



# Three Common Mistakes in Spine Assessment

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# Disclosure

**I have no current affiliation or financial interest with any grantor or commercial interests that may have direct interest in the subject matter of the CE Program.**

# Objectives

1. Identify epidemiology of neck and back pain
2. Review spine anatomy
3. Discuss an organized approach to assessment of neck and back symptoms
4. Perform thorough and accurate cervical and lumbar spine exams
5. Describe pharmacologic and non-pharmacologic interventions for neck and back diagnoses

# Diagnosing Neck and Back Pathology: Often Challenging

## *Common Chief Complaints*

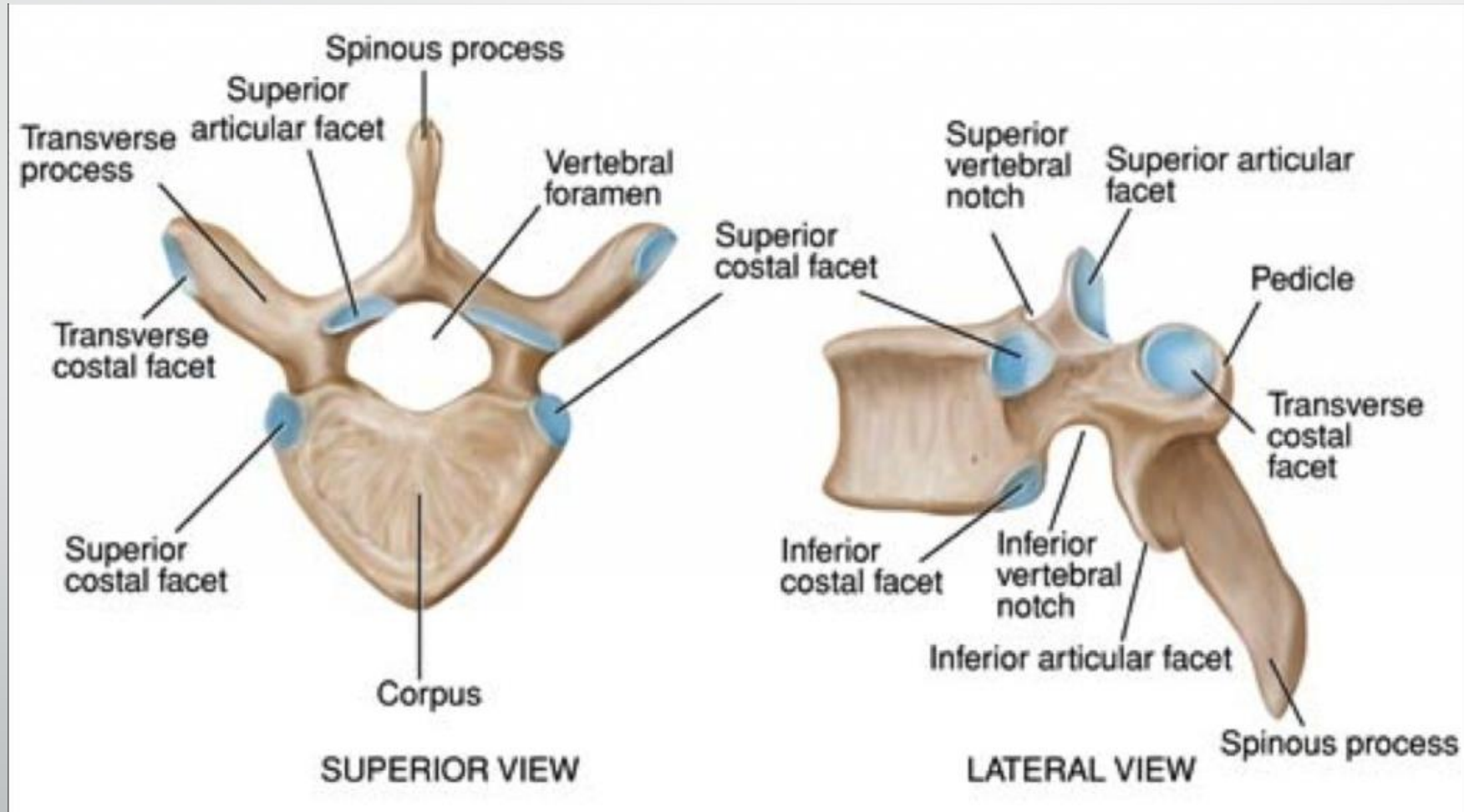


- BACK PAIN
- GLUTEAL PAIN
- HIP PAIN
- LEG PAIN OR TINGLING
- SCIATICA
- NECK PAIN
- SHOULDER PAIN
- HEADACHE
- ARM PAIN OR TINGLING
- WEAKNESS
- SPASM

