

## • Miskin-Mandell

| Spinal Stenosis                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Normal                                                                                                                                                                                                                                                                                                                                                                         | Mild Spinal Stenosis                                                                                                                                                                                                                                                                                                                                                                                                         | Moderate Spinal Stenosis                                                                                                                                                                                                                                                                                                                                                                                       | Severe Spinal Stenosis                                                                                                                                                                                                                                                                                                                                                                        |
|  <p>1 • Free distribution of nerve roots, without crowding</p> <p>2 • Traversing dorsal and ventral nerve roots in the lateral recesses are distinct</p> <p>3 • Anterior margin of the thecal sac is flat or convex</p> <p>4 • Posterior epidural fat is preserved (dependent on level)</p> |  <p>• Slight crowding of nerve roots</p> <p>• Traversing dorsal and ventral nerve roots in the lateral recesses remain distinct, but there may be abutment of the nerve roots in the lateral recesses</p> <p>• Anterior margin of the thecal sac is flat or concave</p> <p>• Posterior epidural fat is preserved (dependent on level)</p> |  <p>• Crowding of nerve roots, resulting in a "speckled" appearance of CSF interspersed with nerve roots</p> <p>• Difficult to differentiate the traversing nerve roots in the lateral recesses</p> <p>• Anterior margin of the thecal sac is concave</p> <p>• Posterior epidural fat is preserved (dependent on level)</p> |  <p>• Complete effacement of CSF, resulting in nerve roots not being individually distinguishable</p> <p>• Cannot discretely identify nerve roots in the lateral recesses</p> <p>• Anterior margin of the thecal sac is concave</p> <p>• Posterior epidural fat may be partially or completely effaced</p> |

### References:

1. Fardon D, Williams A, Dohring E, Murtagh F, Gabriel Rothman S, Sze G. Lumbar Disc Nomenclature: Version 2.0. The Spine Journal. 2014;14(11):2525-45. doi:10.1016/j.spinee.2014.04.022 -
2. Lee G, Lee J, Choi H, Oh K, Kang H. A New Grading System of Lumbar Central Canal Stenosis on MRI: An Easy and Reliable Method. Skeletal Radiol. 2011;40(8):1033-9. doi:10.1007/s00256-011-1102-x -
3. Miskin N, Gaviola G, Huang R et al. Standardized Classification of Lumbar Spine Degeneration on Magnetic Resonance Imaging Reduces Intra- and Inter-Subspecialty Variability. Curr Probl Diagn Radiol. 2022;51(4):491-6. doi:10.1067/j.cpradiol.2021.08.001
4. Nityanand Met al. Standardized Classification of Lumbar Spine Degeneration on Magnetic Resonance Imaging Reduces Intra- and Inter-subspecialty Variability, Current Problems in Diagnostic Radiology, Volume 51, Issue 4, 2022, Pages 491-496, ISSN 0363-0188, <https://doi.org/10.1067/j.cpradiol.2021.08.001>.

## Classification of LSS (cont)

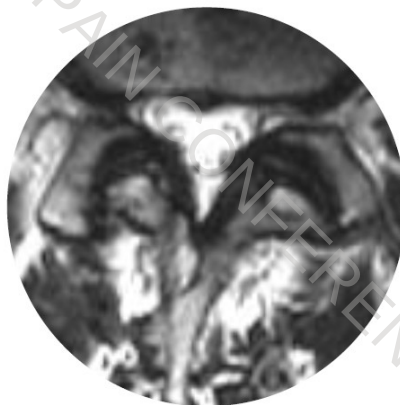
Normal



Mild



Moderate



Moderate–Severe

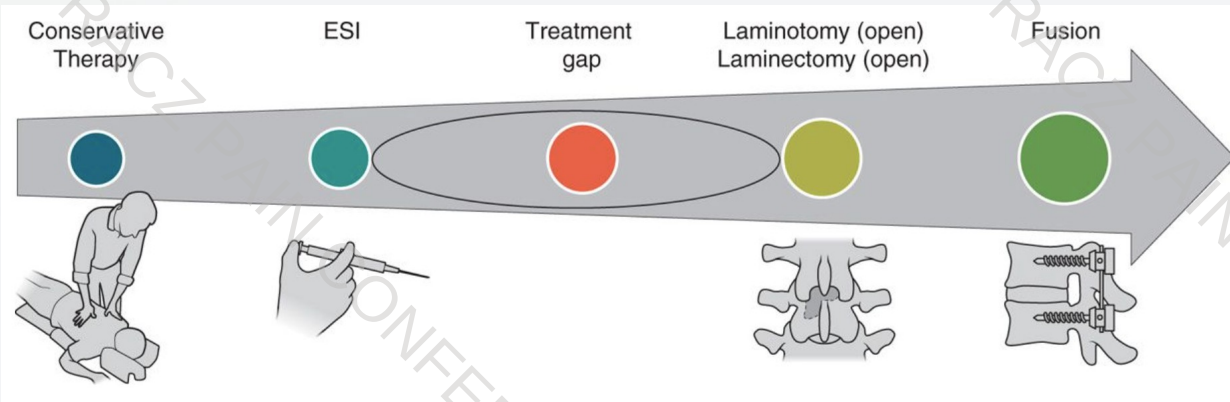


Severe



- Do not rely on the reports, READ YOUR OWN IMAGING!

