

In The Name of God



(A PROJECT OF NEW LIFE HEALTH CARE SOCIETY KARACHI)

UNIT 07
ASSESSMENT OF
THORAX AND LUNGS

Shahzad Bashir

RN, BScN, DCHN, MScN (Std. DUHS)

Instructor

New Life College of Nursing

November 10, 2015

Acknowledge:

Myung-Hee Pak, RN, MSN, CNS

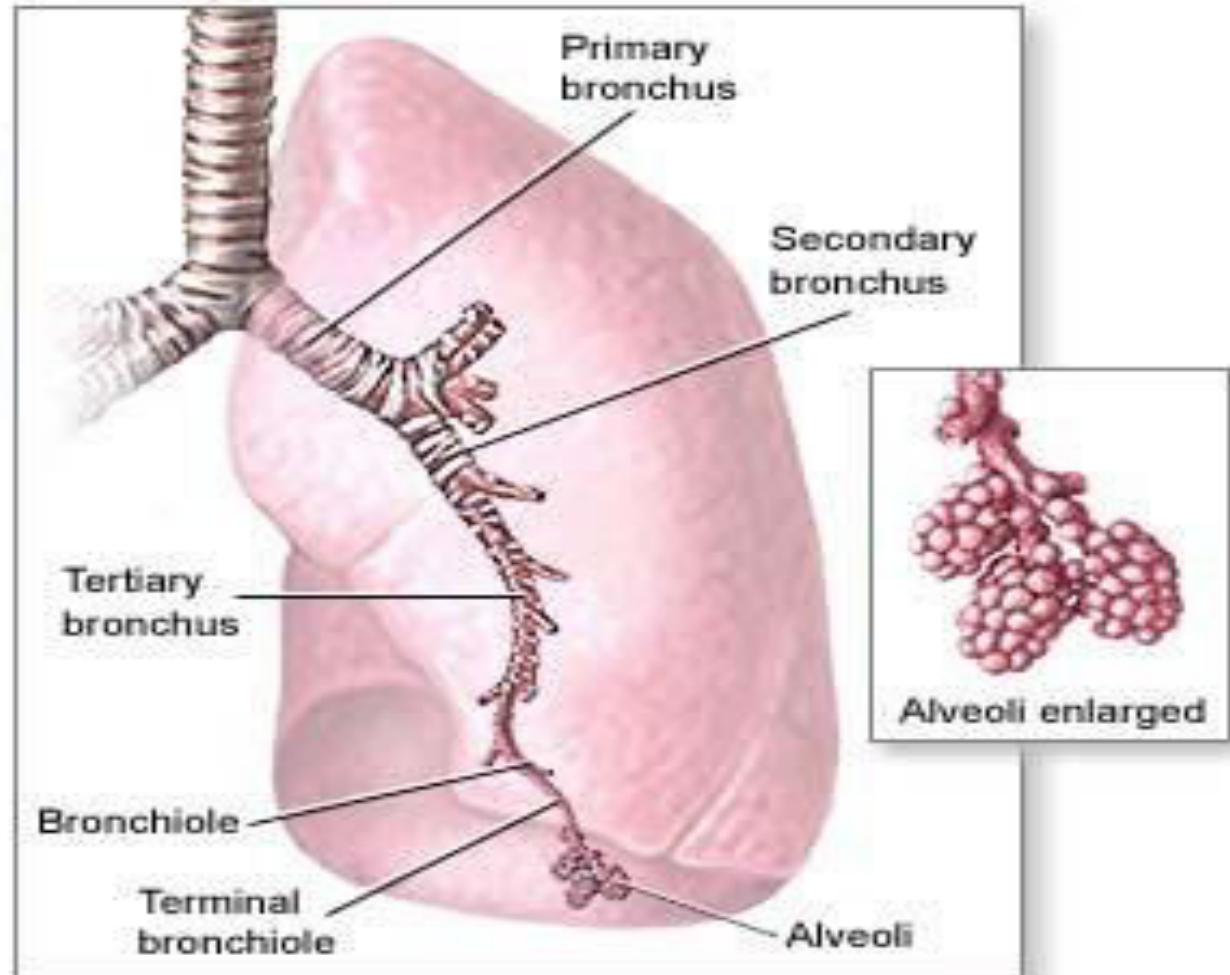
Objectives

- **By the end of the unit, learners will be able to:**
- Describe the component of health history that should be elicited during the assessment of thorax and lungs.
- Identify the structural landmarks of thorax and lungs.
- Describe specific assessments to be made during the physical examination of the above systems.
- Document findings.

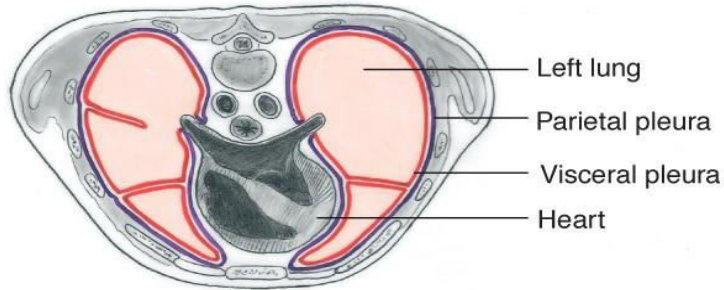
Anatomy of Lungs

- Organs of respiration
- Located in thoracic cavity
- Right lung-3 lobes
- Left lung- 2 lobes
- Important to know landmarks of thorax
- Composed of trachea, bronchioles & alveoli

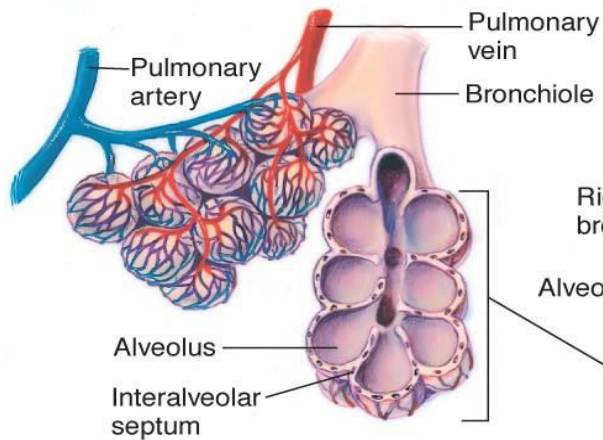
Conti....



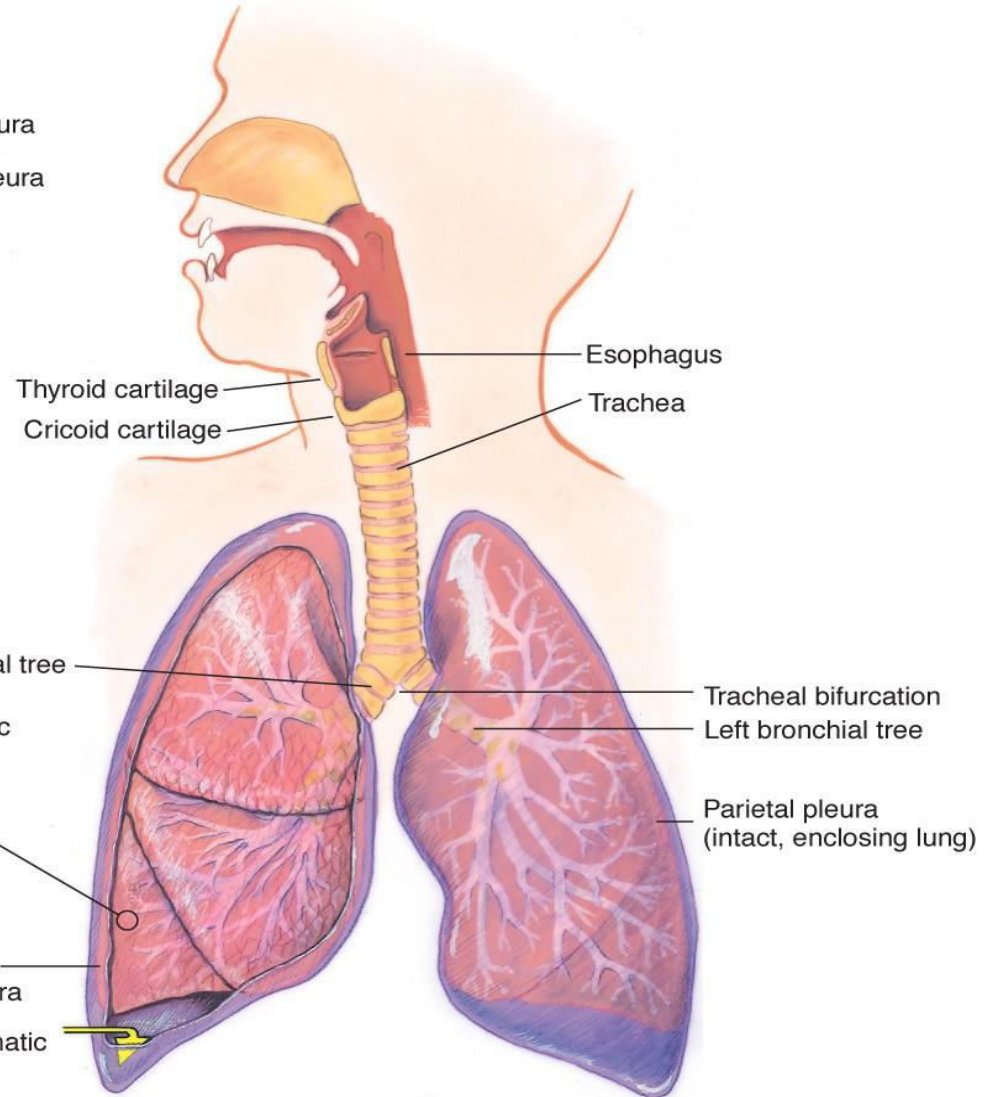
Structures of the Respiratory System



CROSS SECTION OF THORAX



ACINUS



Conti...

