

BCHM 4608
Physical exam of the chest

DR Eddie KS LAM

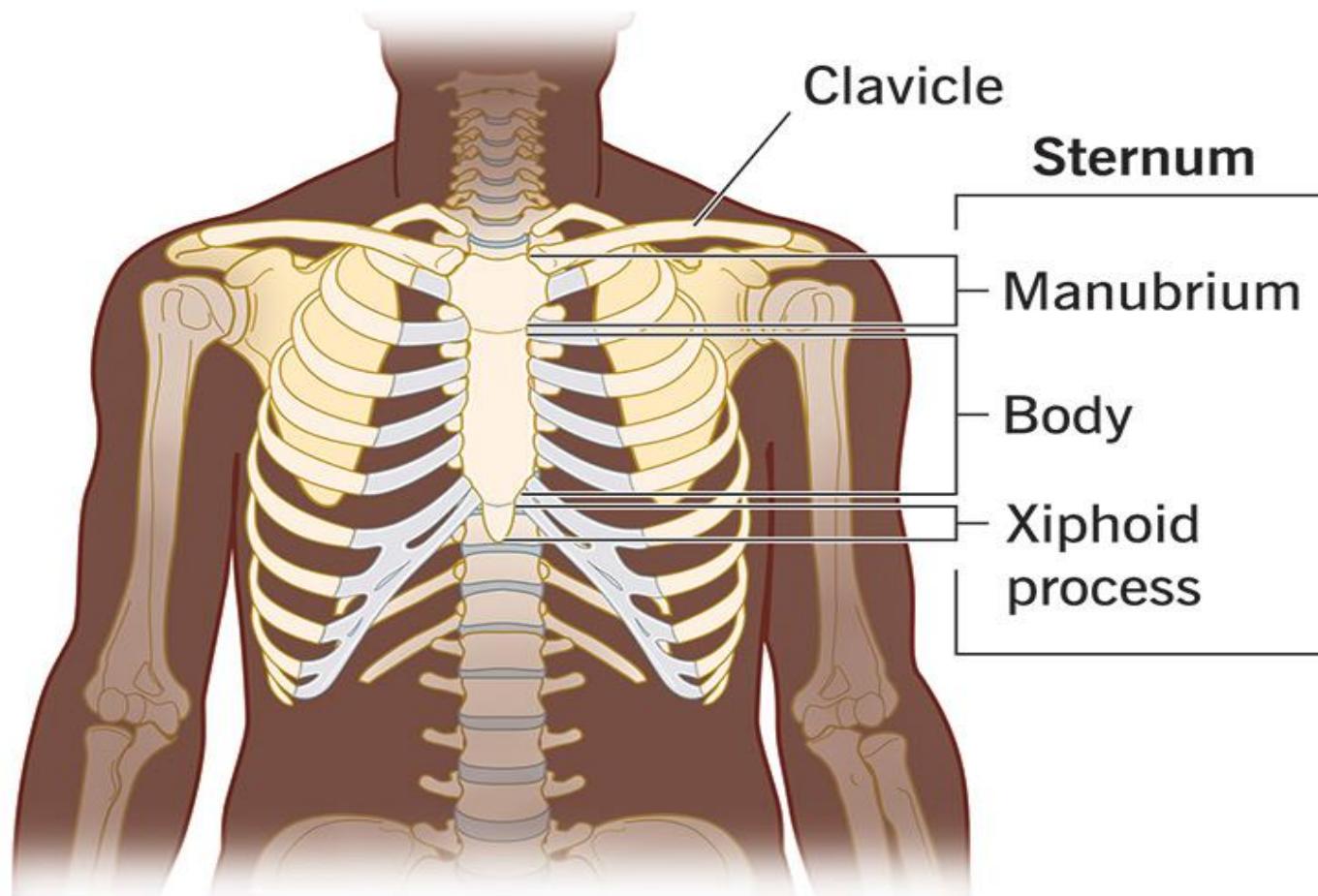
Thorax and Lung Exam

- Anatomy:
- Suprasternal notch
- Manubrium
- Sternal angle
- Body of sternum
- 2nd rib arises from sternal angle
- 2nd interspace and 2nd costal cartilage
- Xyphoid process. Urine te

