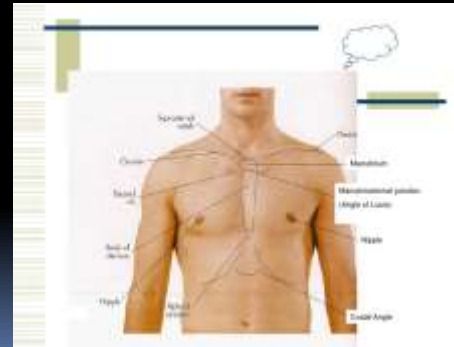


## ASSESSMENT OF THE RESPIRATORY SYSTEM

### Assessment of the Chest and Lungs



## TOPOGRAPHICAL LANDMARKS



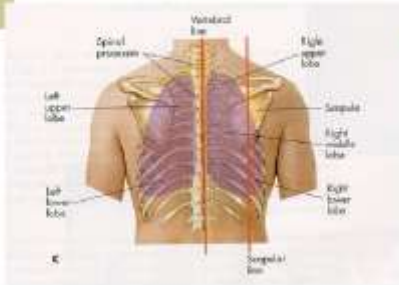
## Reference Lines

- Anterior Chest
  - Midsternal line
  - Anterior axillary lines
  - Midclavicular lines
- Posterior Chest
  - Vertebral line
  - Midscapular lines
- Axilla
  - Anterior axillary lines
  - Midaxillary lines
  - Posterior axillary lines

## Anterior Chest



## Posterior Chest



## Axilla



## History

- Physical problems
- Functional problems
- Life style
- Smoking
- Past medical history
- Family Hx
- Personal and social hx
- Allergens / environment
- Anxiety



## The basic steps of the examination

- Inspection
- Palpation
- Percussion
- Auscultation

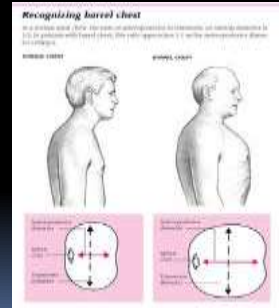
## INSPECTION

- a) Shape of chest – elliptical, symmetrical
- b) Symmetry of chest – measurement of chest expansion
- c) Breathing pattern
- d) Position of trachea
- e) Intercoastal spaces

## Inspection

- a) Shape of chest:

- Barrel chest
  - over inflation of lungs
  - anterior-posterior diameter increased.



## Inspection

- Funnel chest
  - Depression of the lower portion of the sternum
  - Complications
    - Heart damage
    - ↓ Cardiac output



## Inspection

- Pigeon chest
  - Sternum protrudes outward
  - anterior-posterior diameter
    - ↑



## Inspection

- Scoliosis
  - Increased Lateral curvature of thoracic spine
  - Complications
    - Lung & heart damage
    - Back problems
    - Body image



## Inspection

- Kyphosis
  - Hunchback
  - Abnormal increased curvature of the thoracic spine



## Inspection

- Lordosis
  - Sway-back
  - Abnormal, anteriorly increased curvature of the lumbar spine

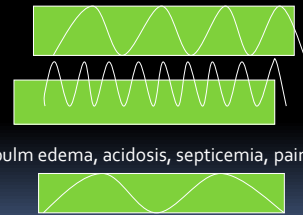


## Inspection:

### c) Breathing patterns

#### i) Rate

- Eupnea
  - Normal
  - 12-20 / min
- Tachypnea
  - ↑ rate
  - Pneumonia, pulm edema, acidosis, septicemia, pain
- Bradypnea
  - ↓ rate

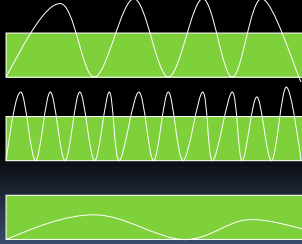


### Inspection

c) Breathing pattern:

ii) Depth

- Hyperpnea
  - ↑ depth
- Hyperventilation
  - ↑ depth & rate
- Hypoventilation
  - ↓ depth & rate

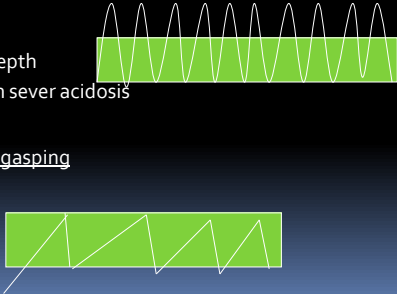


### Inspection

c) Breathing pattern:

ii) Depth

- Kussmaul's
  - ↑ rate & depth
  - Assoc. with sever acidosis
- Apneustic
  - Prolonged gasping




