Viscerogenic Causes of Neck and Back

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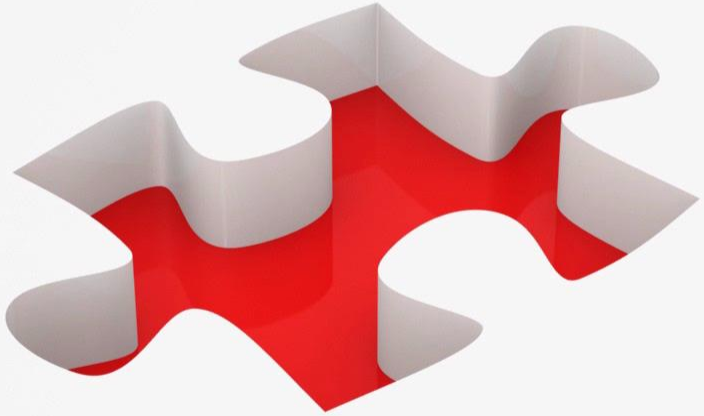


Cervical pain Systemic Causes

Cancer

- Metastatic lesions (leukemia, Hodgkin's disease)
- Cervical bone tumors
- Cervical cord tumors
- Lung cancer; Pancoast's tumor
- Esophageal cancer
- Thyroid cancer

Cervical pain Systemic Causes

Cardiovascular

- Angina
- Myocardial infarction
- Aortic aneurysm

Pulmonary

- Lung cancer; Pancoast's tumor
- Tracheobronchial irritation
- Chronic bronchitis
- Pneumothorax

Gastrointestinal

- Esophagitis
- Esophageal cancer

Other Causes

- Infection
- Vertebral osteomyelitis
- Meningitis
- Lyme disease
- Retro-pharyngeal abscess

- Epidural abscess
- Fibromyalgia
- Osteoporosis
- Psychogenic
- Rheumatoid arthritis
- Fracture

Thoracic/scapular pain Systemic Causes

Cancer

- Mediastinal tumors
- Metastatic extension
- Pancreatic cancer
- Breast cancer

Cardiovascular

- Angina
- Myocardial infarction
- Aortic aneurysm

Pulmonary

- Respiratory or lung infection
- Empyema
- Chronic bronchitis
- Pleurisy
- Pneumothorax
- Pneumonia

Renal/Urologic

- Acute pyelonephritis
- Kidney disease

Gastrointestinal

- Esophagitis (severe)
- Esophageal spasm
- Peptic ulcer
- Acute cholecystitis
- Biliary colic
- Pancreatic disease

Other

- Infection:
- Vertebral osteomyelitis •
- Herpes zoster
- HIV
- Osteoporosis
- Fibromyalgia
- Psychogenic (nonorganic)
- Acromegaly
- Cushing's syndrome

Lumbar pain Systemic Causes

Cancer

- Metastatic lesions
- Prostate cancer
- Testicular cancer
- Pancreatic cancer
- Colorectal cancer
- Multiple myeloma
- Lymphoma

Cardiovascular

- Abdominal aortic aneurysm
- Endocarditis
- Myocarditis
- Peripheral vascular:
- Post-operative bleeding from anterior spine surgery

Renal/Urologic

- Kidney disorders:
- Acute pyelonephritis
- Perinephritic abscess
- Nephrolithiasis
- Ureteral colic (kidney stones)
- Urinary tract infection
- Dialysis (first-use syndrome)
- Renal tumors

Gastrointestinal

- Small intestine:
- • Obstruction (neoplasm)
- • Irritable bowel syndrome
- • Crohn's disease
- Colon:
- • Diverticular disease
- Pancreatic disease
- Appendicitis

Gynecologic disorders:

- • Retroversion of the uterus
- • Uterine fibroids
- • Ovarian cysts
- • Endometriosis
- • Pelvic inflammatory disease (PID)
- • Incest/sexual assault
- • Rectocele, cystocele
- • Uterine prolapse
- Normal pregnancy
- Multiparity

Other

- Infection:
- Vertebral osteomyelitis
- Herpes zoster
- Spinal tuberculosis
- Candidiasis (yeast)
- Psoas abscess
- HIV

- Ankylosing spondylitis
- Fibromyalgia
- Osteoporosis
- Psychogenic
- Fracture
- Cushing's syndrome
- Type III Hypersensitivity disorder
- Post-regional anesthesia

Most Common Red Flags Associated with Neck/Back Pain of Systemic Origin

- Age less than 20 or over 50
- Previous history of cancer
- Constitutional symptoms
- Recent urinary tract infection
- History of injection drug use

- Immunocompromised condition
- Failure to improve with conservative care (usually over 4 to 6 weeks)

- Pain is not relieved by rest or recumbency
- • Severe, constant night time pain
- • Progressive, neurologic deficit; saddle anesthesia
- • Back pain accompanied by abdominal, pelvic, or hip pain

- History of falls or trauma
- •Significant morning stiffness with limitation in all spinal movements, ankylosing spondylitis
- Skin rash

Past Medical History

- Provides essential clues in determining the need for referral to a physician
- A history of fever and chills with or without previous infection anywhere in the body may indicate a low-grade infection.