Lungs



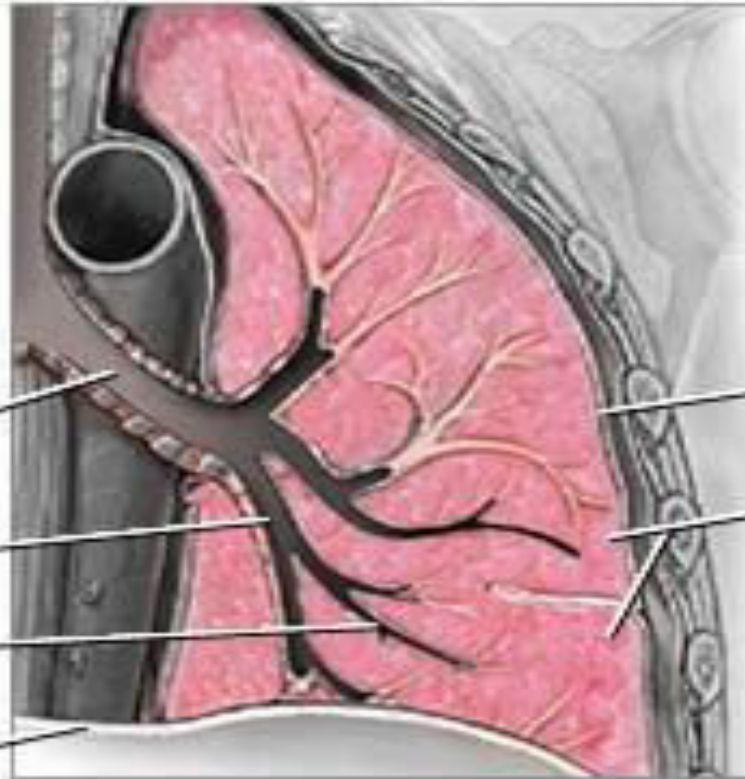
Left lung

Left main
stem bronchus

Bronchi

Bronchioles

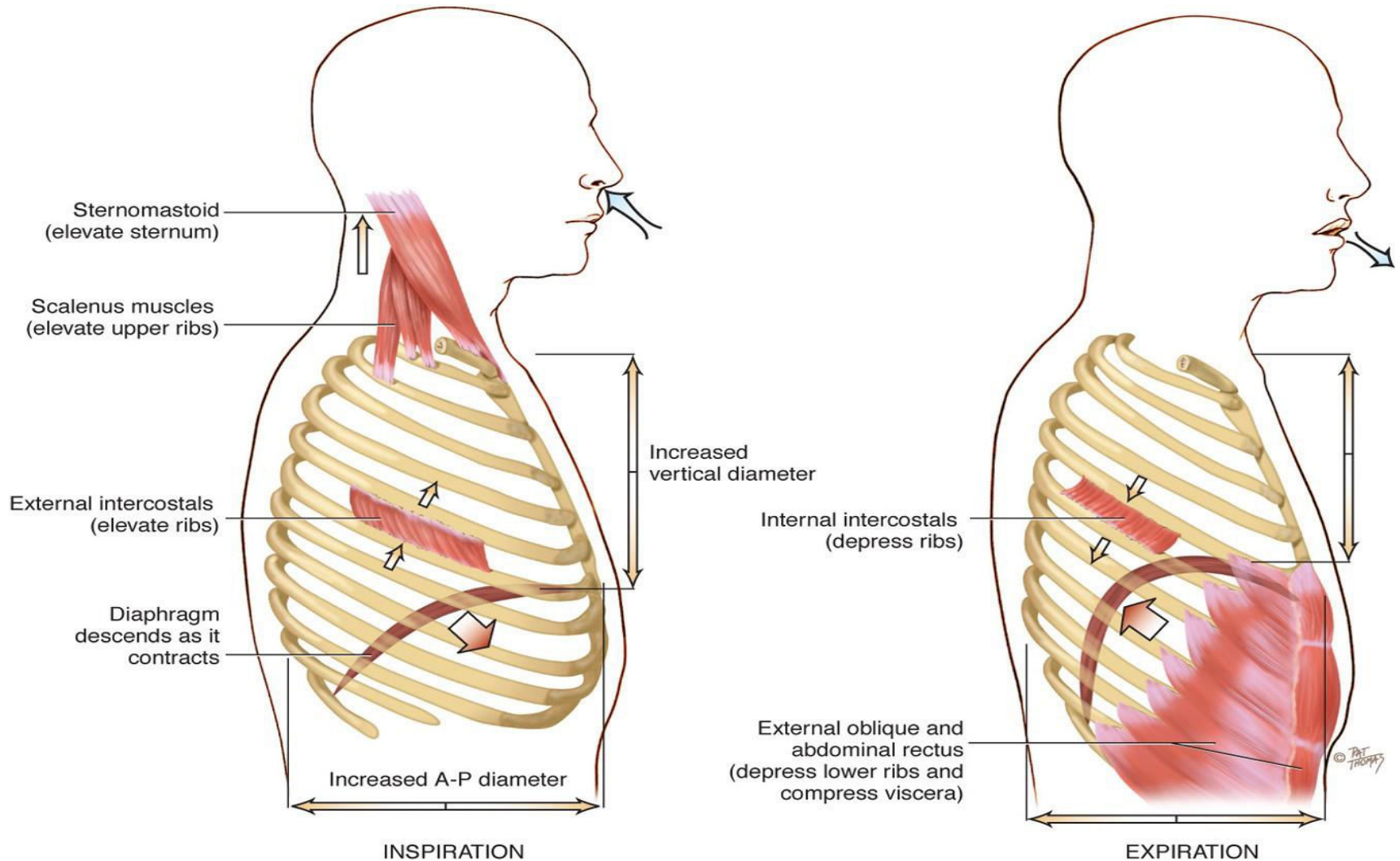
Diaphragm



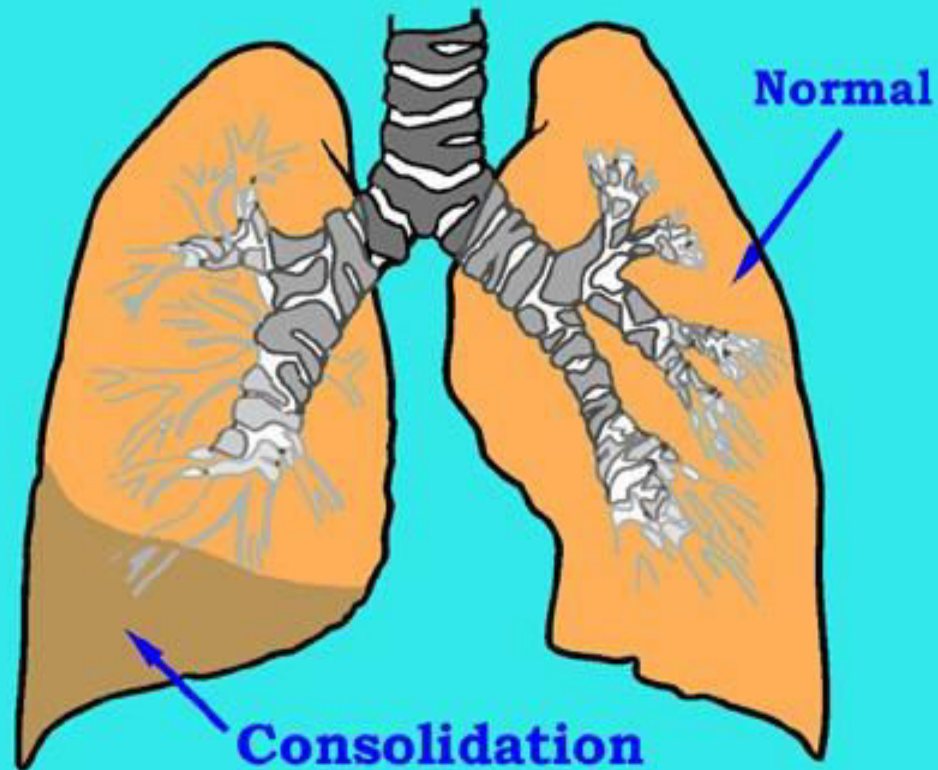
Pleura

Left
lobes

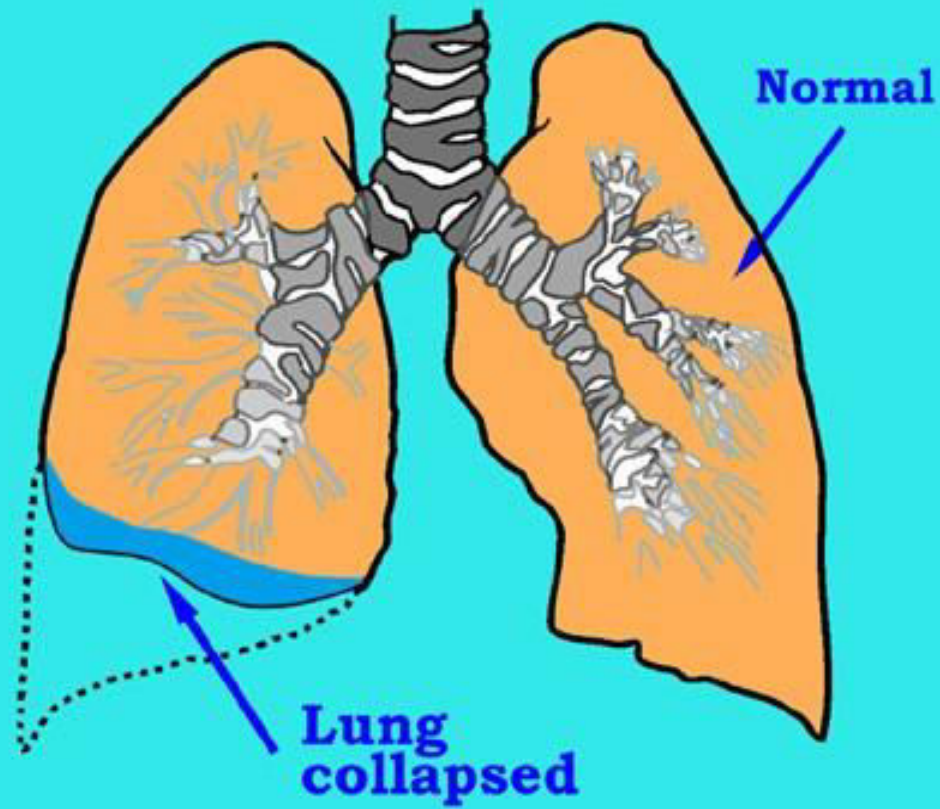
Mechanics of Respiration (cont.)



