

Anatomy Team
433

King Saud University
College of medicine
Respiratory Block

5 *Radiological Anatomy of*

Thorax



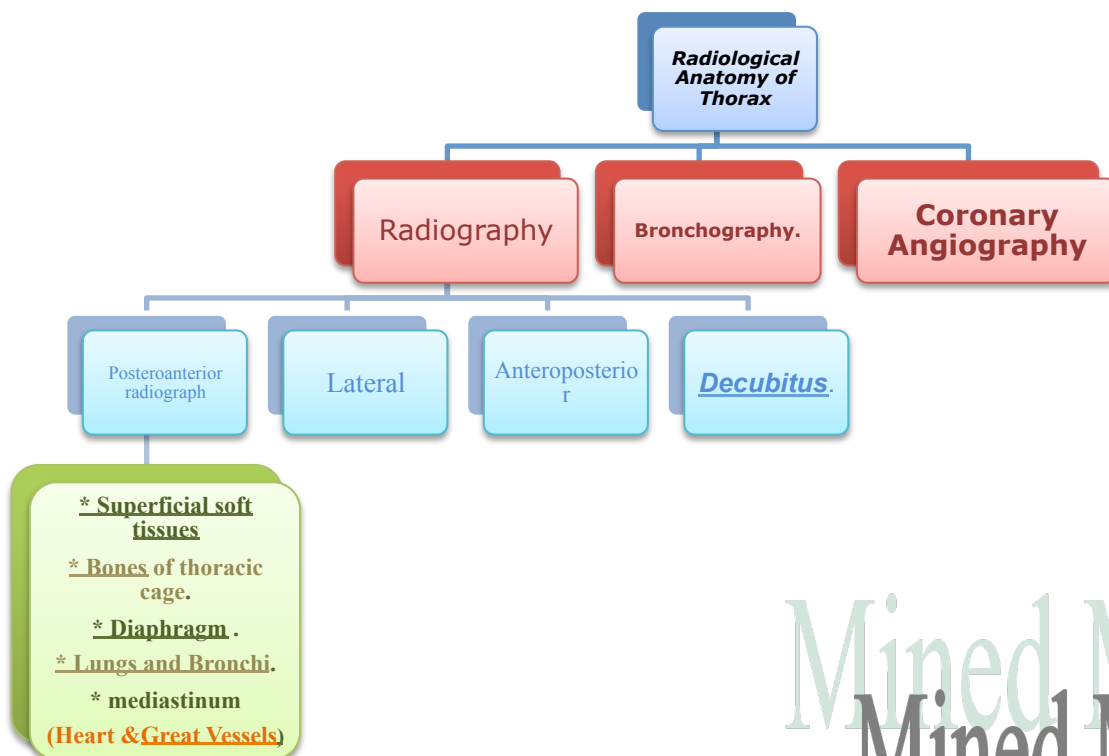
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- ✓ Identify the bones of the thoracic cage.
- ✓ Identify superficial soft tissues.
- ✓ Identify the trachea and lunge fields.
- ✓ Describe the mediastinum and the cardiac shadows.
- ✓ Describe brief knowledge about **Bronchography.**
- ✓ Describe brief knowledge about **Coronary Angiography**



Mined Map
Mined Map

Indications for chest X-ray

A chest x-ray may be used to diagnose and plan treatment for various conditions, including:

Diseases/Fractures of the bones of the chest (ribs, sternum, clavicle and the vertebrae)