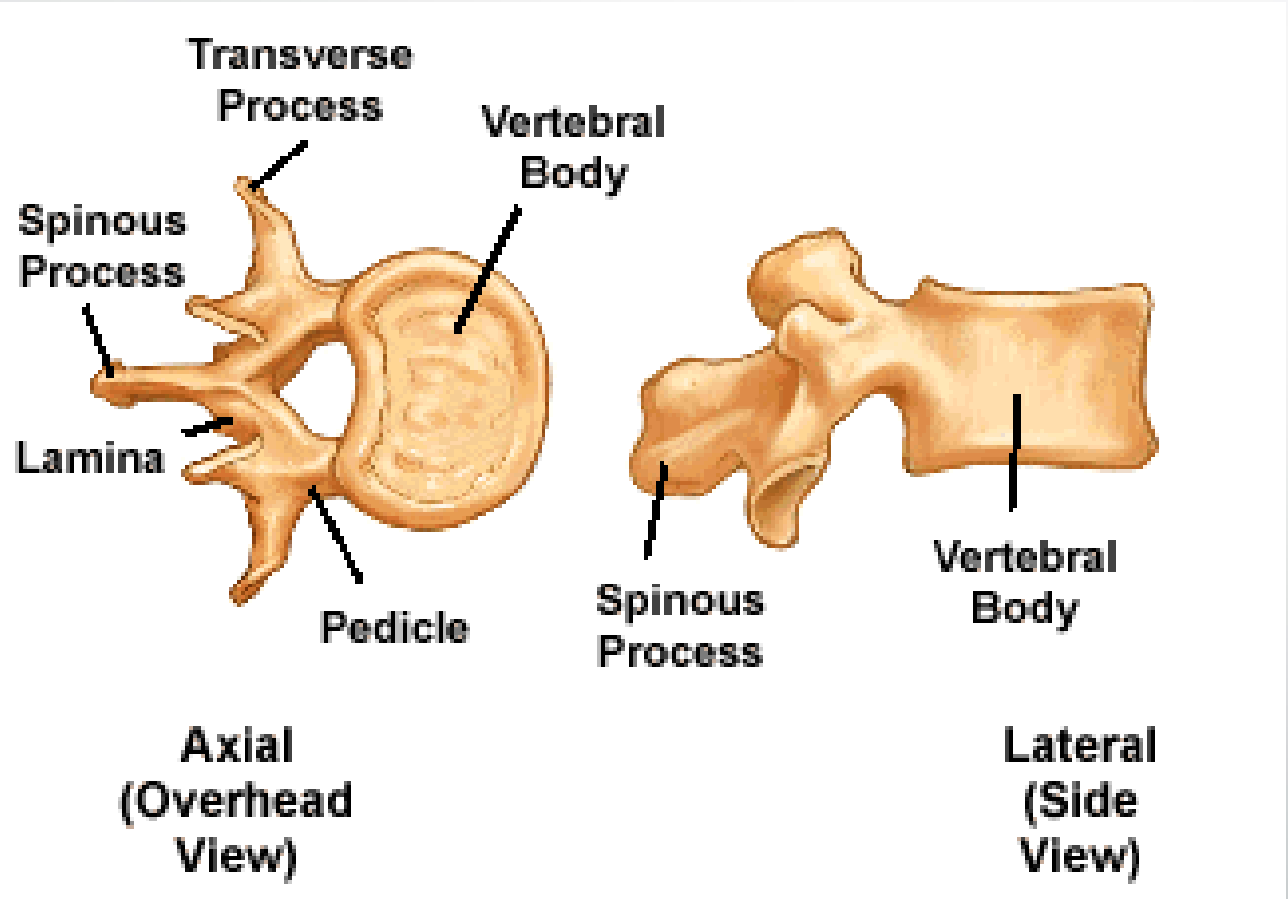
# I ♥ STATS

- 1 year incidence of neck pain is 10.4-21.3%
- Cervical radiculopathy is most often related to degenerative changes
- >30% of adults in the U.S. have experienced low back pain in the last 3 months
- 1<sup>st</sup> episode of back pain is usually between ages 20-40
- 31% with LBP will not recover fully in 6 months

