Peak Performance for Spine Assessment

Laurel Short, MSN, FNP-c

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

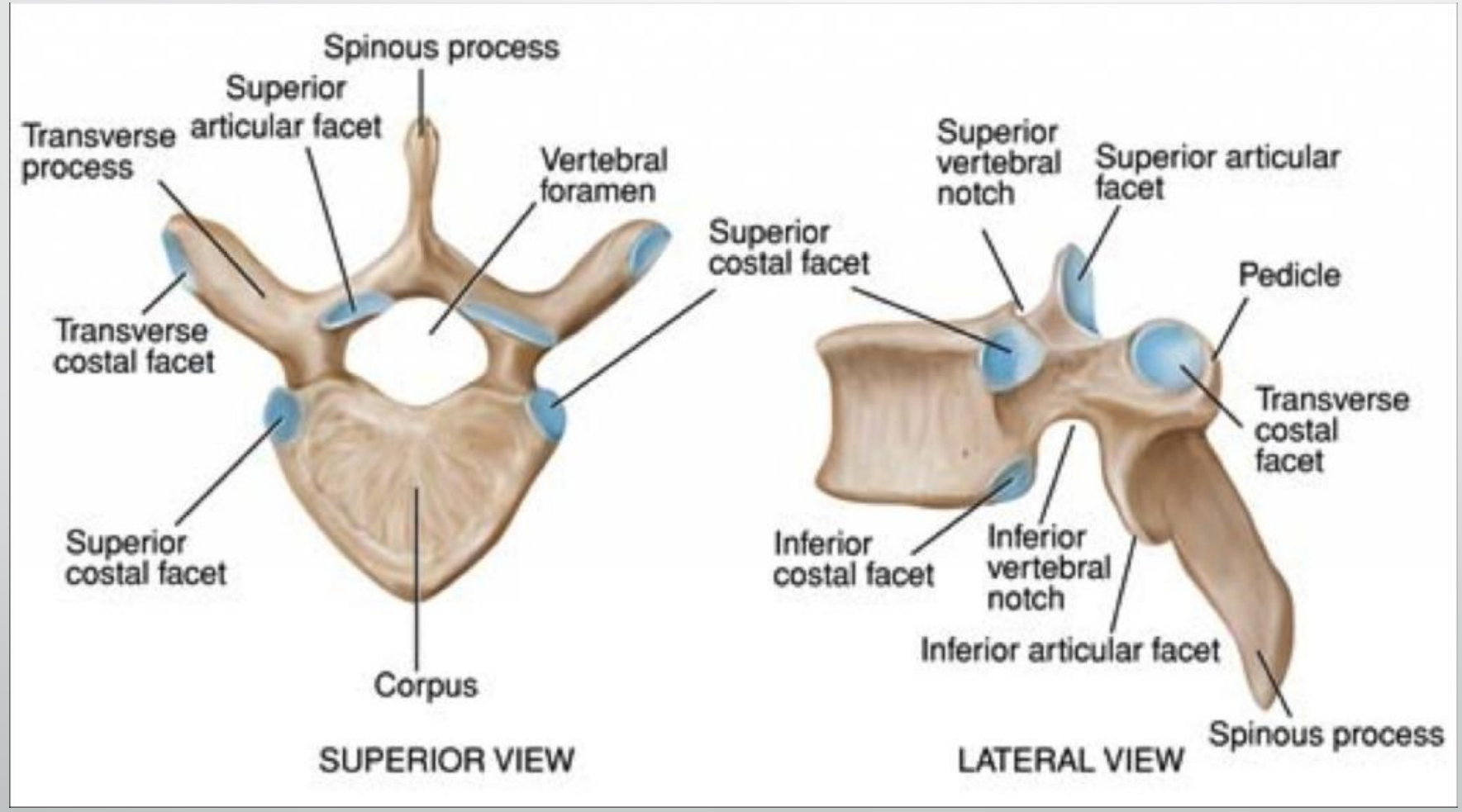
- BACK PAIN
- GLUTEAL PAIN
- HIP PAIN
- LEG PAIN OR TINGLING
- SCIATICA
- NECK PAIN
- SHOULDER PAIN
- HEADACHE
- ARM PAIN OR TINGLING
- WEAKNESS
- SPASM

