Respiratory Assessment

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Reference Lines

Anterior Chest	Posterior Chest	Axilla
Midsternal Line	Vertebral Line	Anterior Axillary Lines
Anterior Axillary Lines	Midscapular lines	Midaxillary lines
Midclavicular Lines		Posterior Axillary Lines

Anatomy Points to Remember

- Lungs are symmetric
- Lungs are divided into lobes Right lung = 3 lobes, Left lung = 2 lobes
- Primary muscles of respiration
- Upper airway
- Lower airway

Health History

Chief Presenting Complaint

- Onset
- Duration
- Nature
- Sputum
- Severity
- Associated symptoms
- What makes it worse?
- What improves it?
- Previous treatments
- Past similar experiences

Past health history

- Lung disease or breathing problems such as frequent severe colds, asthma, emphysema, bronchitis, pneumonia, tuberculosis
- Allergies
- Previous chest x-rays
- Medications
- Personal and Social History tobacco use, alcohol, drugs, home environment, occupational environment, travel

Family history





Physical Examination





Inspection

General	Chest Wall	Oxygenation	Respiratory Effort
Appearance	Symmetry	Nails	Rate and depth
Posture	Muscle development	Skin	Breathing pattern
Breathing effort	Costal angle 90 degrees or less	Lips	Chest Expansion
Trachea position - midline			

Palpation

Trachea- for position

Thoracic expansion (Excursion)

- Place both thumbs at about 7th rib posteriorly along spinal process
- Extend fingers of both hands outward over the posterior chest wall
- Ask person to take a deep breath and observe for bilateral outward movement of thumbs
- Normal: bilateral, symmetrical expansion
- Abnormal: unilateral or unequal



Vocal (Tactile) Fremitus

- normal: bilateral symmetrical vibrations
- Decreased or absent: obstruction such as bronchitis, emphysema
- Increased: consolidation (compression) of the lung tissue such as pneumonia

Percussion



 Flat or extremely dull sounds are normally heard over solid areas such as bones.

location 0 Scapular Line 0 0 0 Vertebral Line-0 0 0 0 0 0 0 Figure 2. Areas to percuss during the posterior respiratory exam.

O = Percussion

How To:

- Place left hand finger in the ICS and right hand finger taps the left hand finger with movement from the right wrist



Percussion Sounds

Sound	Intensity	Pitch	Length	Quality	Example of origin
Resonance (heard over part air and part solid)	Loud	Low	Long	Hollow	Normal Lung
Hyper-resonance (heard over mostly air)	Very Loud	Low	Long	Booming	Emphysema
Tympany (heard over air)	Loud	High	Moderate	Drum Like	Puffed out cheek, gastric bubble
Dullness (heard over more solid tissue)	Medium	Medium	Moderate	Thud like	Diaphragm , pleural effusion
Flatness (heard over very dense tissue)	Soft	High	Short	Flat	Muscle, Bone, Thigh

Auscultation







С



http://www.easyauscultation.com/cases-waveform?coursecaseorder=2&courseid=201

Variations dependent on age:

Neonates

- Chest is round
- Obligate nose breathers
- Periodic breathing is common
- Breathing is from abdomen and diaphragm

Children and Neonates

- Breath sounds may sound louder and more bronchial as chest walls thinner than adults

- Bronchovesicular sounds may be heard throughout the chest

Pregnancy

- Costal angle increases in the third trimester
- Dyspnoea and orthopnoea are common
- Breathing is deeper

Older Adult

- Often get decrease in chest expansion
- Bony prominences are marked
- AP diameter often increased with respect to transverse

Signs of compromise:

- Stridor
- Grunting
- Central cyanosis
- Flaring nares









Bronchiectasis







Bronchitis







Pneumonia



Signs and symptoms of Chronic Obstructive Pulmonary Disease

Feature	Chronic Bronchitis	Emphysema	
Cough	Frequent	With exertion	
Sputum	Copious	Scant	
Hematocrit	Elevated	Normal	
PaCO2	Often elevated	Usually normal	
Radiograph	Increased lung markings	Hyperinflation	
Elastic recoil	Normal	Decreased	
Airway resistance	Increased	Normal to slightly increased	
Cor Pulmonale	Early	Later	

	PNEUMONIA	PNEUMOTHORAX	PLEURAL EFFUSION	COPD	
HISTORY / INSPECTION	Cough, sputum production, fever.	Dyspnoea, chest pain, Hx of trauma.个JVP in tension.	Dyspnoea , mild non- productive cough, chest pain.	Chronic smoking, repeated chest infections, dyspnoea, cough.	
PALPATION	 ↑Tactile fremitus ↓ chest expansion - unilateral 	 ↓ Tactile fremitus Tracheal deviation if tension (away from affected side) ↓ chest expansion - unilateral 	 ↓ Tactile fremitus Tracheal deviation (away from affected side) if >1000ml 	 ↓ chest expansion bilaterally 	
PERCUSSION	Dull	Hyper-resonant	Stony Dull	Hyper-resonant	
AUSCULTATION	 Bronchial Breathing Added sounds: crackles and wheeze 个 Vocal resonance (whispering pectoriolquy) 	 ↓, vesicular breath sounds Added sounds 	 ↓ vesicular breath sounds Crackles at the upper edge of the effusion Pleural friction rub Muffled vocal resonance 	 ↓, vesicular breath sounds Added sounds: wheeze, crackles 	

Obstructive vs restrictive lung diseases			
Obstructive	restrictive		
characterized by limitation of airflow due to partial or complete obstruction	characterized by reduced expansion of lung parenchyma accompanied by decreased total lung capacity.		
Eg are emphysema, chronic bronchitis, bronchiectasis, and asthma	Eg are ILD like Fibrosing alveolitis, idiopathic pulmonary fibrosis, interstitial pneumonia, Pneumoconiosis,Sarcoidosis; and chest wall neuromuscular diseases		
total lung capacity normal	decreased		
forced vital capacity (FVC) normal	reduced		
decreased expiratory flow rate, measuerd as forced expiratory volume at 1 second (FEV $_{\!\!1\!)}$	Normal or reduced		
FEV1/FVC ratio < 0.80	normal		

Pathological process	Chest wall movement (reduced)	Mediastinal displacement	Percussion note	Breath sounds	Vocal resonance	Added sounds
Consolidation (i.e. lobar pneumonia)	Affected side	None	Dull	Bronchial	Increased	Fine crackles
Collapse Major bronchus	Affected side	Towards lesion	Dull	Diminished or absent	Reduced or absent	None
Peripheral bronchus	Affected side	Towards lesion	Dull	Bronchial	Increased	Fine crackles
Fibrosis Localized	Affected side	Towards lesion	Dull	Bronchial	Increased	Coarse crackles
Generalized (e.g. idiopathic lung fibrosis)	Both sides	None	Normal	Vesicular	Increased	Fine crackles
Pleural effusion (>500 mL)	Affected side	Away from lesion (in massive effusion)	Stony dull	Vesicular reduced or absent	Reduced or absent	None
Large pneumothorax	Affected side	Away from lesion	Normal or hyperresonant	Reduced or absent	Reduced or absent	None
Asthma	Both sides	None	Normal	Vesicular Prolonged expiration	Normal	Expiratory polyphonic wheeze
Chronic obstructive pulmonary disease	Both sides	None	Normal	Vesicular Prolonged expiration	Normal	Expiratory polyphonic wheeze and coarse crackles