- The therapist must always ask about a history of motor vehicle accident, blunt impact, repetitive injury, sudden stress caused by lifting or pulling, or trauma of any kind.
- Even minor falls or lifting when osteoporosis is present can result in severe fracture in older adults

- Educating clients about their risk factors is a key element in risk factor reduction.
- Risk factors vary depending on family history, previous personal history, and disease, illness, or condition present. For example, risk factors for heart disease will be different from risk factors for osteoporosis .

- Always check medications for potential adverse side effects causing muscular, joint, neck, or back pain.

- Age is a risk factor for many systemic and Viscerogenic problems. The risk of certain diseases associated with back pain increases with advancing age (e.g., osteoporosis, aneurysm, myocardial infarction, Sarcopenia).

- Routine screening for osteoporosis, hypertension, incontinence, cancer, vestibular or balance problems, and other potential problems can be a part of the physical therapist's practice.

- During the examination the therapist will begin to get an idea of the client's overall clinical presentation.
- The client interview, systems review and assessment of pain patterns and pain types form the basis for the therapist's evaluation and eventual diagnosis.

Effect of Position

- When seen early in the course of symptoms, neck or back pain of a systemic origin is usually accompanied by full and painless range of motion without limitations.

Night Pain

- Pain at night can signal a serious problem such as tumor, infection, or inflammation.
- Long-standing night pain unaltered by positional change suggests a space-occupying lesion, such as a tumor.

- Systemic back pain may get worse at night, especially when caused by vertebral osteomyelitis Cushing's disease, osteomalacia,primary and metastatic cancer, ankylosing spondylitis etc.

- After reviewing the client history and identifying pain types or pain patterns, the therapist must ask the client about the presence of additional signs and symptoms.
- Signs and symptoms associated with systemic disease are often present but go unidentified either because the client does not volunteer the information or the therapist does not ask.

LOCATION OF PAIN AND SYMPTOMS

Pain can be divided into anatomic location of symptoms.

- ✓ Visceral disease of the abdomen and/or pelvis is more likely to refer pain to the low back region.

Head

- The therapist may evaluate pain and symptoms of the face, scalp, or skull. Headache is a frequent complaint given by adults and children.
- The brain itself does not feel pain because it has no pain receptors. Most often the headache is caused by an extra cranial disorder.

- Muscles, nerves, arteries and veins, subcutaneous tissues, eyes, ears, sinuses and mucous membranes.
- HIS has divides headaches into three parts:
- Primary headache
- Secondary headache,
- Cranial neuralgias

- Primary headache includes migraine, tension type headache, and cluster headache.
- Secondary headaches are caused by an underlying disease, like a tumor, brain bleed or infection.

Headache types

Migraine

- Described as throbbing or pulsating Often one-sided (unilateral); often around or behind one eye
- Associated with nausea, vomiting

Common triggers:

alcohol, food, hormonal changes, hunger, lack of sleep, perfume, stress, medication, pollens,

- May be preceded by symptoms:
  - • Visual changes
  - • Motor weakness
  - • Dizziness
  - • Paresthesias

Facial pallor, cold hands and feet

Tension Headache

- Described as dull pressure
- Sensation of band around head
- Bilateral or globe
- Muscular tenderness , soreness in C spine
- Worse with loud sound, bright light
- H/O panic, anxiety, depression

Cervicogenic headache

- Start at occipit and spread anteriorly
- Bilateral mild to severe
- Worse with neck movements
- Can resemble migraine
- History of trauma (e.G., Whiplash)
- Disc disease
- Arthritis

- Referred pain in any part of the head caused by musculoskeletal tissues innervated by cervical nerves (C1-C4).

Myelopathy

refers to pathology of the spinal cord.

- When due to trauma, it is known as spinal cord injury. When inflammatory, it is known as myelitis. Disease that is vascular in nature is known as vascular myelopathy.
  - Clinical signs and symptoms depend on which spinal cord level is affected and the extent of the pathology.

