BASIC OF CHEST X RAY

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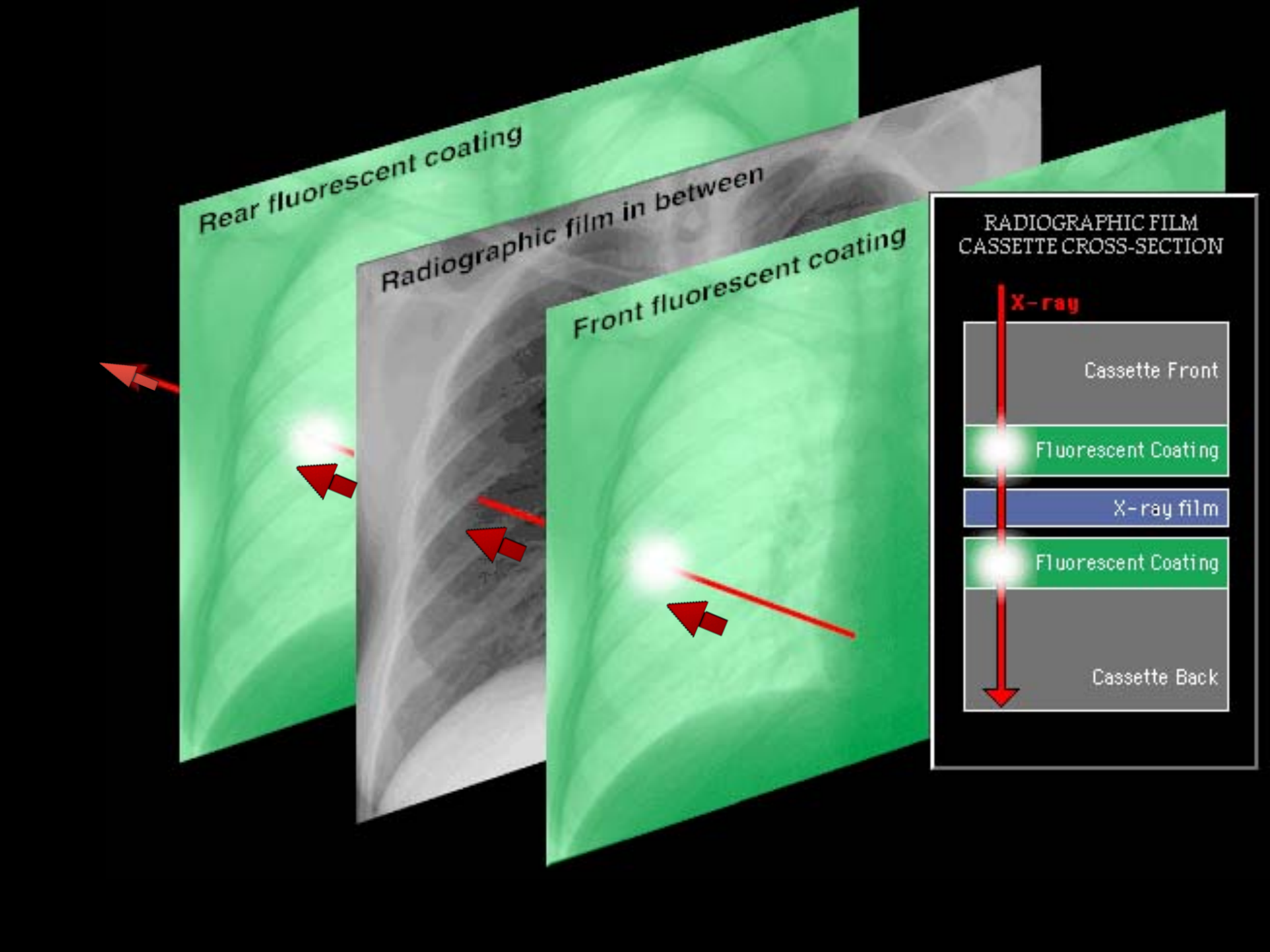
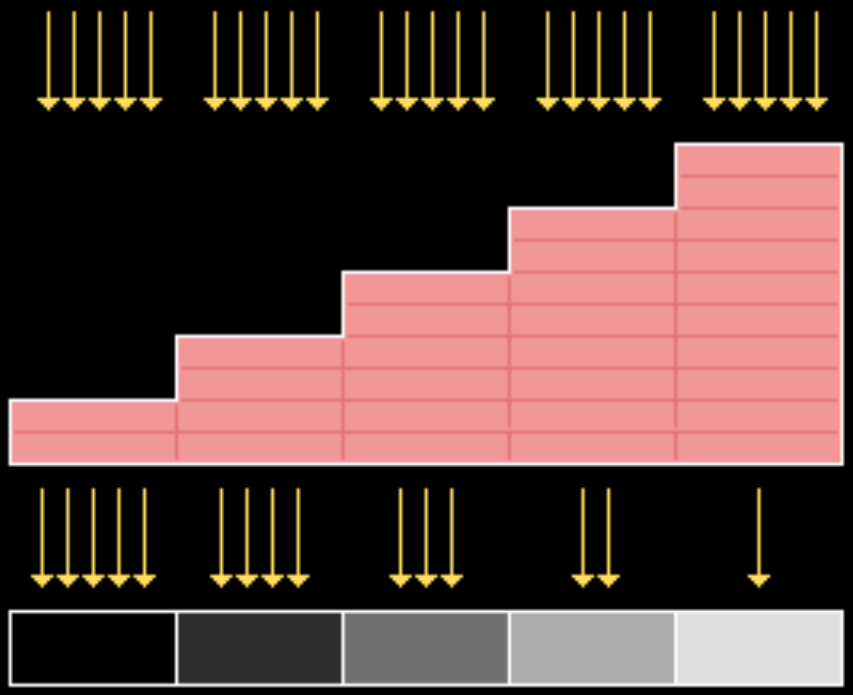
RADIOLOGICAL METHODS OF RESP. INVESTIGATION

