



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



I have no tears | there is only pain

Pain Types and Viscerogenic Pain Patterns

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Study Outline

- Pain
- Mechanisms of Referred Visceral Pain
- Multi-segmental Innervations
- Assessment of Pain and Symptoms
- Sources of Pain
- Types of Pain
- Comparison of Systemic Versus Musculoskeletal Pain Patterns
- Characteristics of Viscerogenic Pain
- Screening for Emotional and Psychologic Overlay
- Screening for Systemic Versus Psychogenic
- Symptoms and Physician Referral



What is Pain??

What is pain?

- ❑ Pain is a difficult word to define
- ❑ Patients use different words to describe pain
- ❖ Aching, Pins and needles, Annoying, Pricking, Biting, Hurting, Radiating etc
- ❑ Different words in Urdu & Punjabi



What is pain?

□ Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage.

IASP – International Association for the Study of Pain 2009

Or

□ Pain is an unpleasant feeling often caused by intense or damaging stimuli.



What is pain?

□ Pain is

- subjective
- protective
- modified by developmental, behavioral, personality and cultural factors
- Recognized as the "fifth vital sign"

□ It is a symptom

- Associated signs are crying, sweating, increased heart rate, blood pressure, behavioral changes etc





Dual nature of pain

Fast pain

- ✓ acute
- ✓ pricking type
- ✓ well localized
- ✓ short duration

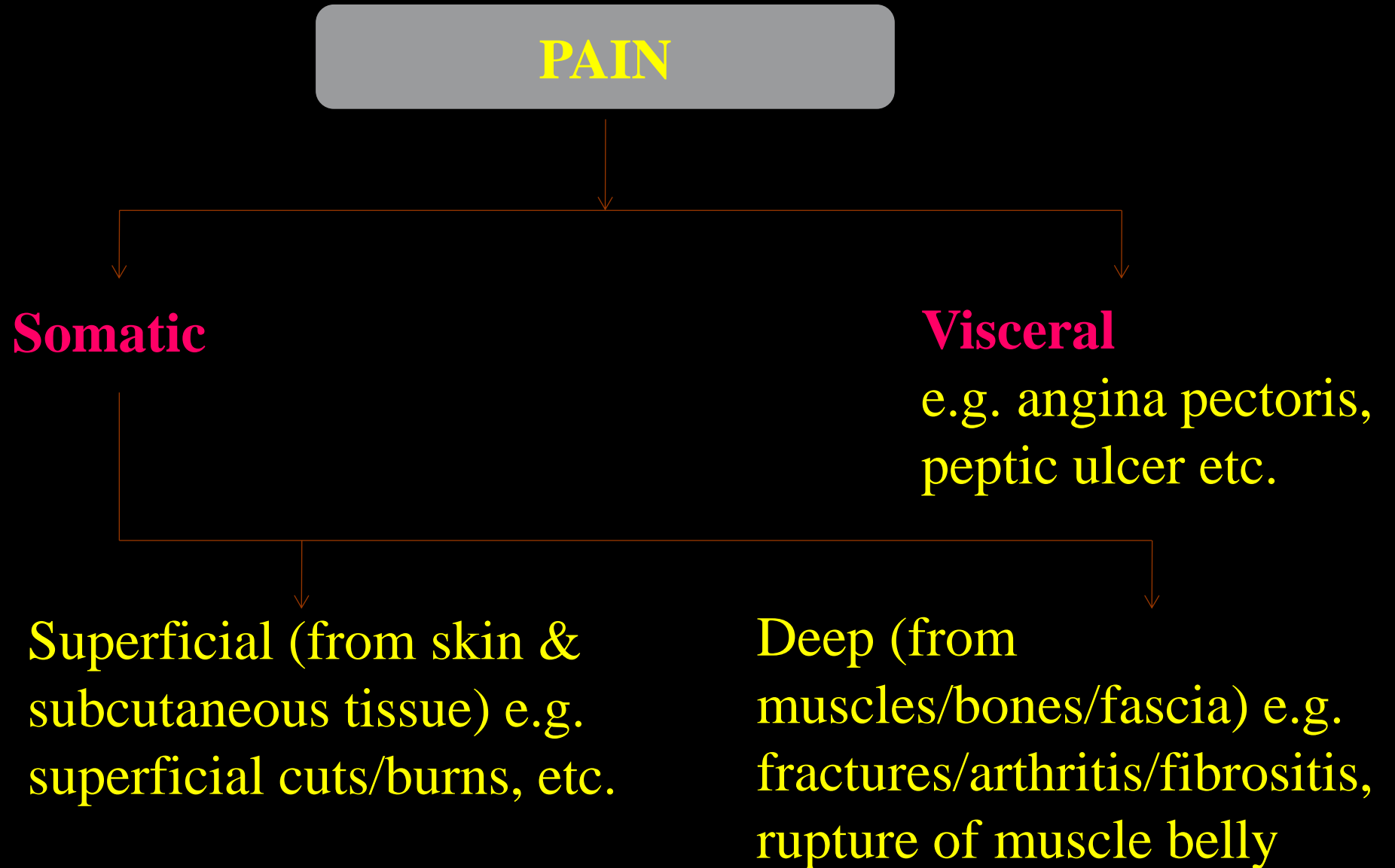
- ✓ Myelinated nerve fibres are involved (A delta)

Slow pain

- ✓ chronic
- ✓ throbbing type
- ✓ poorly localized
- ✓ long duration

- ✓ Unmyelinated nerve fibres are involved (c fibres)

