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Outline

- Intro
- Anatomy
  - Thorax
  - Abdomen
- Physical Exams
- Common activity-related pathology

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Objectives

- Review anatomy of the thorax and abdomen
- Review assessment of the thorax and abdomen
- Thorax and abdomen disorders
- Common activity related pathology of the thorax and abdomen
- Physical Assessment / Exam
- Clinical diagnosis / differential diagnosis

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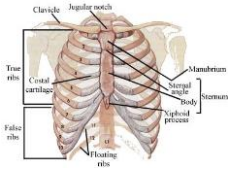
Anatomy

- Sternum, vertebrae and ribs
- Protective shell around organs
- Sternum
  - Manubrium, body, xiphoid
- Ribs
  - True (1-7) dedicated costal cartridge
  - False (8-10) shared costal cartilage
  - Floating (11-12) no anterior connection



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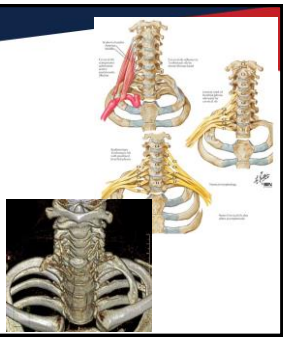
Cervical Rib

- From seventh cervical vertebra
- Congenital abnormality
- .6-.8 of population (1-150)
- May be on right/left or both
- Vary in size and shape
- Usually not symptomatic
- May be factor in thoracic outlet syndrome



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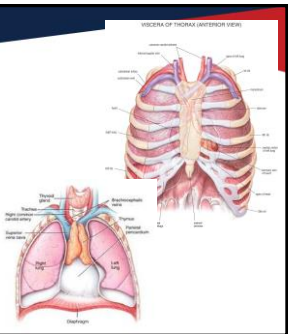
Thorax Viscera

- Heart
- Lungs
- Trachea
- Esophagus
- Thymus gland (endocrine)



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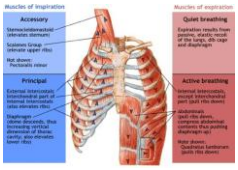
Thorax Muscles

- Inspiratory
  - Diaphragm
  - External intercostals
- Expiratory
  - Internal intercostals
  - Innermost intercostals (intimi)
  - Transverse Thoracis (weak)
  - Subcostals
- Accessory
  - SCM Scalenes, Pec minor
  - Rectus abdomnis, Ext/Int oblique, Trans abdominus & others in abdominal region



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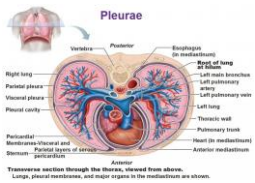
Pleural cavity

- Pleurae lines the rib cage and covers the lungs
- Thin fluid filled space between visceral and parietal pleurae
  - Allow layers to slide over each other
  - "potential" space, layers remain tightly connected



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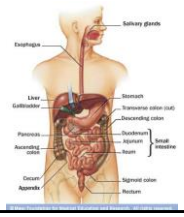
Gastrointestinal

Mouth
Esophagus
Stomach
Small intestine
Appendix
Large intestine
Anus



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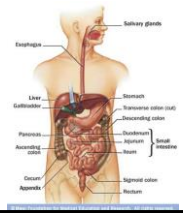
Other structures

- Liver
- Gallbladder
- Pancreas
- Spleen



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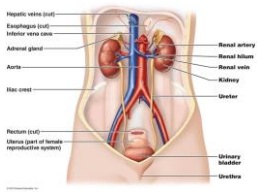
Urinary

- Kidneys
- Ureters
- Bladder
- Urethra



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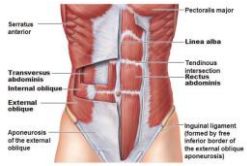
Muscles

- Rectus abdominis
- Internal / external oblique
- Transverse Abdominis



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Abdominal Cavity

- Diaphragm
- Rectus abdominis
- Internal / External Oblique
- Vertebrae
- Iliac crest, inguinal ligament, pubis