- 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
- 1st episode of back pain is usually between ages 20-40
- 31% with LBP will not recover fully in 6 months

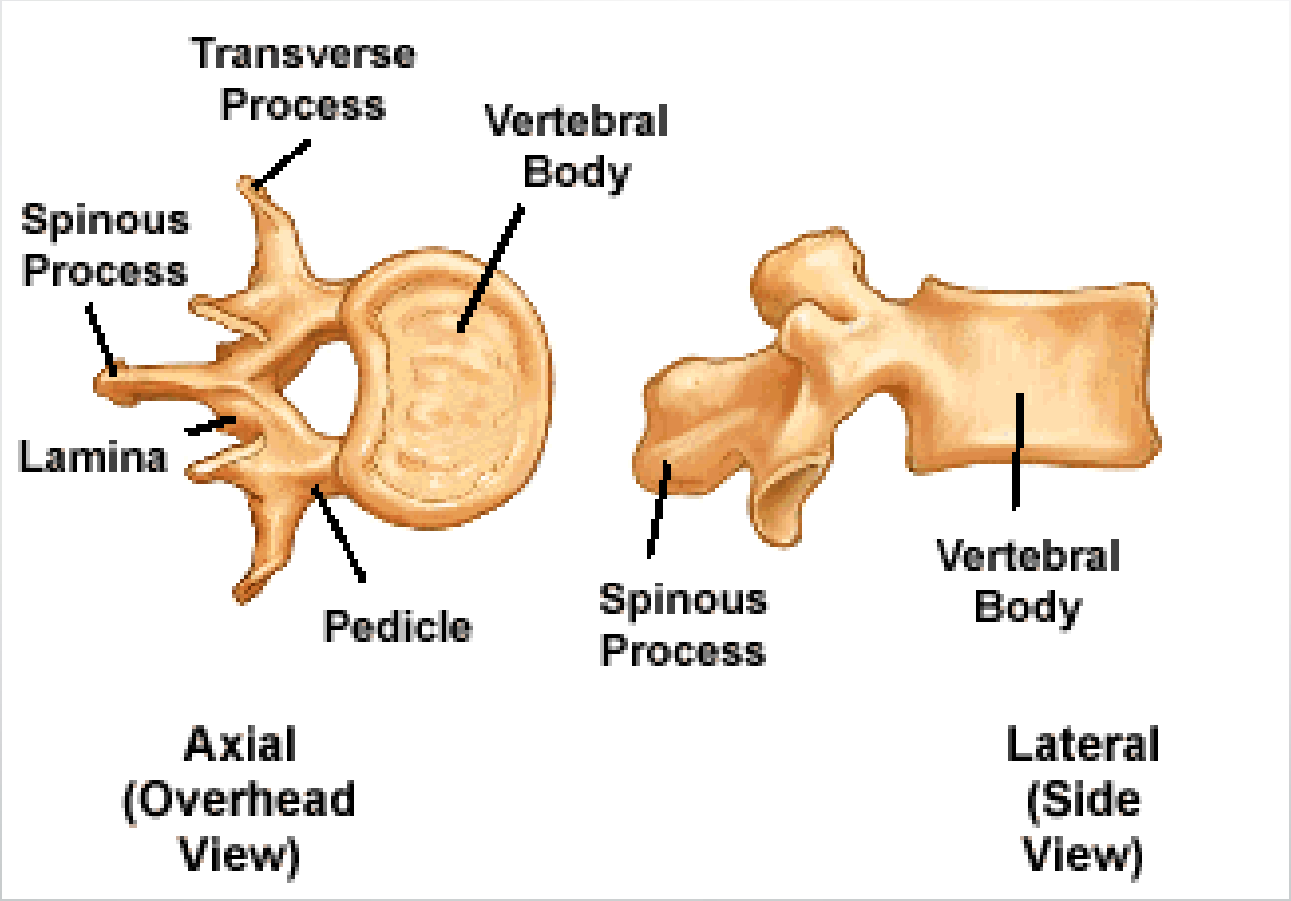
(photo/visual here)