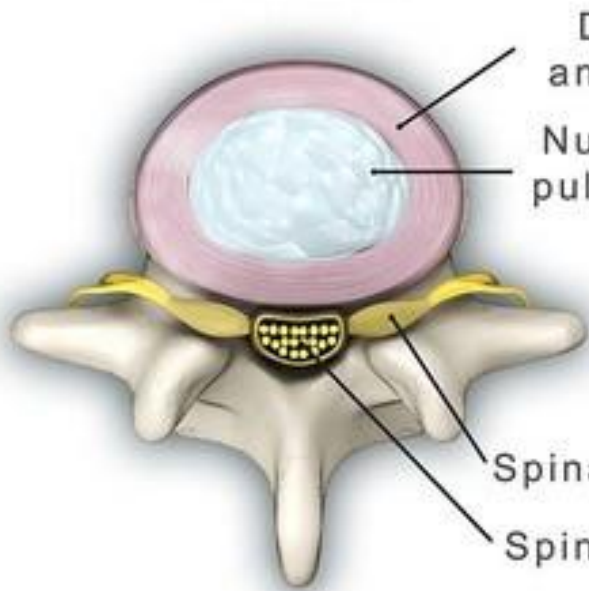
# Cervical Vertebra



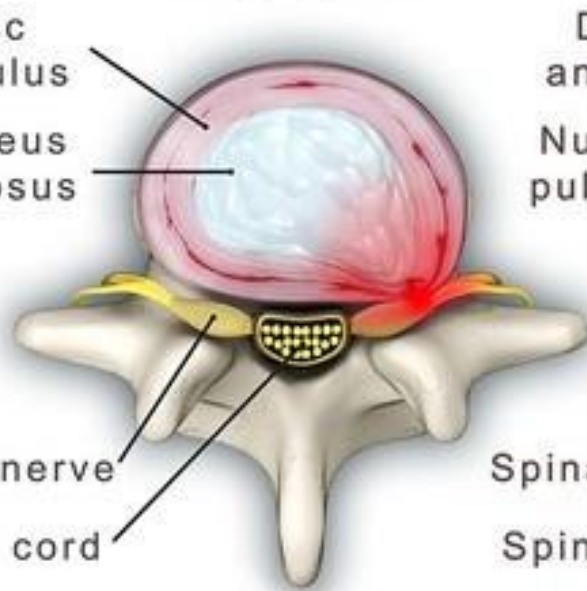
# Lumbar Vertebra



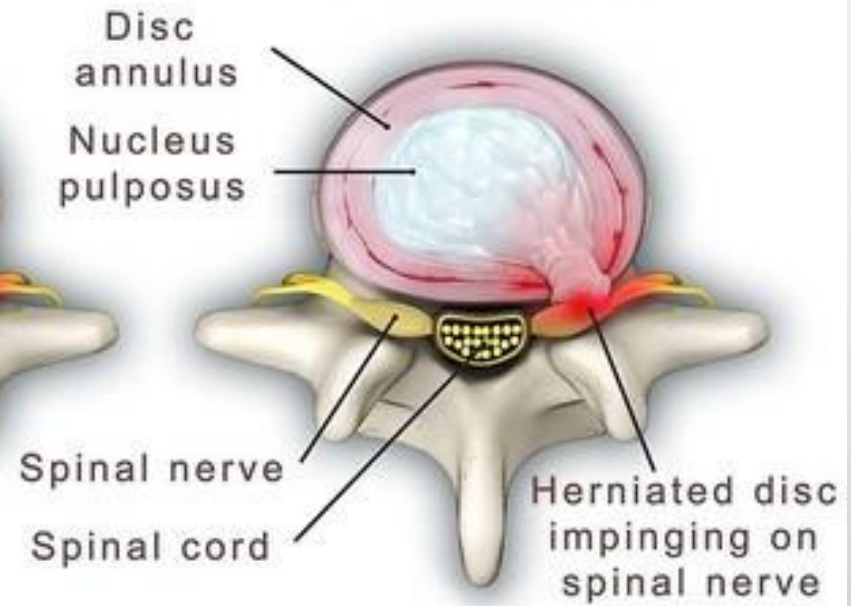
**Normal disc**



**Bulging disc**

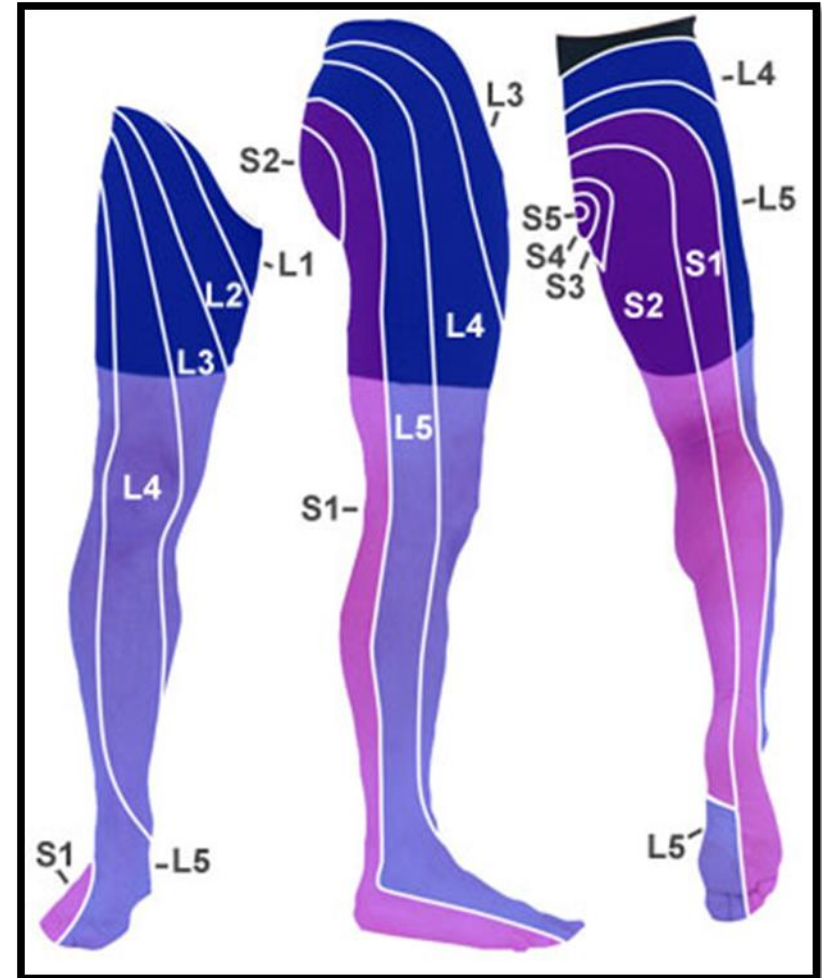
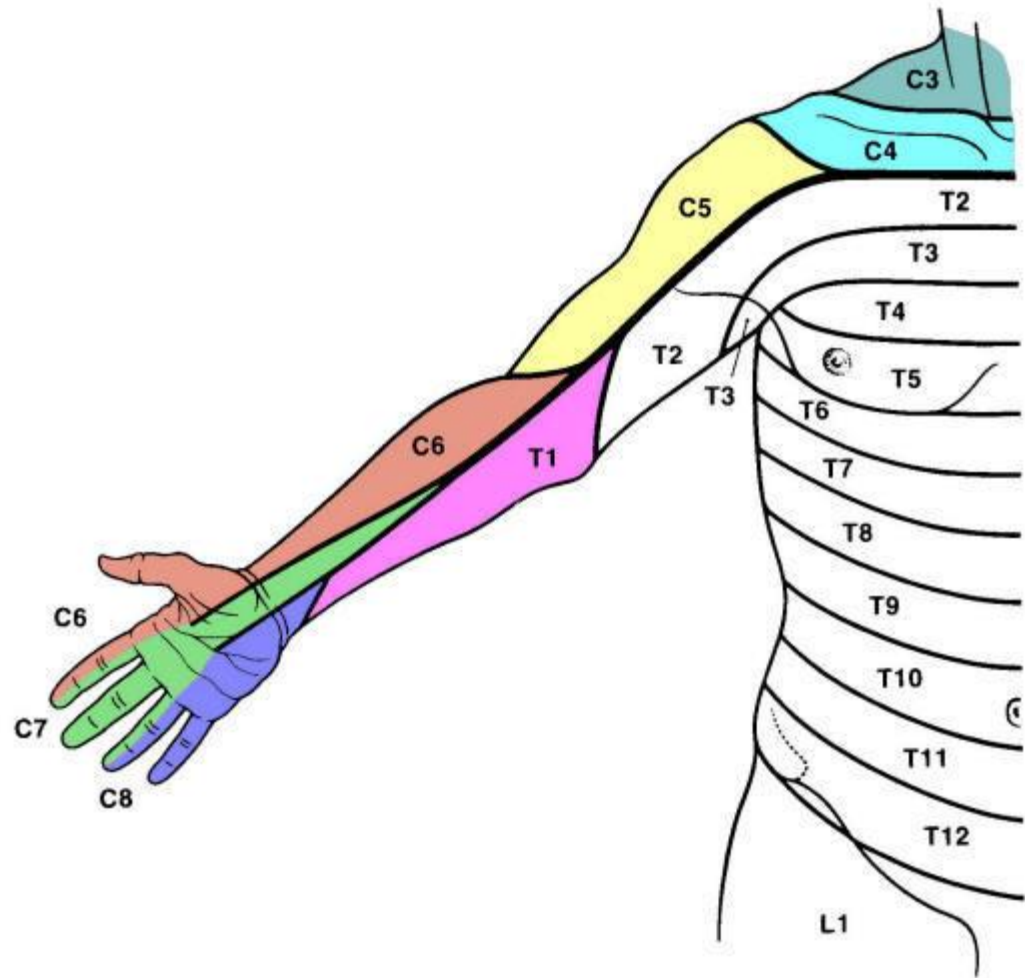