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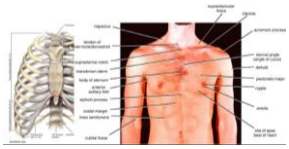
Landmarks

- Clavicles
- Sternal angle
  - 2nd costal cartilage; 4th/5th disc space
- Sternum
  - Right border of heart lies behind
- Subcostal angle
  - Inferior sternum, between 7th costal cartilages
- Costal margins
  - Medal 7-10 costal cartilages
- Apex beat of heart
  - Contraction of the heart, 5th intercostal space
- Axillary folds
  - Axillae margins, anterior is formed by pect major, posterior by latissiumus dorsi and teres major



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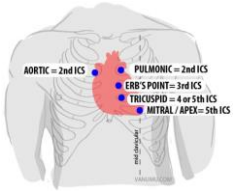
Heart Auscultation Landmarks

- Aortic
  - Left ventricle and aorta
- Pulmonic
  - Right ventricle and pulmonary artery
- Erb's Point
  - Not one valve, but common listening point, between base and apex of heart
- Tricuspid
  - Right atrium and right ventricle
- Mitral/apex
  - Left atrium and left ventricle



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Landmarks

- Abdominal quadrants
- RUQ – liver, right kidney, gall bladder, colon, pancreas
- RLQ – Appendix, colon, small intestine, ureter
- LLQ – colon, small intestine, ureter
- LUQ – Stomach, lift kidney, spleen, colon, pancreas

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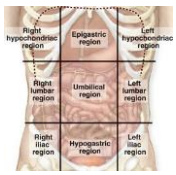
Landmarks



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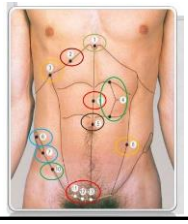
Landmarks

- Xiphoid process
- Costal margin
- Tip of 9th costal cartilage
- Tendinous intersections
- Umbilicus
- Iliac crest
- ASIS
- Linea semilunaris
- Linea alba
- Inguinal ligament
- Pubic tubercle
- Pubic crest



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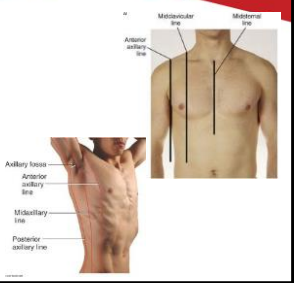
Landmarks

- Midsternal
- Midclavicular
- Anterior Axillary
- Midaxillary
- Posterior Axillary



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Assessment Plan (Thorax) History (Cardiac)

- Medical History
  - Family
    - History of SCD under 40
    - Cardiovascular disease
  - Personal
    - Physical inactivity
    - Smoking
    - Hypertension
    - High blood lipids
    - Obesity
    - Diabetes
    - Marfan's
    - Connective tissue disorders
- Previous cardiovascular symptoms
  - Exertional angina
  - Dyspnea
  - Syncope
  - Unusual fatigue
  - Palpitations
  - Known heart murmur
  - Increased BP
  - SCT / sickle cell disease (family or personal)

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Assessment Plan (Thorax) History (Pulmonary)

- Family / Personal
  - Smoking
  - Undetected pulmonary disorder
    - Intermittent symptoms with respiration, coughing, sneezing
    - Infection (fever, recent infection, fatigue)
  - Injury history of blunt trauma to chest, sudden deceleration

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Assessment Signs and Symptoms

Cardiac
- Angina
- Dyspnea
- Fatigue
- Palpitations
- Syncope
- Claudication (impaired gait)
- Skin/Nail temp, color, appearance
- Edema

Pulmonary
- Dyspnea
- Cough
- Cyanosis
- Chest tightness
- Decreased exercise capacity

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Pain Patterns

Cardiac
- Cardiac
  - Neck/throat to medial side of arm
  - Crushing/pressure in chest and radiates to left arm
- Vascular
  - Occurs locally in region of affected vessel
  - Tearing, sharp or throbbing