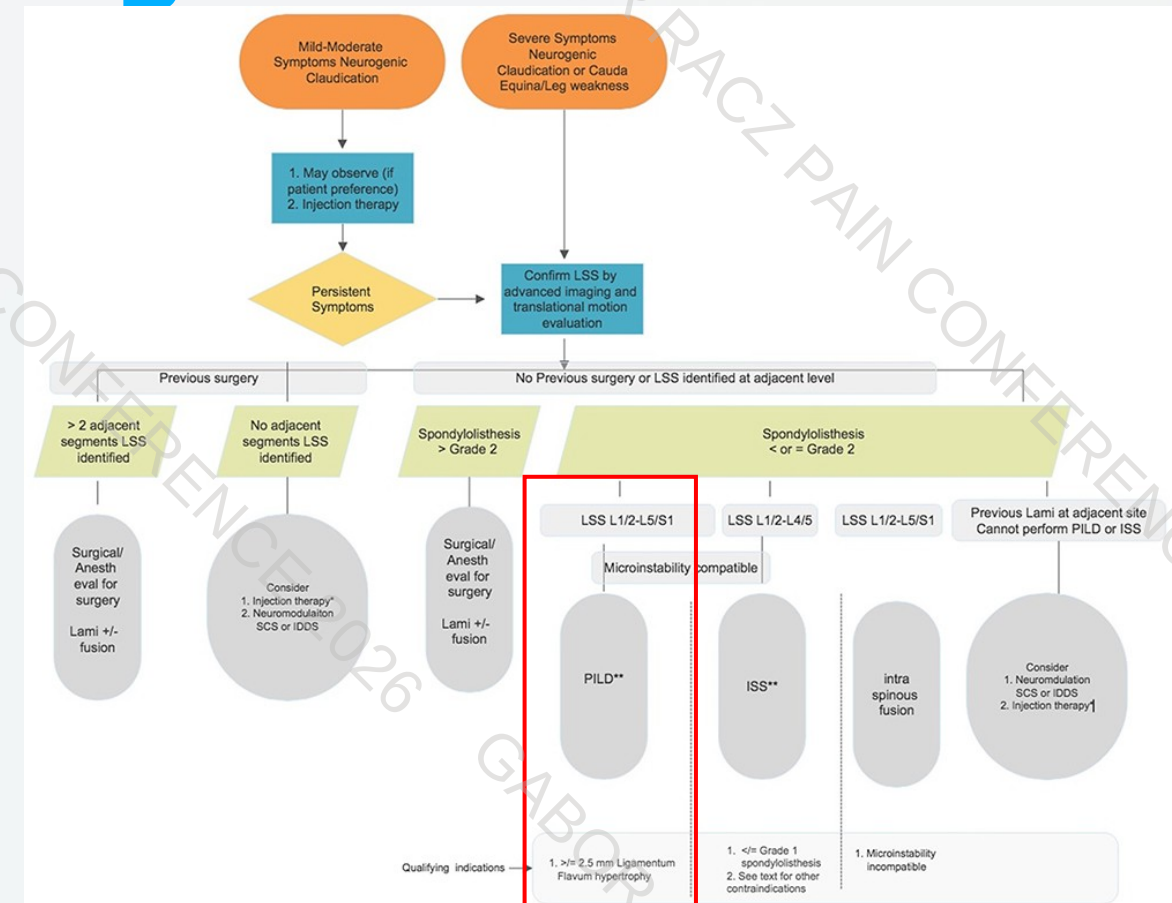
# Treatment Algorithm



► J Pain Res. 2022 May 5;15:1325–1354. doi: [10.2147/JPR.S355285](https://doi.org/10.2147/JPR.S355285)

## Best Practices for Minimally Invasive Lumbar Spinal Stenosis Treatment 2.0 (MIST): Consensus Guidance from the American Society of Pain and Neuroscience (ASPEN)

Timothy R Deer<sup>1,✉</sup>, Jay S Grider<sup>2</sup>, Jason E Pope<sup>3</sup>, Tim J Lamer<sup>4</sup>, Sayed E Wahezi<sup>5</sup>, Jonathan M Hagedorn<sup>6</sup>, Steven Falowski<sup>7</sup>, Reda Tolba<sup>8</sup>, Jay M Shah<sup>9</sup>, Natalie Strand<sup>10</sup>, Alex Escobar<sup>11</sup>, Mark Malinowski<sup>12</sup>, Anjum Bux<sup>13</sup>, Navdeep Jassal<sup>14</sup>, Jennifer Hah<sup>15</sup>, Jacqueline Weisbein<sup>16</sup>, Nestor D Tomycz<sup>17</sup>, Jessica Jameson<sup>18</sup>, Erika A Petersen<sup>19</sup>, Dawood Sayed<sup>20</sup>

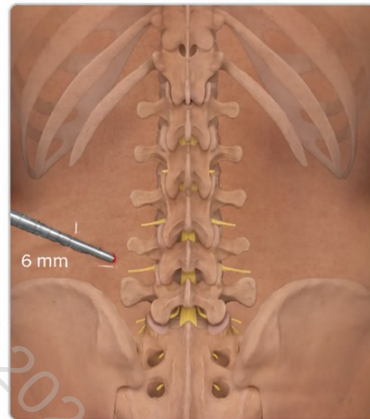




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## What is Percutaneous?