CLASSIFICATION OF PAIN



Significance

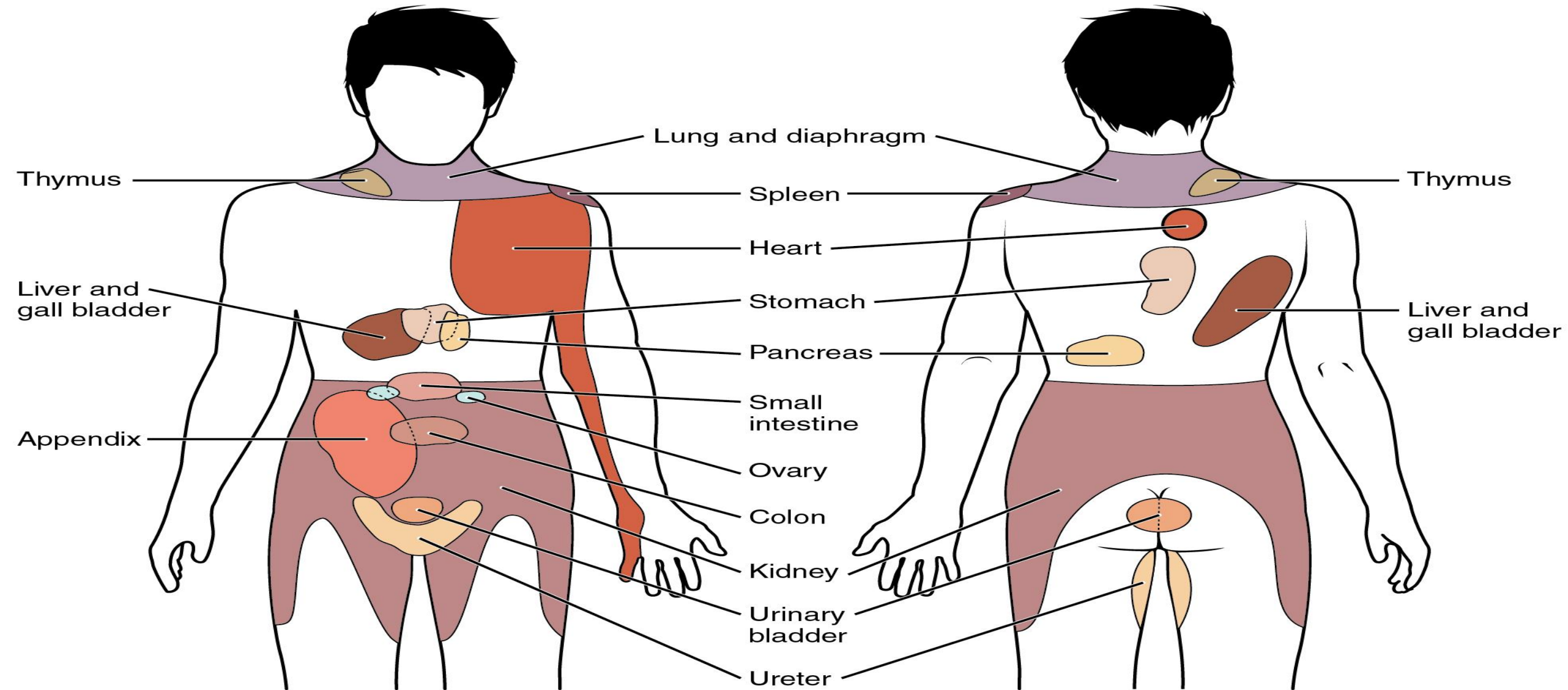
- ❑ Warning signal against tissue damage.
- ❖ Pain is one of the most prominent symptoms of tissue damage.
- ❑ Initiate protective reflexes
- ❖ causes the subject to get rid of the painful stimulus, or at least, to minimize tissue injury or damage



MECHANISMS OF REFERRED VISCERAL PAIN

- ✓ Embryologic development
- ✓ Multi-segmental innervations
- ✓ Direct pressure and shared pathways

MECHANISMS OF REFERRED VISCERAL PAIN (cont...)



Visceral Referred Pain

Site of Referral

Organ

Right Shoulder inferior scapula
Gallbladder

Right lung, Liver,

Left shoulder

Left lung, stomach, spleen

Jaw, neck, left shoulder and arm

Heart

Either shoulder

Diaphragm

Flank & Upper abdomen

Kidney

Substernal

Esophagus, heart, lung

Spine at T10

Pancreas

Suprapubic

Bladder

Occiput, forehead

Eye

Temporal HA

TMJ

If It crosses the knee or shoulder it's usually disk or neurologic

Embryologic Development

- ❑ Pain is referred to a site where the organ was located during embryologic development
- ❑ Nerves refer pain sensations from previous location in spite of migration of the organ

Example: chest is part of the gut in embryo, not unusual for disorders of thoracic viscera to refer pain to abdomen (pneumonia/pleuritis - abdominal pain)

Embryologic Development

- Example: heart muscle starts out as cranial structure, but pericardium is formed by gut tissue (Pericarditis can be felt as abdominal pain)

Embryologic Development

- ❑ Organs that develop from the same embryologic tissues and at similar times can demonstrate similar pathologic or abnormal development.



Multi-segmental Innervation

- ❑ Visceral organs innervated by the autonomic nervous system (part of the peripheral nervous system)
- ❑ Visceral afferents mediating pain travel with sympathetic and parasympathetic nerves
- ❑ Visceral organs have multiple levels of innervation (overlap with somatic structures)

Multi-segmental Innervation

- ❑ Visceral pain can be perceived in corresponding somatic areas
- ❖ **Example** : Cardiac innervation from C3-T4, pain can present in jaw, shoulder, chest, arm, neck, upper trapezius, back

Components of Autonomic (Motor) Nervous System

Parasympathetic (Craniosacral) Division

Origin:

Preganglionic neurons located in brainstem nuclei and S2–S4 regions of spinal cord

Functions:

- “Rest and digest” response
- Brings body to homeostasis

CN III (Oculomotor)

CN VII (Facial)

CN IX (Glossopharyngeal)

CN X (Vagus)

S2–S4 regions of spinal cord

Pelvic splanchnic nerves

Sympathetic (Thoracolumbar) Division

Origin:

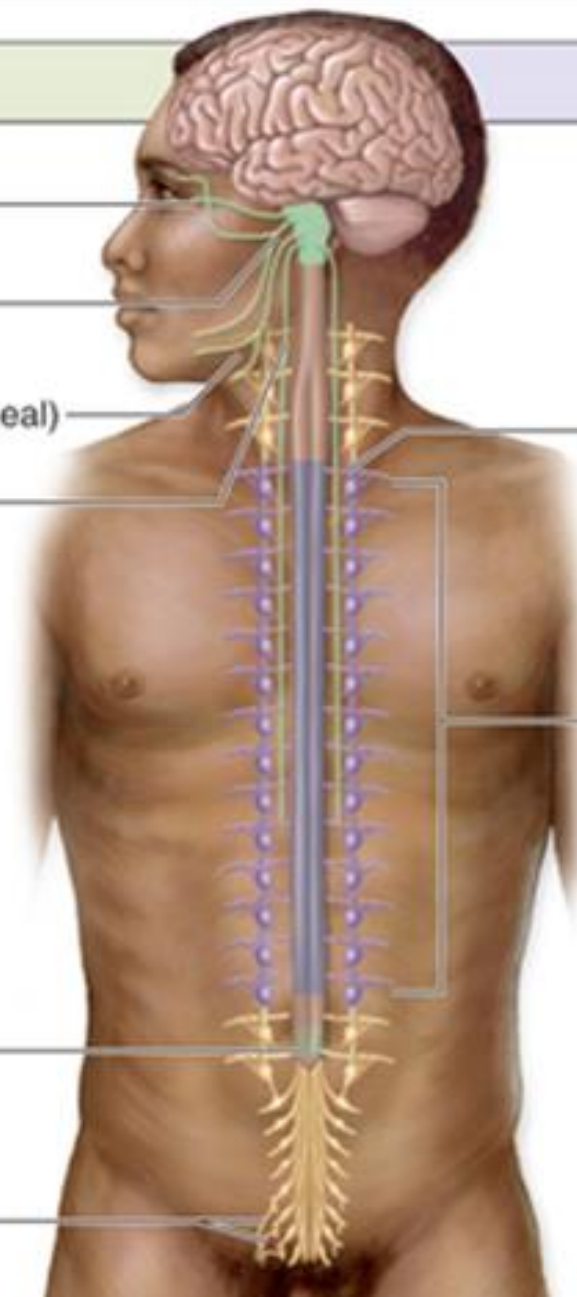
Preganglionic neurons located in lateral horns of T1–L2 regions of spinal cord

Functions:

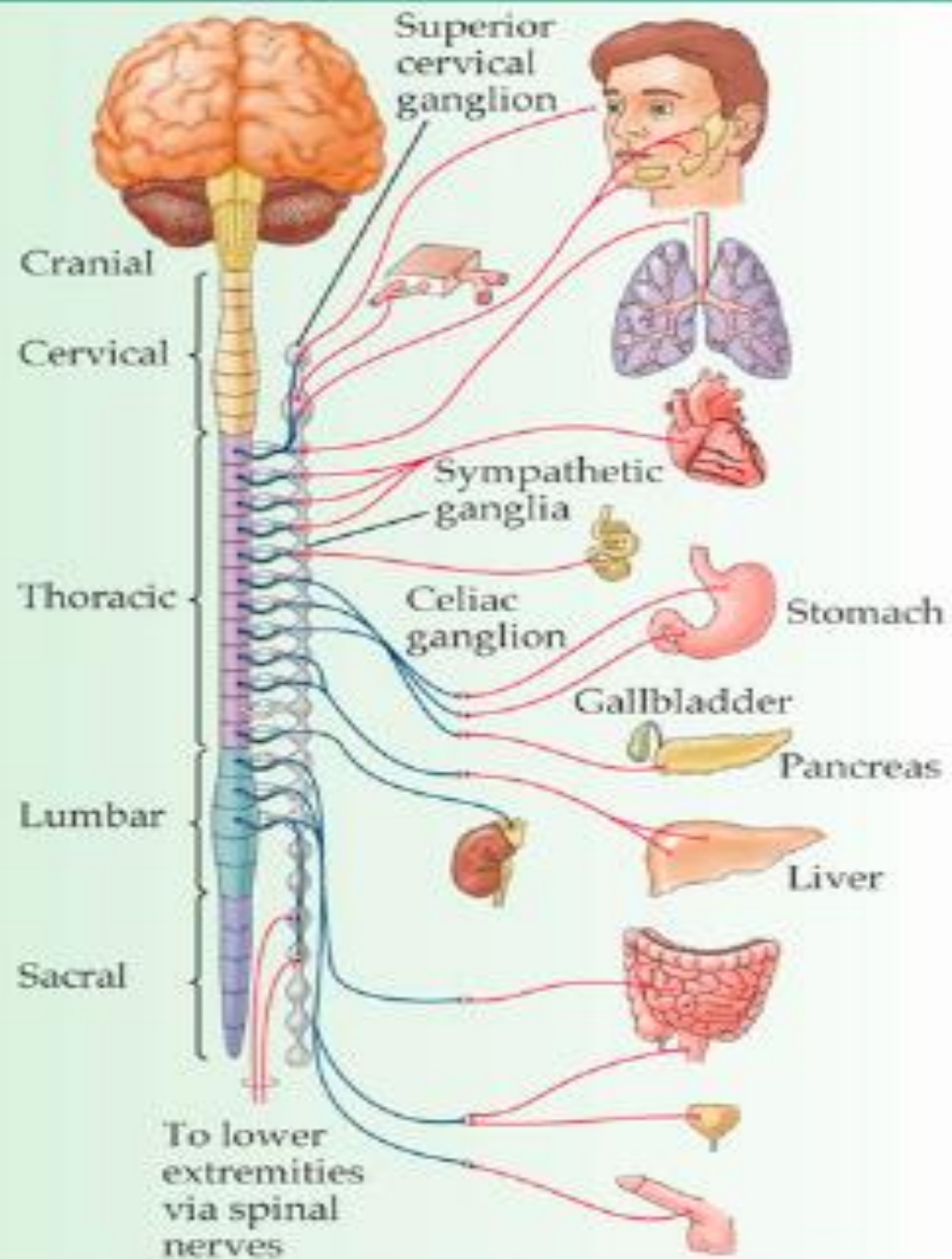
- Activated in emergency situations
- “Fight-or-flight” response
- Also involved with homeostasis