**Herniated disc**





# Dermatome Review!



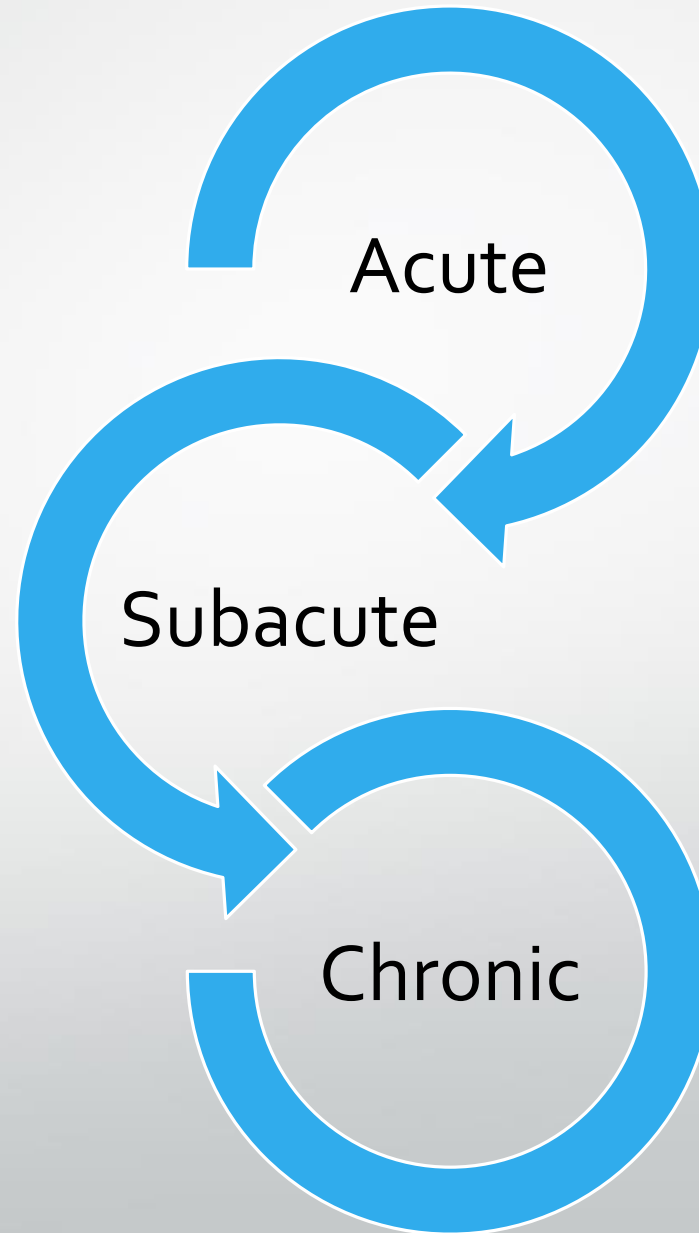


Assessment

# Medical History

- Location of pain
- Key characteristics: onset, aggravating/alleviating factors, quality of pain
- Age
- **Red flags**
- Overweight/obesity, muscle imbalance and low activity level often contribute to MSK issues

# Timeframe



# Red Flags- Cervical

Symptom	Potential Condition
Recent trauma	Bony/ligament disruption of cervical spine
Fever, history of immunocompromise, IV drug use	Infection/Abscess
Constitutional symptoms	Malignancy
Upper Motor Neuron Signs	Cervical cord compression or demyelinating disease
Ripping/tearing neck sensation	Arterial dissection
Chest pain, shortness of breath, diaphoresis	Myocardial ischemia