Percutaneous Spine Surgery



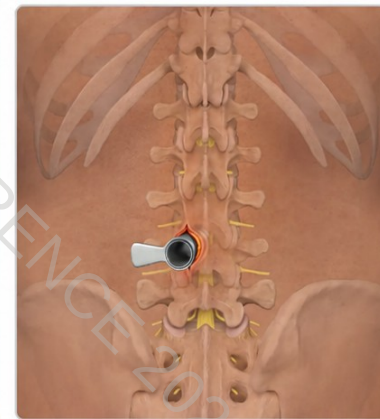
~6 mm incision

Endoscopic Surgery



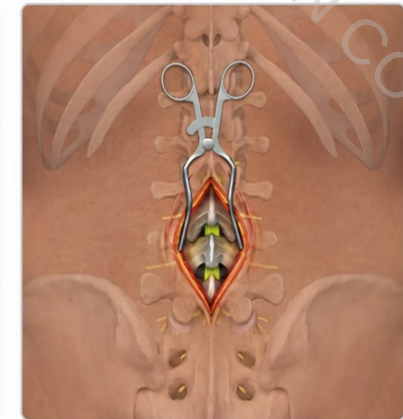
~7-16 mm incision

Minimally Invasive Surgery



~18-22 mm incision

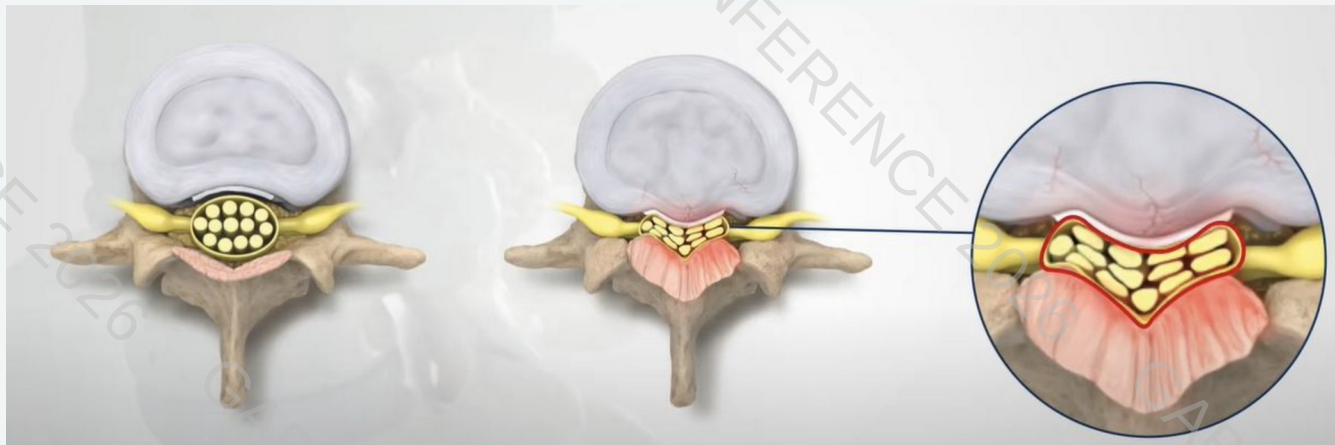
Open Surgery



~50-100 mm incision

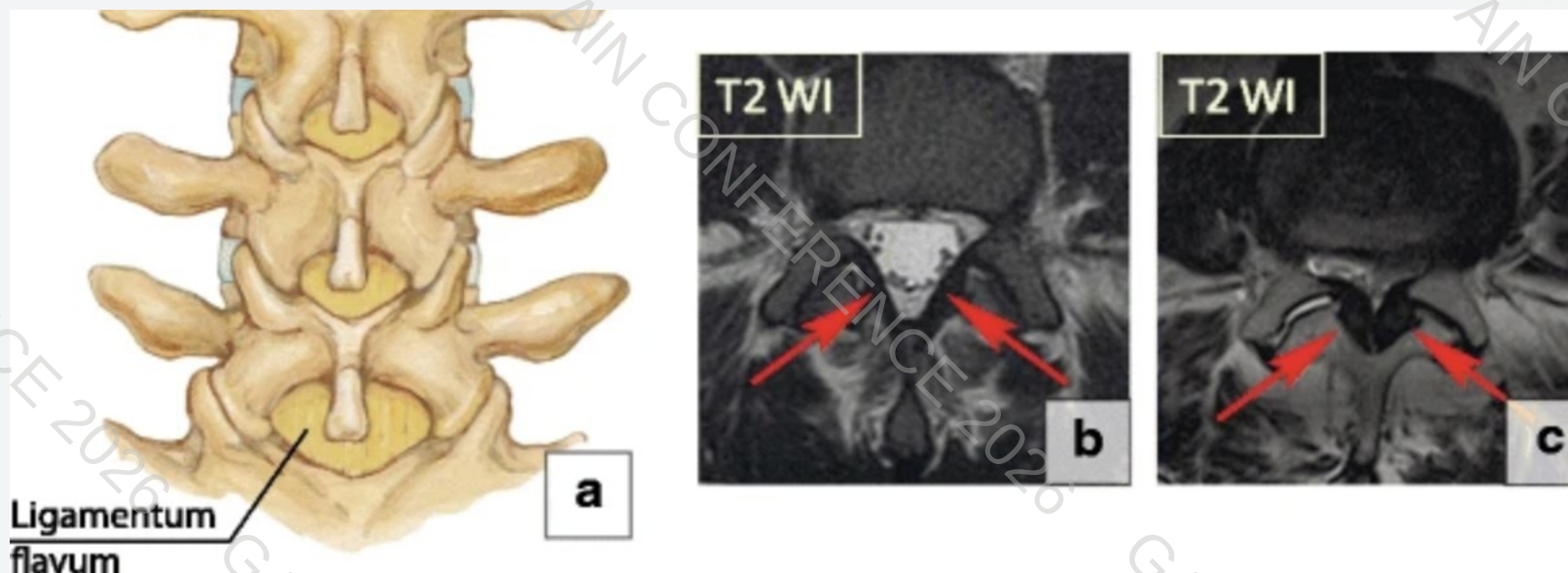
# Percutaneous Image-Guided Lumbar Decompression (PILD)

- Minimally invasive procedure to debulk the ligamentum flavum



# Percutaneous Image-Guided Lumbar Decompression (PILD)

- Ligamentum flavum hypertrophy



- Moderate central spinal stenosis
- Hypertrophied ligamentum flavum (HLF) contributes to 85% of spinal canal narrowing
- HLF greater than or equal to 2.5 mm