Sympathetic trunk

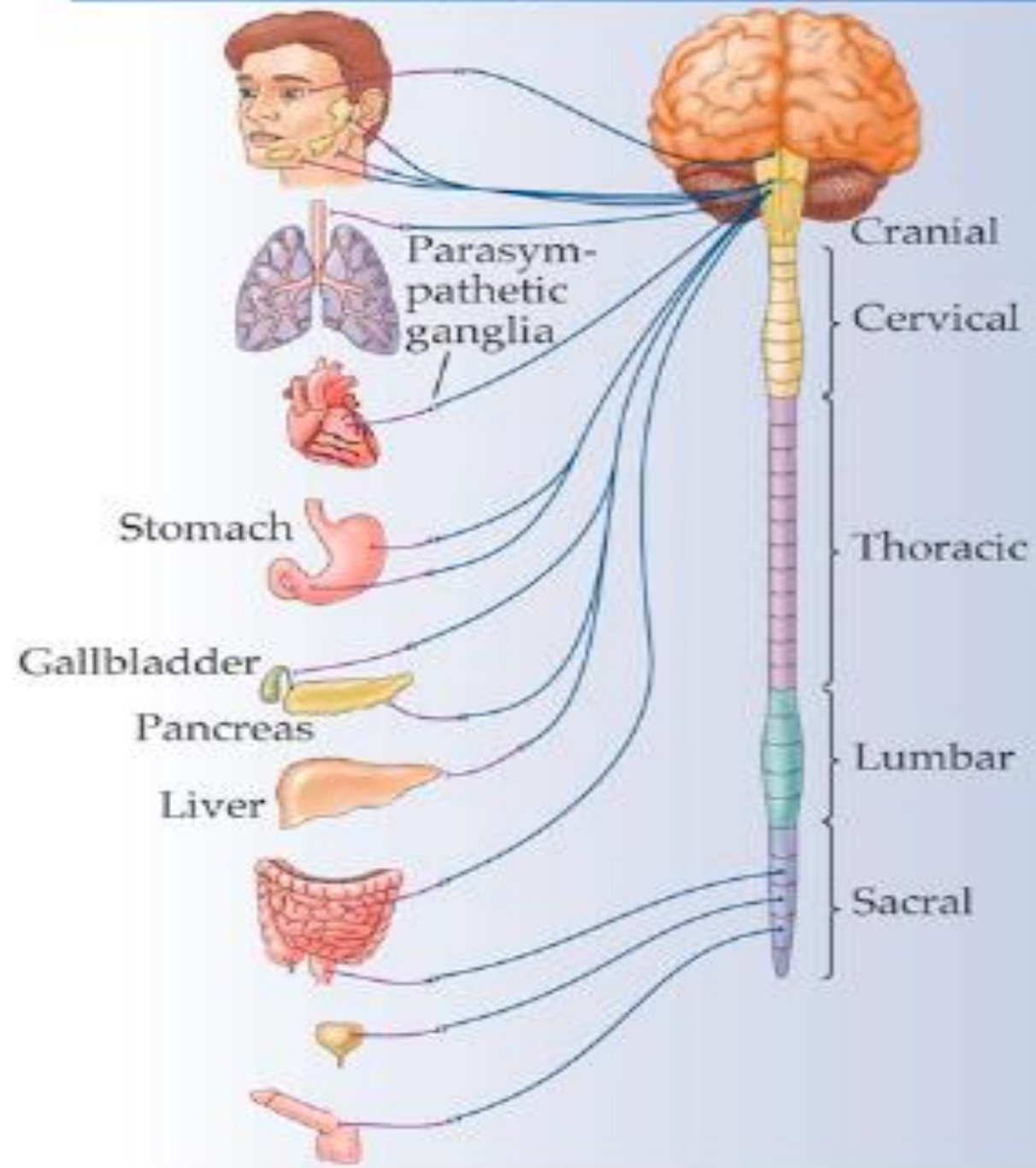
T1–L2 regions of spinal cord



Sympathetic division



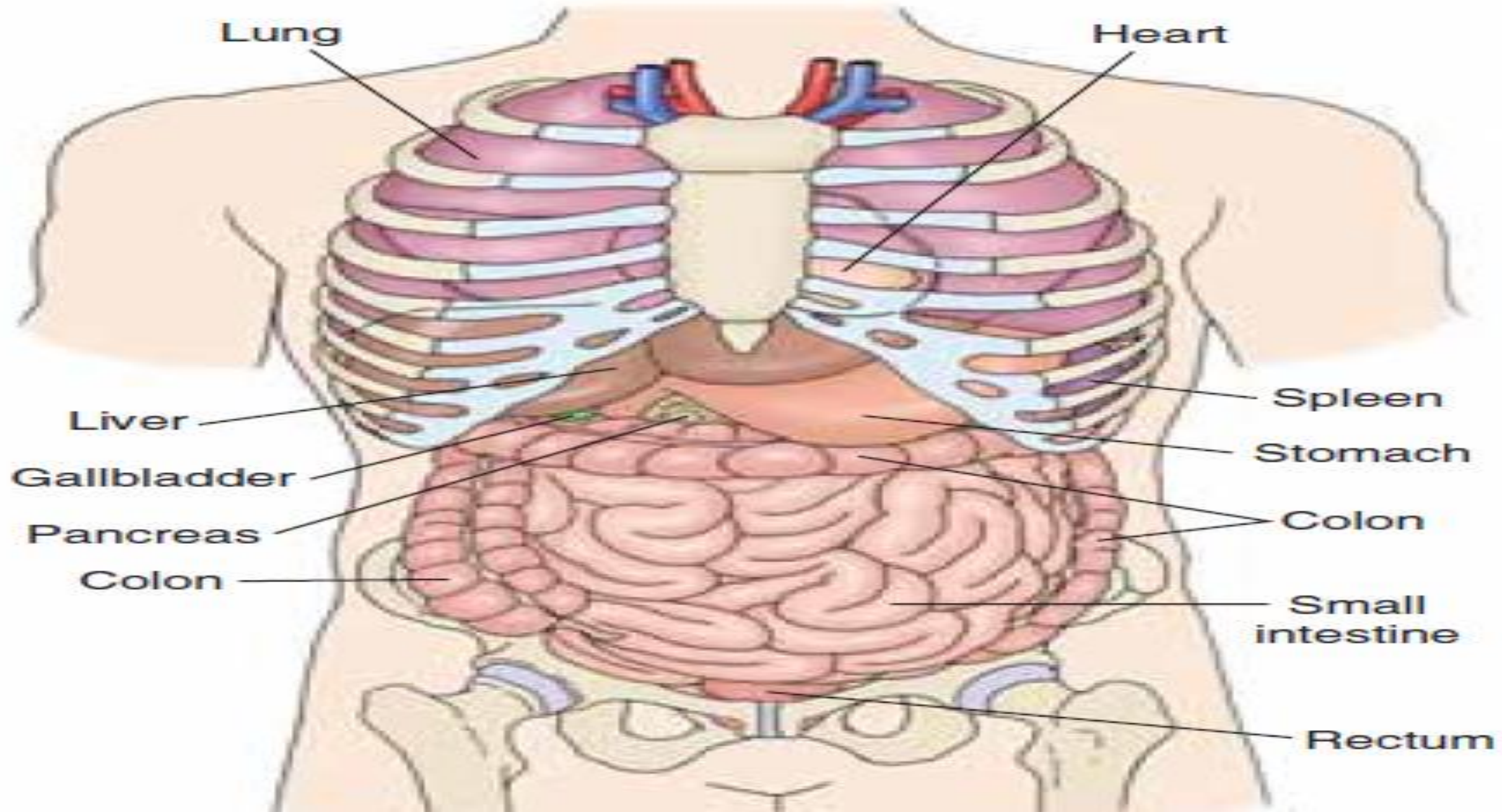
Parasympathetic division



Direct Pressure & Shared Pathways

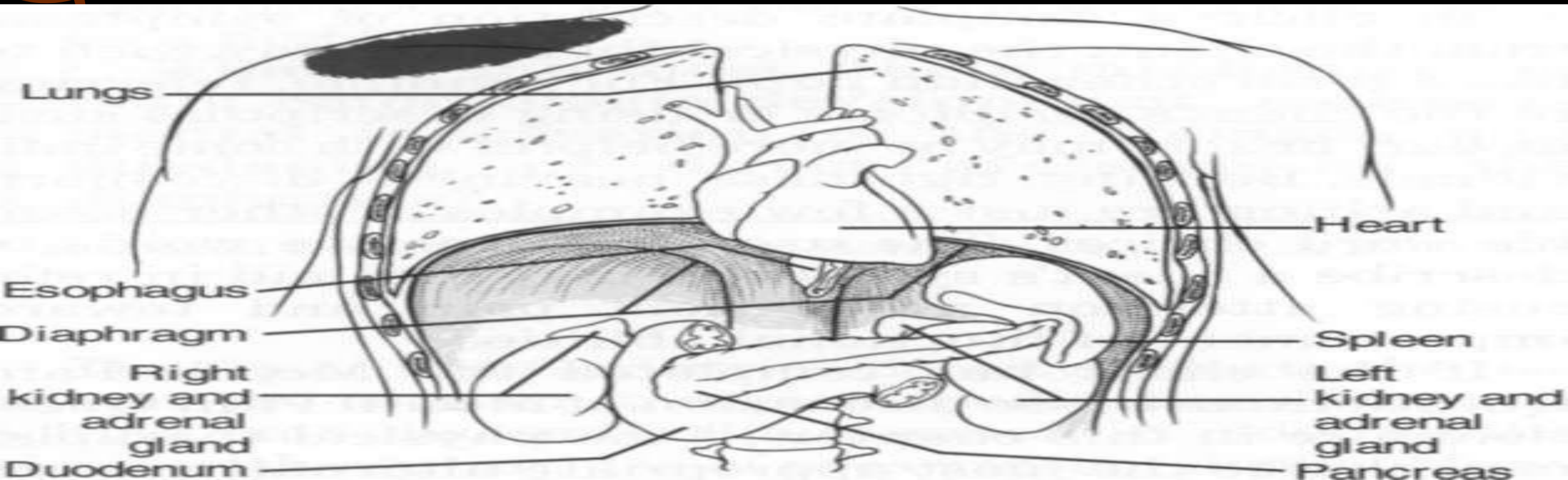
- ❑ Many of the viscera are near the respiratory diaphragm.
- ❑ Visceral organs can become inflamed, infected, or obstructed leading to direct pressure on the respiratory diaphragm creating referred pain to somatic areas.
- ❑ For example, the lower portion of the heart is in contact with the center of the diaphragm. The spleen on the left side of the body is tucked up under the dome of the diaphragm. The kidneys (on either side) and the pancreas in the center are in easy reach of some portion of the diaphragm.

