Lumbar Spine and Related Lower Extremity Radiating Pain

ICD-9-CM code: 724.3 Sciatica

ICF codes: Activities and Participation Domain code: **d4104** Standing (Getting into and out of a standing position or changing body position from standing to any other position, such as lying down or sitting down)

Body Structure codes: **s76002** Lumbar vertebral column
s7508 Structure of the lower extremity, other specified

Body Functions code: **b28013** Pain in back
b2803 Radiating pain in a dermatome

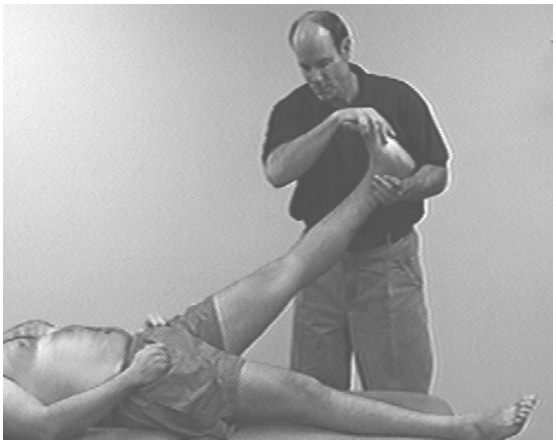
Common Historical Findings:

Shooting, narrow band of pain - usually below the knee
Paresthesias
Numbness
Weakness

Common Impairment Findings - Related to the Reported Activity Limitation or Participation Restrictions:

May adopt postures or positions found to relieve nerve tension
Symptoms are reproduced with SLR or other lower limb tension tests
May have sensation deficits over medial calf, dorsal web space between 1st and 2nd metatarsals, or lateral foot to light touch or sharp/dull
May have strength deficits of gastrocnemius/soleus complex (single leg heel raise), extensor hallucis longus (EHL manual muscle test), or tibialis anterior (TA manual muscle test)

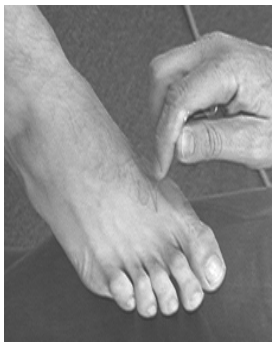
Physical Examination Procedures:



Straight Leg Raising/Ankle Dorsiflexion

Performance Cues:
Raise leg until symptoms are slightly reproduced

Determine symptom alteration with hip flexion and extension; ankle dorsiflexion and plantarflexion



Sensation Testing

Performance Cues:

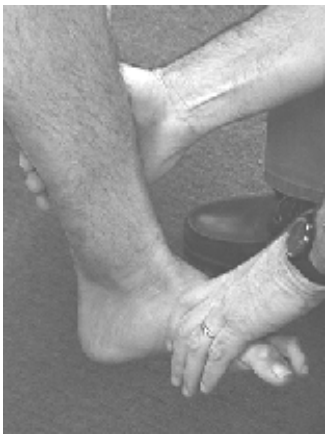
Utilize light touch or sharp/dull testing:

L4 = Medial lower leg
L5 = Dorsal web space
S1 = Lateral foot (5th metatarsal)
Assess perianal region if you suspect cauda equina involvement

Segmental Muscle Strength Testing
Single Leg Heel Raise

Performance Cues:

Provide hand to hand contact to assist bal
First - perform bilateral heel raise and note amount of ankle plantarflexion
Second - perform single leg heel raise and determine if full ankle plantarflexion is achieved
Gastrocnemius/Soleus muscles = S1



Segmental Muscle Strength Testing
Tibialis Anterior

Performance Cues:
"Raise your foot and ankle up and in and hold it there"
Note ability to resist opposing manual force
Tibialis anterior = L4

Extensor Hallucis Longus Manual Muscle Tests

Performance Cues:
"Raise your big toes to the ceiling and hold"
Note ability to resist opposing manual force
May resist bilaterally and compare ability to resist
Extensor hallucis longus = L5

Lumbar Spine and Related Lower Extremity Radiating Pain
Description, Etiology, Stages, and Intervention Strategies

The below description is consistent with descriptions of clinical patterns associated with the vernacular term "Lumbar Radiculopathy"

Description: Lumbar radiculopathy is a disorder of the nerve root at the central canal involving a portion of the cauda equina or at the lateral forminal canal involving one or more nerve roots. The patient presentation is usually involves pain, numbness or paresthesia, and weakness of the lower extremities. The pain is typically described as a lancinating, narrow band or pain that radiates distally.

Etiology: Lumbar radiculopathy is suspected to occur as a result of arthritic spurs, displacement of the lumbar disc, fractures of the spine, and other pathology such as neoplasms. It is commonly believed that these disorders compress the nerves exiting the spinal cord producing impaired conduction of the involved nerves. In many patients, the inflammatory process around

the nerve root is believe to be the major cause of the pain and nerve conduction disturbances – because the anatomical abnormalities persist (upon follow-up imaging) even after the symptoms have been alleviated.