1. PLAIN FILM / CHEST X-RAYS
2. CT SCAN
3. M R I
4. ULTRASONOGRAPHY (USG)
5. NUCLEAR MEDICINE
6. ARTERIOGRAPHY
7. MCS (= MASS CHEST SURVEY)
8. TOMOGRAPHY
9. FLUOROSCOPHY
10. BRONCHOGRAPHY


Rear fluorescent coating
Radiographic film in between
Front fluorescent coating
RADIOGRAPHIC FILM
CASSETTE CROSS-SECTION
X-ray
Cassette Front
Fluorescent Coating
X-ray film
Fluorescent Coating
Cassette Back

TISSUE DEPTH

X-ray Absorption is Proportional to the Depth of the Target Tissues...



Increasing radiographic density ⟶

BUT

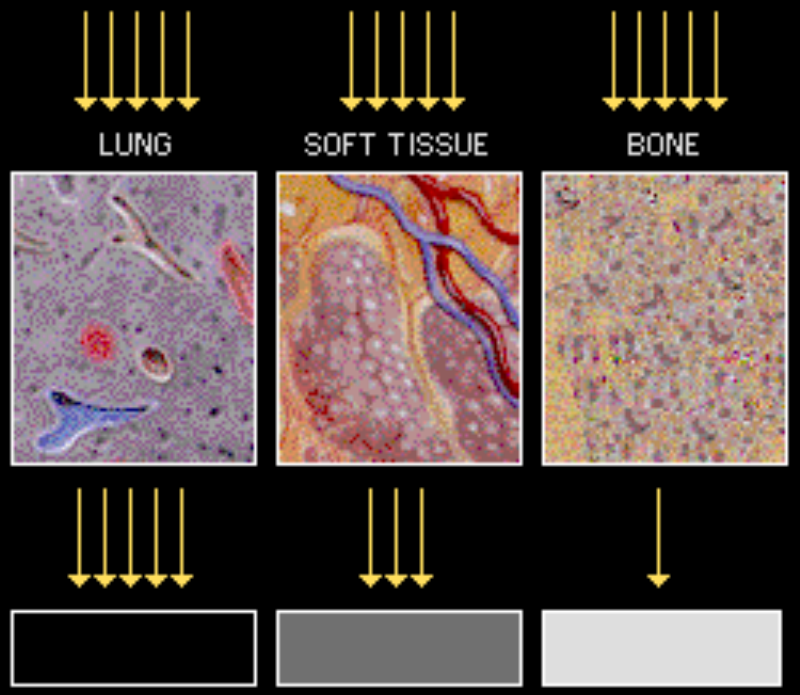
X-rays from source

Tissue

Resulting radiographic density on film

ATOMIC WEIGHT

The Atomic Weight of the Tissue Also Plays a Major Role in Determining Image Density