- Upper motor neuron signs (weakness, spasticity, clumsiness, altered tonus)
- Pathological hyper-reflexia and positive Babinski sign
- Sensory deficits
- Bowel/bladder symptoms and sexual dysfunction.

Clinical signs and symptoms of cervical myelopathy

- Wide-based spastic gait
- Clumsy hands
- Visible change in handwriting
- Difficulty manipulating or handling coins
- Hyperreflexia
- Positive Babinski test
- Positive Hoffman sign
- Lhermitte's sign
- Urinary retention followed by overflow incontinence

- Torticollis
- Turning of whole body instead of the neck
- **Vertebrobasilar insufficiency** occurs with decreased vertebral height, osteophyte formation, postural changes, and ligamentous changes
- Anterior neck pain that is worse with swallowing and turning the head from side to side.

Systemic Origins of Headache

Cancer

- Primary neoplasm
- Chemotherapy; brain radiation

Cardiovascular

- Migraine
- Ischemia (atherosclerosis; vertebrobasilar insufficiency)
- Cerebral vascular thrombosis
- Subarachnoid hemorrhage
- Hypertension
- Febrile illnesses
- Hypoxia

Cont.

Pulmonary

- Obstructive sleep apnea
- Hyperventilation (e.g., associated with anxiety or panic attacks)

Renal/Urologic

- Kidney failure; renal insufficiency
- Dialysis (

Gynecologic

- Pregnancy
- Dysmenorrhea

Neurologic

- Post-seizure
- Disorder of cranium, cranial structures
- Cranial neuralgia (e.g., trigeminal, Bell's palsy, optic neuritis)
- Brain abscess
- Hydrocephalus

Neck and Back Pain: Symptoms and Possible Causes

• Night pain unrelieved by rest or change in position; made worse by recumbency	**Tumor**
• Fever, chills, sweats	**Infection**
• Throbbing pain	**Aortic Aneurysm**
• Abdominal pain radiating to mid-back	**Pancreatitis, gastrointestinal disease, peptic ulcer**
Morning stiffness that improves as day goes on	**Infl. Arthritis**
• "Stocking glove" numbness	**Referred pain, nonorganic pain**
• Chronic spinal pain	**Stress/psychosocial factors**

Thoracic pain

- Look for the cause of thoracic pain at the level above and below the area of pain and dysfunction.
- Shoulder impingement & mechanical problems in the cervical spine can refer pain
- The close proximity of the thoracic spine to the chest and respiratory organs requires careful screening

- Thoracic pain can also be referred from the kidney, biliary duct, esophagus, stomach, gallbladder, pancreas, and heart.
- Thoracic aortic aneurysm, angina, and acute myocardial infarction are the most likely cardiac causes of thoracic back pain.

- Tumors occur most often in the thoracic spine(lymphoma, breast, or lung cancer).
- Tumor involvement in the thoracic spine may produce ischemic damage to the spinal cord or early cord compression.
- Peptic ulcer can refer pain to the midthoracic spine (T6- T10).
- History of NSAID use and blood in the stools is important

Scapula

- Most causes of scapular pain occur along the vertebral border and result from various primary musculoskeletal lesions. However, cardiac, pul-monary, renal, and GI disorders can cause scapular pain.

Lumbar Spine

- LBP is very prevalent in the adult population, affecting up to 80% of all adults sometime in their lifetimes. In most cases, acute symptoms resolve within a few weeks to a few months.
- Bone and joint diseases (inflammatory and non-inflammatory), lung and heart diseases, and enteric diseases top the list of conditions contributing to LBP in older adults.

Sacrum/Sacroiliac

- Sacroiliac pain in the absence of trauma and in the presence of a negative spring test must be evaluated.

- The most common etiology of serious pathology in this anatomic region comes from the spondylo-arthropathies (disease of the joints of the spine) such as ankylosing spondylitis, Reiter's syndrome, psoriatic arthritis, and arthritis associated with chronic inflammatory bowel (enteropathic) disease

- Spondylo-arthropathy is characterized by morning pain accompanied by prolonged stiffness that improves with activity. There is limitation of motion in all directions and tenderness over the spine and sacroiliac joints.
- The most significant finding in ankylosing spondylitis is that the client has night (back) pain and morning stiffness as the two major complaints, but asymmetric sacroiliac involvement with radiation into the buttock and thigh can occur.

- Such symptoms present a red flag identifying clients who should be referred to a physician.
- Clients with these diseases have a genetic predisposition to these arthropathies, which are triggered by a number of environmental factors such as trauma and infection.
- Polymyalgia rheumatica and fibromyalgia syndrome are associated with lumbosacral pain.