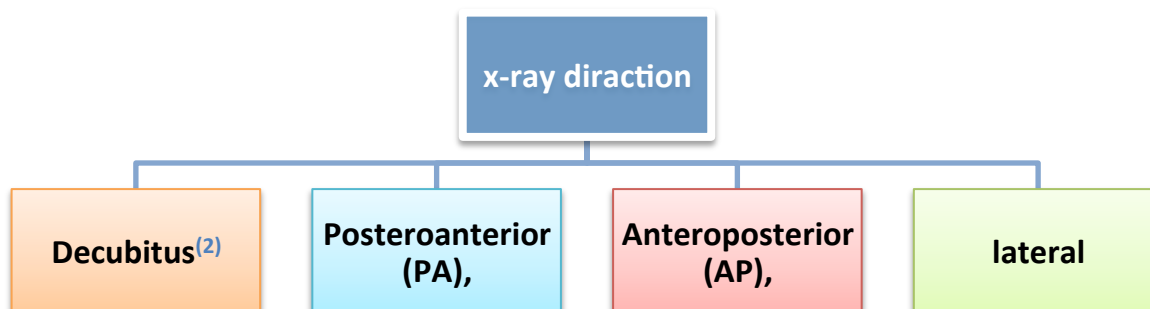
Lung disorders such as pneumonia, emphysema, pleural effusion, tuberculosis and lung cancer.

Heart disorders (congestive heart failure which causes heart enlargement).

Chest radiographs are also used to screen for **job-related lung diseases** in industries such as mining where workers are exposed to dust, (asbestosis, silicosis⁽¹⁾).

Chest x-ray is also requested as pre-employment demand.

Different views of the chest can be obtained by changing the relative position of the body and the direction of the x-ray beams:



(!) **silicosis**: a disease of the lungs caused by continued inhalation of the dust of siliceous minerals and characterized by progressive fibrosis and a chronic shortness of breath

(2) **decubitus** - a reclining position (as in a bed)

View	Posteroanterior (PA) view:	Anteroposterior (AP) view:
path	<ul style="list-style-type: none"> The x-rays enter through the posterior aspect of the chest exit out of the anterior aspect where they are detected by an x-ray film. 	<ul style="list-style-type: none"> The x-rays enter through the anterior aspect exit through the posterior aspect of the chest.
Assessment	a good <u>assessment of the Cardiac Size.</u>	
Features	because the film is close to the anterior chest wall it avoids heart magnification	AP chest x-rays are done where it is difficult for the patient to obtain a normal chest x-ray, such as when the patient cannot get out of bed (supine position).
Identified	<ul style="list-style-type: none"> the presence of the fundal gas bubble the absence of the scapulae in the lung fields. 	
	<i>Lateral view</i>	<i>Decubitus view</i>
	Indicated only for further interpretation	lying at the side

posteroanterior
the following structures must be examined:

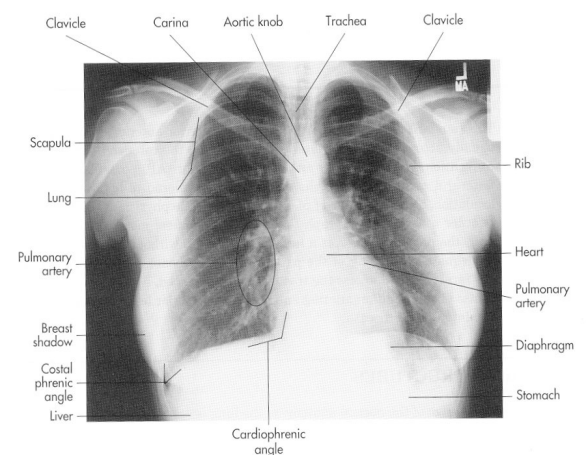
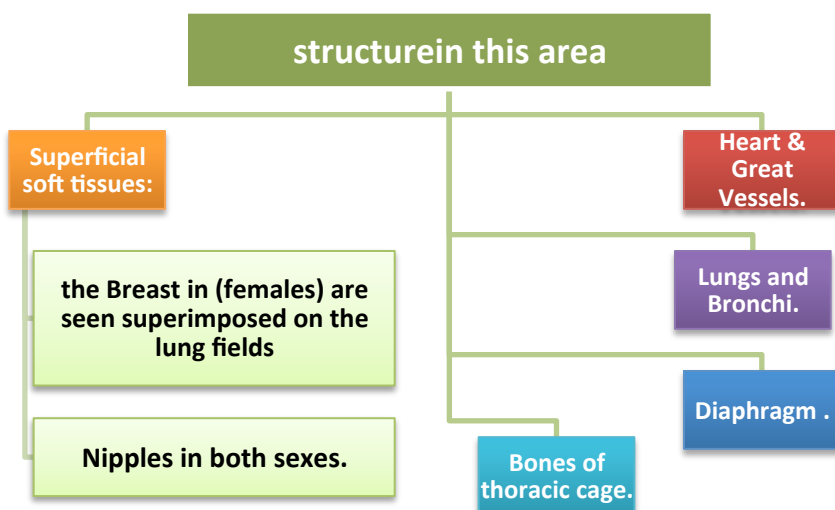