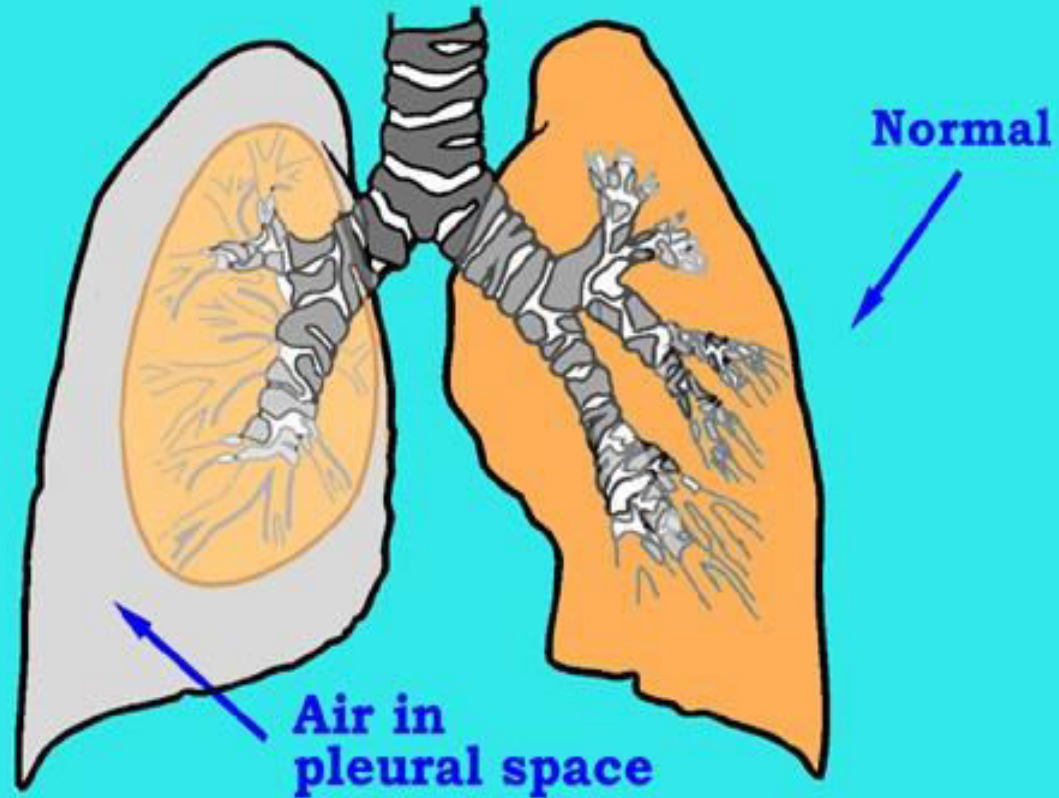
Pneumonia with Consolidation



Atelectasis



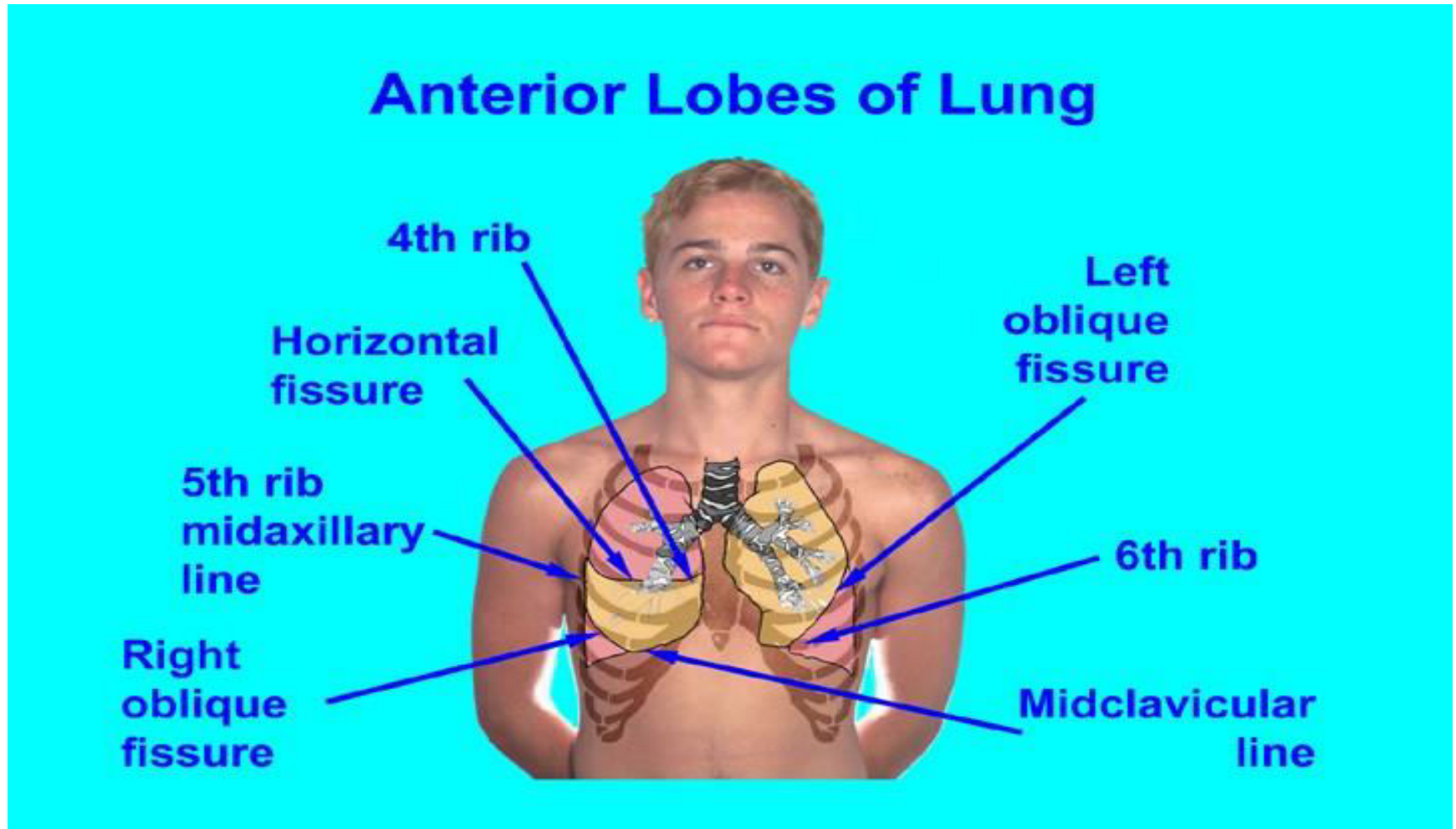
Pneumothorax



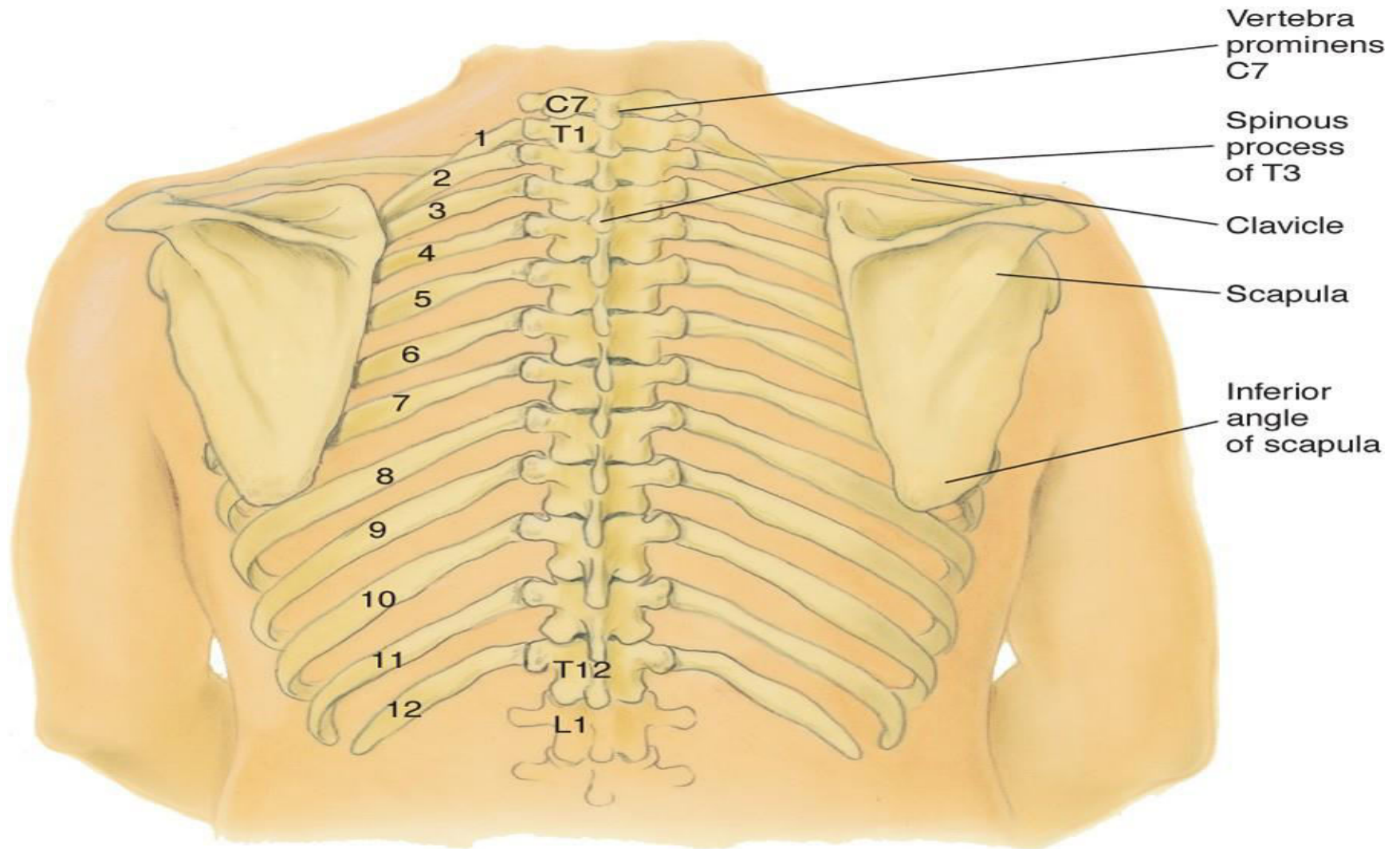
Anatomical Landmarks

- **Anteriorly:** Apex of lung $\frac{3}{4}$ -1 and $\frac{1}{2}$ " (2-4cm) above clavicle.
- **Anteriorly:** Base to 6th rib midclavicular, 8th rib midaxillary.
- **Posterior:** Apex- first thoracic vertebrae.
- **Posterior:** Base T-10 expiration and T-12 deep inspiration.