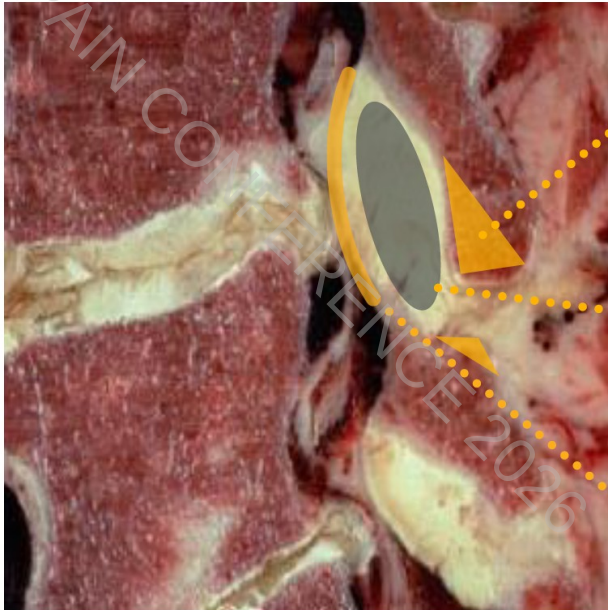
# Percutaneous Image-Guided Lumbar Decompression (PILD)

- Benefits
  - Small incision
  - Minimally invasive
  - Outpatient procedure
  - Early treatment option
  - Addresses cause of stenosis
  - Quick discharge
  - Safe





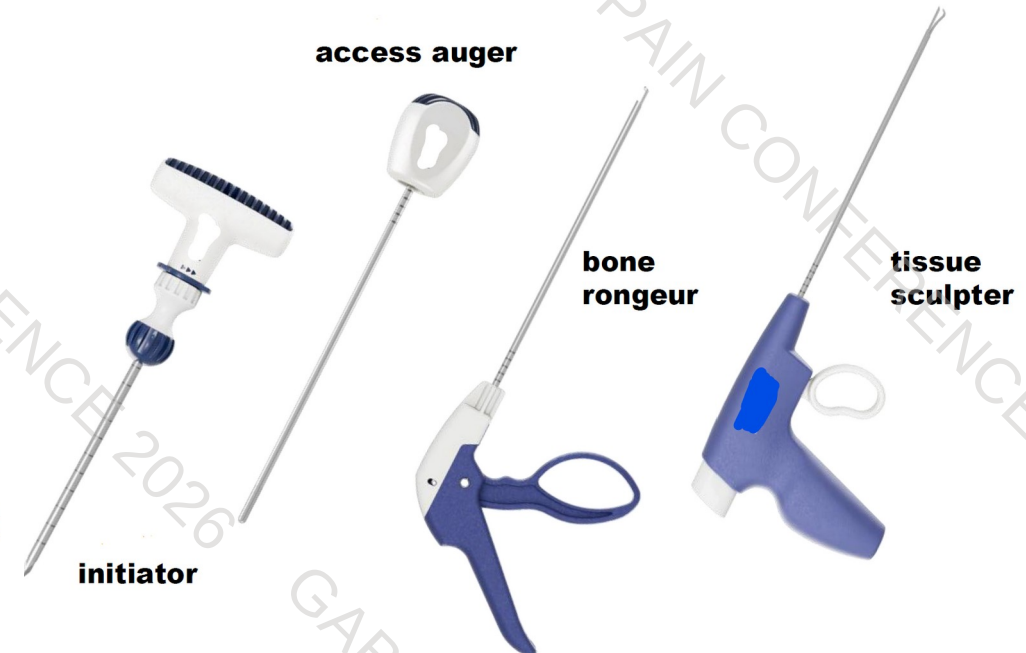
# Percutaneous Image-Guided Lumbar Decompression (PILD)



**Bone Rongeur removes bony overgrowth blocking trajectory**

**Tissue Sculpter debulks the dorsal collagenous tissue**

**Healthy ventral fibers of ligament are left intact**

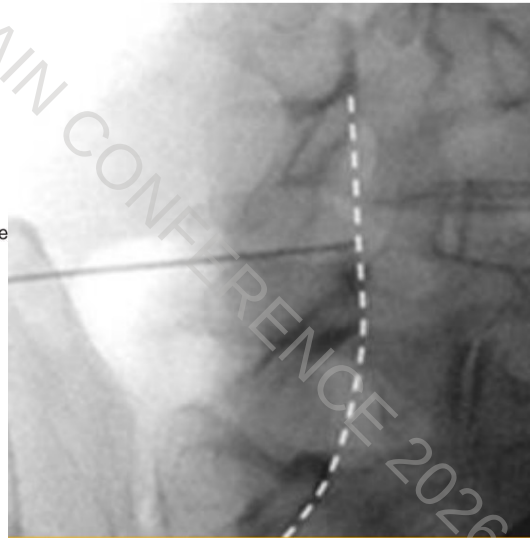
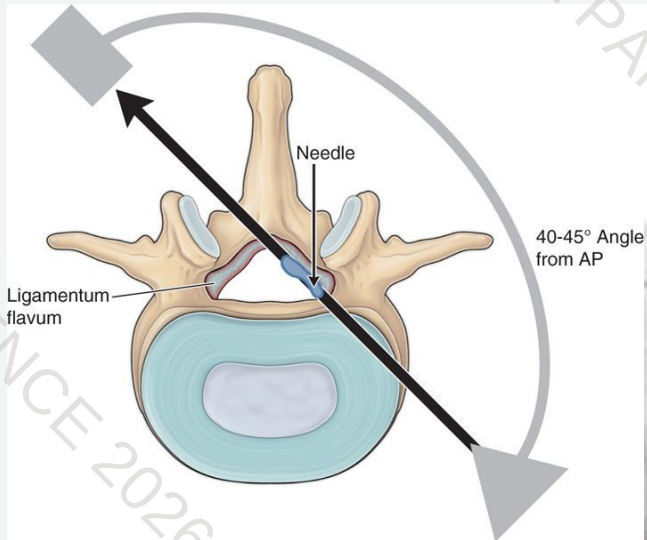


**References:**

Jain S, Deer TR, Sayed D, et al. Minimally invasive lumbar decompression: a review of indications, techniques, efficacy and safety. Pain Manag. 2020;10(5). <https://doi.org/10.2217/pmt-2020-0037>. Accessed June 1, 2020.  
Deer TR, Grider JS, Pope JE, et al. Best Practices for Minimally Invasive Lumbar Spinal Stenosis Treatment 2.0 (MIST): Consensus Guidance from the American Society of Pain and Neuroscience (ASPN). J Pain Res. 2022;15:1325-1354. Published 2022 May 5. doi:10.2147/JPR.S355285