SOURCES OF PAIN AND SYMPTOMS

Pain can be evaluated by the source of symptoms. It could be Visceral, Neurogenic, Vasculogenic, Spondylogenic, or psychogenic in origin.

Specific symptoms and characteristics of pain (frequency, intensity, duration, description) help identify sources of back pain.

Viscerogenic

- Visceral pain is not usually confused with pain originating in the head, neck, and back because sufficient specific symptoms and signs are often present to localize the problem correctly.
- Disorders of the GI, pulmonary, urologic, and gynecologic systems can cause stimulation of sensory nerves supplied by the same segments of the spinal cord, resulting in referred back pain.

- Back pain can be associated with distention or perforation of organs, gynecologic conditions, or GIT disorders. Pain can occur from compression, ischemia, inflammation, or infection affecting any of the organs.
- Colicky pain is associated with spasm in a hollow viscus. Severe, tearing pain with sweating and dizziness may originate from an expanding abdominal aortic aneurysm. Burning pain may originate from a duodenal ulcer.

- Muscle spasm and tenderness along the vertebrae may be elicited in the presence of visceral impairment. For example spasm on the right side at the 9th and 10th costal cartilages can be a symptom of gallbladder problems.
- The spleen can cause tenderness and spasm at the level of T9 on the left side. The kidneys are more likely to cause tenderness, spasm, and possible cutaneous pain or sensitivity at the level of the 11th and 12th ribs.
- The therapist should look for clusters of signs and symptoms that may suggest involvement of a particular system.

Neurogenic

Neurogenic pain is not easily differentiated. Radicular pain results from irritation of axons of a spinal nerve or neurons in the dorsal root ganglion whereas referred pain results from activation of nociceptors in somatic or visceral tissue.

- Neurologic signs are produced by conduction block in motor or sensory nerves, but conduction block does not cause pain. Thus, even in a client with back pain and neurologic signs, whatever causes the neurologic signs is not causing the back pain by the same mechanism. Therefore, finding the cause of the neurologic signs does not always identify the cause of the back pain.

- Conditions such as radiculitis may cause both pain and neurologic signs
  - ❖Individual will have three problems each with a different mechanism

- Neurologic signs due to conduction block
- Radicular pain due to nerve-root inflammation
- Neck or back pain due to inflammation .

- Identifying a mechanical cause of pain does not always rule out serious spinal pathology. For example neurogenic pain can be caused by a metastatic lesion applying pressure or traction on any of the neural components. The therapist must rely on history, clinical presentation, and the presence of any associated signs and symptoms to make a determination about the need for medical referral

- Sciatica alone or sciatica accompanying back pain is an important but unreliable symptom.
- This similarity may lead to long and serious delays in diagnosis. Such a situation may require persistence on the part of the therapist and client in requesting further medical follow up.

- Spinal stenosis caused by a narrowing of the spinal canal, nerve root canals, or intervertebral foramina may produce neurogenic claudication
- Pressure on the cauda equina from tumor, disc protrusion, infection, or inflammation can result in cauda equina syndrome, which is a medical emergency.

Clinical Signs and Symptoms of **Cauda Equina Syndrome**

- • Low back pain
- • Unilateral or bilateral sciatica
- • Saddle anesthesia; perineal hypoesthesia
- Change in bowel a n d / o r bladder function (e.g., difficulty initiating flow of urine, urine retention, urinary or fecal incontinence, constipation, decreased anal tone and sensation)
- • Lower extremity motor weakness and sensory deficits
- Diminished or absent lower extremity deep tendon reflexes

Vasculogenic

- Pain of a vascular origin may be mistaken for pain from a wide variety of musculoskeletal, neurologic, and arthritic disorders.
- Vasculogenic pain can originate from both the heart (viscera) and the blood vessels (soma), primarily peripheral vascular disease.
- Back pain has been linked to atherosclerotic changes in the posterior wall of the abdominal aorta in older adults.
- The therapist can rely on special clues regarding vasculogenic-induced pain in the screening process

Vascular	Neurogenic
Throbbing	Burning
Diminished, absent pulses	No change in pulses
Trophic changes (skin color, texture, temperature)	No trophic changes; look for subtle strength deficits (e.g., partial foot drop, hip flexor or quadriceps weakness; calf muscle atrophy)
Pain present in all spinal positions	Pain increases with spinal extension, decreases with spinal flexion
Symptoms with standing: no	Symptoms with standing: yes
Pain increases with activity; promptly relieved by rest or cessation of activity	Pain may respond to prolonged rest

Spondylogenic

- Bone tenderness and pain on weight bearing usually characterize spondylogenic back pain
- Associated signs and symptoms may include weight loss, fever, deformity, and night pain.
- Fracture from any cause, osteomalacia, osteoporosis, Paget's disease, infection, inflammation, and metastatic bone disease can cause bone pain

- The acute pain of a compression fracture superimposed on chronic discomfort, often in the absence of a history of trauma, may be the only presenting symptom.
- Back pain over the thoracic or lumbar spine that is intensified by prolonged sitting, standing, and the Valsalva maneuver may resolve after 3 or 4 months as the fractures of the vertebral bodies heal.