Visceral Diagrams



Direct Pressure & Shared Pathways

- ❑ Example: If an infection, inflammation, or tumor or other obstruction distends the pancreas, it can put pressure on the central part of the diaphragm.



Direct Pressure & Shared Pathways

Diaphragm Innervation Patterns:

Central (phrenic n. C3-5)

✓ shoulders

Peripheral

✓ ipsilateral costal margins &/or lumbar regions

Shared Pathways

- ❑ The visceral organs are innervated through the autonomic nervous system. The ganglions bring in good information from around the body.
- ❑ The nerve plexuses decide how to respond to this information and give the body fine, local control over responses.
- ❑ The brachial plexus supplies the upper neck and shoulder while the phrenic nerve innervates the respiratory diaphragm. More distally, the celiac plexus supplies the stomach and intestines.

Shared Pathways

- The neurologic supply of the plexuses is from parasympathetic fibers from the vagus and pelvic splanchnic nerves.
- The plexuses work independently of each other, but not independently of the ganglia.
- Ganglia collect information from parasympathetic and sympathetic fibers, deliver info to plexuses which provide control in each organ system

Shared Pathways

□ Patient can experience symptoms in any area innervated by the shared pathways

Example: phrenic nerve (C3-5) innervates central diaphragm, pericardium, gall bladder, pancreas - pain from these areas can be referred to the somatic areas of C3-5 also (the shoulder)

❖ Pain from pancreas can mimic heart disease, gall bladder disease, mid-back/scapular pain, or shoulder pain



Pain assessment and symptoms

- Produces a baseline to assess therapeutic interventions e.g. administration of analgesic drugs
- ❖ Facilitates communication between staff looking after the patient
- ❖ For documentation

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Pain assessment & measurement

- ❖ Pain assessment and measurement are two different issue.
- ❖ Different scales are used for measuring pain intensity
 - Numeric Rating scale
 - Faces pain scale
 - McGill pain questionnaire
 - Present pain intensity index

Pain assessment & measurement

- FLACC Score

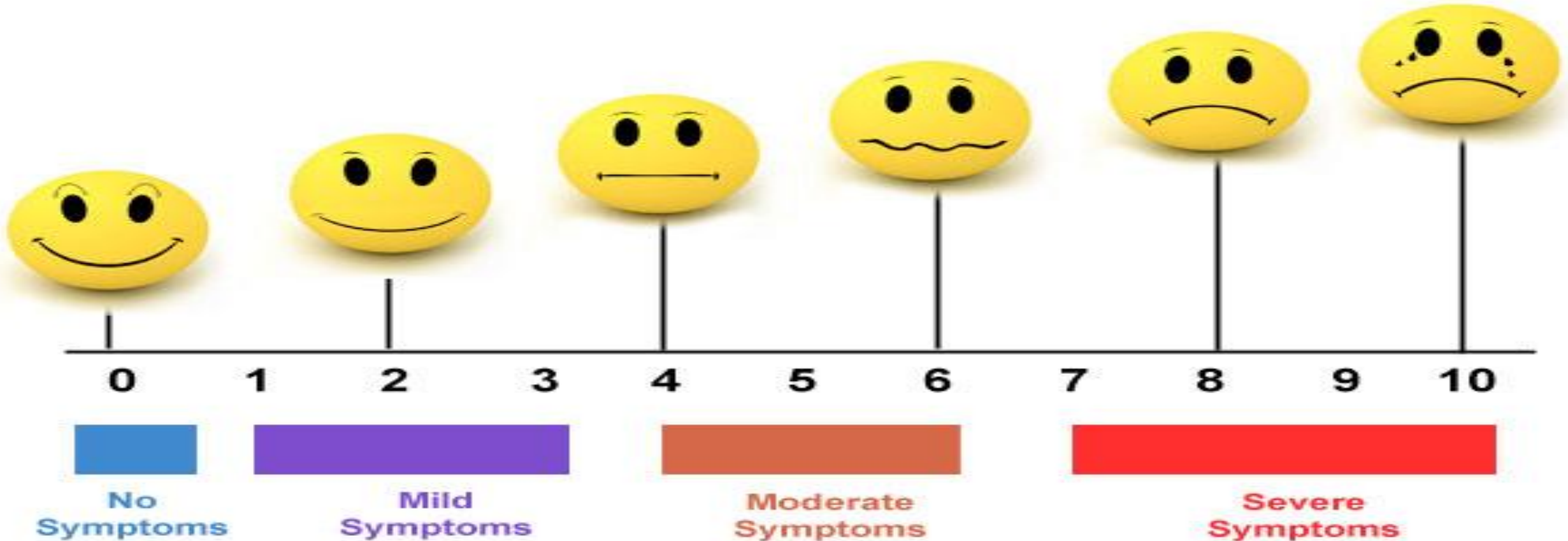
- Verbal Descriptor Scale (VDS)

- PAIDAD

- NEONATAL INFANT PAIN SCALE

Numeric Rating Scale and the Faces Pain Scale

On a scale from 0 to 10 with zero meaning 'No pain' and 10 for 'Unbearable pain,' how would you rate your



Short Form McGill Pain Questionnaire

Instructions: Read the following descriptions of pain and mark the number that indicates the level of pain you feel in each category according to the following scale:

1 = None 2 = Mild 3 = Moderate 4 = Severe

	Throbbing
	Shooting
	Stabbing
	Sharp
	Cramping
	Gnawing
	Hot-Burning
	Aching
	Heavy
	Tender

	Splitting
	Tiring/Exhausting
	Sickening
	Fearful
	Punishing/Cruel

Total Score: _____

The higher the score, the more intense the pain.



Present Pain Intensity Index

instructions: use the descriptors below to indicate your current level of pain.

- 0 = No Pain
- 1 = Mild
- 2 = Discomforting
- 3 = Distressing
- 4 = Horrible
- 5 = Excruciating

FLACC SCORE

Category	Scoring		
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to distractable	Difficult to console

Each of the five categories (F)face, (L)legs, (A)activity, (C) cry and (C) consolability is scored from 0-2, resulting in total range of 0-10



Verbal Descriptor Scale

TODAY I HAVE:

0 = NO PAIN

1 = SLIGHT PAIN

2 = MILD PAIN

3 = MODERATE PAIN

4 = SEVERE PAIN

5 = EXTREME PAIN

6 = PAIN AS BAD AS IT CAN BE

Pain Assessment IN Advanced Dementia

PAINAD

	0	1	2	Score
Breathing Independent of vocalization	Normal	Occasional labored breathing. Short period of hyperventilation	Noisy labored breathing. Long period of hyperventilation. Cheyne-stokes respirations	
Negative Vocalization	None	Occasional moan or groan. Low level speech with a negative or disapproving quality	Repeated troubled calling out. Loud moaning or groaning. Crying	
Facial expression	Smiling, or inexpressive	Sad. Frightened. Frown	Facial grimacing	
Body Language	Relaxed	Tense. Distressed pacing. Fidgeting	Rigid. Fists clenched, Knees pulled up. Pulling or pushing away. Striking out	
Consolability	No need to console	Distracted or reassured by voice or touch	Unable to console, distract or reassure	
				TOTAL