# Red Flags- Lumbar

Symptom	Potential Condition
Fecal incontinence, saddle anesthesia, urinary retention	Cauda equina syndrome
Immunosuppression, IV drug use, fever	Infection
Chronic steroid use	Fracture or infection
Osteoporosis, trauma	Fracture
Age >50 + trauma	Tumor or Fracture
Constitutional symptoms, h/o CA	Malignancy
Pain worse at night	Malignancy
Focal neurologic deficit, progressive or disabling symptoms	Any of above

## Yellow Flags

Factors that increase risk of developing disability and chronic pain

- Belief that back pain is harmful or potentially severely disabling
- Fear and avoidance of activity or movement
- Tendency to low mood and withdrawal from social interaction
- Expectation of passive treatment(s) rather than belief that active participation will help

# Type of Pain

Somatic

Neurogenic



# Neuropathic Pain

The background of the slide is a detailed illustration of a neural network. It features numerous neurons with prominent, dark red nuclei and intricate, branching cytoplasmic structures. The neurons are interconnected by a dense web of fine, light blue lines, representing axons and dendrites. The overall color palette is a cool, monochromatic blue, with the red nuclei providing a focal point of contrast.

**Burning**

**Tingling**

**Numb**

**Electric**

**Radiating**

# Physical Exam

- Inspection
- Palpation
- Gait- tandem, heel/toe, squat
- Range of Motion
- Strength
- Reflexes and Sensation
- Special Tests



# American Spinal Injury Association Strength Grading

- 0 Total paralysis
- 1 Palpable or visible contraction
- 2 Active Movement
- 3 Active movement against gravity
- 4 Active movement against gravity with some degree of resistance
- 5 Active movement with full resistance (normal)

# Reflex Grading

- 0 No response
- 1+ Slight by definite response (may or may not be normal)
- 2+ Brisk response (normal)
- 3+ Very brisk (may or may not be normal)
- 4+ Repeating response/clonus (always abnormal)





Disc	Root	Reflex	Muscle	Sensation
C4-5	C5	Biceps	Deltoid & Biceps	Lateral arm
C5-6	C6	Brachioradialis	Biceps & Wrist Extensor	Lateral forearm
C6-C7	C7	Triceps	Triceps & Wrist Flexors	Middle finger

Disc	Root	Reflex	Muscle	Sensation
L3-4	L4	Patellar	Anterior Tibialis (foot inversion)	Medial leg/foot
L4-5	L5	None	Extensor Hallucis (dorsiflex big toe)	Lateral leg and/or dorsum foot
L5-S1	S1	Achilles	Peroneus (dorsiflex foot)	Lateral foot



# Key Special Tests

- Babinski reflex
- Hoffman sign
- Spurling sign
- Arm abduction sign
- Shoulder impingement
- Grip and release
- Faber test (hip)
- Straight Leg raise
- Gaenslen's test

# Differential Diagnoses- Neck

- Anterior interosseous nerve entrapment
- Carpal tunnel syndrome
- Cervical myelopathy
- Cubital tunnel syndrome (ulnar neuropathy)
- Herpes Zoster (shingles)
- Parsonage-Turner syndrome (brachial plexopathy)
- Posterior interosseous nerve entrapment
- Radial tunnel syndrome
- Rotator cuff injury/shoulder impingement
- Abscess or tumor (rare, includes extraspinal malignancy e.g. thyroid, esophageal)

# Case Study- Cervical

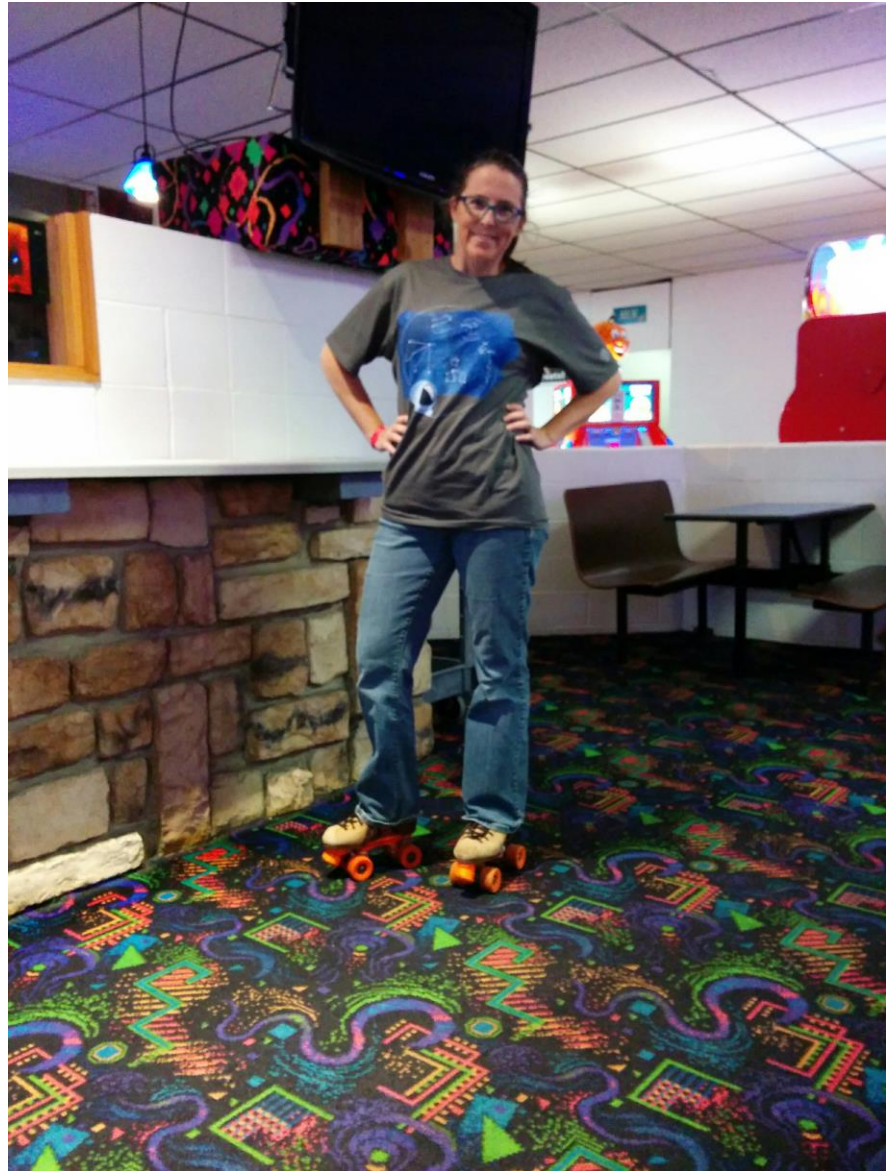
- 65 y/o female with 4 week history of neck and shoulder pain. Resides with her husband and works full-time as a large animal vet.
- Additional history of intermittent shoulder impingement. Shoulder pain improved with cortisone injection, though neck symptoms increased to include radiating pain/paresthesias to the RUE.
- Decision points: What diagnostic imaging should be ordered? Treatment plan recommendations.