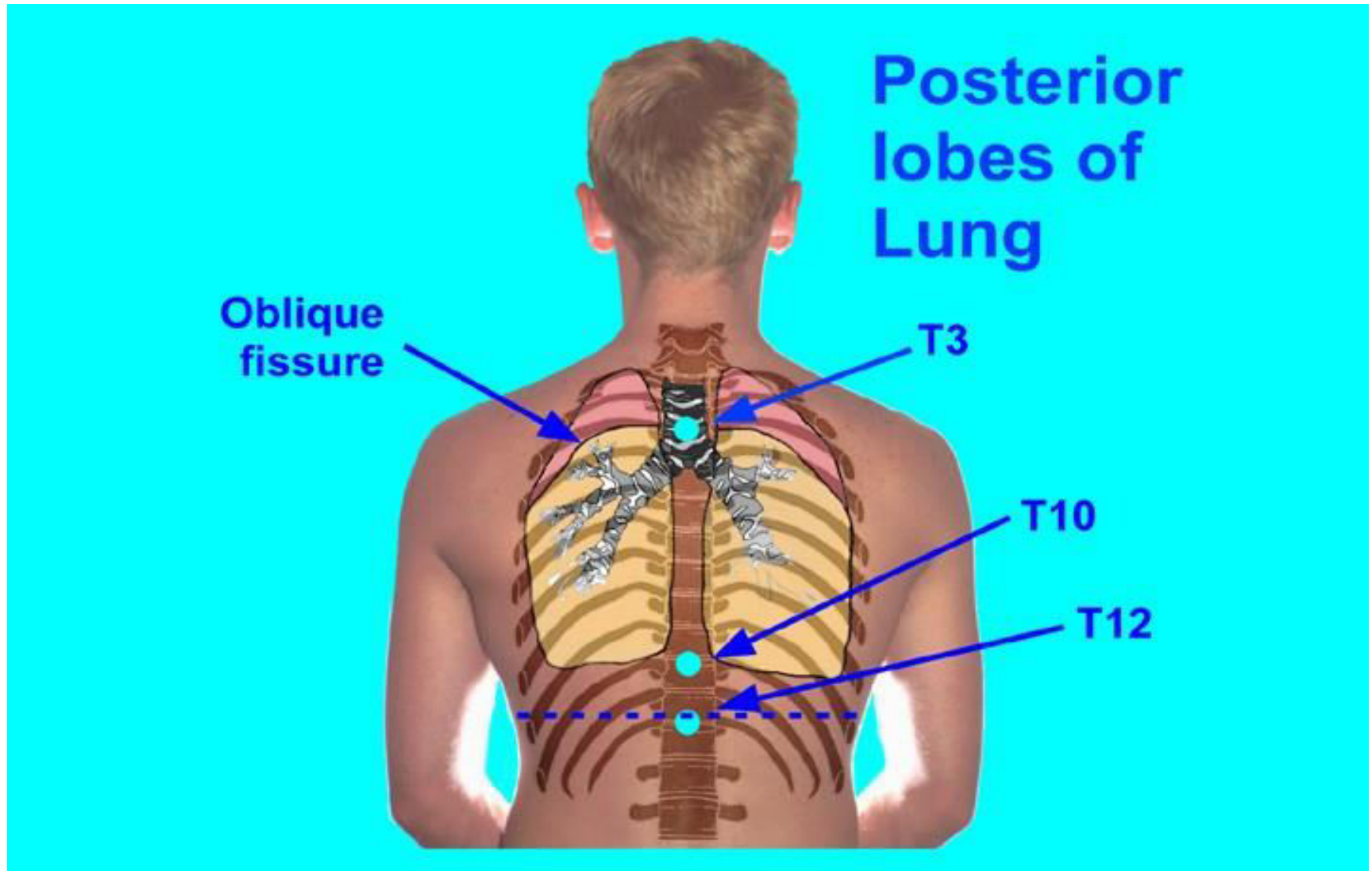
Anterior Lobes of Lung



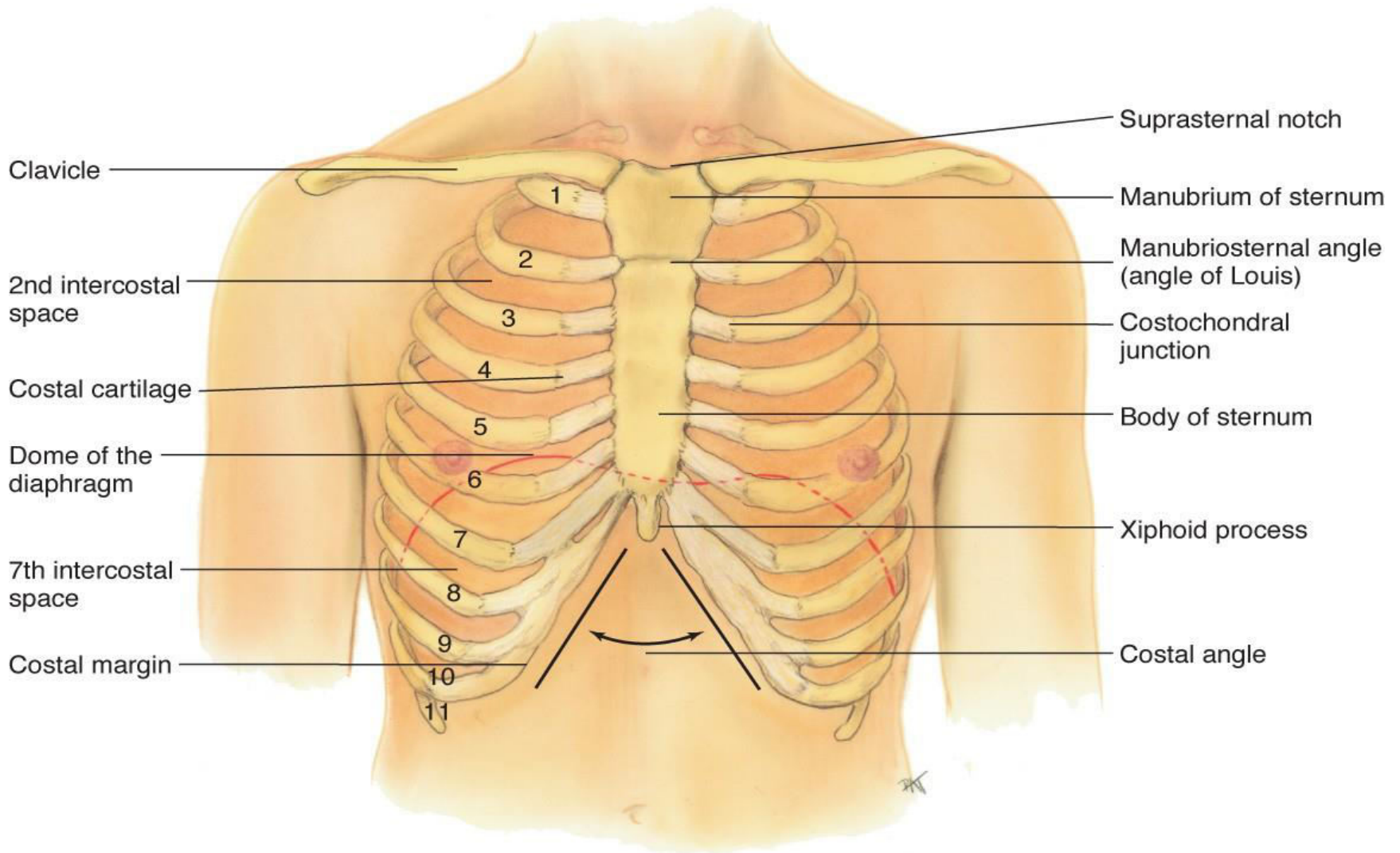
Posterior Thoracic Cage



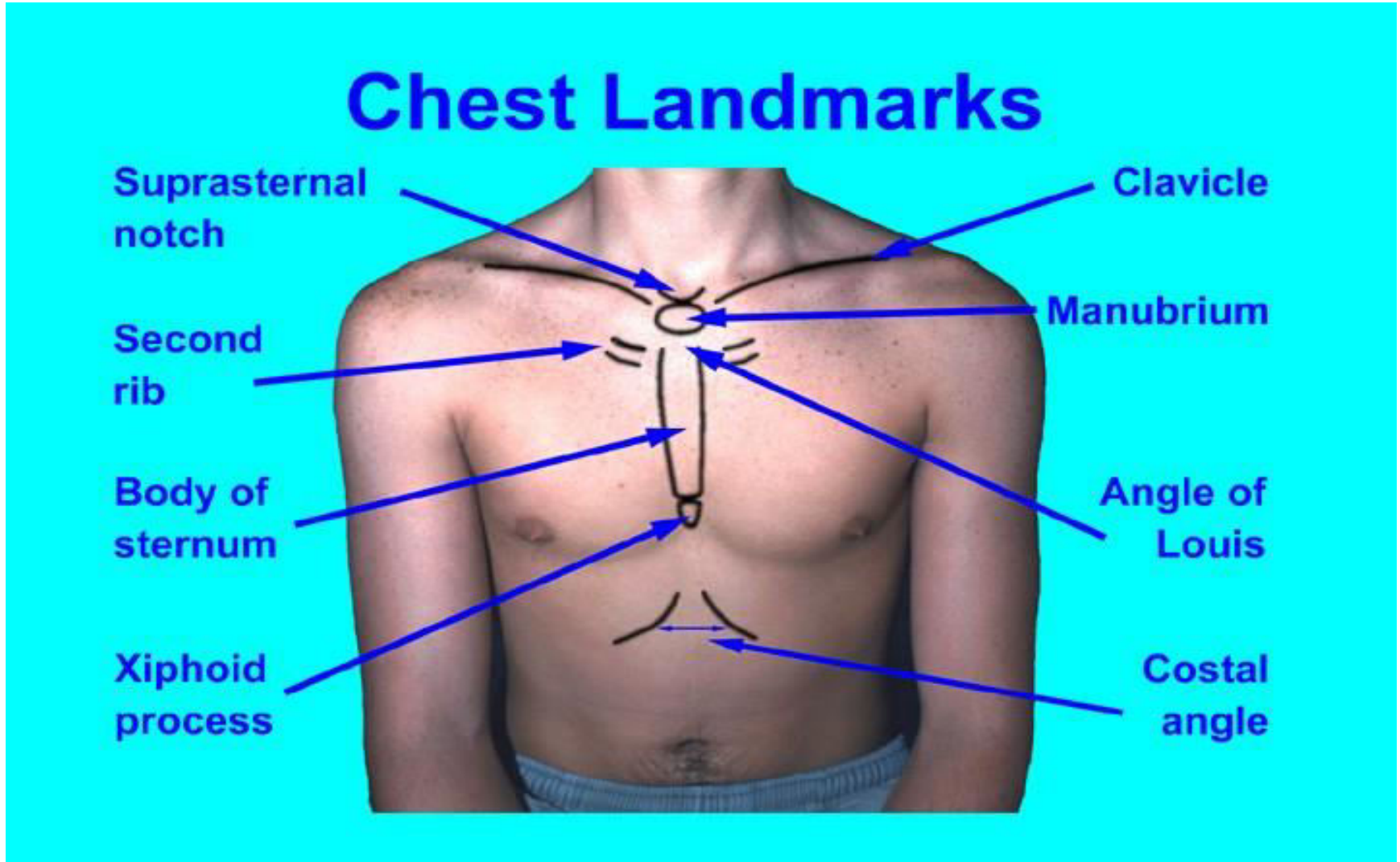
Posterior Lobes of Lung



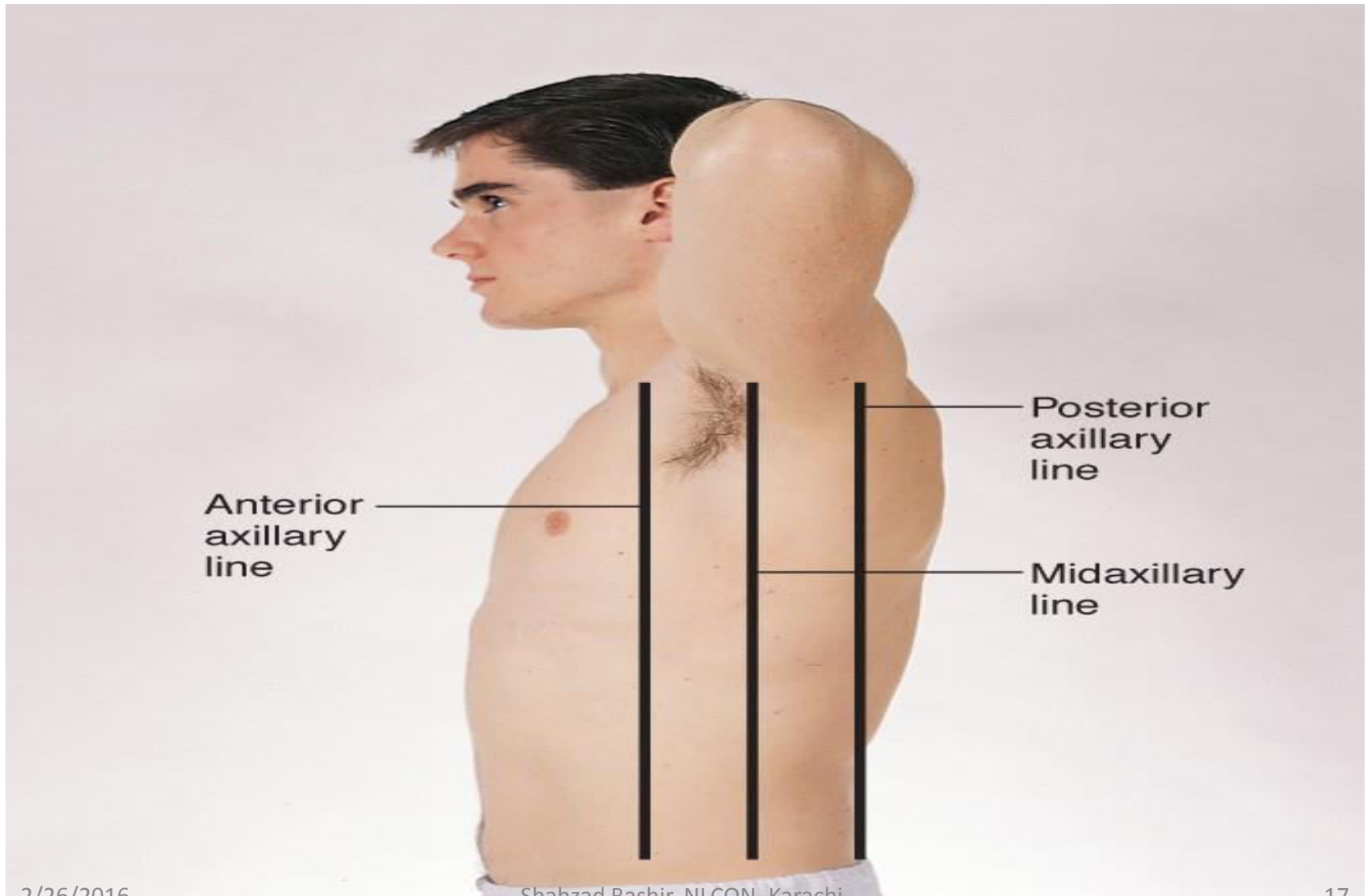
Anterior Thoracic Cage

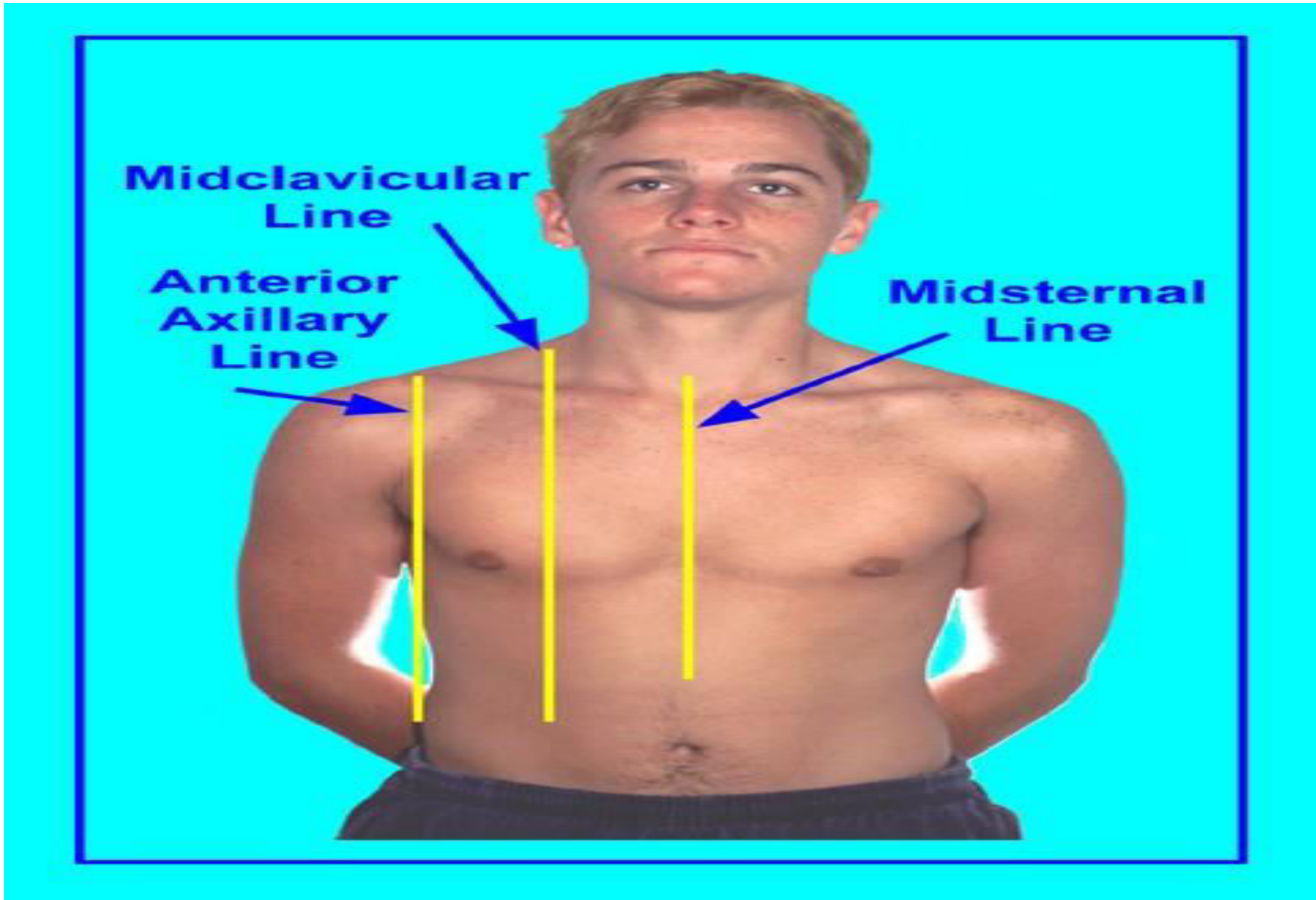


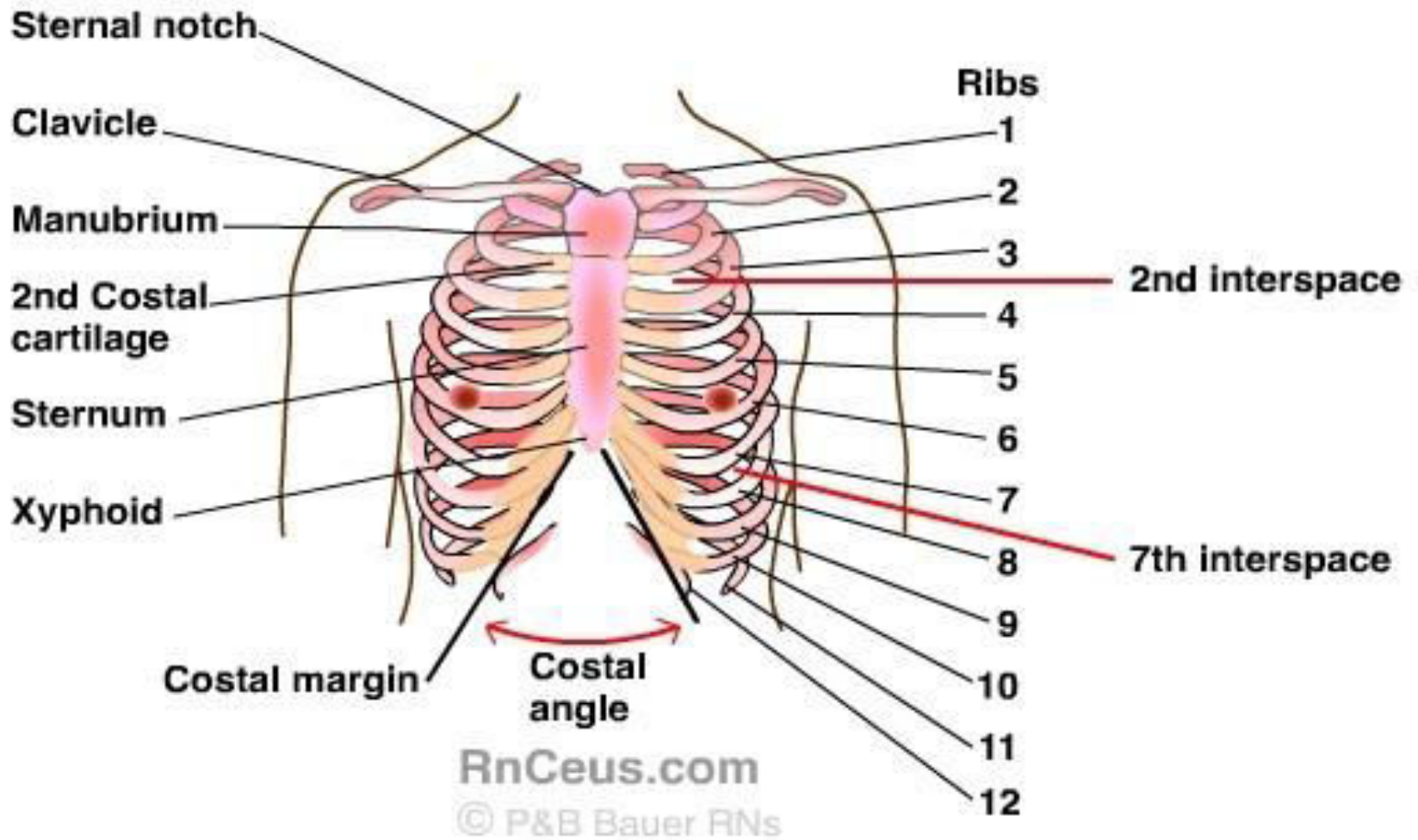
Chest Landmarks



Reference Lines (Lateral)







History Taking

- Symptoms of the respiratory tract
- History of previous illness
- Family history
- Environmental exposure
- Cigarette smoking
- Occupational history

The six principal symptoms of the respiratory tract

- Cough
 - Epiglottitis causes a Barking quality cough
 - Cough that is worse at night is suggestive of asthma or heart failure
- Sputum:
 - Large volume of purulent (Yellow Or Green) e.g. bronchiectasis or lobar pneumonia
 - Pink frothy secretions from trachea in Pulmonary Edema
- Haemoptysis
- Dyspnea:
 - Dyspnea can be graded from I to IV based on the New York Heart Association classification:
 - Class I - dyspnea only on heavy exertion
 - Class II - dyspnea on moderate exertion
 - Class III- dyspnea on minimal exertion
 - Class IV- dyspnea at rest
- Chest pain
- Wheeze

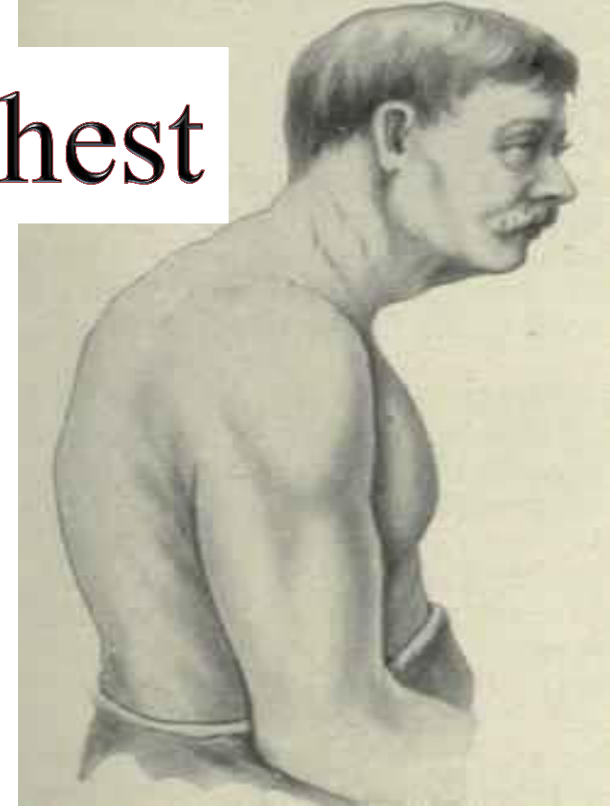
Inspection of Thorax and Lungs

- With patient sitting up- uncovered
- Observe for lesions, chest symmetry, ventilatory pattern, depth, rate and rhythm, muscles used & skin color
- Note both posterior view and anterior view.
- Note spinal deformities
- AP (anteroposterior) diameter should be less than transverse (1/2)

