



LUMBAR SPINE CASE 3

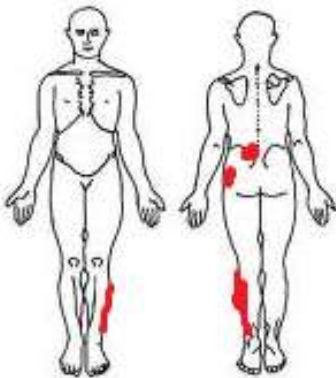
A.J. Lievre, PT, DPT, OCS, CMPT
Aaron Hartstein, PT, DPT, OCS, FAAOMPT

Orthopaedic Manual Physical Therapy Series
Richmond 2018-2019



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VOMPTI_CLINICAL REASONING FORM



Body Chart – Initial Hypothesis:

L4-5, 5-S1 disc, facet (somatic)

· L5/S1 Radiculopathy

· SIJ pain

· Glute Min referral



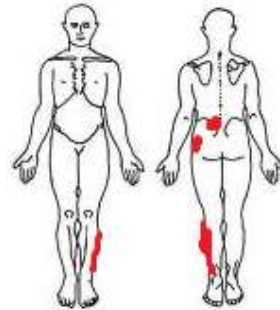
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SUBJECTIVE EXAM

Subjective *Asterisks* Signs/Symptoms: (Aggravating/Easing factors, Description/location of symptoms, Behavior, Mechanism of injury);

- 70 yo male insidious onset of left posterior- lateral calf pain/pins/burning 3 weeks ago
- Hx of LBP and buttock pain for years which has continued and exacerbated
- Unsure of relationship
- LBP and buttock is an ache which is continuous
- Lateral calf pain is intermittent, but becoming more frequent
 - Aggs: standing & walking (especially fast), lying supine with leg flat
 - Eases: sitting relieves pain immediately
 - LB is stiff in morning < 30 minutes, no pain in calf until mid to late morning



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➤ **Rate your assessment of Severity & Irritability**

Justify your assessment with examples from the Subjective Exam &/or Objective Exam

- Severity Non Min **Mod** Max

Continuous back pain, intermittent LE symptoms

- Irritability Non **Min** Mod Max

LE come on after a while of being upright, but immediately abate upon sitting

➤ **Stage & Stability?**

- Acute Subacute Chronic **Acute on chronic**
- Stable Improving **Worsening** Fluctuating Red Flags

Identify any potential risk factors (Yellow, Red flags, non MSK involvement, biopsychosocial)

The patient has had an X-Ray showing DJD/DDD in the lower lumbar spine. His GCP told him to “give therapy a try” but likely he will be headed for surgery



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STRUCTURE at Fault:

Joints in/refer to the painful region	Myofascial tissue in/refer to the painful region	Non Contractile tissue in/refer to the painful region	Neural tissue in/refer to the painful region	Other structures that must be examined – non MSK
L4-S1 facets SIJ Knee or hip Superior Tib-fib	Lumbar multifidus Glute med/min Piriformis Peroneals	L4-S1 disc Iliolumbar ligament Trochanter bursa	L5 or S1 nerve roots	Fracture? Visceral? Spondyloarthropathy? Mass?

Primary HYPOTHESIS after Subjective Examination: L5 Radiculopathy 2 to Stenosis

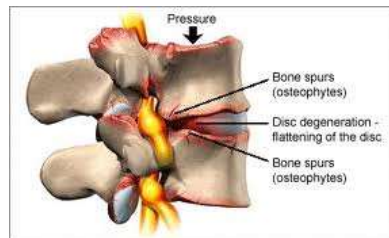
Differential List (Rank/List in order to rule out):