Increasing radiographic density ⟶

ISTILAH DENSITAS

RADIOGRAFI:

1. AIR DENSITY = HIPERLUSEN

2. FAT DENSITY = RADIOLUSEN

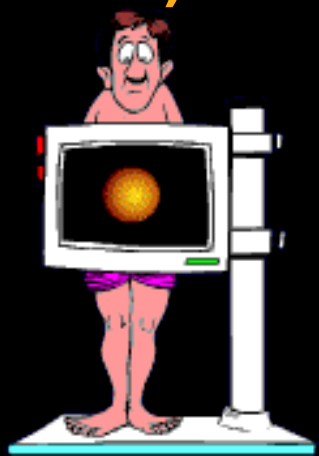
3. WATER DENSITY = INTERMEDIATE

4. BONE DENSITY = RADIOPAK

5. METAL DENSITY = HIPER-RADIOPAK

❖ CHEST X-RAYS : VIEWS

- POSTEROANTERIOR (PA) ⇔ ROUTINE
- LEFT / RIGHT LATERAL (LL/RL)
- RIGHT / LEFT ANTERIOR OBLIQUES (RAO/LAO)
- RIGHT / LEFT LATERAL DECUBITUS (RLD/LLD)
- TOP LORDOTIK



SYARAT-SYARAT FOTO THORAX PA bila memungkinkan ;

1. **INSPIRASI CUKUP**

   Diafragma kanan setinggi ics.9 -10posterior

2. **POSISI SIMETRIS**

   Proyeksi tulang corp.vert. Th. terletak ditengah sendi sternoclav. kanan & kiri

3. **KONDISI SINAR-X SESUAI**

   mAs (jumlah sinar) cukup → film diluar cav.thorax cukup kehitaman

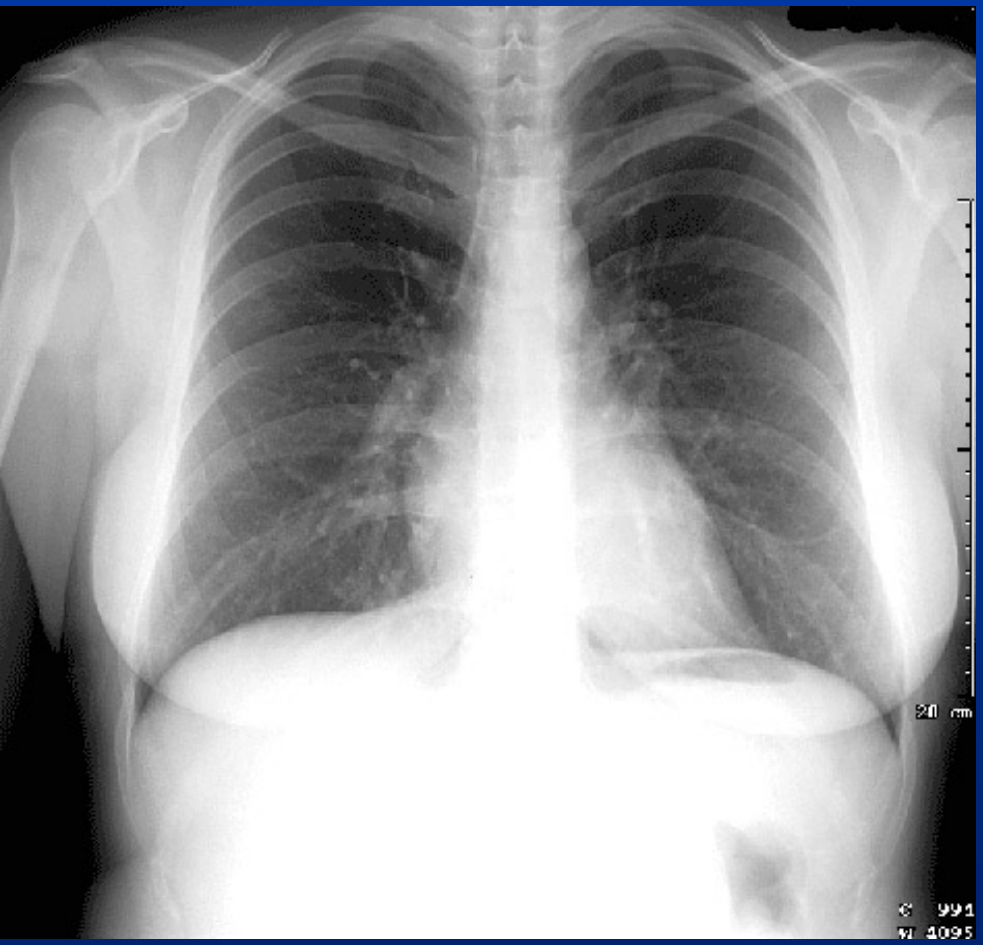
   kV (kualitas sinar) cukup → vert.Th. Hanya terlihat s/ Th. 3 – 4.