# Differential Diagnoses- Low Back

- Lumbar sprain/strain
- Degenerative disc disease
- Sciatica related to joint or muscle dysfunction
- Compression fracture
- Spondylolisthesis
- Abdominal, rectal, pelvic issues
- Spondylolysis
- GU issues
- Herniated nucleus pulposus
- Hip problems, SI Joint
- Osteoporosis
- Tumor, Abscess, cyst, hematoma (rare)

## Case Study- Lumbar







Lower Limb

# Hip

Pelvic Girdle: 3 joints

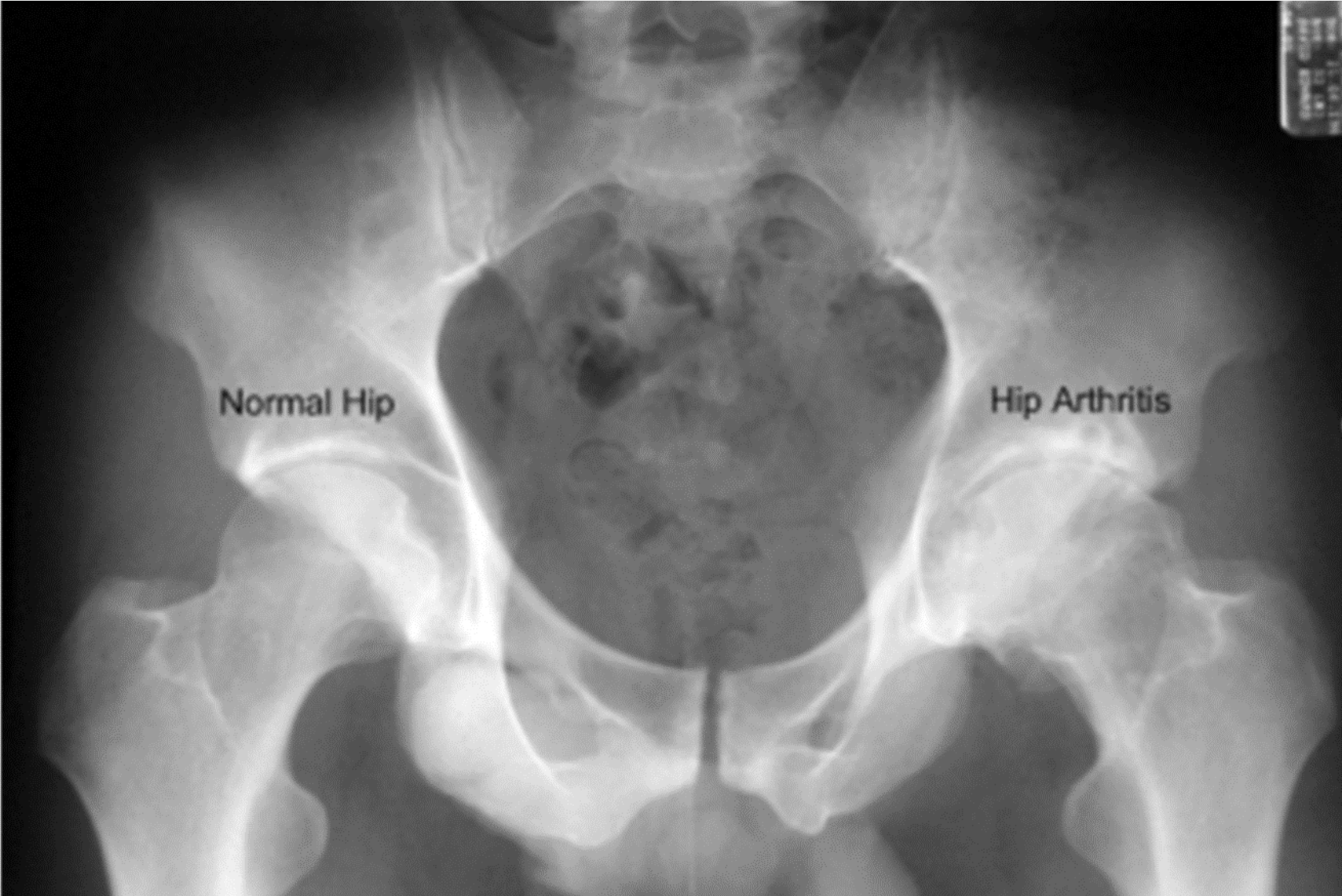
Hip joint

Sacroiliac joint

Pubic symphysis

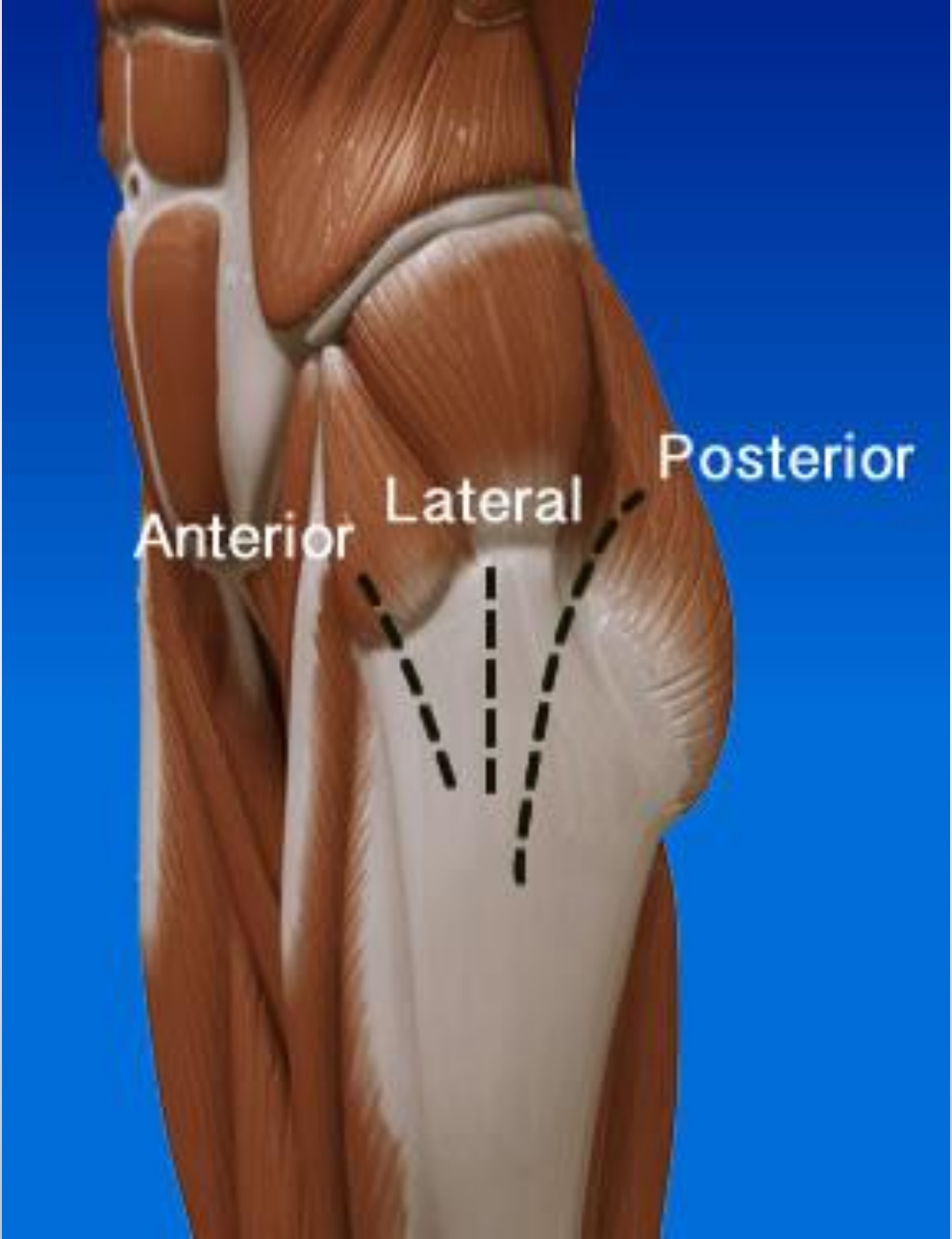


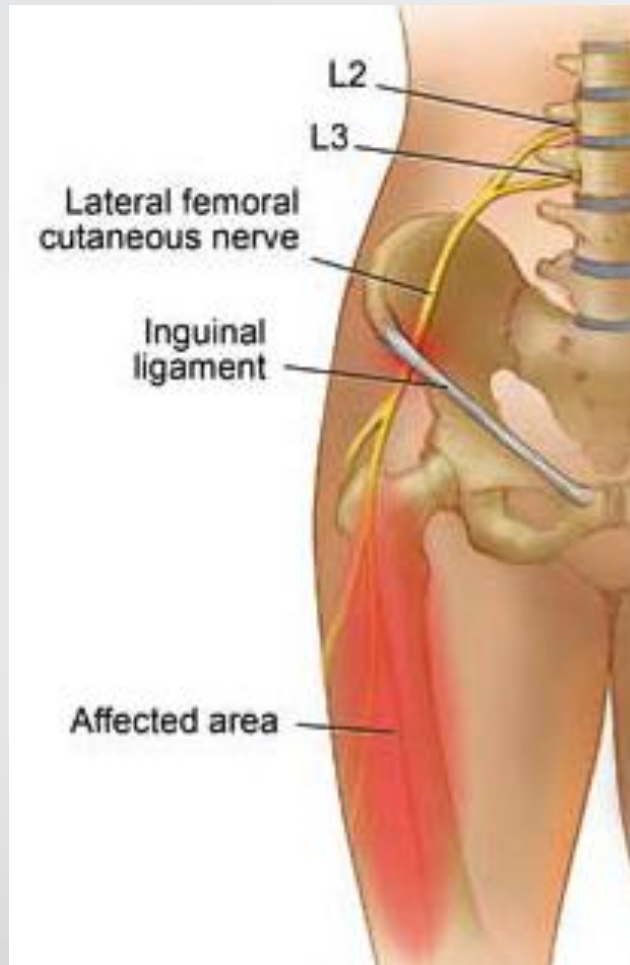




# Hip

- Key point: Identify if pain is from hip joint, a surrounding area, or lumbar spine
- Assess anterior, lateral, and posterior hip
- Special tests: Stinchfield (resisted flexion with extended knee), Faber, Gaenslon, Ober