- Glute min referral
- L4-S1 somatic

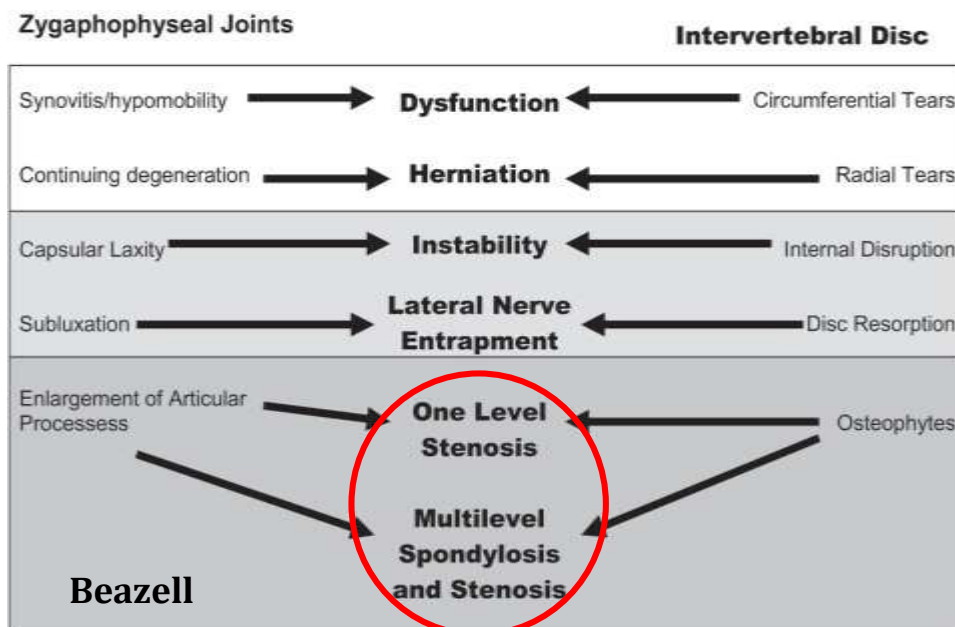


Lumbar Spinal Stenosis

- Developmental Spinal Stenosis
 - Structural changes that effect the size of the vertebral canal or IVF
 - Decreased disc height or z-joint facet hypertrophy (osteophytes)
 - Disc prolapse or herniation
 - Ligamentum flavum hypertrophy
 - Spondylolisthesis



Cascade of Spinal Degeneration



Physical Exam *Asterisks* Signs/Symptoms (Special tests, Movement/Joint Dysfunction, Posture, Palpation, etc)

- Observation: Forward flexed posture with hip and knees flexed
- Lumbar ROM: (+) ext (LBP), (+) left SB (LBP & buttock pain)
 - Back left quadrant (LB, buttock and calf pain when sustained)
- Weakness L5 myotome, Reflex and dermatome (-)
- (-) Torsion
- (+) SLR and slump
- Hip stiffness in all directions L>R
- (-) SI clearing
- (+) PA right L4-5 and L5-S1 P!
- (+) PPIVMs/PAIVMs lower t-spine and upper lumbar all directions
- Oswestry Disability Index = 30% perceived disability

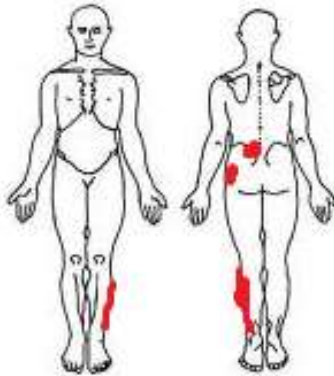


- Lumbar spine examined by Myelogram
 - Flexion exam (top 2)
 - Extension exam (bottom 2)



➤ Are the relationships between the areas on the body chart, the interview, and physical exam consistent? "Do the features fit" a recognizable clinical pattern? **Yes** No

L5 radiculopathy secondary to stenosis



Diagnosis of Lumbar Spinal Stenosis

An Updated Systematic Review of the Accuracy of Diagnostic Tests

SPINE Volume 38, Number 8, pp E469-E481
©2013, Lippincott Williams & Wilkins

- MRI most sensitive diagnostic test
- Clinical Reports
 - Most sensitive
 - Radiating leg pain, thigh pain
 - Pain exacerbated with standing
 - Most specific
 - B buttock or thigh pain
 - Decreased pain bending forward
 - Wide BOS while walking



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The Clinical Value of a Cluster of Patient History and Observational Findings as a Diagnostic Support Tool for Lumbar Spine Stenosis

Chad Cook¹, Christopher Brown², Keith Michael², Robert Isaacs², Cameron Howes², William Richardson², Matthew Roman³ & Eric Hegedus^{4*}

Physiother. Res. Int. 16 (2011) 170-178

- Cluster Variables
 - Bilateral leg symptoms
 - Leg pain more than back pain
 - Pain during walking and standing
 - Pain relief on sitting
 - > 48yo
- 0 out of 5 variables: LR(-) 0.19
- 4 out of 5 variables: LR (+) 4.6
 - Post test probability 76%