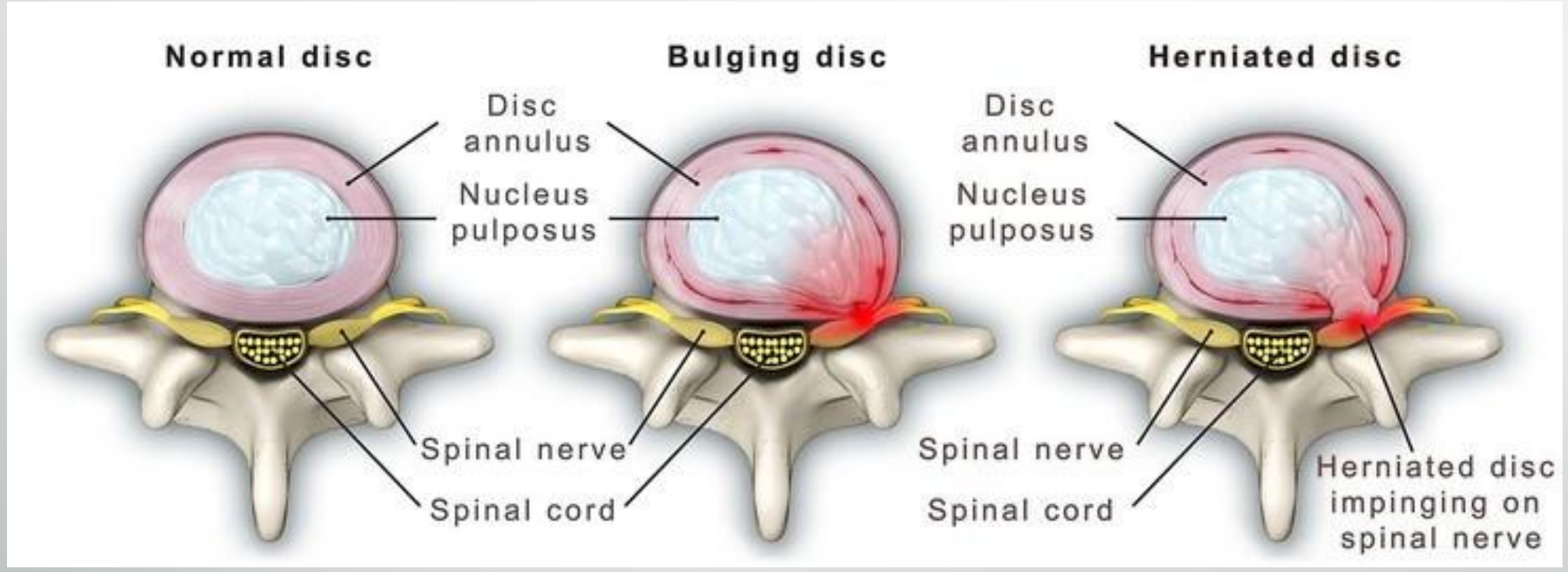
Anatomy

Cervical Vertebra

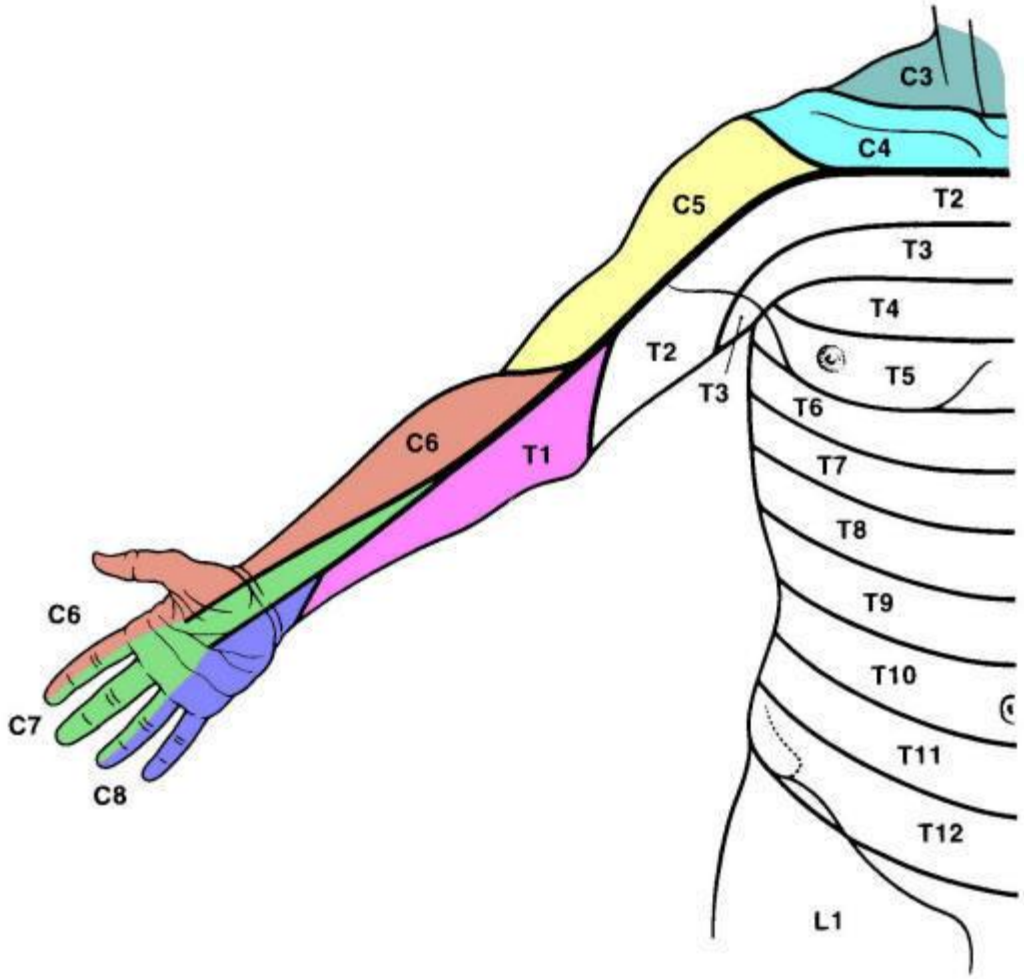


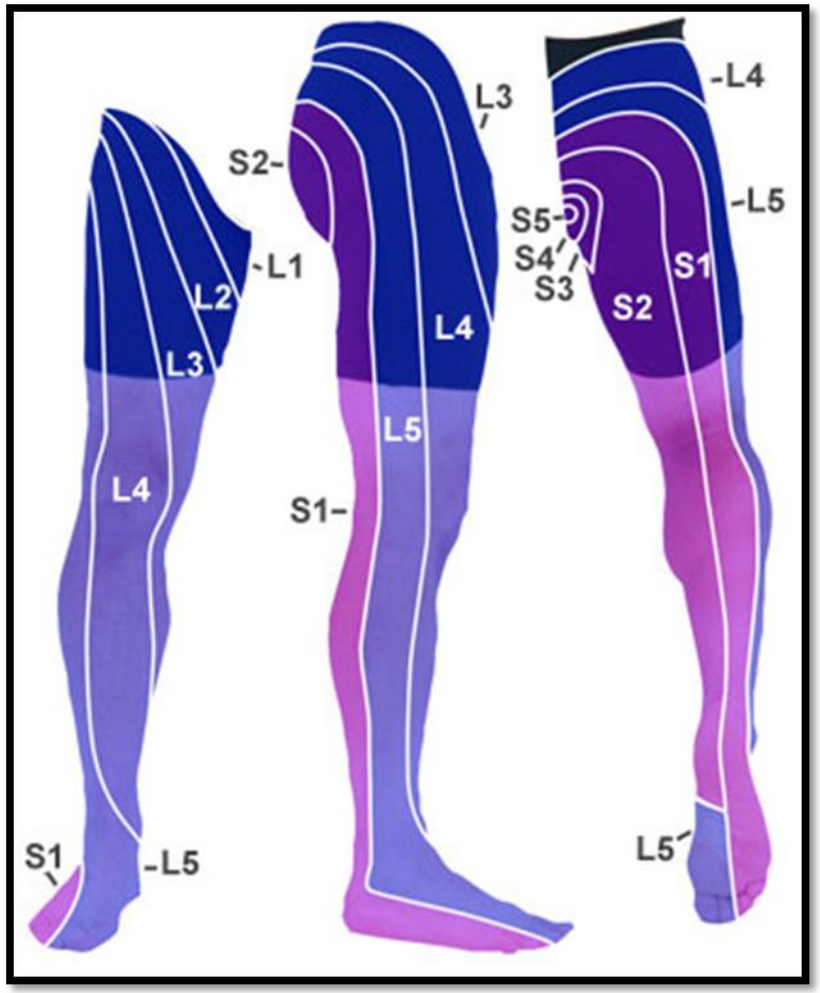
Lumbar Vertebra




Normal disc
Bulging disc
Herniated disc
Disc annulus
Nucleus pulposus
Spinal nerve
Spinal cord
Disc annulus
Nucleus pulposus
Spinal nerve
Spinal cord
Herniated disc impinging on spinal nerve

Dermatome Review!