# Percutaneous Image-Guided Lumbar Decompression (PILD)



Needle is at VILL

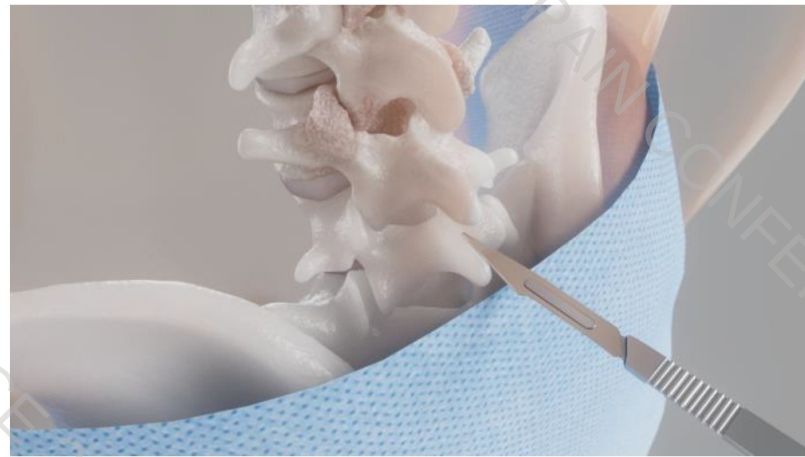


Needle is further past VILL  
to access epidural space  
due to HLF

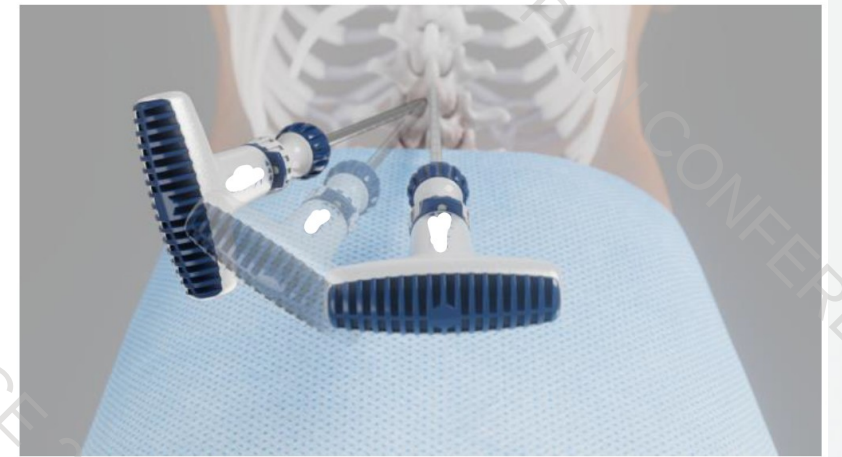


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# Percutaneous Image-Guided Lumbar Decompression (PILD)



Small horizontal 11 blade stab incision,  
1-1.5 vertebral segments caudal of  
target zone



Insert access trocar, slight medial to  
lateral trajectory, toward target, check  
imaging frequently (CLO)



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# Percutaneous Image-Guided Lumbar Decompression (PILD)



Advance access cannula trocar and dock on the superior surface of the inferior lamina



Remove trocar, leaving cannula, and adjust depth guide for safety

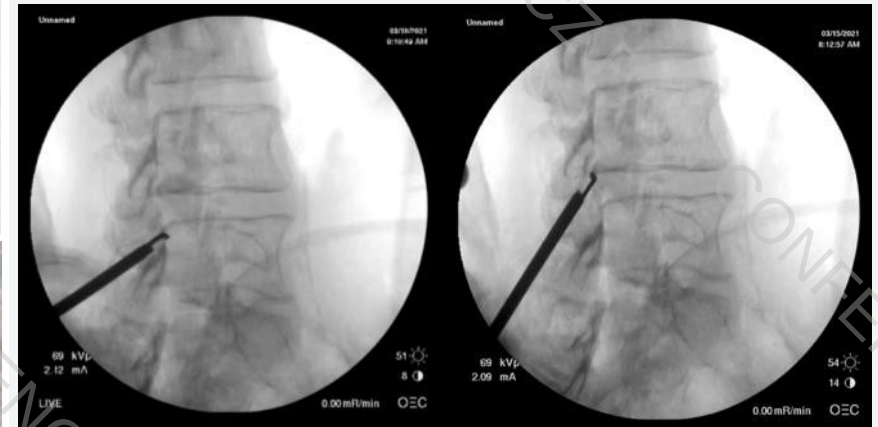
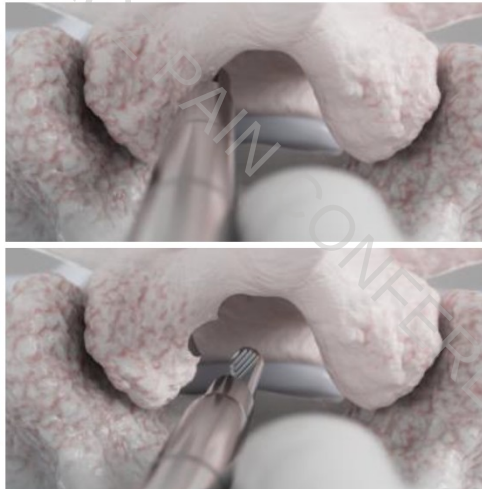


Utilize auger if necessary to debrief bone / tissue



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# Percutaneous Image-Guided Lumbar Decompression (PILD)



Use kerrison rongeur to remove small pieces of bone from the inferior and superior lamina