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TABLE 1 **SIGNS AND SYMPTOMS ORIGINALLY PROPOSED AS THE CRITERIA FOR PLACING A PATIENT INTO A PARTICULAR CLASSIFICATION AND REVISED CRITERIA BASED ON UPDATED EVIDENCE**

Classification	Original Classification Criteria	Updated Classification Criteria
Manipulation	<ul style="list-style-type: none"> Asymmetrical lateral flexion ROM (ie, capsular pattern of motion restriction) Unilateral LBP without symptoms into the lower extremities Asymmetrical bony landmarks of the pelvis Positive sacroiliac dysfunction tests (ie, sodium ring sit test, prone knee bend test, standing flexion test) 	<ul style="list-style-type: none"> No symptoms distal to the knee Recent onset of symptoms (<15 d) Low FABQ score (<10) Hypermobility of the lumbar spine Hip internal rotation ROM (>35° for at least 1 hip)
Stabilization	<ul style="list-style-type: none"> Frequent recurrent episodes of LBP with minimal perturbation Hypermobility of the lumbar spine Previous history of lateral-shift deformity with alternating sides Frequent prior use of manipulation with dramatic but short-term results Trauma, pregnancy, or use of oral contraceptives Relief with immobilization (eg, taping) 	<ul style="list-style-type: none"> Younger age (<40 y) Greater general flexibility (postpartum, average SLR ROM >90°) "Instability catch" or aberrant movements during lumbar flexion/extension ROM Positive findings for the prone instability test For patients who are postpartum: <ul style="list-style-type: none"> Positive posterior pelvic pain provocation (PH) and ASLR and modified Trendelenburg tests Pain provocation with palpation of the long dorsal sacroiliac ligament or pubic symphysis
Specific exercise		
Extension	<ul style="list-style-type: none"> Symptoms centralize with lumbar extension Symptoms peripheralize with lumbar flexion 	<ul style="list-style-type: none"> Symptoms distal to the buttock Symptoms centralize with lumbar extension Symptoms peripheralize with lumbar flexion Directional preference for extension
Flexion	<ul style="list-style-type: none"> Symptoms centralize with lumbar flexion Symptoms peripheralize with lumbar extension Diagnosis of lumbar spinal stenosis 	<ul style="list-style-type: none"> Older age (>50 y) Directional preference for flexion Imaging evidence of lumbar spinal stenosis
Lateral shift	<ul style="list-style-type: none"> Visible frontal plane deviation of the shoulders relative to the pelvis Asymmetrical side-bending active ROM Painful and restricted extension active ROM 	<ul style="list-style-type: none"> Visible frontal plane deviation of the shoulders relative to the pelvis Directional preference for lateral transition movements of the pelvis
Traction	<ul style="list-style-type: none"> Signs and symptoms of nerve root compression No movements centralize symptoms 	<ul style="list-style-type: none"> Signs and symptoms of nerve root compression No movements centralize symptoms

Abbreviations: ASLR, active straight-leg raise; FABQ, Fear-Avoidance Beliefs Questionnaire; Wink X-Radiote: LBP, low back pain; ROM, range of motion; SLR, straight-leg raise.



com

A INTERVENTIONS – MANUAL THERAPY

Clinicians should consider utilizing thrust manipulative procedures to reduce pain and disability in patients with mobility deficits and acute low back and back-related buttock or thigh pain. Thrust manipulative and nonthrust mobilization procedures can also be used to improve spine and hip mobility and reduce pain and disability in patients with subacute and chronic low back and back-related lower extremity pain.

A INTERVENTIONS – CENTRALIZATION AND DIRECTIONAL PREFERENCE EXERCISES AND PROCEDURES

Clinicians should consider utilizing repeated movements, exercises, or procedures to promote centralization to reduce symptoms in patients with acute low back pain with related (referred) lower extremity pain. Clinicians should consider using repeated exercises in a specific direction determined by treatment response to improve mobility and reduce symptoms in patients with acute, subacute, or chronic low back pain with mobility deficits.

C INTERVENTIONS – FLEXION EXERCISES

Clinicians can consider flexion exercises, combined with other interventions such as manual therapy, strengthening exercises, nerve mobilization procedures, and progressive walking, for reducing pain and disability in older patients with chronic low back pain with radiating pain.