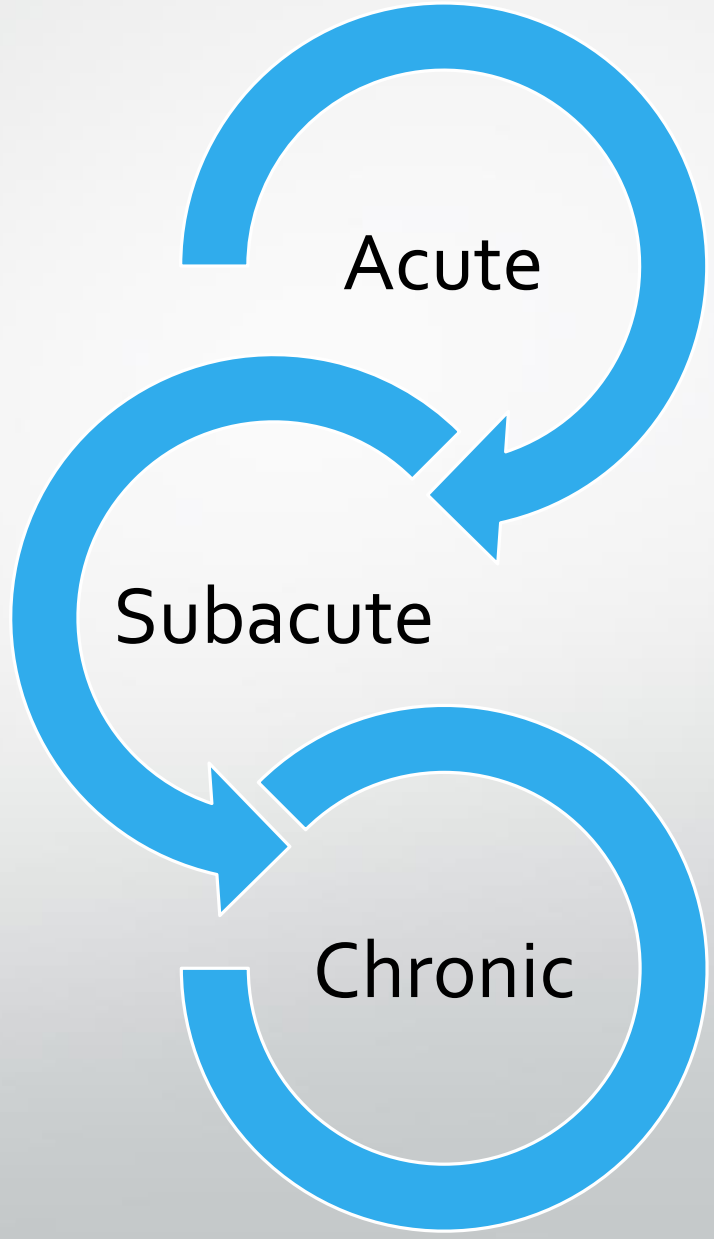


Assessment

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

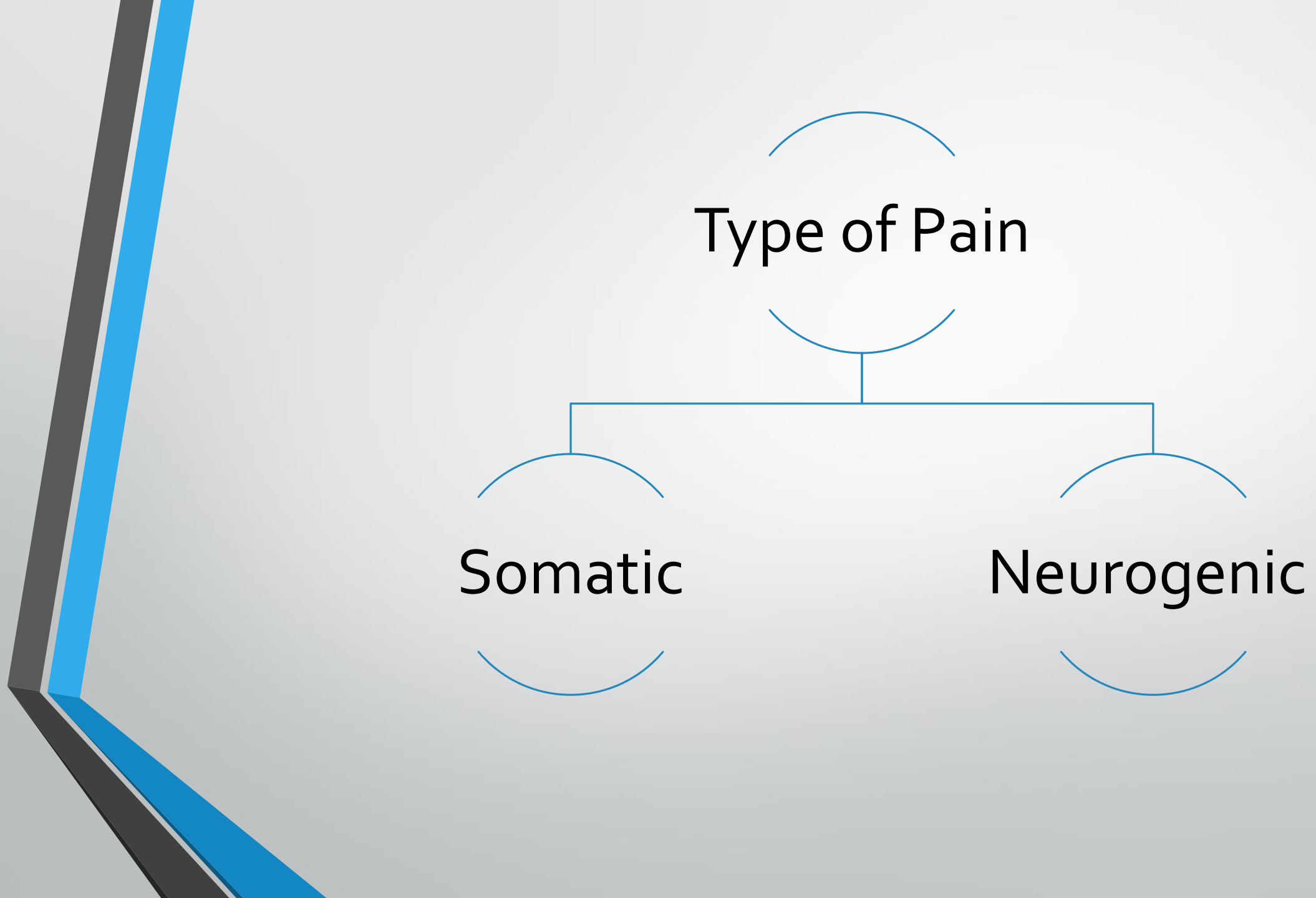
Red Flags- Lumbar

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

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