Identify sternal angle

- Id sternal notch
- Move finger 5 cm down (3 fingers) and noted the sternal angle where 2nd rib and costal cartilage arise
- Interspace immediately below 2nd interspace
- Only first 7 ribs articulate with sternum
- 8th 9th and 10th articulate with costal cartilage above
- 11th and 12th ribs are floating ribs and have free ant tips

Sternum (Breastbone)



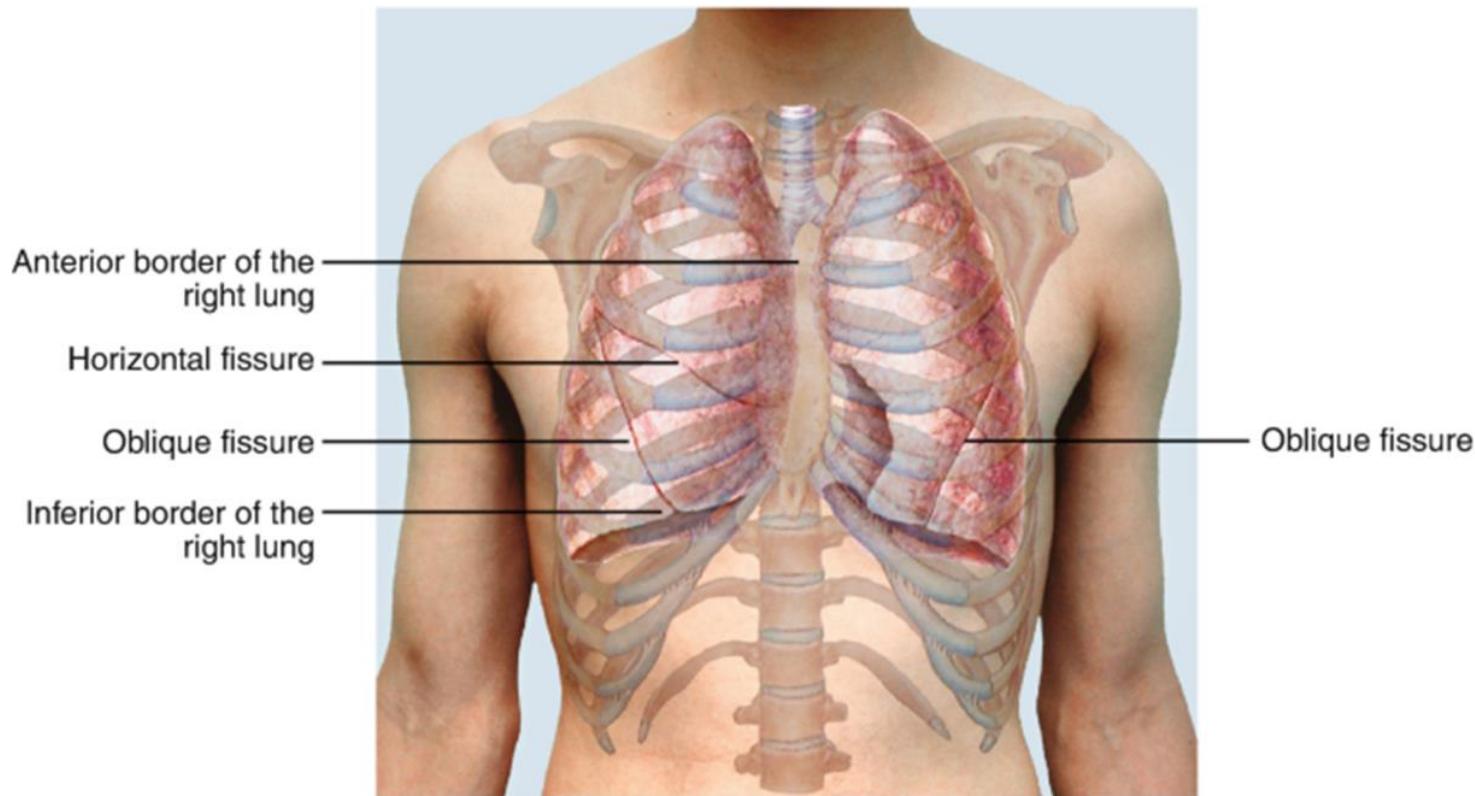
Posterior ribs

- Scapula lying at level of 7th rib or interspace
- When pt flexes neck, most prom spinous process is 7th cervical or 1st thoracic