Acute Stage / Severe Condition: Physical Examinations Findings (Key Impairments)

ICF Body Functions codes: **b28013.3** SEVERE pain in back; and **b2803.3** SEVERE radiating pain in a dermatome

- Radicular pain limits movements are commonly seen that create a stretch to the involved nerve root – such as lumbar and hip flexion with a straightened knee
- Postures to limit the tension on the (such as a lateral shift) may be present
- Muscles associated with the level of the injury will often present with guarding/spasming
- Positive straight leg raising (SLR) where radicular pain is reproduced at about 30^{o} of SLR and worsens with ankle dorsiflexion
- Positive contralateral SLR

Sub Acute Stage / Moderate Condition: Physical Examinations Findings (Key Impairments)
ICF Body Functions codes: **b28013.2** MODERATE pain in back; and **b2803.2** MODERATE radiating pain in a dermatome

- As above with the following differences
- Radicular pain typically diminishes as the inflammation is reduced
- Patient reports less pain in mid range/neutral postures and but pain remaines with end range movement

Settled Stage / Mild Condition: Physical Examinations Findings (Key Impairments)
ICF Body Functions codes: **b28013.1** MILD pain in back; and **b2803.1** MILD radiating pain in a dermatome

- As above with the following differences
- The patient's radicular symptoms are reproduced only at the extreme end ranges of SLR or forward bending while standing

When less acute the therapist should re-assess for strength and flexibility deficits that may be present and predispose the patient to repeated or further injury.

Intervention Approaches / Strategies

Acute Stage / Severe Condition

Goals: Alleviate radicular symptoms
Improve active movement range for the lumbar spine and lower extremities

- Patient Education/Re-injury Prevention
  Establish a movement or position that best relives the patient's radicular symptoms. (Positions that reduce nerve entrapment at the lateral forminal canal are typically slight flexion, sidebending opposite the painful side, and slight rotation away from the painful side.) This positioning is usually done with the patient sidelying on a treatment or mat table – mimicking the patient's bed positions
  Advise the patient to follow the medication instructions provided by her/his physician – specifically emphasize the importance of proper administration of steroidal or non-steroidal antiflammatory medications in addressing the inflammation around the nerve root
  Instruct the patient to avoid movements that may exacerbate their symptoms

- Therapeutic Exercises
  Nerve mobility exercises for the involved lower extremity in the painfree ranges (e.g., ankle dorsiflexion/plantarflexion in painfree ranges – with varying amounts of knee extension)

- Physical Agents
  Ice
  Electrical stimulation

<u>Sub Acute Stage / Moderate Condition</u>

Goal: Restore painfree active spinal and lower extremity movement

- Approaches / Strategies listed above

- Therapeutic Exercises
  Progress nerve mobility exercises for the involved lower extremity in the painfree ranges
  If the patient is suspected to have an underlying disc disorder, attempt to centralizes the patient's pain in the lower extremity through the use of positions and repeated movements/exercises (usually lateral shift maneuvers combined with extension exercises)

- Manual Therapy
  Manual overpressures or mobilization techniques may be utilized to facilitate and maintain the centralization of lower extremity pain

<u>Settled Stage / Mild Condition</u>

Goals: Restore normal, painfree active spinal movement to enable the patient to perform activities of daily living

Normalize lumbar, pelvis, hip, knee and ankle strength and flexibility

- Approaches / Strategies listed above

When less acute the therapist should re-assess for strength and flexibility deficits that may be present and predispose the patient to repeated or further injury.

- Therapeutic Exercises
  - Continue to progress nerve mobility exercises for the involved lower extremity in the painfree ranges
  - Continue to progress the use of positions and repeated movements/exercises that centralize the patient's symptoms
  - Stretching exercises for relevant tight musculature
  - Strengthening exercises for relevant weak musculature

Intervention for High Performance / High Demand Functioning in Workers or Athletes

Goal: Return to desired occupational or recreational activities

- Approaches / Strategies listed above

- Therapeutic Exercises
  - Add muscular and cardiovascular endurance activities to the current exercise program

- Ergonomic Instruction
  - Provide job/sport specific training to lessen strain on the lumbar spine and to maximize activity tolerance

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Exercise and Movement Re-Education Interventions for Patients with Lumbar Spine Impairments

Body Function Label	**Critical Impairments**	**Other Supportive Criteria**	**Interventions**
Lumbar Spine Mobility Deficits Other vernacular terms: "Facet Syndrome" Mobilization Exercises	End-range pain ROM limitations	Acute low back pain Minimal/no previous history of LBP	End-range stretching to maintain segmental ROM gained from manipulative procedures. Ergonomic instruction, trunk & pelvic girdle strengthening & stretching, as indicated, to prevent future disability.
Lumbar Spine Stability Deficits Other vernacular terms: "Ligamentous Instability" Stabilization Exercises	Symptoms reproduced with sustained end range positions Symptoms eased with neutral positions and midrange movements	Long history of progressively worsening symptoms (i.e., less tolerance to end range positions – such as sitting)	Isometric mobilizations to normalize pelvic girdle symmetry. Ergonomic cuing to maintain mid-range lumbar and pelvic girdle positions. Proprioceptive training and trunk/pelvic girdle strengthening to improve ability to stay in mid-range positions. Taping or bracing as indicated.
Lumbar Spine and Related Lower Limb Pain Other vernacular terms: "Disc Derangement" Extension Exercise, or Specific Exercise Group	Location of symptoms move centrally with repeated lumbar extension or with repeated lateral trunk shifts	Difficulty with sitting and forward bending Multiple previous episodes of LBP (progression of "Ligamentous Instability") Observable reduced lumbar lordosis – may have lateral trunk shift	Manual procedures, postures, or exercises that centralize the symptoms. Ergonomic cuing to maintain lumbar lordosis prevent peripheralization. Progress to treatment of underlying segmental instability.
Lumbar Spine and Related Lower Extremity Radicular Pain Other vernacular terms: "Nerve Root Adhesion" or "Dural Adhesion" Nerve Mobility Exercises	Narrow band of lancinating pain Symptoms reproduced with SLR and/or slump testing	Nerve mobility deficits with lower limb tension testing	Dural and nerve mobility exercises as indicated to address the patient's key impairments Soft tissue and/or joint mobilization to areas of potential spinal and peripheral nerve entrapments

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Mobilization Exercises

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Extension Exercises and Lateral Shift Correction/Exercises

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Nerve Mobility Exercises

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