Debulks and creates adequate space for tissue sculpter

Take 3-5 meaningful bites from each lamina

Make sure to be at but not past the VLL in the CLO view



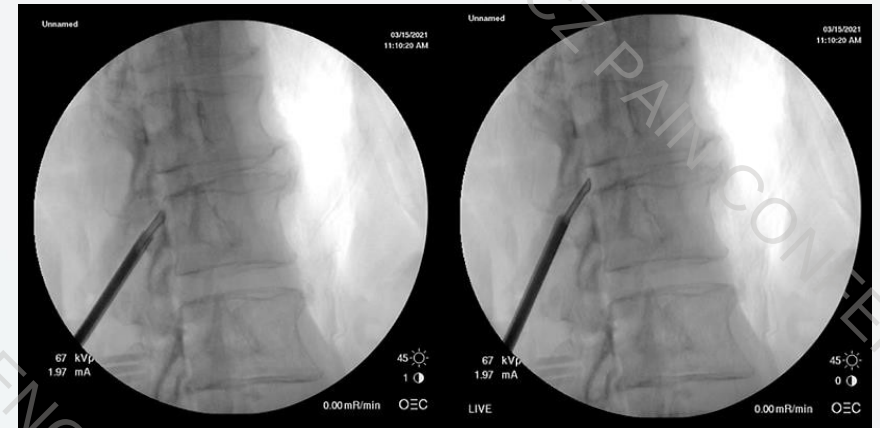
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# Percutaneous Image-Guided Lumbar Decompression (PILD)



Direct tip of tissue sculptor toward the ventral aspect of the adjacent superior lamina to capture ligament

Work in a scooping motion from inferior to superior under live fluoro



Take 3 sets of 3 scoops using slight doorknob motion to scoop, cut, and capture tissue