Pulmonary
- Lung
  - Upper lung tumors may affect brachial plexus; may also compress bronchi, leading to cough, dyspnea, chest pain
  - Lung tissue dose not produce pain until inflammation affects pleura
- Tracheobronchial
  - Overlying cutaneous areas
- Diaphragm
  - Ipsilateral shoulder, also neck, ribs, spine
- Pleurisy
  - Sharp, stabbing pain over affected area

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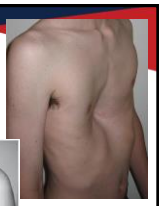
Physical Exam Inspection

- Marfans
- Lack of normal kyphosis
- Deformed / displaced sternum
- Notable deformity in chest wall



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Physical Exam

- Heart rate
  - Heart apex, brachial, femoral, radial, posterior tibial or dorsal pedis, carotid artery
  - Rate, rhythm, character
    - 70-100 bpm normal for adults
    - Preadolescents – 55-115bpm
  - Bradycardia - less than 60 bpm resting
  - Tachycardia – above 100 bpm resting
- Respiration Rate
  - 10 to 15 breaths per minute
  - Should be regular, moderate in depth and effortless
  - Forced/difficult respiration, dyspnea or shallow breaths are abnormal
  - Notice rate, rhythm, depth, effort and odor

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Physical Exam

- Blood pressure
  - Stethoscope /sphygmomanometer
- Korotkoff sounds
- Proper cuff size
  - False measures
- Normal systolic 100-140
- Normal diastolic 70-90
- BP equal to or greater than 140/90 on consecutive days indicates HTN
- Large differences in systolic BP between lying, sitting and standing may suggest orthostatic hypotension
  - Dehydration
  - Blood loss

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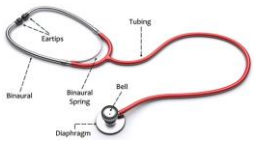
Auscultation

- AT role in cardiac auscultation is to recognize abnormal sounds.
- Diaphragm (high pitched) S1/2 and Bell (low pitched) S3/4
- Performed over aortic, pulmonary, Erb's*, tricuspid and mitral listening zones
- First sound (S1) are closing of mitral and tricuspids
- Second sounds (S2) are closing of aortic and pulmonary valves
- Abnormal; extra heart sounds (S3/S4), muffled, murmurs or rubbing/hissing noises are caused by valve disorders



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Auscultation

- Normal Heart Sound – Apex
- Mitral Regurgitation – Apex

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Auscultation

- Third Sound (S3) – Apex
- Fourth Sound (S4) - Apex

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Auscultation

- Normal Lung (bronchial)
- Normal Lung (tracheal)
- Normal Lung (tracheal / posterior)
- Expiratory Wheeze
- Wheeze / Rhonchi
- Inspiratory Stridor

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Assessment Plan (abdominal) History

- Present Condition
  - Pain
  - Indigestion
  - Nausea / Vomiting
  - Bowel / Bladder Habits
- Past Medical History
  - GI Disorders
  - Hepatitis
  - Surgery
  - UTIs

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Assessment Plan History

- Family
  - Gallbladder
  - Kidney
  - IBS
  - Cancer
- Personal / Social
  - Nutrition
  - Trauma
  - Stress
  - Drug use

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Assessment Plan Exam

- Supine
- Abdomen exposed
- Inspection
  - Abdominal contour
    - Flat
    - Concave
    - Convex
  - Symmetry
    - Epigastric / Hypogastric Fullness
    - Distension
    - Masses
  - Scars
    - Surgery
    - Discoloration
      - Cullens
      - Grey turner sign

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Inspection

- Cullens Sign – Intraperitoneal hemorrhage
- Grey-Turner – retroperotioneal hemorrhage

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Auscultation

- Bowel sounds
- Vascular sounds
- Organs
- Bowel Sounds
  - Over the abdomen, all four quad
  - Should hear long gurgles
  - Sounds are transmitted, multiple areas not necessary
  - 5-34 sounds per minutes