4. **FILM MELIPUTI SELURUH CAVUM THORAX**

   Puncak cavum thorax & sinus phrenico-costalis kanan – kiri

This is the simulated patient in PA (posterioranterior) position. Note that the x-ray tube is 72 inches away.

NORMAL CHEST



PARENCHYME : RADIOLUCENT

PLEURA : INVISIBLE

HILAR : LEFT > RIGHT

DIAPHRAGM : RIGHT > LEFT

SINUS PHRENICO COSTALIS <

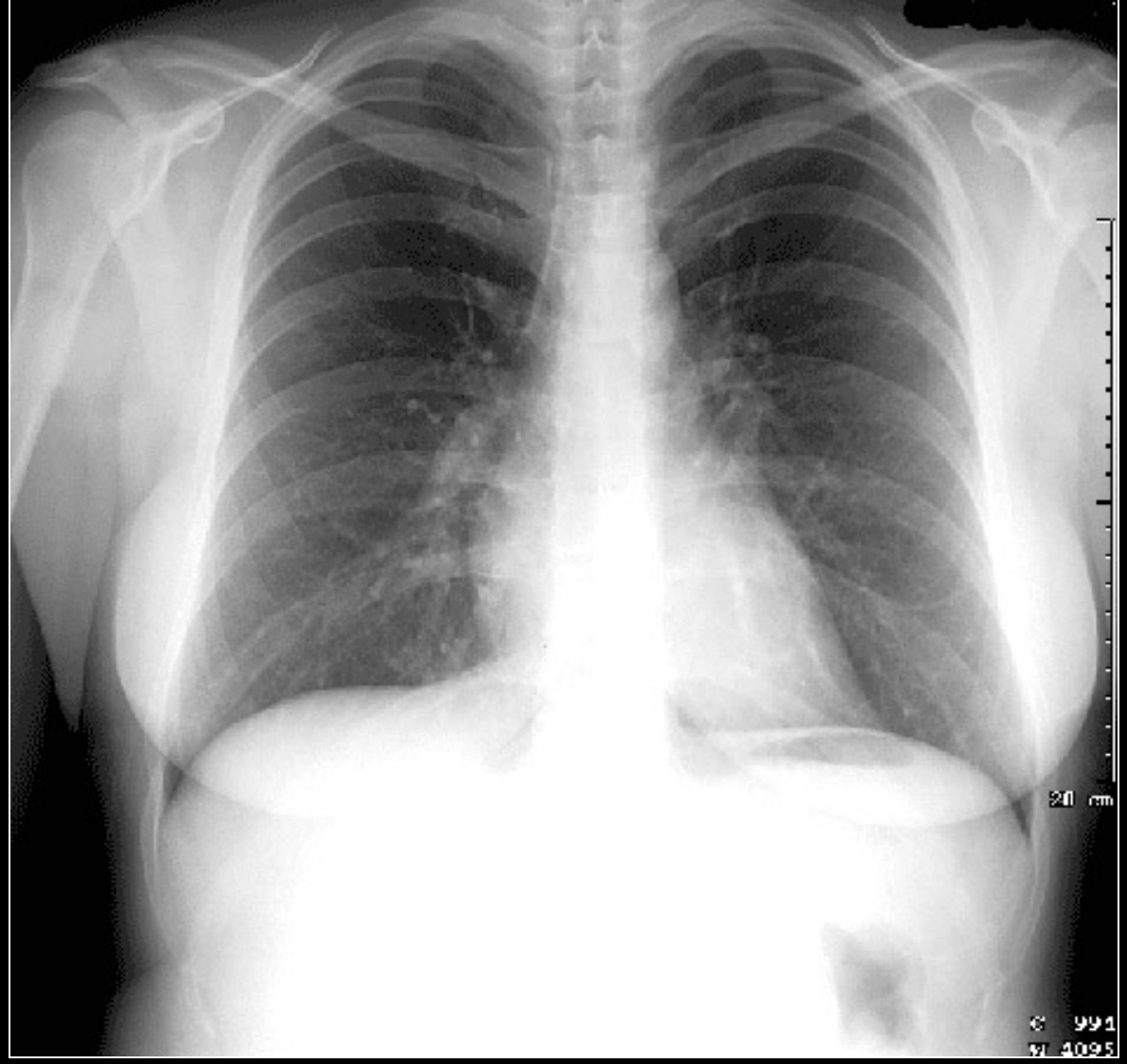