Lung location

- Apex of each lung rises 2-4 cm above inner 3rd of clavicle
- Inferior border of lung crosses 6th rib at mcl and 8th rib at midaxillary line
- Post lung lower border at level of T10th spinus process
- May descend to T12 process with deep inspiration

Reference: SpringerLink

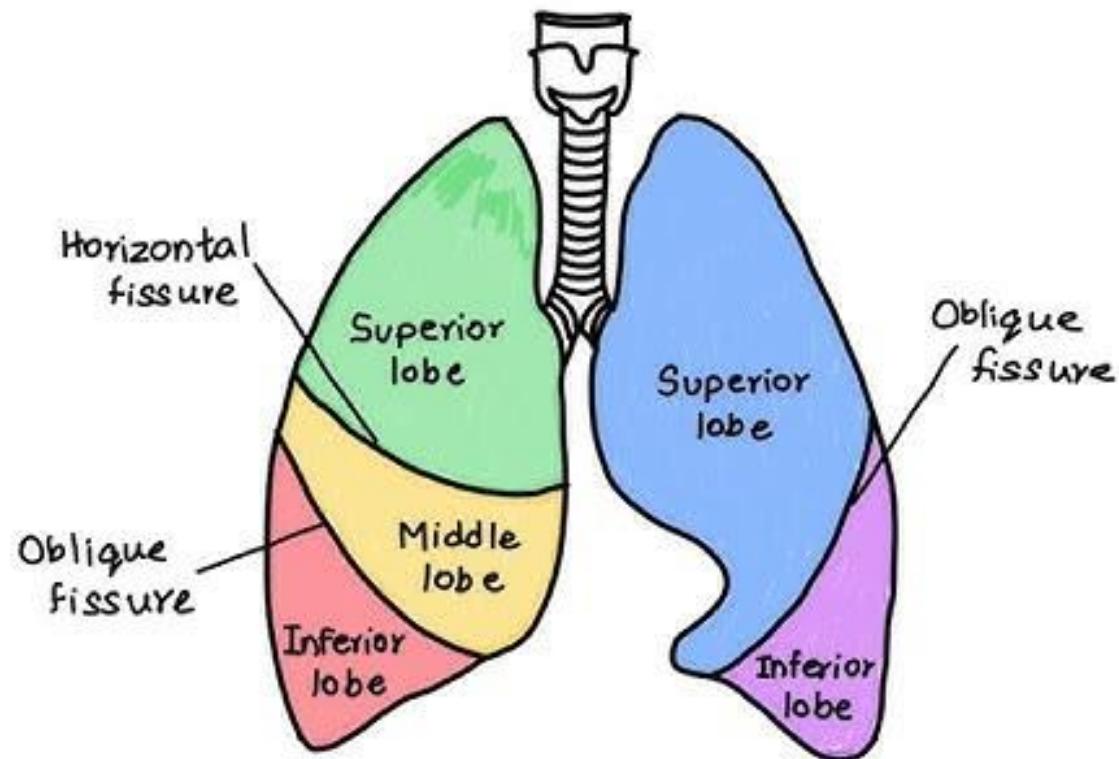


Source: Radiopaedia-Apical zone



Lung lobes

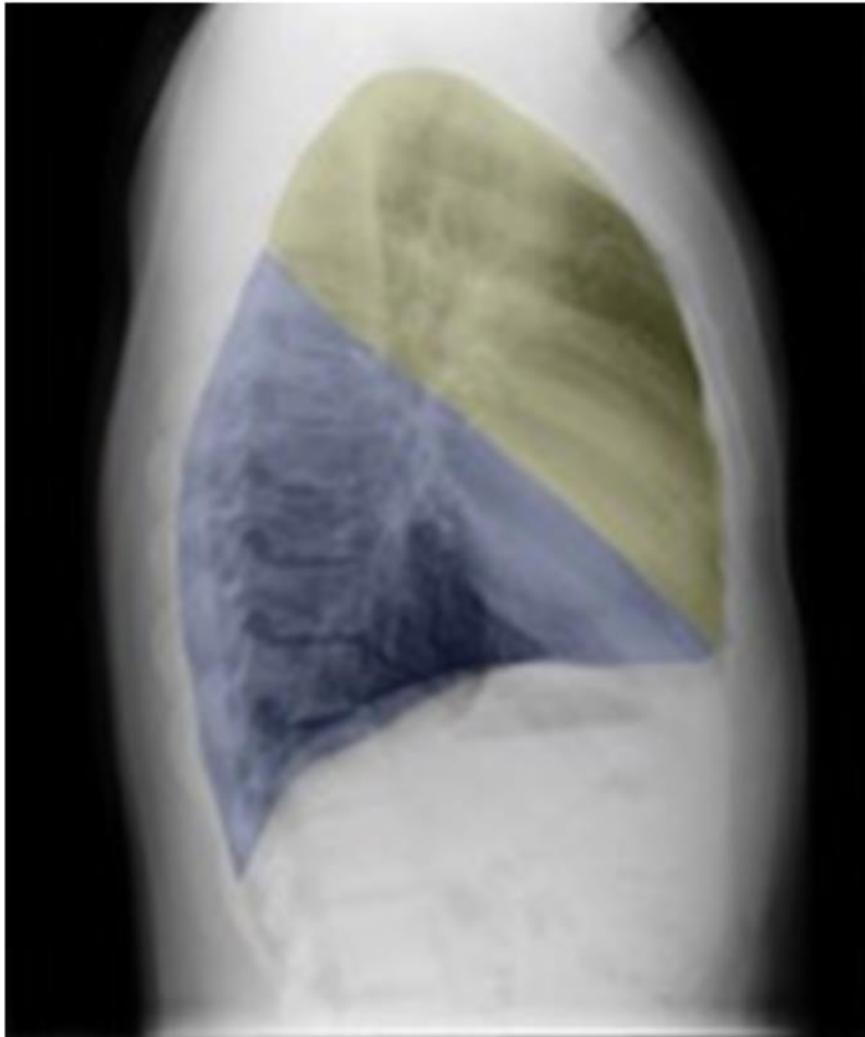
- Posteriorly both lung divided by oblique fissures drawn from 3rd thoracic spinus process obliquely
- Right lung : RUL, RML, RLL with oblique and minor (horizontal) fissures
- Left lung : LUL and LLL