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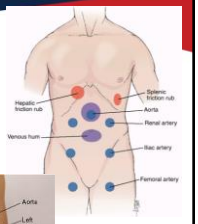
Auscultation

- Diaphragm / Bell
- Abnormal sounds / bruits
- Partially occluded artery
- Aorta
- Renal artery
- Iliac artery
- Femoral artery



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Auscultation

- Rubs (friction rubs)
  - Mechanical sounds
  - Friction between organs
  - Liver, spleen w/ breathing
- Liver Scratch Test
  - Place diaphragm over the liver
  - Lightly scratch skin near edge of liver
  - Scratch higher until sound changes (louder) by the mass of the liver
  - Evaluates size and shape

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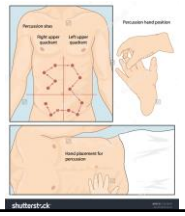
Percussion

- Size
- Density
- Fluid, air, masses
- All quadrants for:
  - Tympany – air filled
  - Dullness – solid masses



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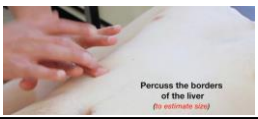
Percussion Liver

- Size determination
  - Percuss from right ASIS up
  - Percuss down from right size of chest



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Percussion

- Visualize organs in each quadrant
- Dull sounds where should be tympanic – mass/tumor, pregnancy, ascites (fluid in abdomen)

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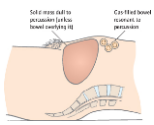
Percussion Bladder

- Suprapubic region
- Percuss from pubic symphysis
- Urine give dull sound



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Percussion Spleen

- Enlarged
- Normally under rib cage
- Lowest costal space
  - Ant axillary line
- Area should be tympanic
- Dullness may indicate enlarged spleen

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Palpation

- Detect
  - Masses
  - Enlarged organs
  - Tenderness
  - Rebound
  - Muscle Guarding
- Localize pain
- Supine, knees bent
- Use pads of fingers
- Light
  - Tenderness
  - Rebound
  - Masses
  - Guarding
- Deep
  - Organs / Masses
  - Location
  - Size, shape, consistency
  - Mobility, pulsatility
  - May be painful

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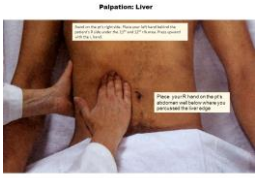
Palpation Liver

- Left hand under ribs 11-12
- Right hand at mid-clavicular line
- Deep breath
- Feel for a step, as the liver edge passess below hand
- If you don't feel anything, repeat the process with your hand 1-2 cm higher
- Liver not felt normally below ribs
- If liver edge is felt, note the following:
  - Degree of extension below the costal margin
  - Consistency of the liver edge *(smooth/irregular)*
  - Tenderness – *suggestive of hepatitis*
  - Pulsatility – *a pulsatile enlarged liver can be caused by tricuspid regurgitation*



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Palpation Gallbladder

- At liver margin
- Lateral border of rectus abdomins
- Not palpable is healthy
- Hands at right costal margin, mid clavicular line (9th rib)
- Deep Palpation
- Round mass may be felt with respiration
- Murphys Sign – under palpation, deep breath may be interrupted by pain

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Palpation Spleen

- Only palpable if doubled/tripled in size
- Palpate (1)
  - Left hand posterior rib cage and lift spleen to abdominal wall
  - Upward with right hand
  - Patient deep breath
- Palpate (2)
  - Align your fingers in the same direction as the left costal margin
  - Press your right hand into the abdomen as you ask the patient to take a deep breath
  - Feel for a step, as the splenic edge passess under your hand
  - If you don't feel anything, repeat process with your hand 1-2 cm closer to the left hypochondrium

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Palpation Kidney

- Left hand behind the patient's back, at the right flank
- Right hand just below the right costal margin in the right flank
- Right hand's fingers deep into the abdomen
- Press upwards with your left hand
- Deep breath
- Lower pole of the kidney moving inferiorly during inspiration
- Repeat this process on the opposite side