## Meralgia Paresthetica



# Trendelenburg Sign





# Keep Zebras in Mind

Malignancy

Aneurysm

Vertebral artery dissection

Abscess/Infection

Reflex sympathetic dystrophy



Diagnostic Imaging- If Red Flag symptoms present, or lack of improvement at 4-6 weeks

- Cervical or Lumbar spine x-ray
- Shoulder or hip x-ray
- Cervical or Lumbar spine MRI
- EMG and Nerve Conduction Study ([aanem.org](http://aanem.org))

# Pharmacologic Treatment Options

- Acetaminophen
- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Analgesics
- Muscle relaxants (tizanidine often less sedating)
- Short course oral steroid- for acute symptoms (20mg tid for 3 days)
- SNRI or Tricyclic antidepressant- for chronic pain or sleep difficulty
- Cortisone injections- joint or spine



# Non-Pharmacologic Treatment

- Activity Modification
- Physical Therapy
- Exercise, including Aqua!
- Complementary- e.g. massage, acupuncture
- Ice/heat
- Weight Management
- Trigger point injection

# Follow-up

## Key Points

- Adequate pain management
- Progress with therapy
- Transition to home exercise program
- Functional changes

## Referral Options

- Physical Medicine & Rehabilitation
- Orthopedic Surgeon
- Sports Medicine
- Neurosurgeon



## Putting it all Together

1. Assess the location of pain: focal or radiating
2. Gather history: onset, aggravating factors, activity tolerance
3. Exam: range of motion, strength, provocation of pain
4. Consider imaging
5. Treatment: Most commonly, conservative measures are effective
6. Follow-up to assess patient progress

# References

- Casazza, B. A. (2012). Diagnosis and treatment of acute low back pain. *American Family Physician*, 85(4), 343–350.
- Chou, R. (2011). Diagnostic Imaging for Low Back Pain: Advice for High-Value Health Care From the American College of Physicians. *Annals of Internal Medicine*, 154(3), 181. <https://doi.org/10.7326/0003-4819-154-3-201102010-00008>
- Chou, R., Huffman, L. H., American Pain Society, & American College of Physicians. (2007). Medications for acute and chronic low back pain: a review of the evidence for an American Pain Society/American College of Physicians clinical practice guideline. *Annals of Internal Medicine*, 147(7), 505–514.
- Chou, R., Qaseem, A., Snow, V., Casey, D., Cross, J. T., Shekelle, P., ... American Pain Society Low Back Pain Guidelines Panel. (2007). Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Annals of Internal Medicine*, 147(7), 478–491.
- Eubanks, J. D. (2010). Cervical radiculopathy: nonoperative management of neck pain and radicular symptoms. *American Family Physician*, 81(1), 33–40.
- Falope, E. O., & Appel, S. J. (2015). Substantive review of the literature of medication treatment of chronic low back pain among adults: Chronic low back pain. *Journal of the American Association of Nurse Practitioners*, 27(5), 270–279. <https://doi.org/10.1002/2327-6924.12155>
- Gerber, L. H., Shah, J., Rosenberger, W., Armstrong, K., Turo, D., Otto, P., ... Sikdar, S. (2015). Dry Needling Alters Trigger Points in the Upper Trapezius Muscle and Reduces Pain in Subjects With Chronic Myofascial Pain. *PM&R*, 7(7), 711–718. <https://doi.org/10.1016/j.pmrj.2015.01.020>
- Gladkowski, C. A., Medley, C. L., Nelson, H. M., Price, A. T., & Harvey, M. (n.d.). Opioids Versus Physical Therapy for Management of Chronic Back Pain. *The Journal for Nurse Practitioners*, 10(8), 552–559. <https://doi.org/10.1016/j.nurpra.2014.05.008>
- Gregory, D. S., Seto, C. K., Wortley, G. C., & Shugart, C. M. (2008). Acute lumbar disk pain: navigating evaluation and treatment choices. *American Family Physician*, 78(7), 835–842.
- Hemmer, C. R. (n.d.). Nontraumatic Cervical Spine for Primary Care Providers. *The Journal for Nurse Practitioners*, 11(10), 987–997. <https://doi.org/10.1016/j.nurpra.2015.08.041>
- Holm, G. (2015). Assessment and Treatment of Common Cervical & Lumbar Spine Issues in Primary Care. PowerPoint Slides.
- Hoppenfeld, S., & Hutton, R. (1976). *Physical examination of the spine and extremities*. New York: Appleton-Century-Crofts.
- Hoppenfeld, S., & Hutton, R. (1977). *Orthopaedic neurology: a diagnostic guide to neurologic levels*. Philadelphia: Lippincott.
- Last, A. R., & Hulbert, K. (2009). Chronic low back pain: evaluation and management. *American Family Physician*, 79(12), 1067–1074.
- Metzger, R., & Chaney, S. (2014). Spondylolysis and spondylolisthesis: What the primary care provider should know: Spondylolysis and spondylolisthesis. *Journal of the American Association of Nurse Practitioners*, 26(1), 5–12. <https://doi.org/10.1002/2327-6924.12083>
- Teichtahl, A., & McColl, G. (2013). An approach to neck pain for the family physician. *Australian Family Physician*, 42, 774–777.