Spinal Stenosis and Radiculopathy:
A Case Report

Nicole Miller, SDPT

68 Year Old Female with Spinal Stenosis and Radiculopathy:
A Case Report

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Spinal Stenosis with Radiculopathy

A case report: 68 y/o female

Nicole Miller, SDPT
**Estelle Norton, PhD**

- History professor at CSU
- Single story ranch house
- Married 45 years
- Active lifestyle
  - Walks
  - Plays golf

**Reasons for seeking PT**

- Recent fall, landing on tailbone
- Severe low back / leg pain since
- Pain walking and standing
- Unable to play golf
- Difficulty sleeping
Current Ability to Participate

- Unable to walk more than 200ft w/o severe pain
- Difficulty working unable to teach standing for entire class
- Difficulty with standing ADL’s
- Unable to golf

Patient History

**Comorbid**
Degenerative joint disease at L4, L5, S1  
Moderately overweight

**Premorbid**
Intermittent back pain since laminectomy (L5/S1)  
20 years ago
Disabilities and/or Functional Limitations

Difficulty with:
- ADL’s that require standing >20 min.
- Walking distances
- Sleeping
- Teaching (standing)
- Golf

Impairments

- Severe low back pain
- Radiating pain into R LE, impaired sensation, muscle strength, reflexes
- Decreased lumbar extension
- Joint stiffness at L1-L4, + mobility & symptom reproduction at L5
- Palpation on R paraspinals L3-S1, increased tone and pain
Spinal Stenosis

Primary
• rare
• congenital spinal canal narrowing

Secondary
• most common form
• adults in 5th-7th decades
• results from degenerative changes, infection, trauma or spinal surgeries

Lumbar Spinal Stenosis

Symptoms

Lower back pain
Lumbar Spinal Stenosis

Symptoms

Walking & ADL’s limited due to severe pain


Lumbar Spinal Stenosis

Symptoms

neurogenic claudication in one or both LEs

• increases with walking/standing
• decreases with sitting
• causes pain, numbness and/or weakness

Anatomy

- Zygapophysial joint
- Ligamenta flava
- Inter-vertebral discs

Drake 2005, Haig 2002
**Anatomy**

Paraspinals
- iliocostalis
- longissimus
- multifidus

Haig 2002

**Pathology**

- Central canal or intervertebral foraminal narrowing
- Causes:
  - Intrinsic shape of the canal
    - congenitally short pedicles
- Degenerative process:
  - narrowing of vertebral spaces
  - movement of one anatomic segment on another

**Pathology**

- Hypertrophy of tissues and joints
  - Ligamentum flavum
  - Facet joints (Zygapophysial joints)
- Intervertebral discs
- Paraspinal denervation
  - Cause changes in spine biomechanics: lumbar instability or impaired movement

**Radiculopathy**

**Symptoms**
- Lumbar spine: radiating pain into buttocks and LEs

**Etiology**
- Irritation of the nerve root
- Caused by compression or inflammation
- Local ischemia of lumbar nerve roots due to decreased blood flow

Histology

Facet (zygapophysial joint) hypertrophy
Joint can become inflamed & increase size
Formation of osteophytes

Hypertrophy of the ligamentum flavum
Thickening and/or calcification of the ligamentum flavum centrally and at the insertion to the superior facet


Histology

Intervertebral discs
- Aging process: disc becomes desiccated as hydrated Type II collagen and proteoglycans are replaced with fibrous tissue, this causes collapse of disc which leads to herniation

Denervation of paraspinal muscles
- Impairment of neural input, sensory and motor, to muscle tissue

**Tissue Healing or Continued Decline**

- Degenerative process will continue
- Treatment interventions and patient education will help manage symptoms and pain but will not change underlying pathological process


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**Medical Management**

- Diagnosis w/ radiographs, CT, MRI
- NSAIDs and prescription pain meds
- Injections
  - corticosteroids, anesthetics or opioids
- Last resort: surgery
  - lumbar decompression/laminectomy/spinal fusion

**Examination: Tests & Measures**

- AROM: Lumbar flexion, extension, sidebending and rotation
- Neurological exam: LE reflexes and sensation
- MMT: LE muscles and abdominals
- Joint mobility: Lumbar vertebrae
- Palpation of paraspinals
- Pain scales (0-10)
- Postural Assessment
- Special tests
  - Straight leg raise, Thomas test, prone knee bend, SI test, slump test

**Important Exam Findings**

- Neurological exam
- Straight leg raise
- Thomas test
- Manual Muscle Testing
**Straight Leg Raise (SLR)**

- For disc herniation and/or increased neural tension
- Reliability:
  - substantial (kappa 0.6-0.8) interrater agreement (Vroomen, 2000)
- Validity, sensitivity and specificity
  - patients with posterior pelvic pain form pregnancy (Mens, 2001)
    - active SLR a suitable diagnostic instrument
      - Sensitivity: 0.87
      - Specificity: 0.94

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**Additional Tests & Measures**

- Evaluation of hip and knee
- MMT of gluteus maximus
- Pain and functional limitation surveys
  - baseline assessment
- Neurogenic claudication vs. vascular claudication

Connection: Disability | Functional Limitations to Impairments

- Unable to stand >20min
- Walking >200ft
- Limited at work
- Difficulty with ADLs
- Unable to sleep in preferred position
- Unable to play golf
**Connection: Disability & Functional Limitations of Impairments**

Unable to stand >20min

- Walking >200ft
- Limited at work
- Difficulty with ADLs
- Unable to sleep comfortably
- Unable to play golf

**Connection: Pathology to Impairments**

*Lumbar Spinal Stenosis*

**Primary:**
- severe low back pain when standing or walking
- joint stiffness at L1-L4, joint mobility at L5

**Secondary:**
- decreased lumbar extension, R sidebending, R rotation
- decrease in activities & general conditioning
Connection: Pathology to Impairments
Radiculopathy

Primary:
- radiating pain and paresthesias into R LE
- decreased sensation, muscle strength & reflexes

Secondary:
- general deconditioning
- decreased lumbar ROM

Medical Prognosis is Poor

- Condition is progressive with DJD
  - Symptoms relieved with interventions such as
    PT, injections and/or surgery
- Varies with age, comorbidities and activity
- Prognosis can be based on baseline functional
  and pain measurement outcomes

**PT Diagnosis**

Patient presents with a decreased ability to walk, perform ADLs and participate in activities due to severe low back pain and radiating pain in the right lower extremity consistent with spinal stenosis with radiculopathy at the levels of L4-S1.

**PT Practice Pattern 4F**

Impaired Joint Mobility, Motor Function, Muscle Performance, Range of Motion, and Reflex Integrity Associated with Spinal Disorders

Range of visits: 8-24 over the course of 1-6 months

APTA's Guide to Physical Therapist Practice, 2nd Ed.
**PT Prognosis**

- Complete absence of pain is not expected outcome—pain management is obtainable.
- Walking tolerance should improve, if PT focuses on improving patient’s lumbar extension range of motion:
  - mobilize upper lumbar and thoracic spine
  - stretch hip flexors

**PT Interventions**

- **Patient Education**
  - improve posture and movement patterns
- **Pain Management**
- **Therapeutic exercises**
  - exercises with lumbar flexion or unweighting
- **Stretching / Strengthening exercises**
  - improve stability of trunk and hip

Atlas 2006, Goodman 2003
Exercises

Questions?