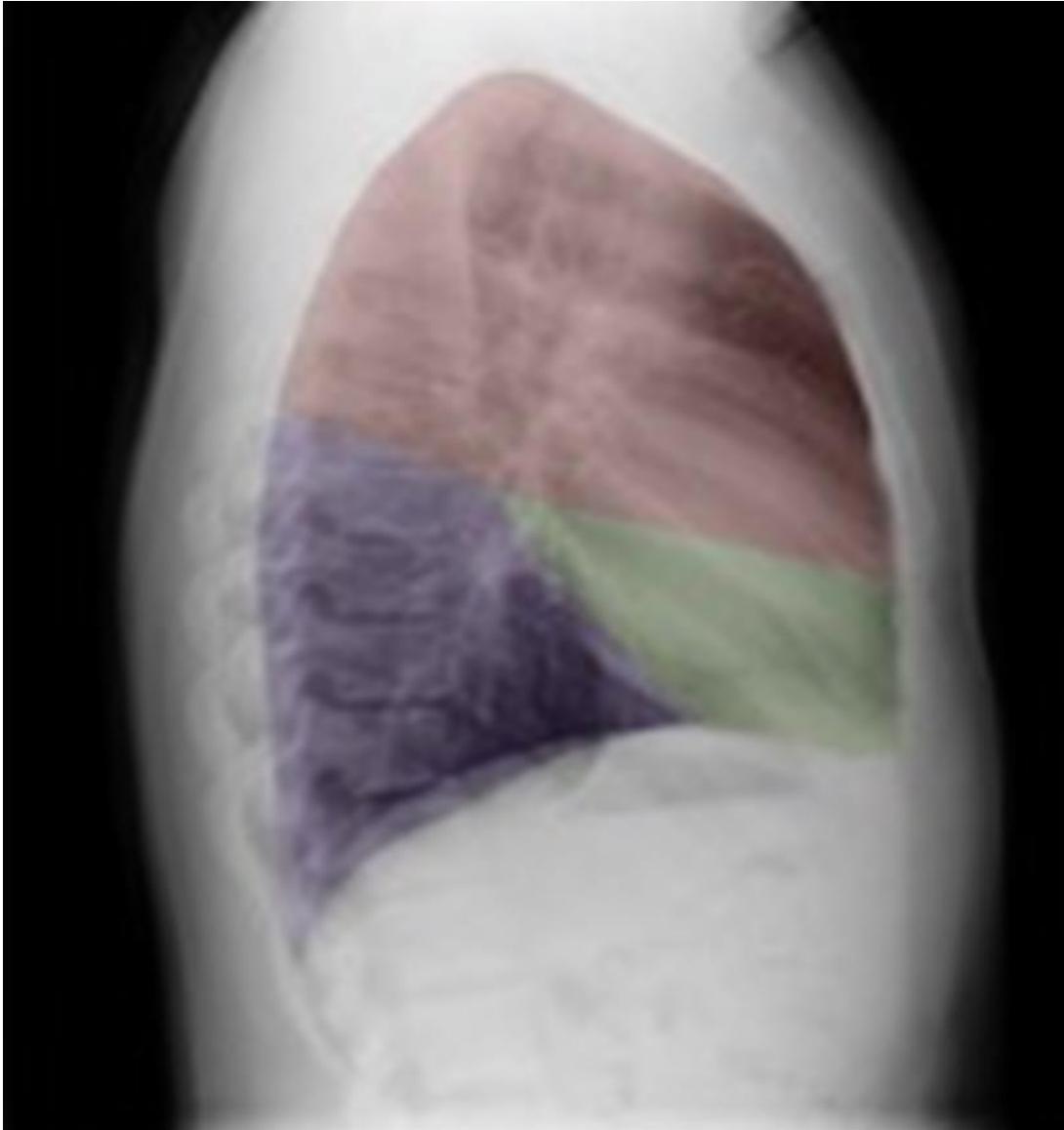
Radiopaedia



Radopaedia



Radiopaedia



Trachea and breathing muscles

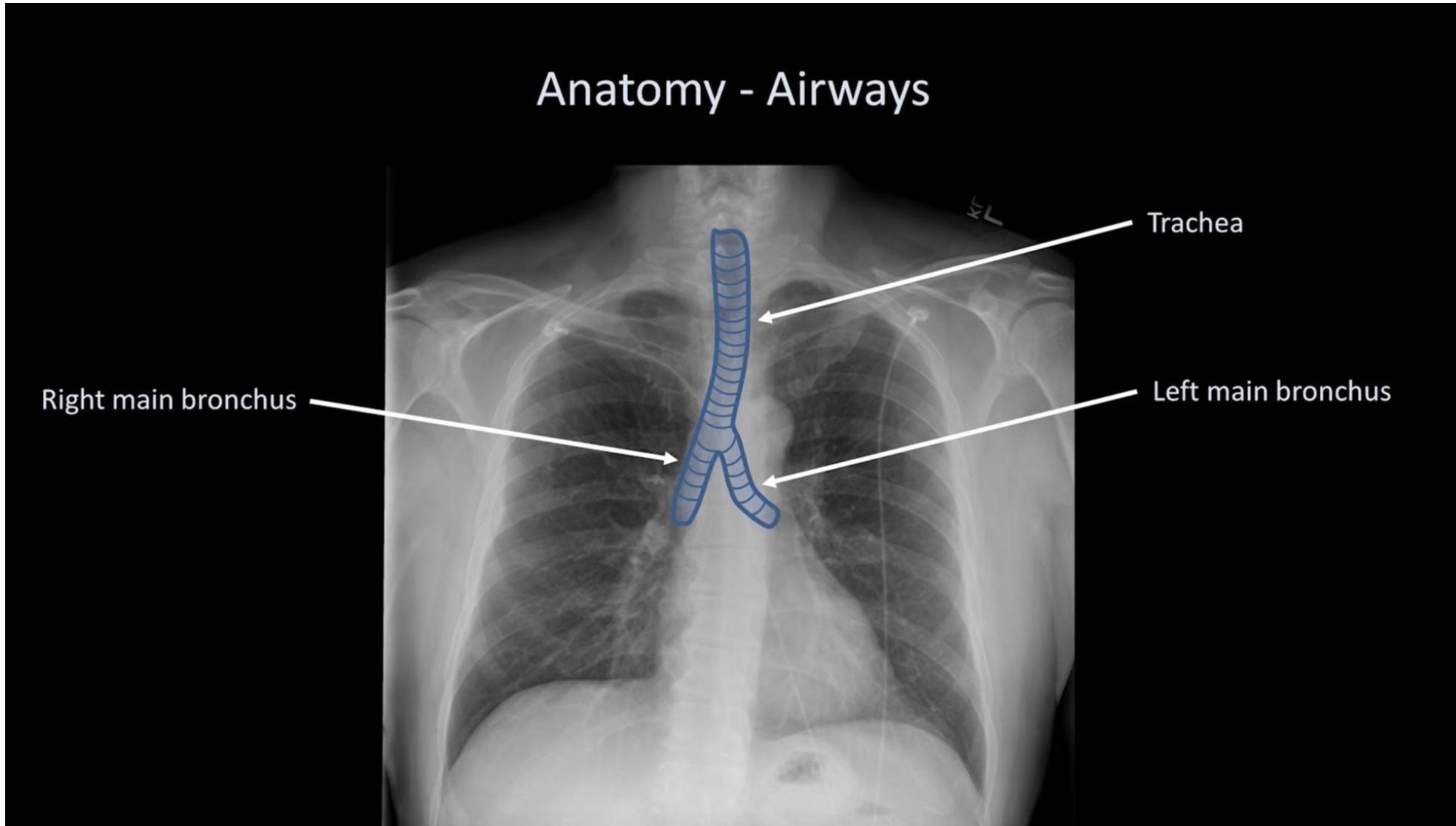
- Bifurcates at level of sternal angle anteriorly and 4th thoracic spinous process posteriorly
- Muscles come into play on labored breathing:
- Trapezi, sternomastoids and scalenus muscles, intercostal muscle