Make sure to be at but not past the VLL in the CLO view



# Percutaneous Image-Guided Lumbar Decompression (PILD)

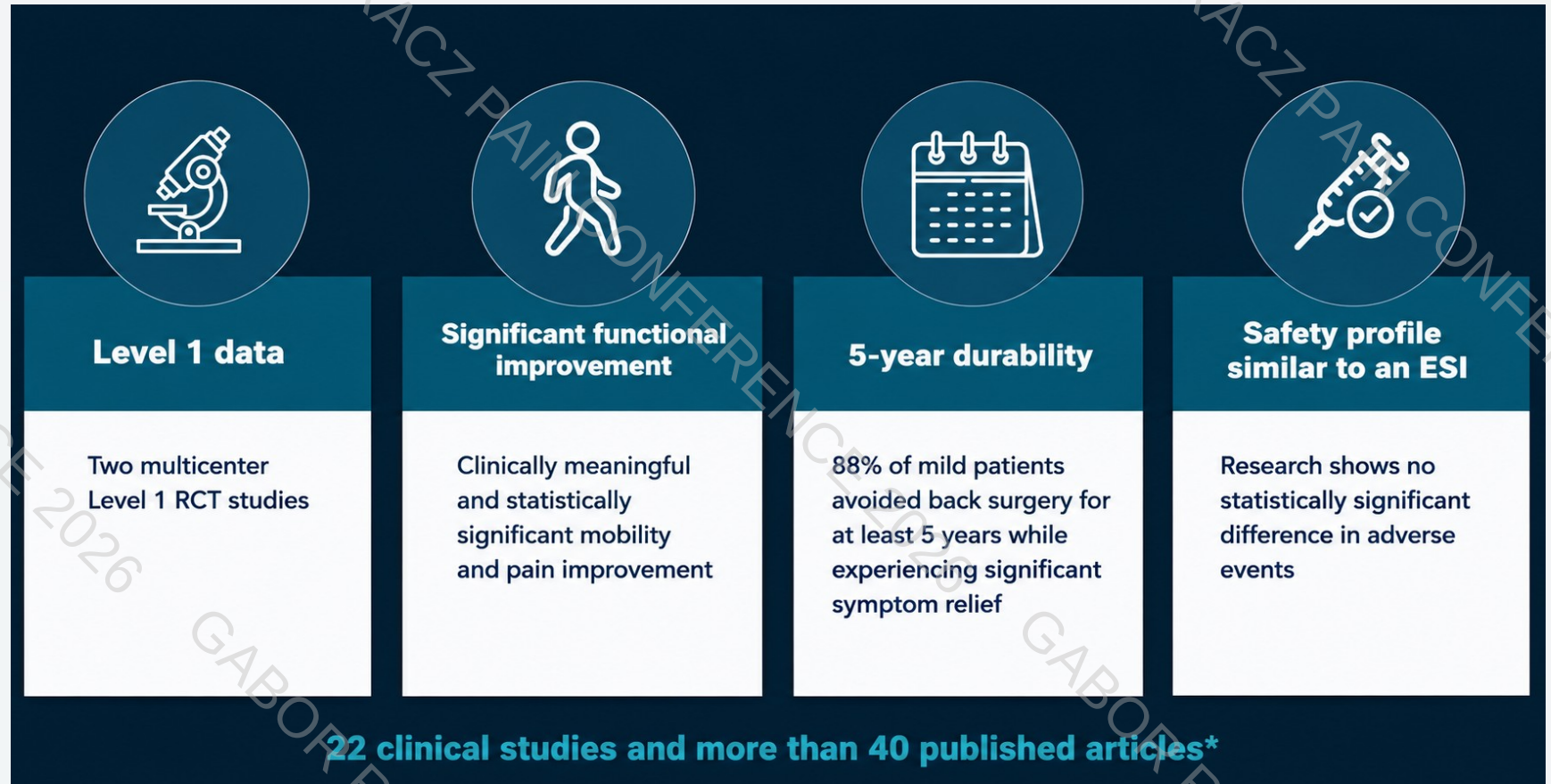


Lamina and ligamentum flavum removed  
after PLD



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## Evidence





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## Evidence



### PAIN Practice

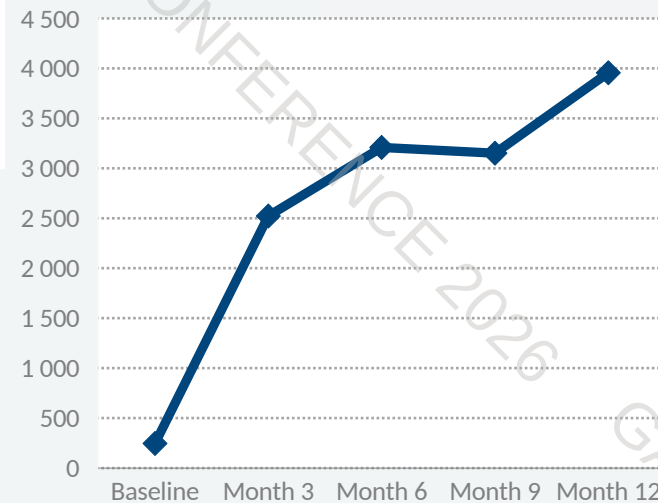
ORIGINAL ARTICLE

#### Functional and Patient-Reported Outcomes in Symptomatic Lumbar Spinal Stenosis Following Percutaneous Decompression

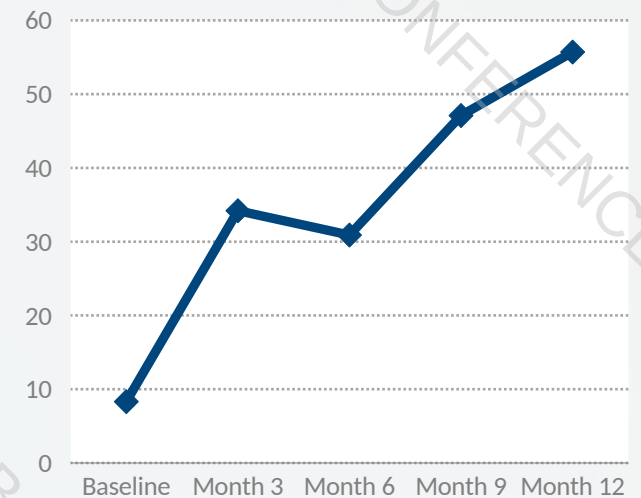
Nagy Mekhail MD, PhD, [Shrif Costandi MD](#), [Benjamin Abraham MD](#), [Samuel Wadie Samuel MD](#)

First published: 01 June 2012 | <https://doi.org/10.1111/j.1533-2500.2012.00565.x>

#### Mean walking distance at each follow-up



#### Mean standing time at each follow-up



#### References:

Mekhail, N, et al. Functional and Patient-Reported Outcomes in Symptomatic Lumbar Spinal Stenosis Following Percutaneous Decompression. Pain Pract. 2012(6):417-425. doi: 10.1111/j.1533-2500.2012.00565.x



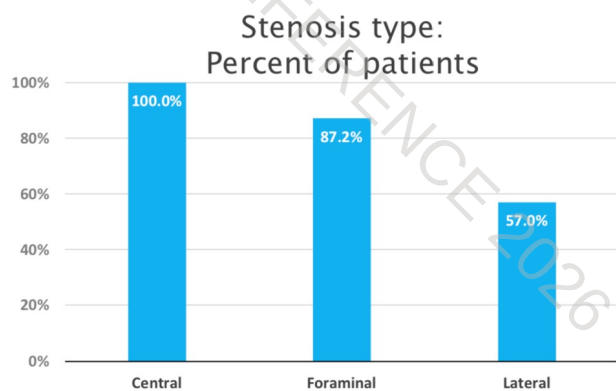
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## Evidence: MIDAS ENCORE

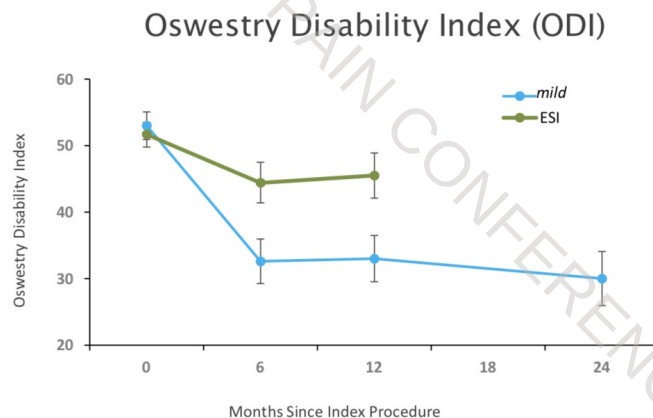
Chronic and interventional pain: Original articles

Long-Term Safety and Efficacy of Minimally Invasive Lumbar Decompression Procedure for the Treatment of Lumbar Spinal Stenosis With Neurogenic Claudication: 2-Year Results of MIDAS ENCORE

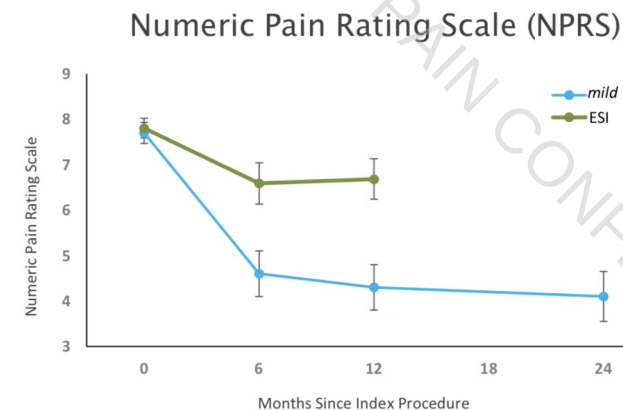
Peter S. Staats, MD, MBA<sup>\*</sup>, Timothy B. Chafin, MD<sup>†</sup>, Stanley Golovac, MD<sup>‡</sup>, Christopher K. Kim, MD<sup>§</sup>, Sean Li, MD<sup>||</sup>, William B. Richardson, MD<sup>\*\*</sup>, Ricardo Vallejo, MD, PhD<sup>††</sup>, Sayed E. Wahezi, MD<sup>‡‡</sup>, Edward P. Washabaugh, MD<sup>§§</sup> and Ramsin M. Benyamin, MD<sup>††</sup>