D INTERVENTIONS – TRACTION

There is conflicting evidence for the efficacy of intermittent lumbar traction for patients with low back pain. There is preliminary evidence that a subgroup of patients with signs of nerve root compression along with peripheralization of symptoms or a positive crossed straight leg raise will benefit from intermittent lumbar traction in the prone position. There is moderate evidence that clinicians should not utilize intermittent or static lumbar traction for reducing symptoms in patients with acute or subacute, nonradicular low back pain or in patients with chronic low back pain.

B INTERVENTIONS – PATIENT EDUCATION AND COUNSELING

Clinicians should not utilize patient education and counseling strategies that either directly or indirectly increase the perceived threat or fear associated with low back pain, such as education and counseling strategies that (1) promote extended bed-rest or (2) provide in-depth, pathoanatomical explanations for the specific cause of the patient's low back pain. Patient education and counseling strategies for patients with low back pain should emphasize (1) the promotion of the understanding of the anatomical/structural strength inherent in the human spine, (2) the neuroscience that explains pain perception, (3) the overall favorable prognosis of low back pain, (4) the use of active pain coping strategies that decrease fear and catastrophizing, (5) the early resumption of normal or vocational activities, even when still experiencing pain, and (6) the importance of improvement in activity levels, not just pain relief.

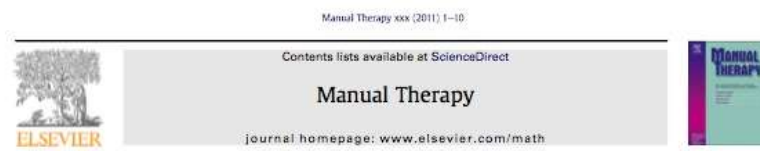


A Comparison Between Two Physical Therapy Treatment Programs for Patients With Lumbar Spinal Stenosis

A Randomized Clinical Trial

Julie M. Whitman, DSc, PT,* Timothy W. Flynn, PhD, PT,* John D. Childs, PhD, PT, MBA,†
Robert S. Wainner, PhD, PT,§ Howard E. Gill, MD,|| Michael G. Ryder, DSc, PT,¶
Matthew B. Garber, DSc, PT,¶ Andrew C. Bennett, DPT,‡ and Julie M. Fritz, PhD, PT**

- Group 1: Manual Therapy (thrust & non-thrust, stretching), exercise (strengthening & flexion biased), weight supported Treadmill
- Group 2: Lumbar flexion exercises, T-mill walking, sub-therapeutic US
- Higher % of pt's in group 1 reported recovery at 6 weeks
 - 62% of group 1 and 41% of group 2 still met criteria for recovery at 1 year follow-up



Masterclass

Lumbar spinal stenosis-diagnosis and management of the aging spine

Karen Maloney Backstrom ^{a,*}, Julie M. Whitman ^b, Timothy W. Flynn ^c

^aUniversity of Colorado Hospital Rehabilitation Department, 1635 Aurora Court Mail Stop F712, Aurora, CO 80045, USA
^bSchool of Physical Therapy, Regis University, USA
^cRocky Mountain University of Health Professions, USA

- 4 fold approach
 - Patient Education
 - Manual Therapy
 - Variable thrust/non-thrust to lumbar spine, pelvis, thoracic spine, hips/LE
 - Exercise
 - Unweighted treadmill walking, stretching (esp hip flexors), flexion biased exercise, core strengthening
 - Medical Management



➤ What is your primary treatment Objective after initial evaluation?

- **Education:**

Educate pt on condition and positions of comfort. Discuss prognosis and his thoughts regarding imaging and surgery

- **Manual Therapy: (Specific Technique)**

Joint mobilization to improve mobility of the upper lumbar and lower thoracic spine, IV opening techniques, Inferior and lateral mobilization to the hips

- **Exercise Prescription: (Specific)**

Lower extremity stretching (hip flexors), flexion biased exercises
Core stabilization, balance

- **Other:**

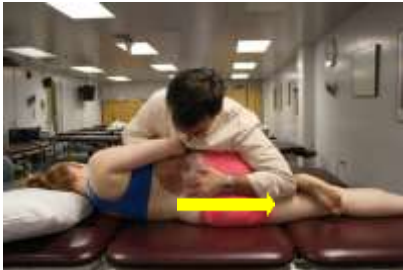
Traction, neural mobilization



What Do You Treat Now?