Adapted from Hoppenfeld p.38

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

Adapted from Hoppenfeld p.254

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)

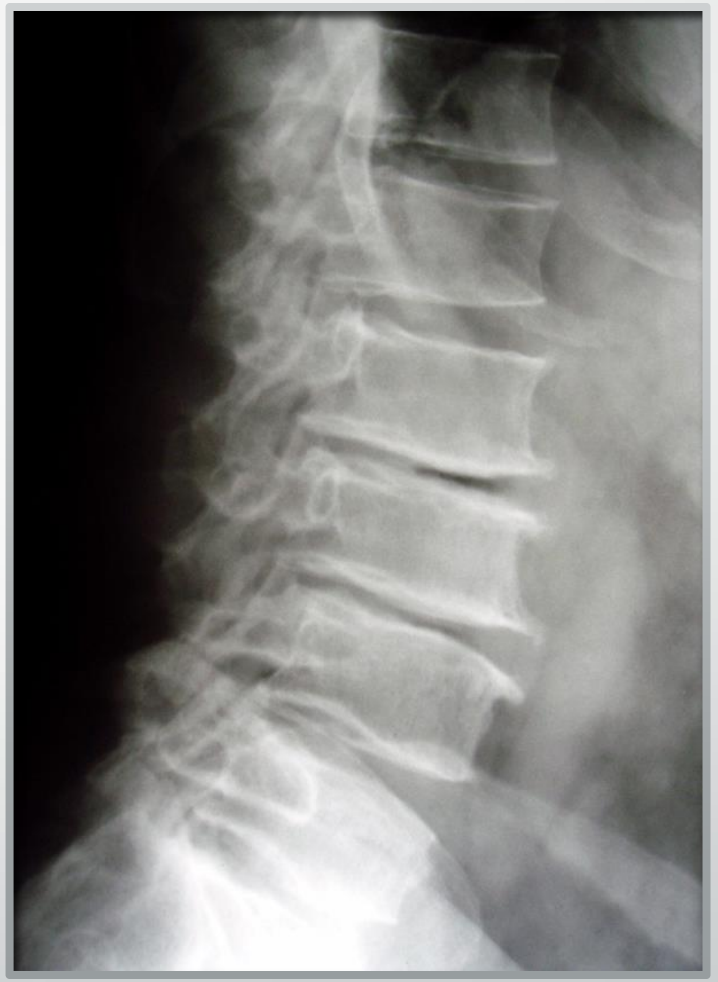
Case Study- Cervical

- 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



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

Pharmacologic Treatment Options

- Acetaminophen
- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Analgesics
- Muscle relaxants
- Short course oral steroid- for acute symptoms
- 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.