Normal chest X-ray

PA chest X-ray: Well-aerated lungs, normal diaphragm, middle shadow and heart borders.

Pitfall Due to Poor Inspiration

About 8 posterior ribs are showing

Poor inspiration will crowd lung markings and make it appear as though the patient has airspace disease



Inspiration

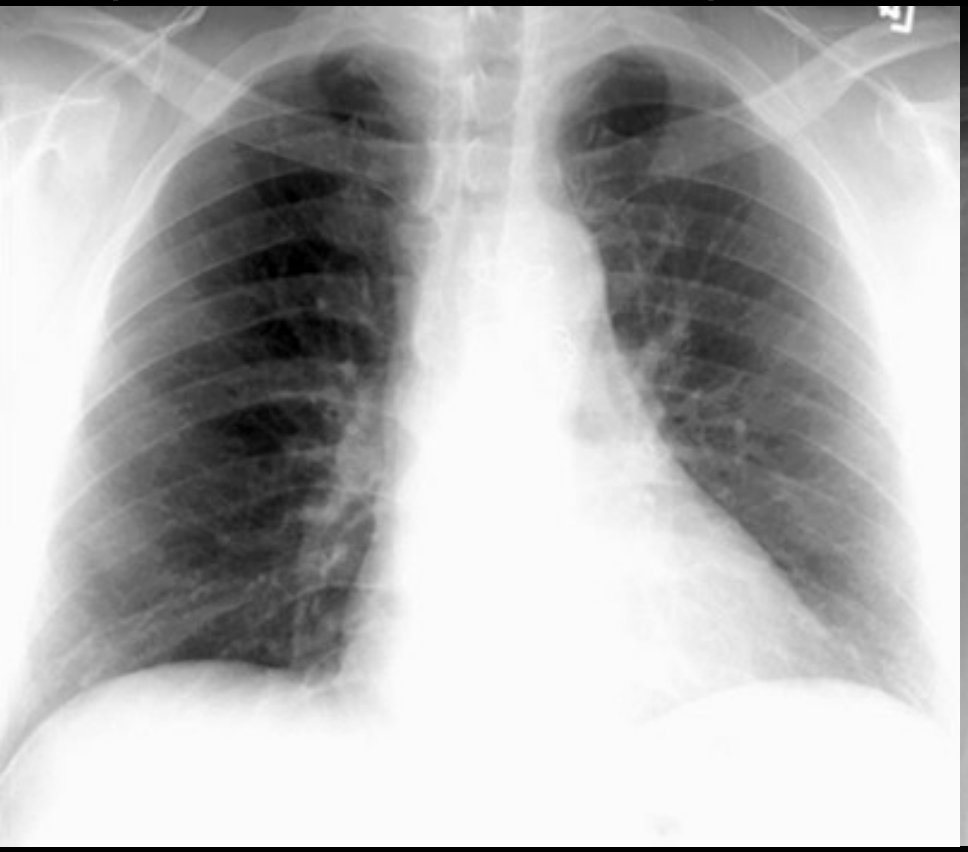
The patient should be examined in full inspiration.