### Inspection

c) Breathing pattern:

iii) Rhythm

- Apnea
  - Not breathing
- Cheyne-stokes
  - Varying depth apnea

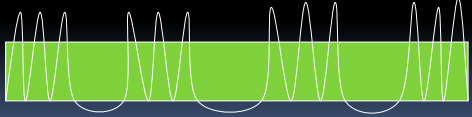


### Inspection

c) Breathing pattern:

iii) Rhythm

- Biot's
  - ↑ rate & depth w/ abrupt pauses



## Inspection:

d) Tracheal deviation:

Normally: centrally aligned

Abnormal: shifted to one side

- Pleural effusion
- Tension pneumothorax
- Atelectasis

## Inspection

e) Intercostal spaces:

- Bulging intercostal spaces
  - Obstruction
  - Emphysema
- Marked retraction of intercostal spaces
  - Blockage

## Palpation

- a) Identify the areas of tenderness
- b) Assessment of Respiratory Excursion
- c) Elicit tactile fremitus

### Assessment of Respiratory Excursion.

#### posterior

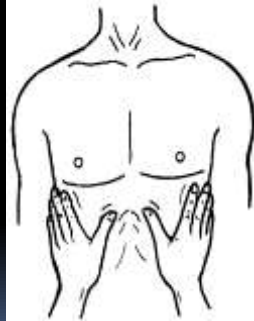
- Place your thumbs about the level of and parallel to the 10th rib, your hands grasping the lateral rib cage.
- As you position your hands, slide them medially in order to raise loose skin folds between your thumbs and the patient's spine.
- Feel for range of symmetry of respiratory movement.



### Assessment of Respiratory Excursion.

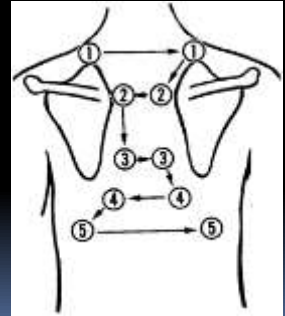
#### Anterior

- Place your thumbs along each costal margin with your hands along the lateral rib cage.
- As you position your hands, slide them medially a bit to raise a between the thumbs.
- Ask the patient to inhale deeply.
- Watch for your thumbs to separate as the thorax expands.
- Feel for the range and symmetry of respiratory movement



### Elicit tactile fremitus

- Use the ball of the hand (the palm of the hand at the base of the fingers), palpate and compare like areas of the lungs. Do not let your fingers touch the patient's chest.
- Have the patient repeat a sound that will make full and rich sounds such as "ninety-nine" or "one-one-one." Symmetrically move your hand over the patient's chest.
- You should feel vibrations of equal intensity on either side of the patient's chest.



### Percussion

#### Rational

- To determine if underlying tissue is filled with air or solid material

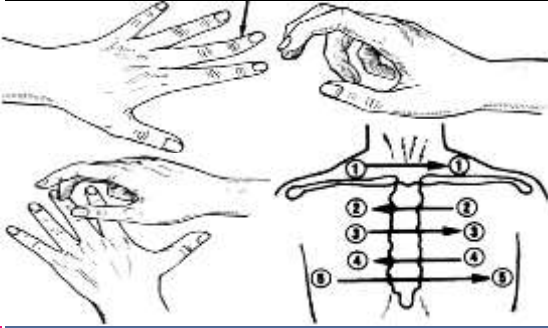
#### Procedure

- Pt sitting
- Tap starting at shoulder
- compare rt to lf

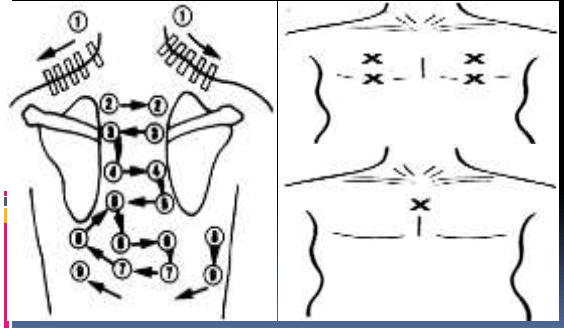
### Percussion: results

- Resonance – drum like
  - Normal
- Hyper-resonance
  - Too much air
  - Emphysema
- Flatness / dull
  - Fluid or solid
  - Pleural effusion
  - Pneumonia
  - Tumor

## Percussion



## Percussion



## Auscultation of the Lungs

- Sitting is the optimal position
- Anterior and posterior walls
- Expose the chest and ask the patient to breath deeply through open mouth
- Compare the pitch, intensity and quality of breathing sounds of one side to the other side
- Perform symmetrically
- Prevent the patient from fall
- Prevent the patient from dizzy secondary to hyperventilation
- Recheck can be done after deep inspiration

## Auscultation

Process of listening to sounds within the body specifically breath sounds during examination of the lungs.