ACCESSORY MUSCLES OF INSPIRATION.

- Scalene & sternocleidomastoid
- Intrinsic muscles of larynx
 - Abductors of vocal cords - post cricoarytenoids - supplied by recurrent laryngeal nerve, branch of vagus.
 - Paralysis - Inspiratory Stridor.



Andreas Astier- CXR for Students



Breath sounds

- **Vesicular breath sounds:** Resp sounds filtered through lungs and chest wall, filtered out the high-pitched components >>> become soft low pitched through inspiration-peripheral lung field
- **Bronchial breath sounds:** near large airways, over manubrium or between scapulae and little filtration occurs, louder and higher in pitch

Sounds of voice

- Just as breath sounds are transmitted through the lung
- **Fremitus** = feel them with **hands (tactile) vibration under skin or hear (vocal) through stethoscope**
- Filtered out and much attenuated as pass through tissues
- Noted alternations and in breath and voice sounds
- **Fremitus is decreased** or absent when voice is decreased, bronchus obstructed, or pleural space occupied by fluid or air PTX, fluid around lung or emphysema
- **Fremitus increased** noted near large bronchi and over consolidated lung, denser inflamed tissue such as tumors, pna

Added sounds

- **Crackles:** discrete, noncontinuous sound, late in inspiration, tiny explosions produced when previously deflated airways are reinflated during inspiration and equalized – PNA, CHF, pul fibrosis, also in lung bases of elderly, bedridden and normal people clear with deep breathing . **Crepitation and crackles interchangeably term with, fine insp crackles typically in fibrosis, reflect opening of small airways or alveoli, not secretions**
- Early insp and exp crackles may occur in bronchiectasis
- **Death rattle:** loud gurgling and bubbling sounds during both inspiration and expiration produced by secretions in trachea and large bronchi

Added sounds

- Wheezes : musical sounds rapid passage of air through a bronchus that is narrowed to point of closure, **do not necessarily parallel the degree of airflow obstruction**
- **Ronchi refers to low pitch wheeze**
- **Rales refers to low pitch crackles, most of us not make this distinction not commonly used**
- Usually expiratory but may occur both inspiration and expiration, vary in pitch but no inferences can be made
- Pleural rub: normal pleural surface move smoothly and noiselessly against each other during respiration, when inflamed they move jerkily and delayed by increased friction creating loud, low pitched and confined to small area of chest wall

Alteration in Breath and Voice Sounds-when normally air-filled lung tissue becomes airless or solid, sounds transmitted to chest wall are much less attenuated than normal