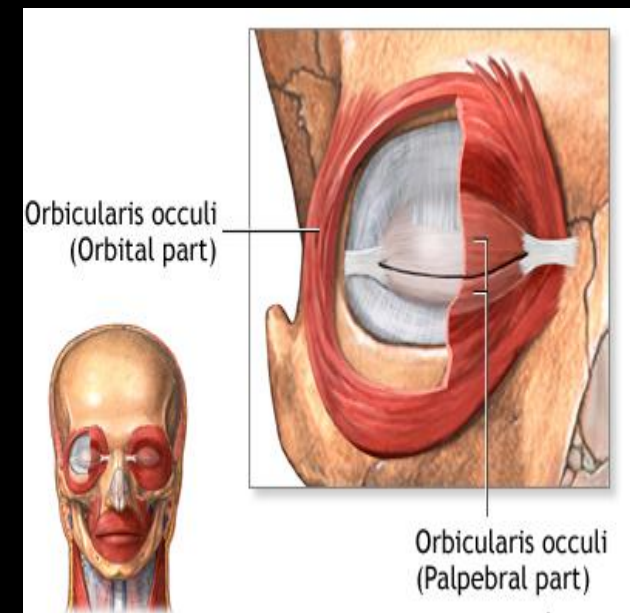
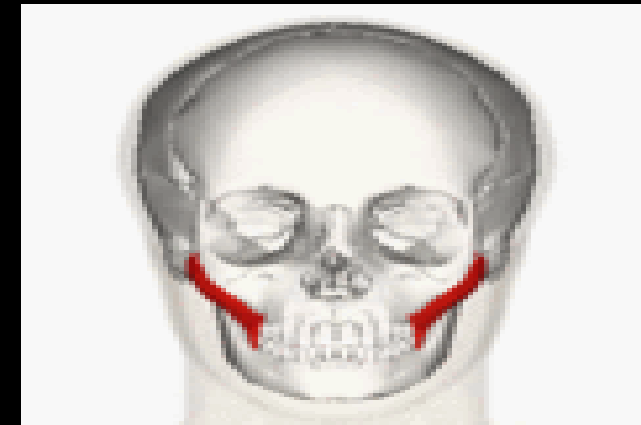
NEONATAL INFANT PAIN SCALE

NIPS	0 point	1 point	2 points
Facial expression	Relaxed	Contracted	–
Cry	Absent	Mumbling	Vigorous
Breathing	Relaxed	Different than basal	–
Arms	Relaxed	Flexed/stretched	–
Legs	Relaxed	Flexed/stretched	–
Alertness	Sleeping/calm	Uncomfortable	–

Maximal score of seven points, considering pain ≥ 4 .

Facial Action Coding System (FACS)

- ❑ is a system to categorize human facial movements by their appearance on the face.
- ❑ FACS can be used to distinguish two types of smiles
 - ❖ Insincere and voluntary Pan-Am smile: contraction of zygomatic major alone
 - ❖ Sincere and involuntary Duchenne smile: contraction of zygomatic major and inferior part of orbicularis oculi.



Neonatal facial coding system

Neutral

Description

Pain Expression



Brow bulge

Eye squeeze

Naso-labial deepen

Open mouth



Pain Assessment in Older Adults

- ❑ Osler's Rule of Age
- ❑ 1 in 5 taking analgesics medications regularly
- ❑ Many with prescription pain meds > 6 months
- ❑ Often fearful to admit symptoms, consider it normal due to aging, avoiding expensive tests.

Pain Assessment in Older Adults

- **Visual analogue scale (Mild Dementia)**
- **Verbal Descriptor Scale (Mild to moderate cognitive impairment)**
- **PAINAD (Alzheimer disease)**
- **Cognitive impairment**
- **Older adults more likely to have atypical presentation of acute pain - silent MI, appendicitis without abdominal pain**

Pain Assessment in a Young Child & PAEDIATRIC

- May or may not be capable of describing pain**
 - **Faces rating scale**
 - **child is asked to chose one of six pictures of faces that represent their pain(verbal children)**
 - **Body outlines**
 - **child is asked to color in a picture of a body where the pain is located. Different colours can represent pain intensity,**
 - **Pre-verbal children**
 - **observation of behavioural and physiological scores**

Pain Assessment in a Young Child & PAEDIATRIC

- ❑ Look for behavior signs & facial expression
- ❑ Neonatal infant pain scale

Child Facial Coding System and the Neonatal Facial Coding System

- ❖ "hurt" appears to be understood by children as young as three May use 'owie" or "ouchie"

Evaluation of Pain

- Location
- Description
- Intensity
- Frequency/duration
- Pattern of pain - including aggravating/relieving factors
- Associated signs/symptoms

Pain assessment and symptoms

Onset of pain (circle one): Was there an:

Accident

Injury

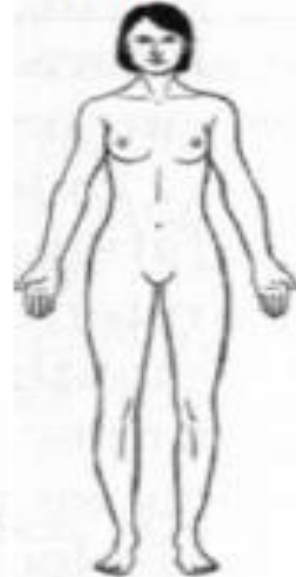
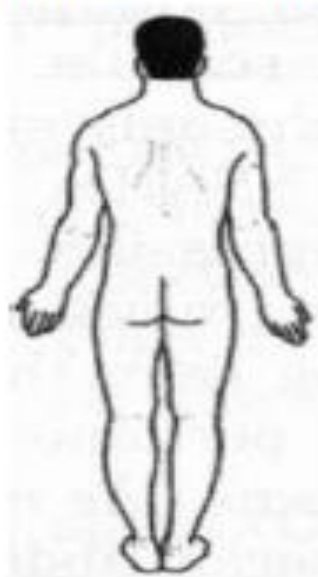
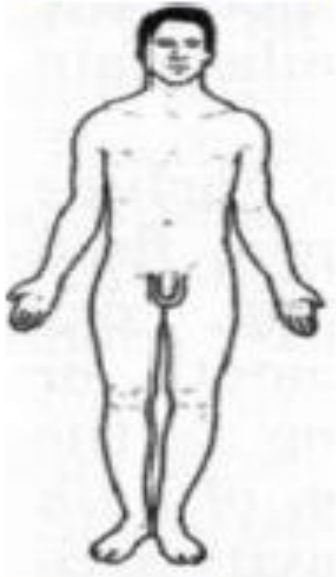
Trauma (violence)

Specific activity

If yes, describe:

Characteristics of pain/symptoms:

Location (Show me exactly where your pain/symptom is located):



- ||||| Numbness
- Severe pain
- ≡ Moderate pain
- ↓ Shooting pain

Do you have any pain or symptoms anywhere else?