- The pain of untreated vertebral compression fractures may persist because of microfractures of biomechanical effects from deformity.
- Other symptoms include pain on percussion over the fractured vertebral bodies, paraspinal muscle spasms, loss of height, and kyphoscoliosis

- Sacral stress fractures should be considered in low back pain of postmenopausal women with risk factors and athletes, particularly runners, volleyball players, and field hockey players.

Psychogenic

- Psychogenic pain is observed in the client who has anxiety that amplifies or increases the person's perception of pain. Depression has been implicated in many painful conditions as the primary underlying problem.
- Anxiety, depression, and panic disorder can lead to muscle tension, more anxiety, and then to muscle spasm.

SCREENING FOR ONCOLOGIC CAUSES OF BACK PAIN

- Cancer is a possible cause of referred pain.
- Multiple myeloma is the most common primary malignancy involving the spine often resulting in diffuse osteoporosis .

- Paraplegia with only stocking glove anesthesia
- Reflexes inconsistent with the presenting problem or other symptoms present
- Cogwheel motion of muscles for weakness
- SLR in the sitting versus the supine position
- (person is unable to complete SLR in supine but can easily perform an SLR in a sitting position)
- SLR supine with plantar flexion instead of dorsiflexion reproduces symptoms

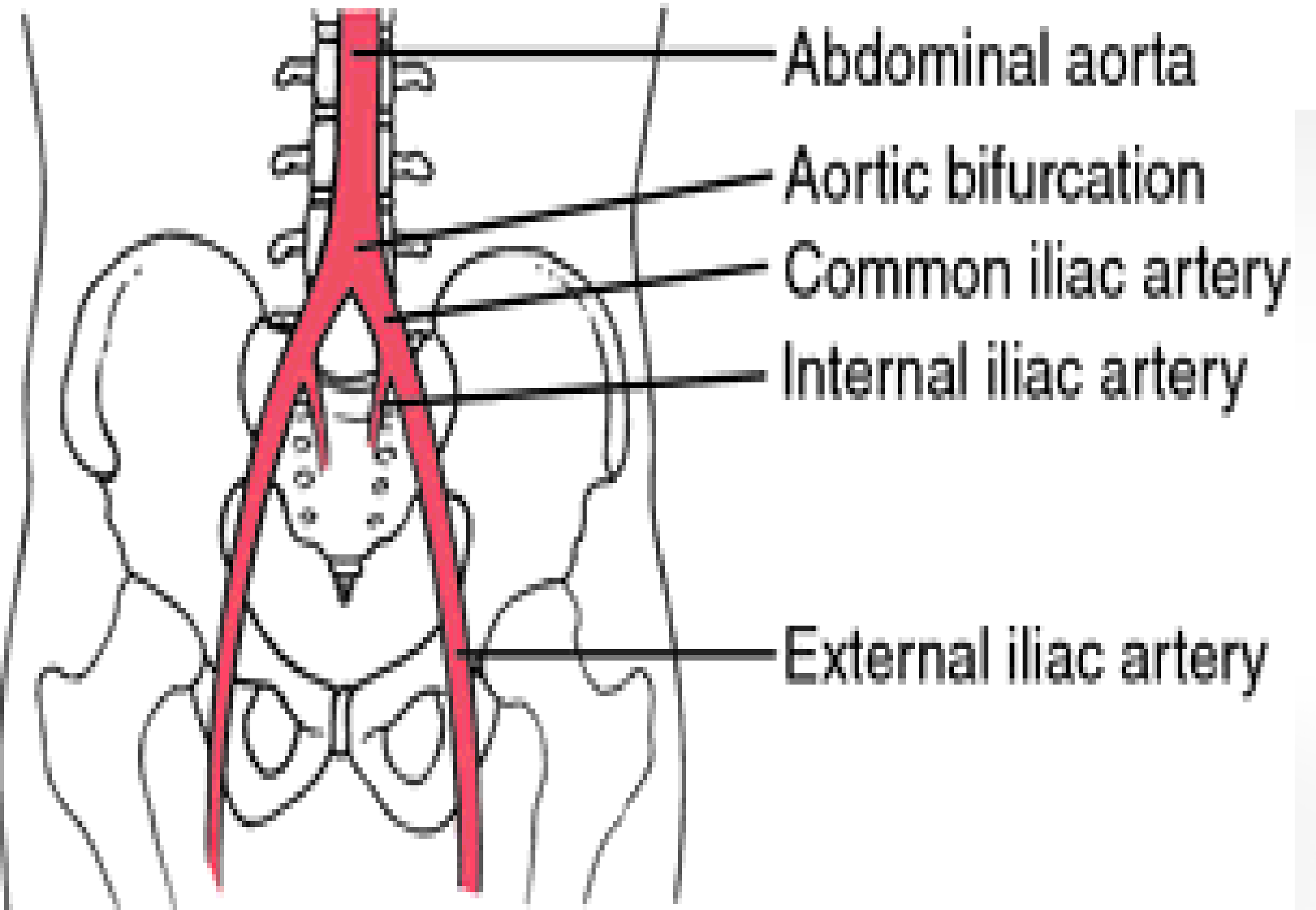
Clinical Signs and Symptoms of **Oncologic Spine Pain**