The diaphragm should be found at about the level

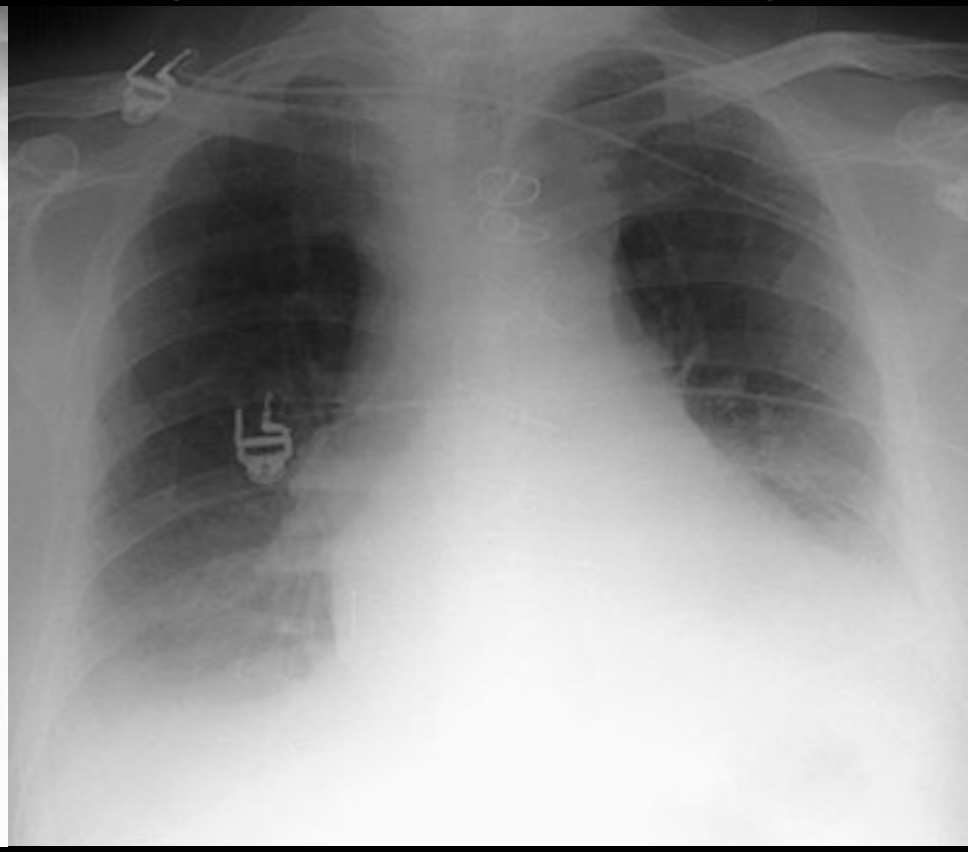
of the 8th - 10th posterior rib or 5th - 6th anterior rib on good inspiration.

supine AP (anteriorposterior) position the x-ray tube is 40 inches from the patient.

PA (POSTERO-ANTERIOR)



AP (ANTERO-POSTERIOR)



This is a PA film on the left compared with a AP supine film on the right. The AP shows magnification of the heart and widening of the mediastinum. Whenever possible the patient should be imaged in an upright PA position. AP views are less useful and should be reserved for very ill patients who cannot stand erect.