Inspection of the Chest

- Are there any chest wall deformities? (e.g. *pectus excavatum* / *pectus carinatum*)
- Does the chest appear over expanded? (i.e. *Barrel shaped chest*)
- Is there any Kyphosis or Scoliosis present?
- Abnormal retraction
- Impaired movement

PECTUS EXCAVATUM



PECTUS CARINATUM (PEGION CHEST)



Normal Anterior-Posterior: Transverse Diameter

Normal Anterior-Posterior: Transverse Diameter

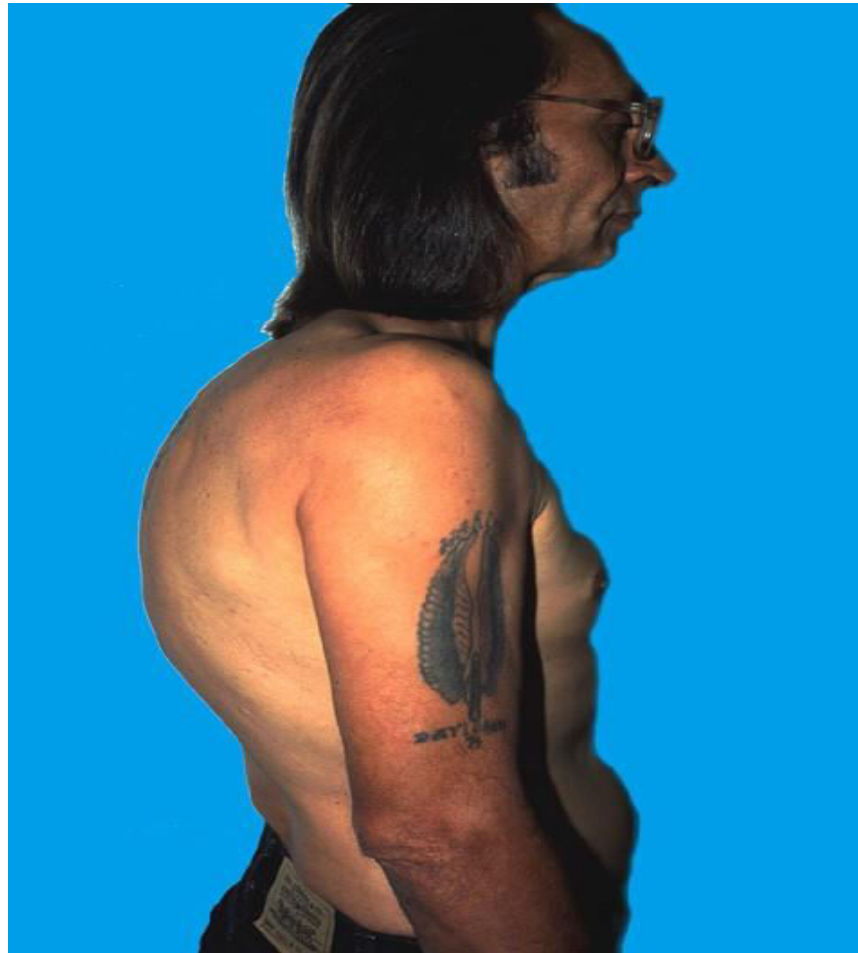


Increased Anterior-Posterior: Diameter

Increased Anterior:Posterior Diameter



Kyphosis



Scoliosis



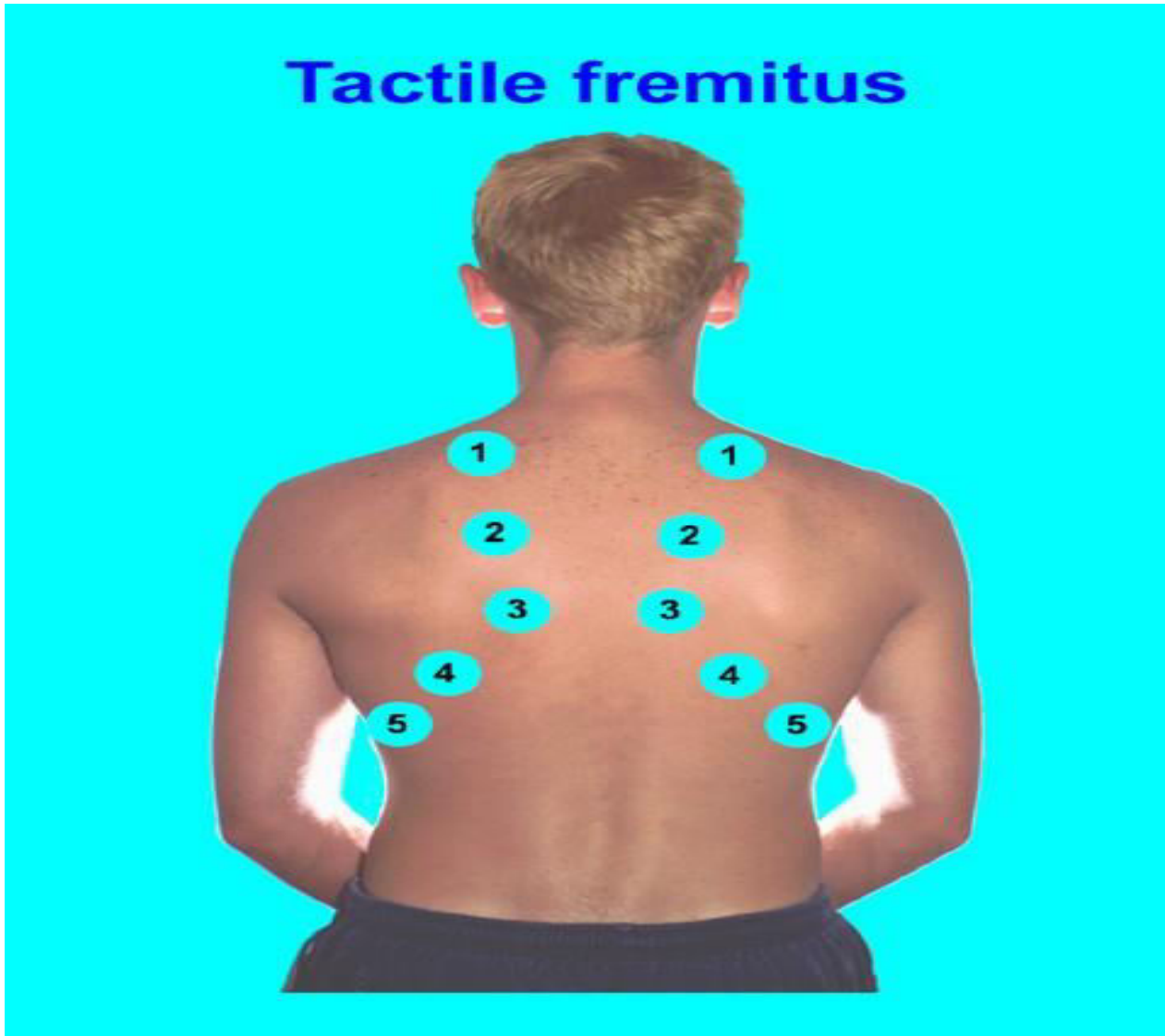
Palpation of Posterior Thorax

- Using fingers palpate chest wall note:
- Tenderness
- Alignment
- Any Bulging or retractions
- Palpate for masses
- Palpate for any crepitus- coarse, crackling sensation palpable over skin surface in subcutaneous emphysema. May follow thoracic injury or surgery.

Palpate Tactile Fremitus

- First say “ahhhh” and feel own neck = fremitus.
- Palpate the patient’s back to right and left of spine as the pt. says 99 and examiner palpates with palm of hand, compare bilaterally.
- Decreased fremitus- anything obstructs transmission of vibrations, e.g., obstructed bronchus, pneumothorax, emphysema. It is decreased when space is filled with air or fluid.

Tactile fremitus



Palpate Chest Expansion/Excursion

- Posterior- place hands along outer edge of costal margin with thumbs toward middle of spine
- Have patient take a deep breath
- Should observe yours hands moving equally far apart.
- Unequal expansion could be due to marked atelectasis, pneumonia, trauma to thorax. Or pneumothorax.