- Severe weakness without pain
- Weakness w i t h full range
- Sciatica caused by metastases to bones of pelvis, lumbar spine, or femur
- Pain does not vary with activity or position (intense, constant); night p a i n
- Skin temperature differences from side to side
- Progressive neurologic deficits
- Positive percussive tap test to one or more spinous process
- Occipital headache, neck pain, palpable external mass in neck or upper torso
- Cervical pain or symptoms accompanied by u r i n a r y incontinence

SCREENING FOR CARDIAC CAUSES OF NECK AND BACK PAIN

Vascular pain patterns

- **Cardiac**
- **peripheral vessels**


Abdominal aorta
Aortic bifurcation
Common iliac artery
Internal iliac artery
External iliac artery

Angina

- Anterior neck and jaw pain
- Can appear as isolated mid-thoracic back pain
- Lag time of 3 to 5 minutes

Myocardial Ischemia

- MI can be completely asymptomatic
- Anterior neck and/or mid thoracic pain
- Associated signs and symptoms.
- Age and past medical history.

Abdominal Aortic Aneurysm (AAA)

- **An aneurysm is an abnormal dilation in a weak or diseased arterial wall causing a saclike protrusion.**
- Prompt medical attention is required
- Common sites are the aorta and cerebral vascular system.
- AAA occurs most often in men in the sixth or seventh decade of life.