X-ray Penetration

normal PA film that is underpenetrated

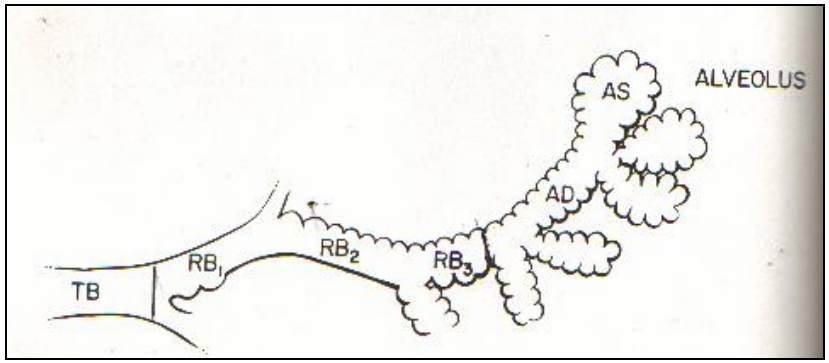
overpenetrated PA film

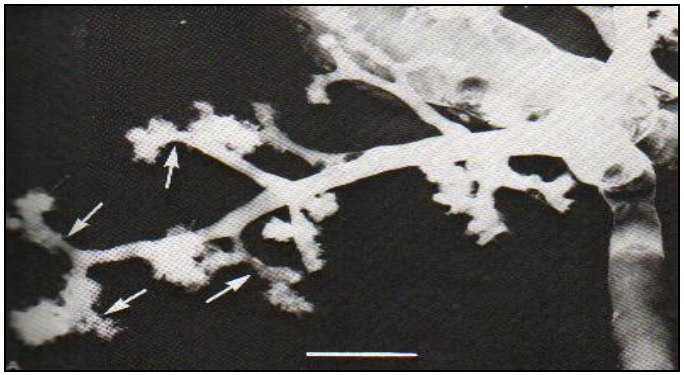
Adequate penetration of the patient by radiation is also required for a good film.

- Lung fields appear dark because of **air.**
  - ✓ *Ninety-nine percent of t he lung is air*
- The pulmonary vasculature , interstitium constitute 1% and give the lacy lung pattern.
- Heart, vessels, liver and diaphragm are liquid density.
- Vertebrae, sternum and ribs obviously cast a **bone density**.

Most of the disease states **replace air from alveoli** with a pathological process which usually is a liquid density and **appears white**.

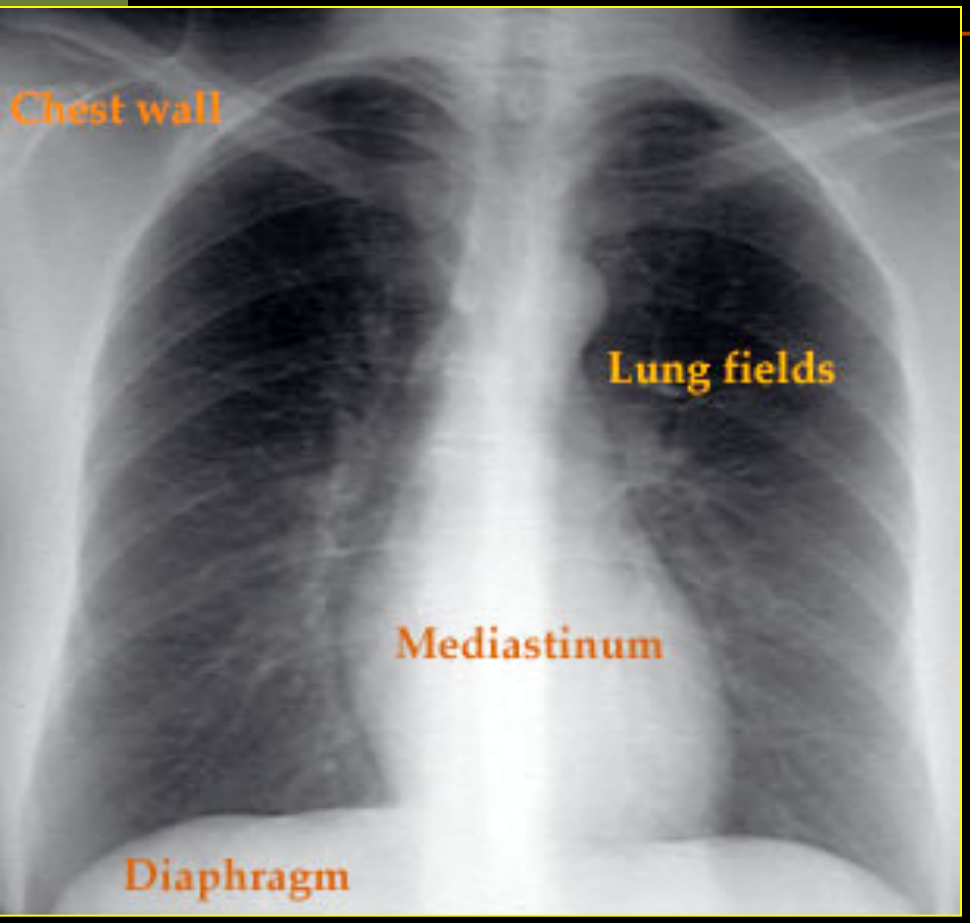
Having a proper understanding of each of the pathological process is essential.