Chest expansion/excursion

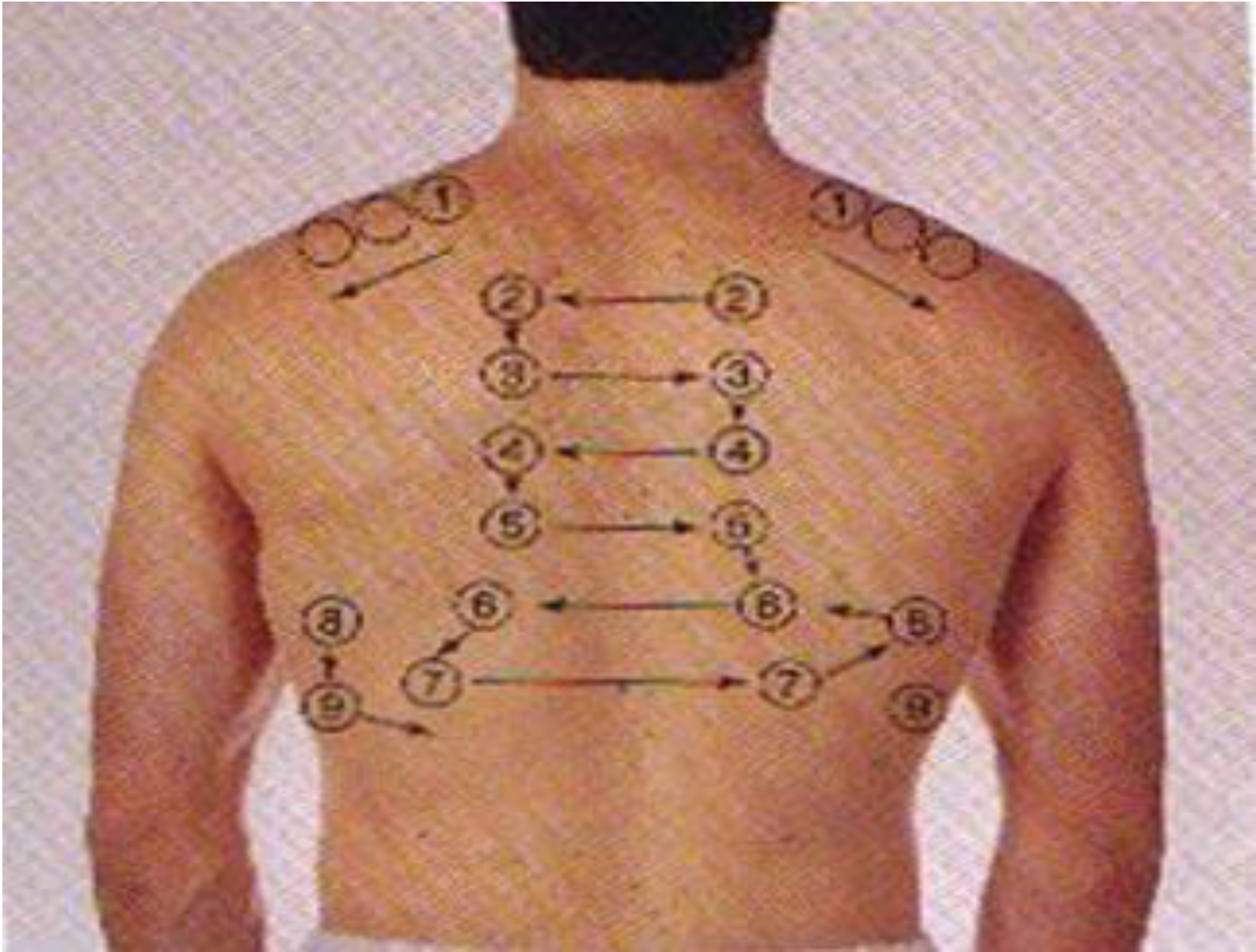


Chest excursion

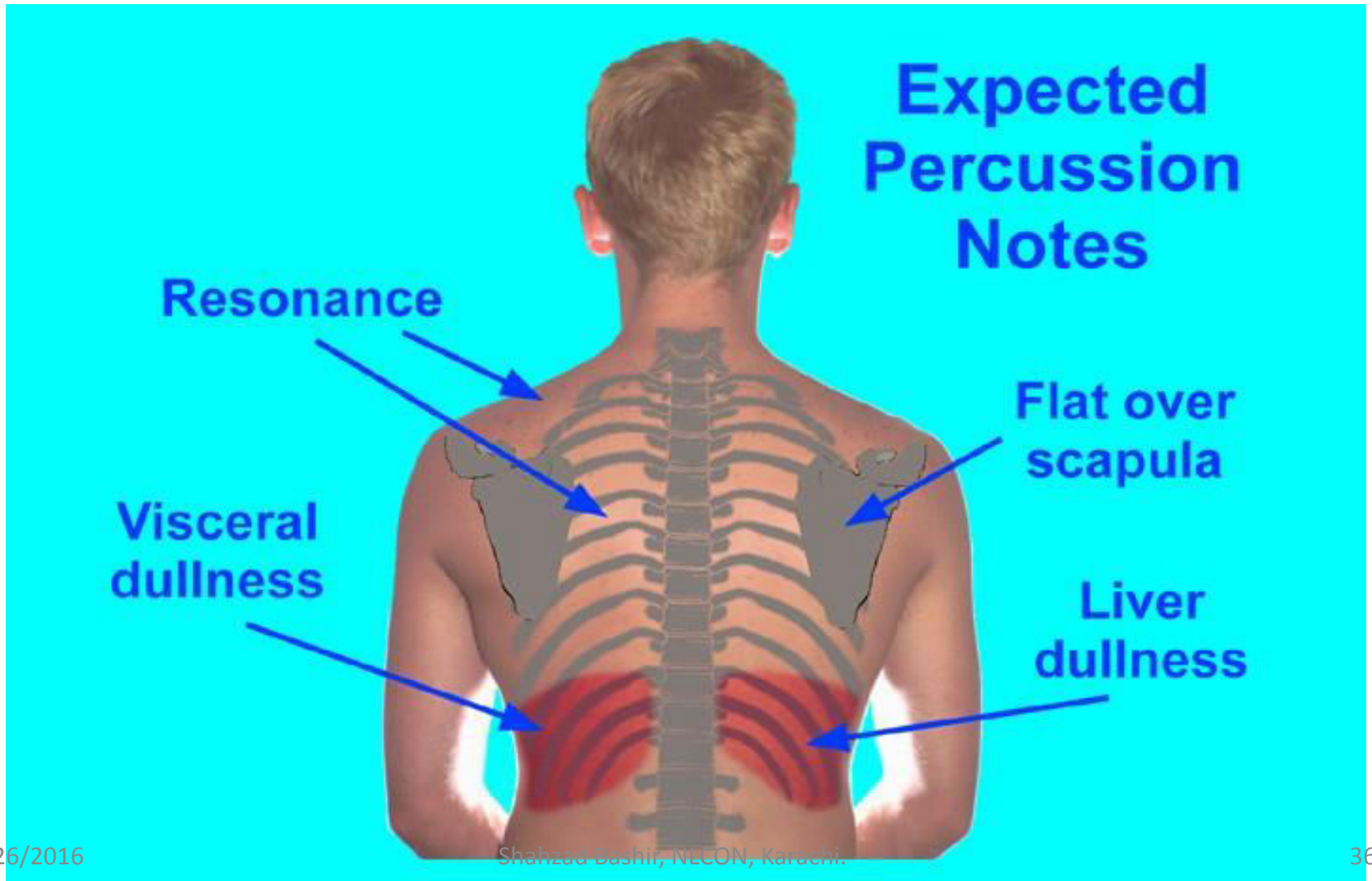


Percuss the Thorax

- Apices to bases
- Anterior
- Lateral
- Posterior- fold arms across chest
- Hear resonance and dullness alternately with lung or ribs.
- Avoid percussion over scapulae and ribs.



Hyperresonance found when too much air is present (emphysema, pneumothorax) Dullness signals abnormal density (pneumonia, tumor)

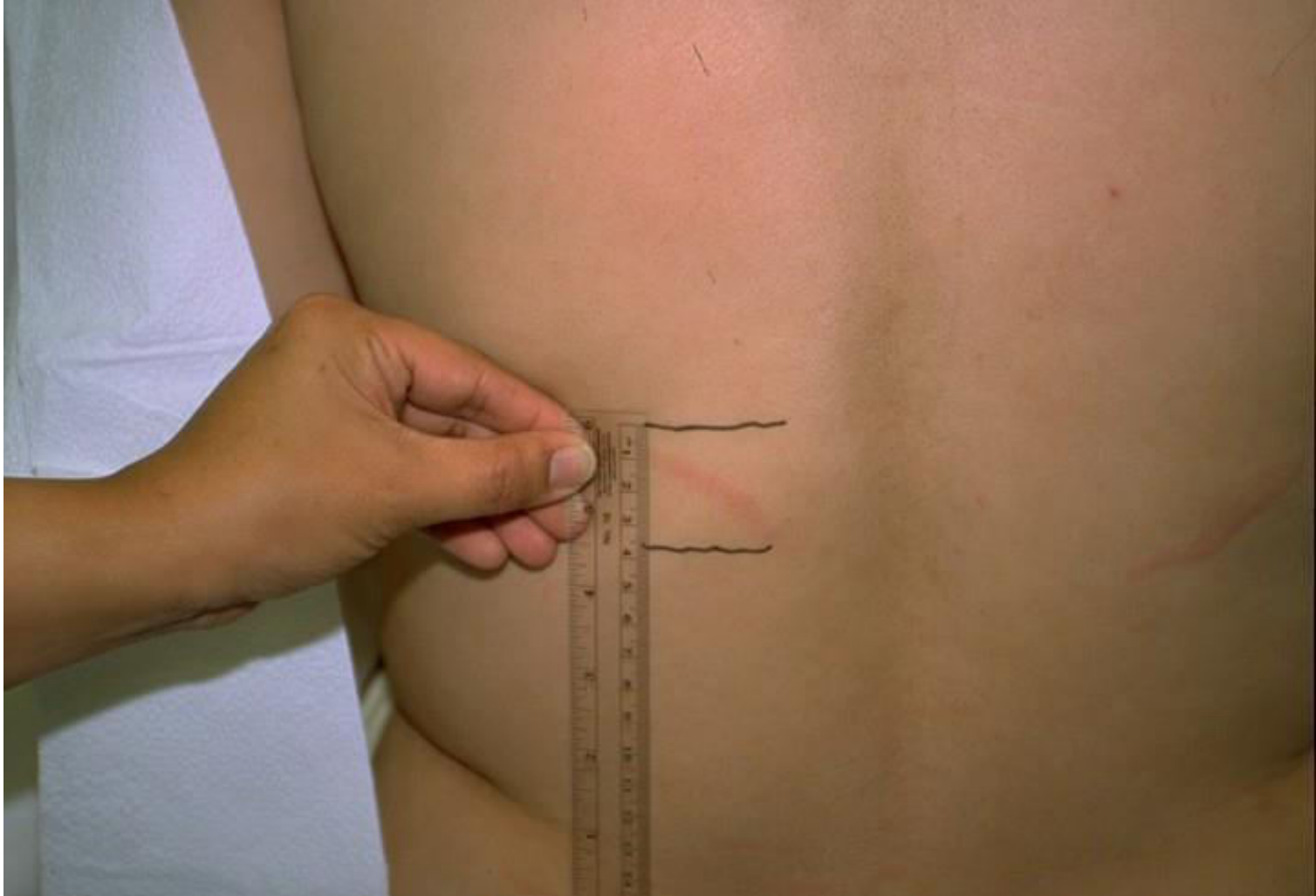




Diaphragmatic Excursion

- Distance between deep inspiration and full expiration.
- Normally ranges from 3-6 cm
- Exhale and hold, percuss and mark location of diaphragm: change dull-resonance
- Deep inspiration and hold it, percuss + mark change again

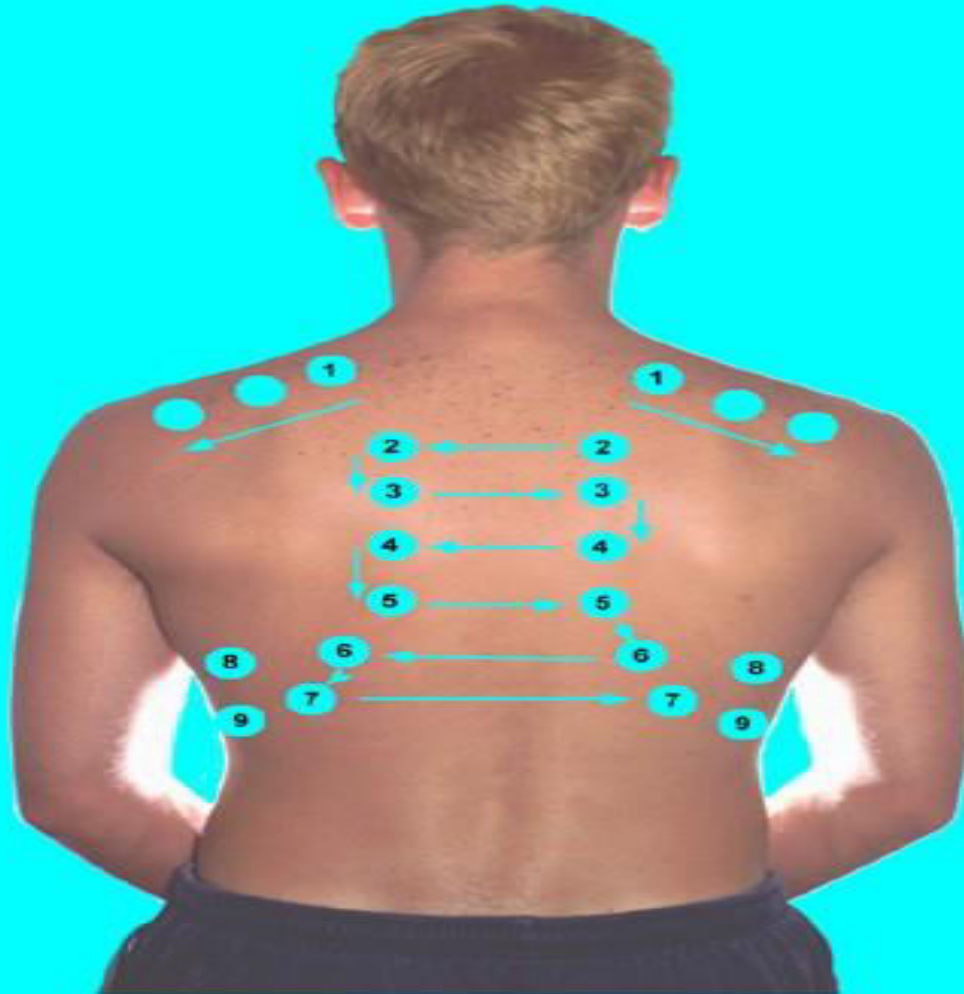
Diaphragmatic excursion



Auscultation

- Beginning at apices to base, compare bilaterally.
- Listen for full cycle, note quality and intensity
- Instruct patient to breathe through mouth, a little deeper (but not faster) than usual
- Use stethoscope diaphragm firmly vs chest wall