- **High pitched sounds normally filtered out come through more readily**
- **Bronchial breath sounds:** exp sound is higher pitched and louder than in vesicular breath sounds, equal or lasts longer than the insp component. Normal over the trachea and large bronchi but not in more peripheral parts of the lung
- **Egophony:** SAY ee THROUGHOUT: altered filtration of sound giving a nasal bleating quality and change the pts “ee” to “ay” in consolidation or tumor. Normal ee>>ee, not ay.
- **Bronchophony:** SAY 99 THRU STELTHSCOPE, LESS DISTINCT AS MOVE AWAY FROM BRONCHUS, voice sounds are louder and clearer than usual say 99, usually heard indistinct, but **in consolidation**, cause the higher pitched components are better transmitted through the airless lung tissue
- **Whispered pectoriloquy:** SIMILAR TO BRONCHOPHONY EXCEPT WHISPER 99 OUT, whispered sounds are louder and heard more clearly than normal due to consolidation, enhanced transmission through airless lung tissue, have pts to whisper 1,2, 3 4

Techniques of Examination POSTERIOR CHEST

- **General exam**
- **Inspection**
- **Palpation**
- **Percussion**
- **Auscultation**

General examination

- Body habitus, deviation i.e. cachexia, obesity kyphoscoliosis
- Breathing pattern , accessory muscle, abnormal retraction or bulging on breathing
- Rate, rhythm, effort of breathing (nl 8-16/min)
- Audible breathing noise
- Use of oxygen, devices, sputum jars
- **Learn how to recognize patient in respiratory distress**

Inspection

- Central cyanosis
- Clubbing of fingers
- Ankle edema or pitting for few seconds and upper limit
- Cervical adenopathy

Inspection

- Chest wall scars, demarcation like radiation field
- Chest deformities, shape of chest, pectus excavatum, carinatum, barrel
- may look superiorly from the foot
- Count resp rate x 15 seconds, tachypnea etc

Palpation

- Locate the apex beat (5 ics along the MCL)
- The tracheal position and apex beat will tell the mediastinum is displaced or not
- Look for tracheal position, 3 fingers over sternal notch, index and ring to sternoclavicular joint and mid finger to delineate the sternum
- Feel space between sternum and medial sternocleidomuscle (paratracheal gutter)
- Chest expansion (AP and Lateral) by grab ant chest wall firmly and insp/expire to look for asymmetry , look at thumb movements to indicate chest wall expansion, if one hand feels movement is much less the other, there is diminished movement
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Percussion of chest anterior chest

- From left to right from clavicle down
- Normal should be resonant (AIR)
- Abn will be dullness

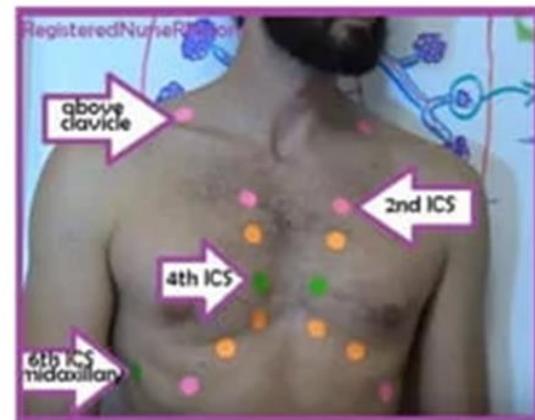
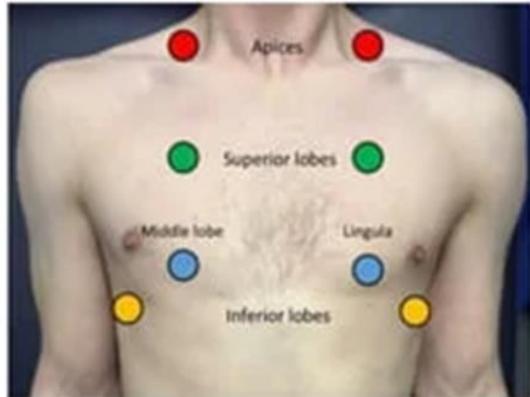
Percussion notes

- Determine underlying tissues are air filled, fluid filled or solid
- Not detect deep seated lesions
- **5 percussion notes:**
- Flatness- thigh
- Dullness- liver or **fluid or solid tissue replace air lung**
- Resonance- normal lung
- Hyperresonance- emphysematous lung
- Tympany- gastric air bubble