Fig. 3-1 Normal position of anatomical structures on a posterior or anterior chest radiograph.

Bones

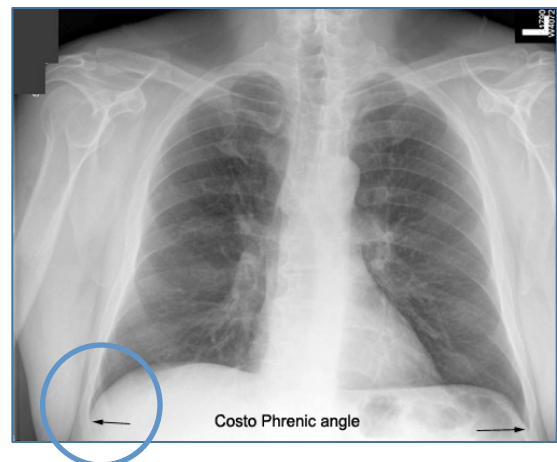
<u>Thoracic Vertebrae</u>	<u>Scapulae</u>	<u>Clavicles</u>	<u>Ribs</u>	
(1)	(2)	(3)	(4)	
imperfectly seen.	The medial borders of the Scapulae may overlap the periphery of each lung field	Clavicles are seen clearly crossing the upper part of each lung field.	The Costotransverse joints, should be examined in order from above downward and compared to its fellow of the opposite side	The Costal Cartilages are not usually seen, but if calcified, they will be visible.

Diaphragm

- The diaphragm shows Dome-shaped shadows on each side.
- The **right dome** is slightly **higher** than the left dome.
- **Beneath the right dome** is the homogeneous, dense shadow of **the liver**.
- Beneath the **left dome** a **gas bubble** may be seen in the fundus of the stomach.

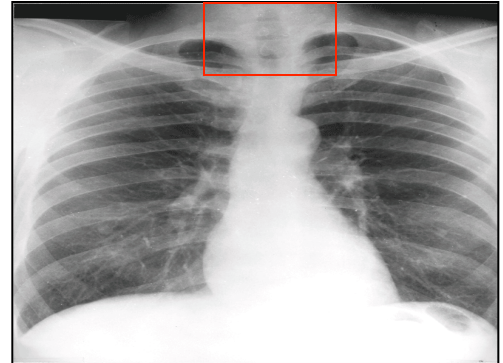
Costo-diaphragmatic (costo-phrenic) Angles

- They are at the sites where the diaphragm meets the thoracic wall.
- The angles become blunt or obscured in case of presence of **pleural fluid or fibrosis**



Trachea

- The radiotranslucent, air-filled shadow of the trachea is seen in the midline of the neck as a dark area.
- It is superimposed on the lower cervical and upper thoracic vertebrae.