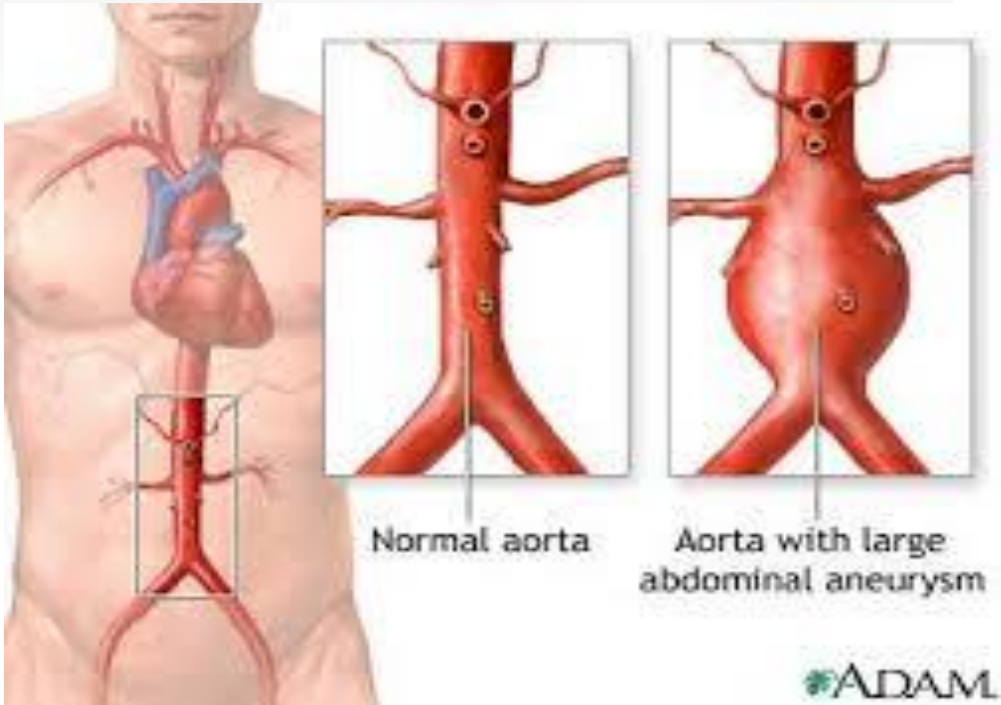
Risk Factors

- Age
- Male gender
- Smoking
- Family history
- Aging & weight lifting
-

Clinical presentation

- Deep and boring pain in the mid-lumbar region.
- Sharp, intense, severe or knifelike

in the abdomen, chest, or in the back



- Bruits
- Diminished Peripheral pulse
- Clues of coronary disease or intermittent claudicating of the lower extremities may be present.
- Proper breathing and abdominal support without using a Valsalva maneuver is important in any exercise program

The location of discomfort, pain, or other symptoms is determined by the location of the pathology (arterial obstruction).

Site of occlusion	Signs and symptoms

Aortic bifurcation	• Sensory and motor deficits
	  • Muscle weakness and atrophy
	  • Numbness (loss of sensation)
	  • Paresthesias (burning, pricking)
	  • Paralysis
	• Intermittent claudication (pain or discomfort relieved by rest): bilateral buttock and/or leg, low back, gluteal, thigh, calf
	• Cold, pale legs with decreased or absent peripheral pulses

Iliac artery	• Intermittent claudication (pain or discomfort in the buttock, hip, thigh of the affected leg; can be unilateral or bilateral; relieved by rest) • Diminished or absent femoral or distal pulses • Impotence in males
Femoral and popliteal artery	• Intermittent claudication (pain or discomfort; calf and foot; may radiate) • Leg pallor and coolness • Dependent rubor • Blanching of feet on elevation • No palpable pulses in ankles and feet • Gangrene
Tibial and common peroneal artery	• Intermittent claudication (calf pain or discomfort; feet occasionally) • Pain at rest (severe disease); possibly relieved by dangling leg • Same skin and temperature changes in lower leg and foot as described above • Pedal pulses absent; popliteal pulses may be present

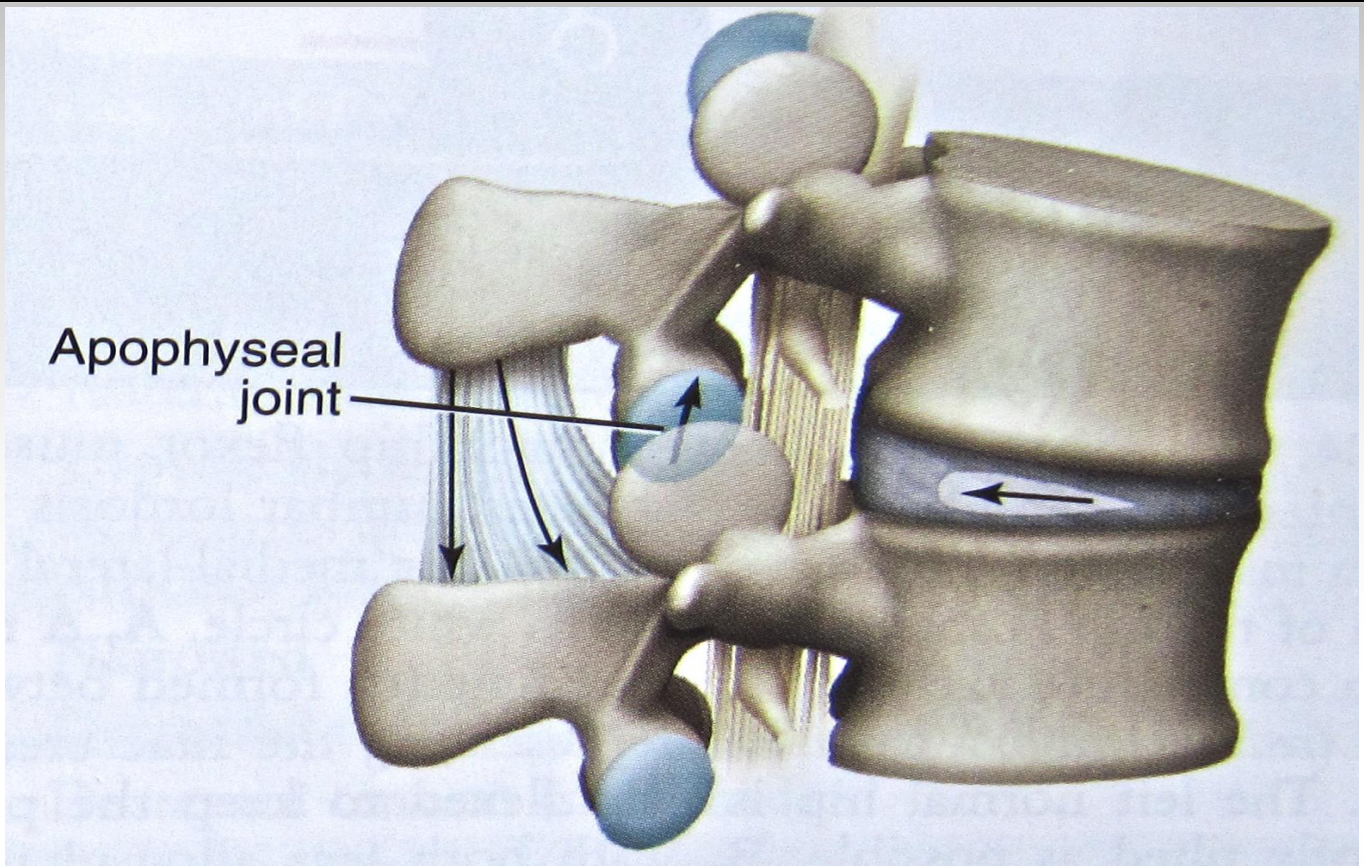
From Goodman CC, Fuller K, Boissonnault WG: *Pathology: implications for the physical therapist*, ed 2, Philadelphia, 2003, WB Saunders.