Breath sounds occur because of movement of air in the airways during inspiration and expiration.

Purpose

- Asses air flow through bronchial tree

Procedure

- Diaphragm of stethoscope
- Superior → inferior
- Compare rt to lf



## Auscultation: Results

### Normal

- Vesicular
  - Lung field
  - Soft and low
- Bronchial
  - Trachea & bronchi
  - Hollow
- Bronchovesicular
  - Mixed
  - Between scapulae
  - Side of sternum
  - 1<sup>st</sup> & 2<sup>nd</sup> intercostal space

## Auscultation: Results

### Adventitious

- Crackles
  - (short interrupted sounds due to opening of previously closed airways)
  - On start of inspiration: problem in large airways
  - On mid of inspiration: medium airways are closed
  - On end of inspiration: smaller airways or lung tissues

## Auscultation: Results

- Wheezes
  - Sonorous wheezes
    - Deep low pitched
    - Snoring
    - Caused by air → narrowed passages
    - ↑ secretions
    - Pleural effusion
  - Sibilant Wheezes
    - High pitched
    - Whistle-like
    - Caused by air → narrowed passages
    - constriction
      - Asthma

## Auscultation: Results

- Pleural friction rub
  - inflammation of pleural membranes, pleural surfaces rub together
  - Produced due to friction between two surfaces
  - Grating, creaking sound
  - Best heard
    - Anterior, Lower, lateral area

## Auscultation: Results

- Stridor
  - Crowing
  - Partial obstruction of the larynx or trachea

## Dyspnea

- Significance
  - Common with cardiac & resp. disease
  - Sudden onset – healthy person →
    - Pneumothorax
  - Sudden onset ill, post-op or injury →
    - Pulmonary emboli

## Dyspnea

- Orthopnea
  - Sit up to breath
    - COPD
    - CHF

## Cough

Cough is a forced expulsive maneuver against an initially closed glottis, causing a characteristic sound.

- Acute: lasting less than 3 weeks
- Chronic: more than 8 weeks

## Cough

Onset  
Duration  
Nature  
Sputum  
Severity  
Associated symptoms

## Sputum Production

### Definition

- Matter discharged from resp. tract that contains mucus and pus, blood, fibrin, or bacteria

## Sputum Production

### Significance

- Purulent
  - Thick, yellow/green
  - Bacteria
- Rusty
- Thin, mucous
  - Viral

## Sputum Production

- Pink-tinged
  - Lung CA
  - TB
- Pink tinged, profuse,
  - Pulmonary edema
- Malodorous
  - Lung abscess

## Chest pain

### Definition

- Cardiac or pulmonary

## Chest pain

### Significance

- CA (late stage)
- Pneumonia
- Pulmonary embolism
- Pleurisy

## Chest pain

### ▪ Pleurisy

- Inflammation of pleura
- Sharp with breath
- ↓ breath sounds

## Clubbed fingers

### Definition

- Sponginess of the nail bed
- Loss of the nail bed angle
- Finger tip is round and bulbous



## Clubbed Finger

### Significance

- chronic hypoxia

## Hemoptysis

### Definition

- Expectoration of blood from the respiratory tract

## Hemoptysis

### Significance

- Pulm or cardiac
- Common causes
  - Pulm infection
  - CA of lungs
  - Pulm. Emboli
  - Pulm. Infarction
  - TB

## Hemoptysis

### ▪ Hemoptysis

- Definition?
  - Coughed up blood
- From?
  - Pulm hemorrhage
- Description
  - Pink, red, mixed with sputum
- Blood pH
  - Alkaline blood

### ▪ Hematemesis

- Definition?
  - Vomited blood
- From?
  - Stomach / GI
- Description
  - "Coffee ground"
- Blood pH
  - Acidic blood

## Cyanosis

### Definition

- Bluish coloring of skin



## Cyanosis

### Significance

- Very late indicator of hypoxia
- Appears when O<sub>2</sub> sats < 85%
- NOT a reliable sign of hypoxia
  - Esp. with anemia

## Cyanosis

- O<sub>2</sub> sat definition
  - % of hemoglobin carrying oxygen compared to total # of hemoglobin

## Cyanosis

- Normal  
Breath 100 O<sub>2</sub> molecules → 98 cross into blood

---

Blood: 100 Hgb

- O<sub>2</sub> SATS
  - 98%
  - No cyanosis

## Cyanosis

- Hypoxia

Breath 100 O<sub>2</sub> molecules → 75 cross into blood

---

Blood: 100 Hgb

- O<sub>2</sub> SATS
  - 75%
  - Cyanosis