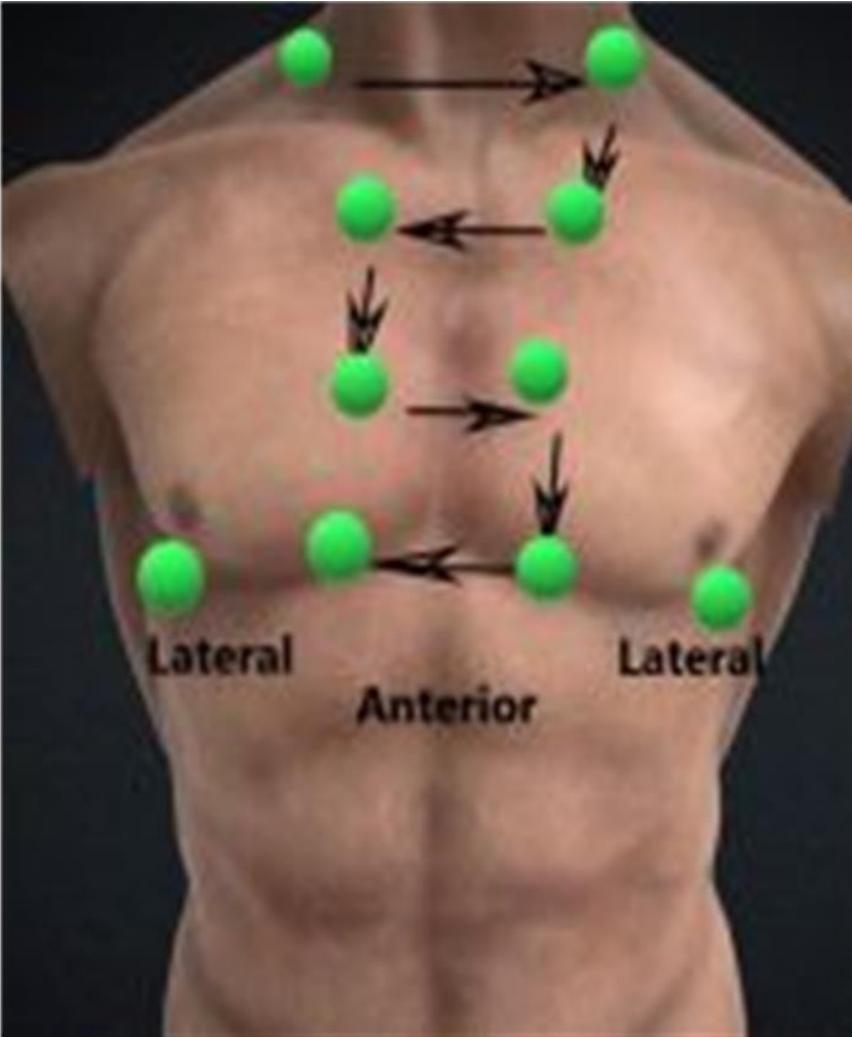
Auscultation of anterior chest

- Start from expected normal side
- Left to right
- Check for vocal fremitus 1,2,3
- Vocal resonance and tactile fremitus give the same information of dx,
- Vocal fremitus either auscultation or palpation
- Choose either one if time is limited

SimpleOSCE- anterior chest auscultation



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From the back

- **Inspection, palpation, percussion and auscultation**
- **Look** for scars, deformities, symmetry
- **Palpate** Tactile fremitus 1,2,3, left and right note vibration
- Chest expansion, start from apex
- **Percussion** avoid scapula and spine
- **Auscultation** from apex, listen to medial border of scapula and spine and laterally again below scapula
- Vocal fremitus

Palpation: elicit vocal or tactile fremitus

- Palpable vibrations when pt speaks
- Ask pt to repeat 99 or 1-1-1
- Palpate and compare symmetrical areas of lungs using ball of hand or both hands to compare
- **Tactile Fremitus is decreased or absent when bronchus obstructed, or pleural space occupied by fluid or air PTX, FLUID AROUND THE LUNG OR EMPHYSEMA**
- **Tactile Fremitus increased noted near large bronchi and over consolidated lung, denser inflamed tissue such as tumors, pna**
- **Estimate level of diaphragm on each side using ulnar of hand until fremitus no longer felt, approx. diaphragmatic level**
- **Abnormal high level suggests pleural effusion or high diaphragm from paralysis or atelectasis**

Auscultation

- Breath sounds : may decrease when pt fails to breath deeply or thick chest wall as in obesity
- Vesicular breathing, exp sound is relatively low pitched soft and shorter than insp sound.
- Vocal fremitus
- Added sounds: crackles, wheezes and rubs

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