The Bike Test

Van Gelderen Bicycle Test

- Back pain of a vascular versus neurogenic origin.
- Vascular and neurogenic disease often coexists in the same person with an overlap of symptoms of each.

- Response to rest
- Position of the spine
- Presence of any trophic (skin) changes



Forward bending opens the vertebral canal (vertebral foramen) giving the spinal cord additional space

What is the effect of peddling a stationary bicycle?

Pulmonary

- Associated signs and symptoms (dyspnea, persistent cough, fever and chills)
- Back pain aggravated by respiratory movements (deep breathing, laughing, coughing)
- Auto splinting
- Spinal/trunk movements (e.g., trunk rotation, trunk side bending) do not reproduce symptoms

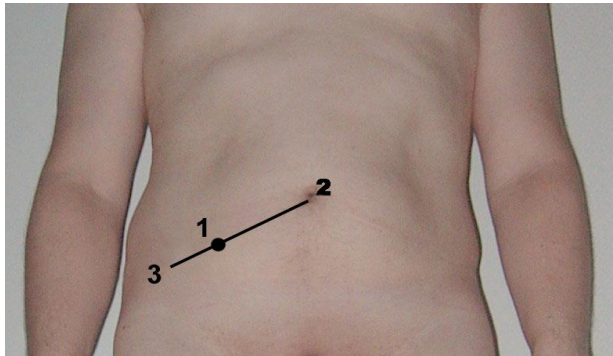
Renal/Urologic

- Renal and urethral pain is felt throughout T9 to LI dermatomes
- Pain of an inflammatory nature can be Relieved by a change in position. However, renal colic remains unchanged by a change in position.
- Side bending to the same side and pressure placed along the spine at that level is "more comfortable

- Associated signs and symptoms (blood in urine, fever, chills, increased urinary frequency, difficulty in starting or continuing stream of urine, testicular pain in men)

Gastrointestinal

- Back and abdominal pain at the same level.
- Back pain associated with food or meals
- Back pain accompanied by heartburn or relieved by antacids
- Associated signs and symptoms (dysphagia, odynophagia, melena, early satiety with weight loss, tenderness over McBurney's point, bloody diarrhea)



- Sacral pain occurs when the rectum is stimulated, such as during a bowel movement or when passing gas and relieved after each of these events

Gynecologic

- History or current gynecologic disorder
- Associated signs and symptoms (missed or irregular menses, tender breasts, cyclic nausea and vomiting, chronic constipation, vaginal discharge, abnormal uterine bleeding or bleeding in a postmenopausal woman)
- Low back and/or pelvic pain developing soon after a missed menstrual cycle; blood pressure may be significantly low, and there may be concomitant shoulder pain when hemorrhaging occurs **(ectopic pregnancy)**
- Low back and/or pelvic pain occurring intermittently but with regularity in response to menstrual cycle (e.g., ovulation around days 10 to 14 and onset of menses around days 23 to 28)

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