Yes

No

Description (If yes, what does it feel like):

Circle any other words that describe the client's symptoms:

Knifelike

Dull

Aching

Other (describe):

Boring

Burning

Throbbing

Heaviness

Discomfort

Sharp

Stinging

Tingling

Stabbing

Frequency (circle one):

Constant

Intermittent (comes and goes)

If constant: Do you have this pain right now?

Yes

No

If intermittent: How often is the pain present (circle all that apply):

Hourly

Once/daily

Twice/daily

Unpredictable

Other (please describe):.



Associated Symptoms

Burning	Difficulty breathing	Shortness of breath
Skin rash (or other lesions)	Change in bowel/bladder	Difficulty swallowing
Dizziness	Heart palpitations	Hoarseness
Diarrhea	Constipation	Bleeding of any kind
Numbness	Problems with vision	Tingling
Joint pain	Weight loss/gain	Other: _____

Duration:

How long does your pain (name the symptom) last?

Aggravating factors (What makes it worse?)	Relieving factors (What makes it better?)
---	--

Pattern

Has the pain changed since it first began? Yes No

If yes, please explain:

What is your pain/symptom like from morning (am) to evening (pm)?

Circle one: Worse in the morning	Worse midday/afternoon	Worse at night
Circle one: Gradually getting better	Gradually getting worse	Staying the same
Circle all that apply:		
Present upon waking up	Keeps me from falling asleep	Wakes me up at night



TABLE 3-1

Recognizing Pain Patterns

Vascular	Neurogenic	Musculoskeletal	Emotional
Throbbing	Sharp	Aching	Tiring
Pounding	Crushing	Sore	Miserable
Pulsing	Pinching	Heavy	Vicious
Beating	Burning	Hurting	Agonizing
	Hot	Dull	Nauseating
	Searing	Cramping	Frightful
	Itchy	Deep	Piercing
	Stinging		Dreadful
	Pulling		Punishing
	Jumping		Torturing
	Shooting		Killing
	Pricking		Unbearable
	Gnawing		Annoying
	Electrical		Cruel
			Sickening
			Exhausting

Indicate a plus (+) for aggravating factors or a minus (-) for relieving factors.

Liquor

Stimulants (e.g., caffeine)

Eating

Heat

Cold

Weather changes

Massage

Pressure

No movement

Movement

Sitting

Sleep/rest

Lying down

Distraction (e.g., television)

Urination/defecation

Tension/stress

Loud noises

Going to work

Intercourse

Mild exercise

Fatigue

Standing

Systemic pain

Musculoskeletal pain

- Onset**
- Recent, sudden
 - Does not present as observed for years without progression of symptoms

- May be sudden or gradual, depending on the history
- **Sudden:** Usually associated with acute overload stress, traumatic event, repetitive motion; can occur as a side effect of some medications (e.g., statins)
 - **Gradual:** Secondary to chronic overload of the affected part; may be present off and on for years

- Description**
- Knifelike quality of stabbing from the inside out, boring, deep aching
 - Cutting, gnawing
 - Throbbing
 - Bone pain
 - Unilateral or bilateral

- Local tenderness to pressure is present
- Achy, cramping pain
- May be stiff after prolonged rest, but pain level decreases
- Usually unilateral

Intensity

- Related to the degree of noxious stimuli; usually unrelated to presence of anxiety
- Dull to severe
- Mild to severe
- May be mild to severe
- May depend on the person's anxiety level—the level of pain may increase in a client fearful of a "serious" condition

Duration

- Constant, no change, awakens the person at night
- May be constant but is more likely to be intermittent, depending on the activity or the position
- Duration can be modified by rest or change in position

Pattern

- Although constant, may come in waves
- Gradually progressive, cyclic
- Night pain
 - Location: chest/shoulder
 - Accompanied by shortness of breath, wheezing
 - Eating alters symptoms
 - Sitting up relieves symptoms (decreases venous return to the heart: possible pulmonary or cardiovascular etiology)
- Symptoms unrelieved by rest or change in position
- Migratory arthralgias: Pain/symptoms last for 1 week in one joint, then resolve and appear in another joint
- Restriction of active/passive/accessory movement(s) observed
- One or more particular movements "catch" the client and aggravate the pain

Aggravating Factors

- Cannot alter, provoke, alleviate, eliminate, aggravate the symptoms
- Organ Dependent (Examples):
 - Esophagus—eating or swallowing affects symptoms
 - » GI—peristalsis (eating) affects symptoms
 - Heart—cold, exertion, stress, heavy meal (especially when combined) bring on symptoms

- Altered by movement; pain may become worse with movement or some myalgia decreases with movement

Relieving Factors

- Organ Dependent (Examples):
 - Gallbladder—leaning forward may reduce symptoms
 - Kidney—leaning to the affected side may reduce symptoms
 - Pancreas—sitting upright or leaning forward may reduce symptoms
- Symptoms reduced or relieved by rest or change in position
- Muscle pain is relieved by short periods of rest without resulting stiffness, except in the case of fibromyalgia; stiffness may be present in older adults
- Stretching
- Heat, cold

Associated	<ul style="list-style-type: none">• Fever, chills	<ul style="list-style-type: none">• Usually none, although stimulation of
Signs and	<ul style="list-style-type: none">• Night sweats	<ul style="list-style-type: none">trigger points may cause sweating, nausea,
Symptoms	<ul style="list-style-type: none">• Unusual vital signs• Warning signs of cancer (see Chapter 13)• GI symptoms: Nausea, vomiting, anorexia, unexplained weight loss, diarrhea, constipation• Early satiety (feeling full after eating)• Bilateral symptoms (e.g., paresthesias, weakness, edema, nail bed changes, skin rash)• Painless weakness of muscles: More often proximal but may occur distally• Dyspnea (breathlessness at rest or after mild exertion)	<ul style="list-style-type: none">blanching

- Diaphoresis (excessive perspiration)
 - Headaches, dizziness, fainting
 - Visual disturbances
 - Skin lesions, rashes, or itching that the client may not associate with the musculoskeletal symptoms
 - Bowel/bladder symptoms
 - Hematuria (blood in the urine)
 - Nocturia
 - Urgency (sudden need to urinate)
 - Frequency
 - Melena (blood in feces)
 - Fecal or urinary incontinence
 - Bowel smears
-

Sources	Types	Characteristics/patterns
Cutaneous	Myofascial pain	Client describes:
Deep somatic	• Muscle tension	• Location/onset
Visceral	• Muscle spasm	• Description
Neuropathic	• Muscle trauma	• Intensity
Referred	• Muscle deficiency (weakness and stiffness)	• Duration
	• Trigger points (TrPs)	• Frequency
	Joint pain	Therapist recognizes the pattern
	• Drug-induced	• Vascular
	• Chemical exposure	• Neurogenic
	• Inflammatory bowel disease	• Musculoskeletal/spondylotic
	• Septic arthritis	• Visceral
	• Reactive arthritis	• Emotional
	Radicular pain	
	Arterial, pleural, tracheal	
	Gastrointestinal pain	
	Pain at rest	
	Night pain	
	Pain with activity	
	Diffuse pain	
	Chronic pain	