Lumbar Treatment – SB PPIVM/PAIVM



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Lower Thoracic and Thoracolumbar Junction Treatment Techniques



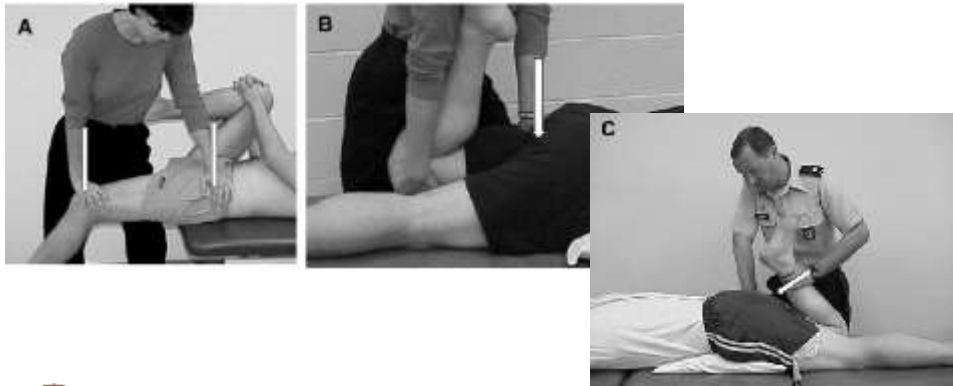
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Nonsurgical management of patients
with lumbar spinal stenosis: a literature
review and a case series of three patients
managed with physical therapy

Julie M. Whitman, PT, DSc^{a,b,*},
Timothy W. Flynn, PT, PhD^{b,c},
Julie M. Fritz, PT, PhD^d

Phys Med Rehabil Clin N Am
14 (2003) 77–101



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C INTERVENTIONS – LOWER-QUARTER NERVE MOBILIZATION PROCEDURES

Clinicians should consider utilizing lower-quarter nerve mobilization procedures to reduce pain and disability in patients with subacute and chronic low back pain and radiating pain.

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GRADE OF RECOMMENDATION **STRENGTH OF EVIDENCE**

A	Strong evidence	A comparison of level I and level II studies support the recommendation. The next level of study is not needed.
B	Moderate evidence	A single high-quality randomized controlled trial or a low-quality randomized controlled trial with strong support for the recommendation.
C	Weak evidence	A single level II study or a prospective around level II and II studies including patients of consensus by committee to support the recommendation.
D	Conflicting evidence	High-quality studies conducted on the topic disagree with respect to their conclusions. The recommendation is based on these conflicting studies.
E	Theoretical/biomechanical evidence	An explanation of evidence from animal or cadaver studies, from conceptual models/analyses, or from basic science research support the conclusion.
F	Expert opinion	Best practice based on the clinical experience of the guideline developers.

Is There a Subgroup of Patients With Low Back Pain Likely to Benefit From Mechanical Traction?

Results of a Randomized Clinical Trial and Subgrouping Analysis

Julie M. Fritz, PhD, PT, ATC,*† Weston Lindsay, MS, PT, ATC,*
James W. Matheson, DPT, MS, SCS, CSCS,† Gerard P. Brennan, PhD, PT,*
Stephen J. Hunter, MS, PT, OCS,* Steve D. Moffit, DPT,* Aaron Swalberg, MPT,*
and Brian Rodriguez, PT, OCS*

- Predictor Variables
 - Presence of leg pain
 - Signs of nerve root compression
 - Peripheralization with repeated lumbar extension
 - Positive crossed SLR
- 84% with recovery using traction vs. only 45% with recovery without traction



Spine (2009) 34:556-561
DOI: 10.1097/BRS.0b013e3181919191

ORIGINAL ARTICLE

A clinical prediction rule for classifying patients with low back pain who demonstrate short-term improvement with mechanical lumbar traction

Congcong Cai · Yong Hao Pan · Kian Chong Lim

- Predictor Variables
 - FABQ – Work subscale < 21
 - No neurological deficits
 - > 30 years old
 - Non-manual work job status



Figure 4. Traction pulls for lumbosacral dysfunction.