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Palpation Aorta

- Palpate using fingers from both hands
- Palpate just above the umbilicus at the border of the aortic pulsation
- Note the movement of your fingers:
  - upward movement = pulsatile
  - Outward movement = expansile (suggestive of AAA)

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Palpation Bladder

- Suprapubic Region
- Heel of hand
  - Pain with UTI
- Palpable if bladder is extended

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Palpation Other

- Appendicitis
  - Pain in lower right quad
  - Referred pain to umbilical region
  - Tenderness at McBurney's; rebound (Blumberg's Sign)
  - Rigidity
  - Nausea, vomiting
  - Shock

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Selected Pathologies

- Sudden Cardiac Death
- Rare
  - 1/50,000-200,000 males
  - 1/200,000-769,000 females
- Any sport/activity
  - Most frequent in basketball/football
- Causes
  - Hypertrophic cardiomyopathy
  - Congenital coronary artery anomalies
  - Electrical / conduction abnormalities
  - Acquired myocarditis
- Contributing factors
  - High-intensity exercise
  - Electrolyte imbalances (dehydration)
  - High body temperature
  - Sudden cessation of intense physical exercise
  - PED / Supplements

National Athletic Trainers' Association Position Statement: Preventing Sudden Death in Sports

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Selected Pathologies

- Marfan Syndrome
- Inherited connective tissue disorder
- Most (80-90%) will develop potentially fatal aorta deformity
- May participate if:
  - No aortic root dilation
  - No moderate/severe mitral regurgitation
  - No family history of dissection or sudden death
- Commotio Cordis
  - Blunt force to chest during ventricular repolarization, leads to ventricular arrhythmia
  - Young males (13y)
  - 80% with firm projectile
  - AED improves outcomes

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Sickle Cell Trait

- Inherited condition, two genes have disease, one has trait
- 10% of African Americans carry SCT, ~1% develop anemia
- Crisis risk greater in exercise in hot and humid environment
- Also risk factor for exertional rhabdomyolysis
- Crisis
  - Muscle cramping in the legs, buttocks, low back
  - Tachycardia
  - Hypotension
  - Hyperventilation
  - LOC

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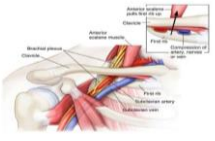
Thoracic Outlet Syndrome

- Subclavian or axillary artery is occluded between scalene, clavicle/first rib or pec minor tendon near coracoid process
- Repetitive overhead activities
- Diffuse arm pain, paresthesia, fatigue, intermittent swelling
- Temperature changes, cyanosis, diminished radial pulse during tests (Adson's, military brace, Allen's, Roo's)
- May be acute/traumatic



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Ruptured Spleen

- Pain in upper left quad
- Referred pain to left shoulder; upper arm (kehr)
- Shallow breathing
- Tenderness, rebound

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Ruptured Liver

- Dull pain in URQ
- Referred pain to right shoulder
- Shallow breathing
- Tenderness, rebound
- Rigidity
- Nausea, vomiting
- Shock

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Selected References

- https://basicmedicalkey.com/abdomen-2/
- https://iytmed.com/pulled-abdominal-muscles/
- http://lickclick.info/abdominal-regions/
- https://www.proprofs.com/quiz-school/story.php?title=abdominal-regions-abdominopelvic-quadrants-hap
- https://biology-forums.com/index.php?action=gallery;sa=view;id=8094
- https://www.coursehero.com/flashcards/467578/structural-Kinesiology11/
- https://quizlet.com/64522503/test
- https://www.pinterest.com/pin/488218415836588931/
- https://thesebonesofmine.wordpress.com/2011/05/06/skeletal-series-part-5-the-human-rib-cage/
- https://www.nursingtimes.net/clinical-archive/respiratory/the-respiratory-system-part-3-lungs-pleura-and-respiratory-defence-mechanisms/203168.article
- http://www.dummies.com/education/science/anatomy/the-surface-anatomy-of-the-thorax/
- https://geekymedics.com/abdominal-examination/

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