**Majority of patients  
had multiple types of stenosis**



**Mean ODI improvement of 22.7 points at 2 years**  
(10-point improvement is clinically significant)



**Mean NPRS improvement of 3.6 points at 2 years**  
(2-point improvement is clinically significant)

**\*Adverse events (AE) with PLD similar to ESI, 1.3% device related and 0% serious AE**

### References:

Staats PS, Chafin TB, Golovac S, Kim CK, Li S, Richardson WB, Vallejo R, Wahezi SE, Washabaugh EP 3rd, Benyamin RM; MIDAS ENCORE Investigators. Long-Term Safety and Efficacy of Minimally Invasive Lumbar Decompression Procedure for the Treatment of Lumbar Spinal Stenosis With Neurogenic Claudication: 2-Year Results of MIDAS ENCORE. Reg Anesth Pain Med. 2018 Oct;43(7):789-794. doi: 10.1097/AAP.0000000000000868. PMID: 30199512; PMCID: PMC6319572.

## Evidence: MOTION

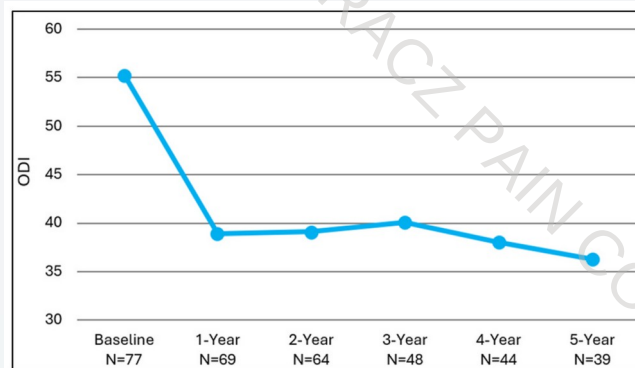


Fig. 2. Oswestry Disability Index (ODI) mean score for the mild + CMM group.

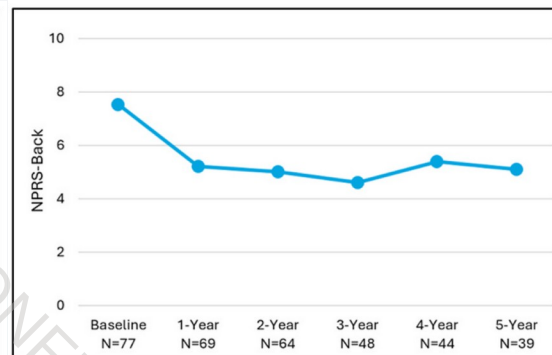


Fig. 3. Numeric Pain Rating Scale (NPRS) mean scores for back and leg pain for the mild + CMM group.

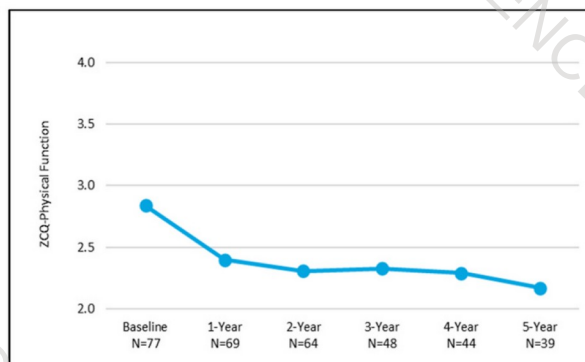
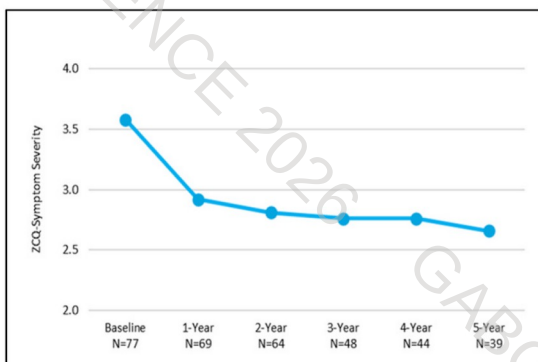
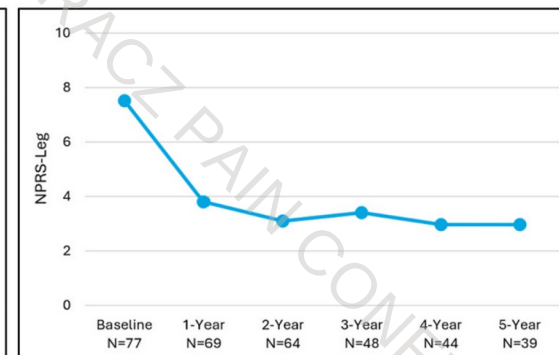


Fig. 4. Zurich Claudication Questionnaire (ZCQ) mean scores for symptom severity and physical function for the mild + CMM group.

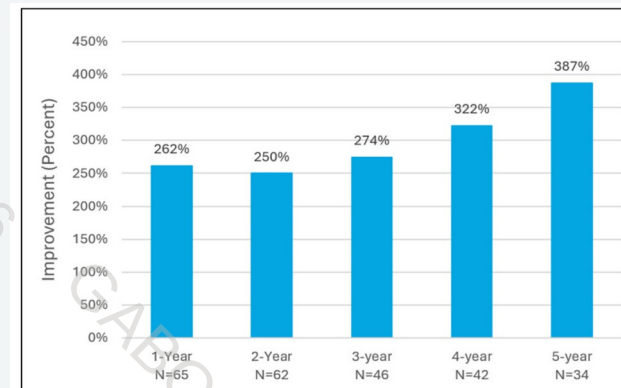


Fig. 5. 15-Minute Walking Tolerance Test mean percent improvement compared to baseline for the mild + CMM group.



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**Thank you!**

Ali Valimahomed, MD