Sequence for Percussion and Auscultation



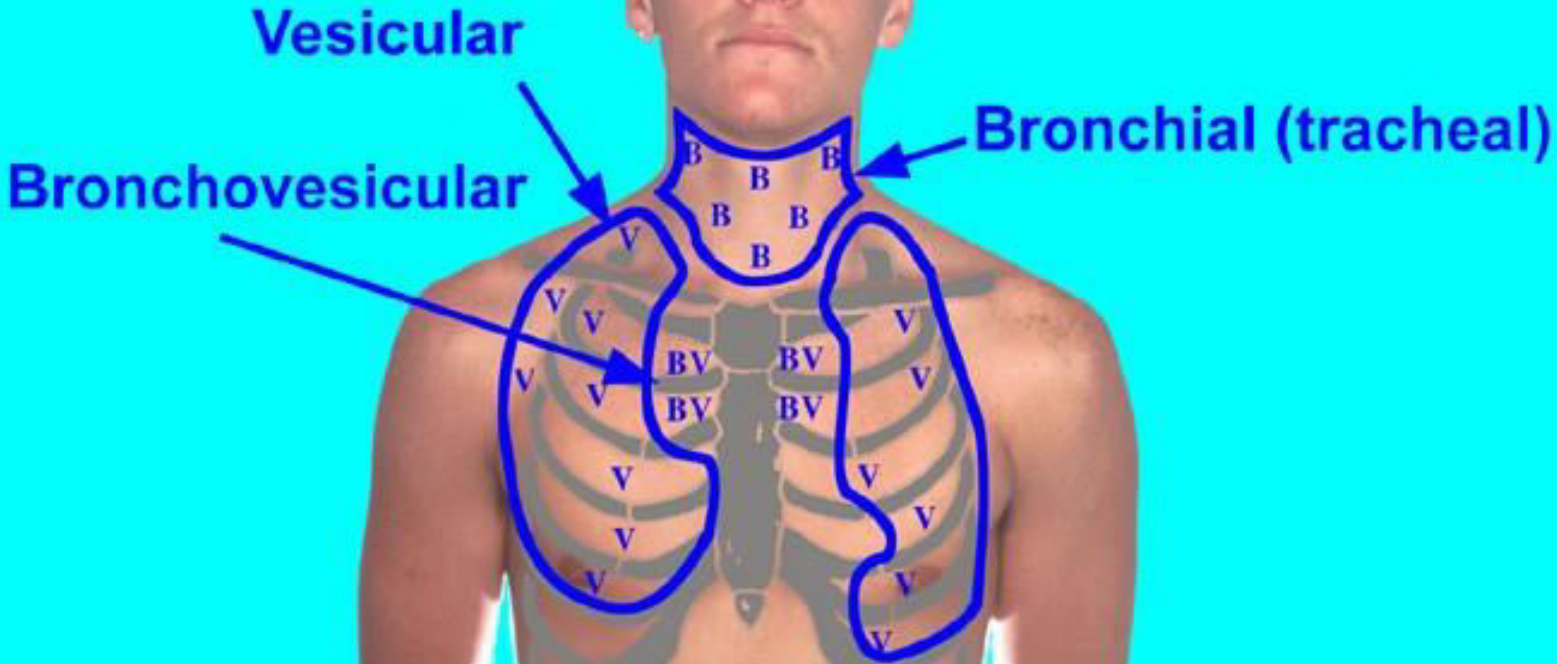
Normal Breath Sounds

- **Bronchial-** heard over trachea and larynx. High pitch, loud, harsh. Inspiration < expiration
- **Bronchovesicular-** heard over major bronchi. Moderate pitch and loudness. Inspiration=expiration
- **Vesicular-** heard over lung fields. Low pitch, soft sound. Inspiration>expiration

Normal Breath Sounds

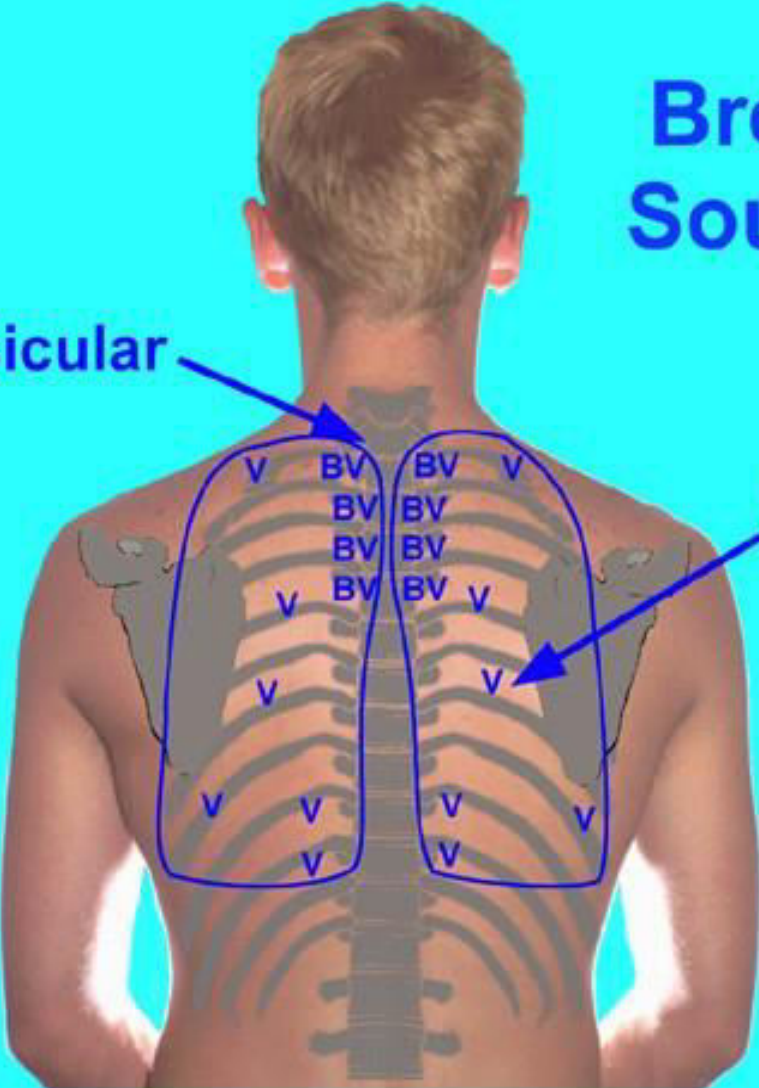
| Sound | Duration of inspiration and expiration | Sound Diagram |
|---------------------|--|---|
| Vesicular | Inspiration > Expiration 2.5 : 1 |  |
| Bronchovesicular | Inspiration = Expiration 1 : 1 |  |
| Bronchial (tubular) | Inspiration < Expiration 1 : 2 |  |

Breath Sounds



Breath Sounds

Bronchovesicular







Vesicular

Adventitious sounds

- **Crackles/ Crepitations** - (rales) rub hair between fingers cracking/popping sound. Secondary to fluid in airway or to opening of collapsed alveoli in atelectasis.
- **Wheezes**- continuous musical and high pitched, due to constricted bronchi. E.g. Asthma, Chronic Emphysema,
- **Rhonchi**- lower pitched, coarse, snoring, due to thick secretions.
- **Pleural friction rub**- lower pitched, dry, rough, grating, inflamed surfaces, as in pleurisy.

Adventitious Breath Sounds

| Sound | Diagram of Sound |
|---|---|
| Crackles Rales Crepitations (fine to medium) |  |
| Crackles Rales Crepitations (medium to coarse) |  |
| Wheezes (sonorous) |  |
| Wheezes (sibilant) |  |

Assess Lungs

- **Note:** decreased or absent breath sounds
- Bronchial tree obstructed at some point by secretions, mucus plug or foreign body
- Emphysema
- Anything that obstructs sound transmission: pleurisy, pleural thickening, air (pneumothorax), fluid (pleural effusion), in pleural space.

Increased Breath Sounds

- Sounds are louder than they should be, e.g., bronchial sounds heard over peripheral lung fields.
- They occur when consolidation e.g., pneumonia or compression creates a denser lung area that enhances sound transmission.

Vocal Resonance

/Further Assessment

- **Auscultation of the chest while the patient speaks can provide extra information about the patient's lungs.**
- **Bronchophony-** say “99”, if heard loud and distinct, it is abnormal. increased over solid areas, decreased by pleural fluid
- **Whispered pectoriloquy-** whisper “99” or “1,2,3” should be muffled. Abnormal= loud & distinct means there is consolidation.
- **Egophony** – say “E”, the E changes to an “A” sound over area of consolidation, pleural effusion or abscess.

Sample Charting

- **SUBJECTIVE**
- No cough, shortness of breath, or chest pain with breathing. No history of respiratory diseases. Has “one or no” colds per year.
- Has never smoked. Works in well-ventilated office-smoking coworkers are restricted to smoke in lounge. Last TB skin test 4 years PTA, negative. Never had chest x-ray.

Sample Charting (cont.)

- **OBJECTIVE**
- **Inspection** AP < transverse diameter. Respirations 16/min, relaxed and even
- **Palpation.** Chest expansion symmetric. Tactile fremitus equal bilaterally and decrease at the base. No tenderness to palpation. No lumps or lesions.
- **Percussion.** Resonant to percussion over lung fields. Diaphragmatic excursion 5 cm and = bilaterally.
- **Auscultation.** Vesicular breath sounds clear over lung fields. No adventitious sounds.

Summary: Respiratory Assessment

- Respiratory rate and rhythm
- Lung sounds
- Use of accessory muscles?
- Nasal flaring?
- Color- skin, nail beds, lips.
- Clubbing of nails.
- Pulse Ox +/-or ABG
- Orthopnea?, SOB?, Dyspnea?

Reference

- Weber. J. R., & Kelley. J.H., (2014), Health assessment in Nursing (5th Ed). Wolters Kluwer Health, Lippincott Williams & Wilkins.
- Bickly L.S, B.(2011) Bates guide to physical examination and history taking (10th ed).Philadelphia: J.B.Lippincott

Thank you