SCREENING FOR SYSTEMIC VERSUS PSYCHOGENIC SYMPTOMS

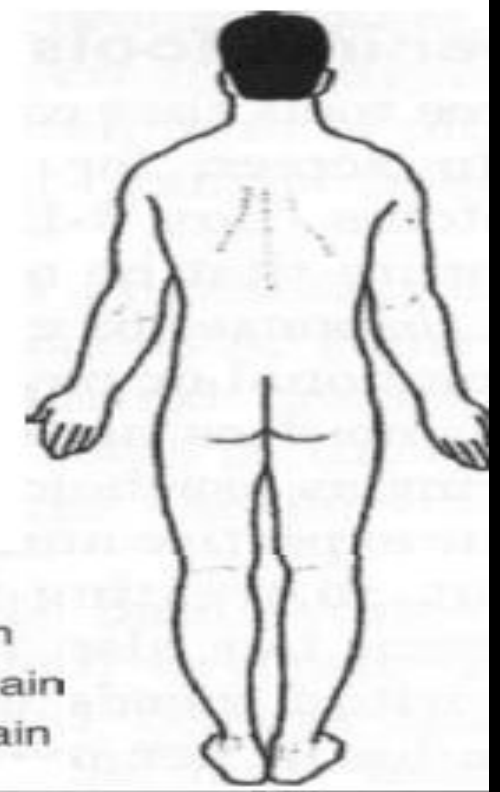
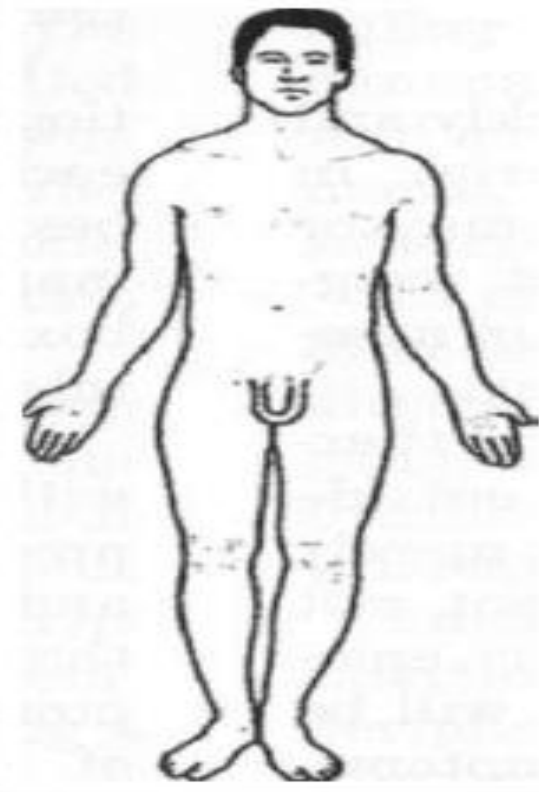
- Symptoms are out of proportion to the injury.
- Symptoms persist beyond the expected time for physiologic healing.
- No position is comfortable.






Three Screening Tools

- McGill Pain Questionnaire
- Symptom Magnification and Illness Behavior
- Waddell's Nonorganic Signs

1 Flickering Quivering Pulsing Throbbing Beating Pounding	11 Tiring Exhausting
2 Jumping Flashing Shooting	12 Sickening Suffocating
3 Pricking Boring Drilling Stabbing Lancinating	13 Fearful Frightful Terrifying
4 Sharp Cutting Lacerating	14 Punishing Gruelling Cruel Vicious Killing
5 Pinching Pressing Gnawing Cramping Crushing	15 Wretched Blinding
6 Tugging Pulling Wrenching	16 Annoying Troublesome Miserable Intense Unbearable
7 Hot Burning Scalding Searing	17 Spreading Radiating Penetrating Piercing
8 Tingling Itchy Smarting	18 Tight Numb Drawing Squeezing Tearing
	19 Cool Cold Freezing



||||| Numbness
 Severe pain
 Moderate pain
 Shooting pain

ACCOMPANYING SYMPTOMS: Nausea _____ Headache _____ Dizziness _____ Drowsiness _____ Constipation _____ Diarrhea _____ Others: _____	SLEEP: Good _____ Fitful _____ Can't sleep _____	FOOD INTAKE: Good _____ Some _____ Little _____ None _____
	COMMENTS: 	

A form of the McGill Pain Questionnaire.

Smarting	_____	Freezing	_____
Stinging	_____	20 Nagging	_____
9 Dull	_____	Nauseating	_____
Sore	_____	Agonizing	_____
Hurting	_____	Dreadful	_____
Aching	_____	Torturing	_____
Heavy	_____		
10 Tender	_____		
Taut	_____		
Rasping	_____		
Splitting	_____		

A form of the McGill Pain Questionnaire.

KEY:

- Group 1 suggests vascular disorder
- Groups 2-8 suggests neurogenic disorder
- Group 9 suggests musculoskeletal disorder
- Groups 10-20 suggests emotional lability

SCORING: Add up total number of checks. Clients who mark

- 4-8 = Within normal limits (WNL)
- ≥6 = may be getting a "little into pain"
- ≥10 = Psychologic evaluation may be needed.



Symptom Magnification and Illness Behavior

- Pain in the absence of an identified source of disease or pathologic condition may elicit a behavioral response from the client.
- Illness behavior is what people say and do to show they are ill or perceive themselves as sick or in pain



Components of this syndrome include

- Dramatization of complaints, leading to overtreatment and overmedication
- Progressive dysfunction, leading to decreased physical activity and often compounding preexisting musculoskeletal or circulatory dysfunction
- Drug misuse
- Progressive dependency on others, including health care professionals, leading to overuse of the health care system



Symptom magnification syndrome (SMS)

- Income disability, in which the person's illness behavior is perpetuated by financial gain
- Conscious symptom magnification is referred to as *malingering*, whereas unconscious symptom magnification is labeled *illness behavior*



- "My (back) pain won't let me. . . ."
- Pain management
- Rehabilitation

Pain Assessment

Waddell Nonorganic Signs

Sign	Description
Tenderness— superficial or nonanatomic	Tenderness is not related to a particular structure. It may be superficial (tender to a light pinch over a wide area) or deep tenderness felt over a wide area (may extend over many segmental levels).
Simulation tests— axial loading in rotation	These tests give the client the impression that diagnostic tests are being performed. Slight pressure (axial loading) applied to the top of the head or passive rotation of the shoulders & pelvis in the same direction produces c/o LBP.

Distraction tests— SLR	A (+) clinical test (SLR) is confirmed by testing the structures in another position. By appearing to test the plantar reflex in sitting, the examiner may actually lift the leg higher than that of the supine SLR.
Regional disturbances— weakness or sensory	When the dysfunction spans a widespread region of the body (sensory or motor) that cannot be explained via anatomical relationships. This may be demonstrated by the client “giving way” or cogwheel resistance during strength testing of many major muscle groups or reporting diminish sensation in a nondermatomal pattern (stocking effect).
Overreaction	Disproportionate responses via verbalization, facial expressions, muscle tremors, sweating, collapsing, rubbing affected area, or emotional reactions.



Note:

Any positive test in 3 or more

categories

results in

an

overall positive Waddell Score.