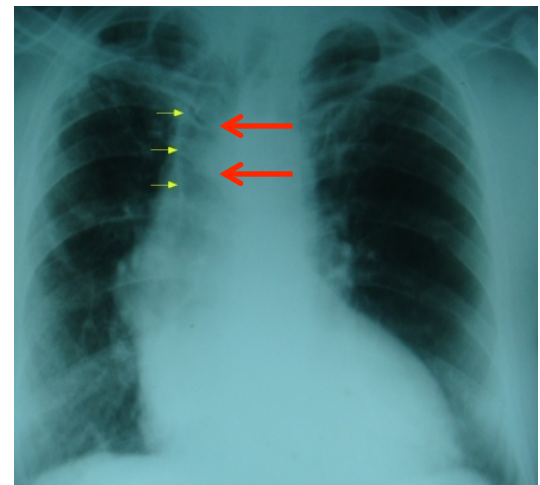


Tracheal shift

Tracheal air column is seen shifted to right on X-ray chest **PA view**.

A loss of volume of the right upper lobe of the lung, either due to collapse or fibrosis.

A massive pleural effusion on the left side. (in this x ray, no pleural effusion is seen on the left)



Lungs

Root

Relatively dense shadows caused by the presence of:
The blood-filled pulmonary and bronchial vessels, the large bronchi, the lymph nodes.

the lower margin of left hilum is at the level of upper margin of right hilum

Fields

the air permit the passage of x-rays. For this reason

the lungs are more translucent on full inspiration than on expiration

pulmonary blood vessels

small, round, white shadows radiating from the lung root.

large bronchi

cast similar round shadows. The smaller bronchi are not seen

Bronchography

What is it ?	special study of the bronchial tree
How it works?	introduction of contrast medium into a particular bronchus or bronchi, usually under fluoroscopic control
Characteristics of the contrast media	<ul style="list-style-type: none"> • Nonirritating • Sufficiently radiopaque to allow good visualization of the bronchi.
How to excrete the contrast medium ?	the patient is asked to cough and expectorate .



Posteroanterior Bronchogram

Mediastinum

Right Border	Left Border	The inferior border
<ol style="list-style-type: none"> 1. Right brachiocephalic vein 2. Superior vena cava 3. Right atrium 4. Sometimes the Inferior vena cava. 	<ol style="list-style-type: none"> 1. A prominence, the Aortic knuckle, caused by the aortic arch; <p>Left margin of :</p> <ol style="list-style-type: none"> 2. the Pulmonary Trunk. 3. the Left Auricle 4. the Left Ventricle 5. apex of heart. 	<p>(lower border of the heart) blends with the diaphragm and liver shadow.</p> <p>Note the cardiophrenic angles.</p>

Heart

The Transverse Diameter

not exceed half the width of the thoracic cage.

On deep inspiration

The vertical length of the heart increases as the diaphragm descends

The transverse diameter is narrowed.

In infants

the heart is always wider and more globular in shape than in adults.

Coronary Angiogram

- The coronary arteries are visualized by introduction of radio-opaque material into their lumen.
- Pathological narrowing or blockage of coronary artery can be identified

Example:

Contrast visualization of the esophagus by swallow a contrast media, (barium swallow).

- Identification of the aortic arch and left bronchus.
- Identification of enlargement of left atrium.

Other types of barium

Barium meal	stomach
Barium follow through	Small intestine
Barium enema	Large intestine



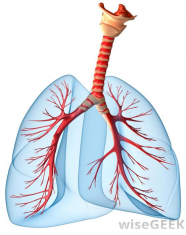
<http://digitalradiographsolutions.com/textbook-images/chest-images/>

<http://www.youtube.com/watch?v=KXVqe6giy0E>

Chest X-ray Interpretation

<http://www.auntminnie.com/index.aspx?sec=ser&sub=def&pag=dis&ItemID=5240>

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Multiple Choice Questions

Q1: The the Aortic knuckle in wich border of the Mediastinum

- A. Right border. B. Left border. C. Inferior border

Q2: The sites where the diaphragm meets the thoracic wall is called :

- A. cardiophrenic angles. B. Sternophrenic angle. C. costo-phrenic

Q3: The Anteroposterior (AP) view is good assessment of the Cardiac Size. :

- A. True. B. False

Q4: Beneath the Left dome is the homogeneous, dense shadow of the liver:

- A. True . b. False

Answers:

Q1: B, Q2:C, Q3:B Q4:B