(Continued on page 557)

Number of predictors present	Sensitivity	Specificity	Positive likelihood ratio	Probability of successful traction (%)
≥1	0.98 (0.80–1.00)	0.09 (0.04–0.16)	1.07 (0.99–1.16)	20.4
≥2	0.96 (0.78–1.00)	0.46 (0.36–0.56)	1.78 (1.47–2.17)	30.0
≥3	0.76 (0.55–0.90)	0.75 (0.65–0.83)	3.04 (2.04–4.53)	42.2
All 4	0.36 (0.19–0.57)	0.96 (0.90–0.99)	9.36 (3.13–28.00)	69.2



n

Pattern Recognition

Identify the key subjective and physical features (i.e. **clinical pattern**) that would help you recognize this disorder in the future.

Subjective	Physical
<p>Neurogenic pain in the L5 dermatome</p> <p>Back pain with referred pain into the buttock</p> <p>Back and peripheral pain with extension postures</p> <p>Pain relieved with flexion postures</p>	<p>Extension motion of the lumbar spine increases lumbar spine pain and LE symptoms</p> <p>Stiffness in the lumbar spine at most levels, and stiffness in the hips specifically limited extension</p> <p>Weakness in the L5 myotome</p> <p>+ neurodynamic testing reproducing their peripheral symptoms</p>

➤ **What is your primary treatment Objective after initial evaluation?**

▪ **Education:**

Educate pt on condition and positions of comfort. Discuss prognosis and his thoughts regarding imaging and surgery

▪ **Manual Therapy: (Specific Technique)**

Joint mobilization to improve mobility of the upper lumbar and lower thoracic spine, IV opening techniques, Inferior and lateral mobilization to the hips

▪ **Exercise Prescription: (Specific)**

Lower extremity stretching (hip flexors), flexion biased exercises
Core stabilization, balance

▪ **Other:**

Traction, neural mobilization



Systematic Literature Review of Imaging Features of Spinal Degeneration in Asymptomatic Populations

AJNR Am J Neuroradiol 36:811-16 Apr 2015

Table 2: Age-specific prevalence estimates of degenerative spine imaging findings in asymptomatic patients^a

Imaging Finding	Age (yr)						
	20	30	40	50	60	70	80
Disk degeneration	37%	52%	68%	80%	88%	93%	96%
Disk signal loss	17%	33%	54%	73%	86%	94%	97%
Disk height loss	24%	34%	45%	56%	67%	76%	84%
Disk bulge	30%	40%	50%	60%	69%	77%	84%
Disk protrusion	29%	31%	33%	36%	38%	40%	43%
Annular fissure	19%	20%	22%	23%	25%	27%	29%
Facet degeneration	4%	9%	18%	32%	50%	69%	83%
Spondylolisthesis	3%	5%	8%	14%	23%	35%	50%



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Annals of Internal Medicine

ORIGINAL RESEARCH

Surgery Versus Nonsurgical Treatment of Lumbar Spinal Stenosis

A Randomized Trial

Anthony Delitto, PT, PhD; Sara J. Piva, PT, PhD; Charity G. Moore, PhD, MSPH; Julie M. Fritz, PT, PhD; Stephen R. Wisniewski, PhD; Deborah A. Josbeno, PT, PhD; Mark Fye, MD; and William C. Welch, MD

Annals of Internal Medicine • Vol. 162 No. 7 • 7 April 2015

- 179 patients
 - 1/2 were assigned to surgical group, 1/2 assigned to PT
 - PT focus on flexion exercises, general exercises and education
 - 1/2 PT subjects crossed over to have surgery before trial finished
- Primary outcome was the SF-36
- 24 week follow-up show no significant difference between groups
- Most improvements in both groups occurred around the 10 week mark
- Realistic expectations for the patient and shared decision making
 - Importance of providing prognosis to patient



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Cochrane Database of Systematic Reviews

Surgical versus non-surgical treatment for lumbar spinal stenosis (Review)

Authors' conclusions

We have very little confidence to conclude whether surgical treatment or a conservative approach is better for lumbar spinal stenosis, and we can provide no new recommendations to guide clinical practice. However, it should be noted that the rate of side effects ranged from 10% to 24% in surgical cases, and no side effects were reported for any conservative treatment. No clear benefits were observed with surgery versus non-surgical treatment. These findings suggest that clinicians should be very careful in informing patients about possible treatment options, especially given that conservative treatment options have resulted in no reported side effects. High-quality research is needed to compare surgical versus conservative care for individuals with lumbar spinal stenosis.



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Commentary

Consensus at last! Long-term results of all randomized controlled trials show that fusion is no better than non-operative care in improving pain and disability in chronic low back pain

The Spine Journal 16 (2016) 588–590



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