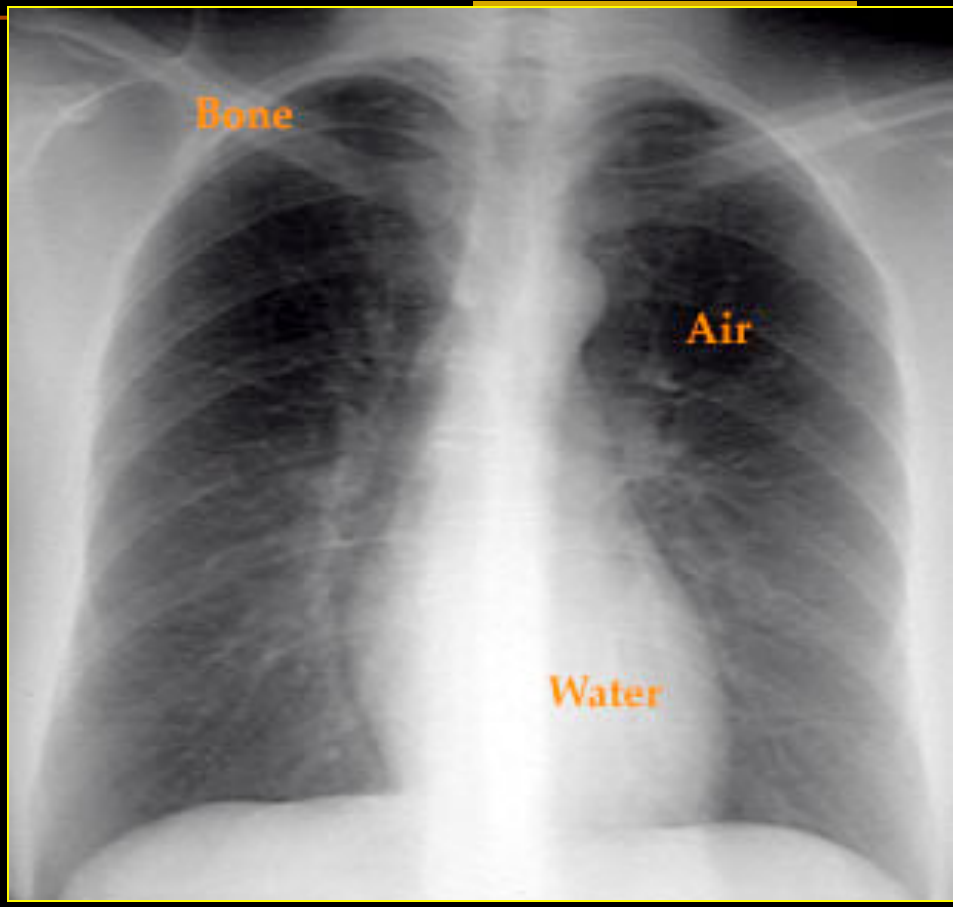

ALVEOLUS
AS
AD
TB
RB1
RB2
RB3

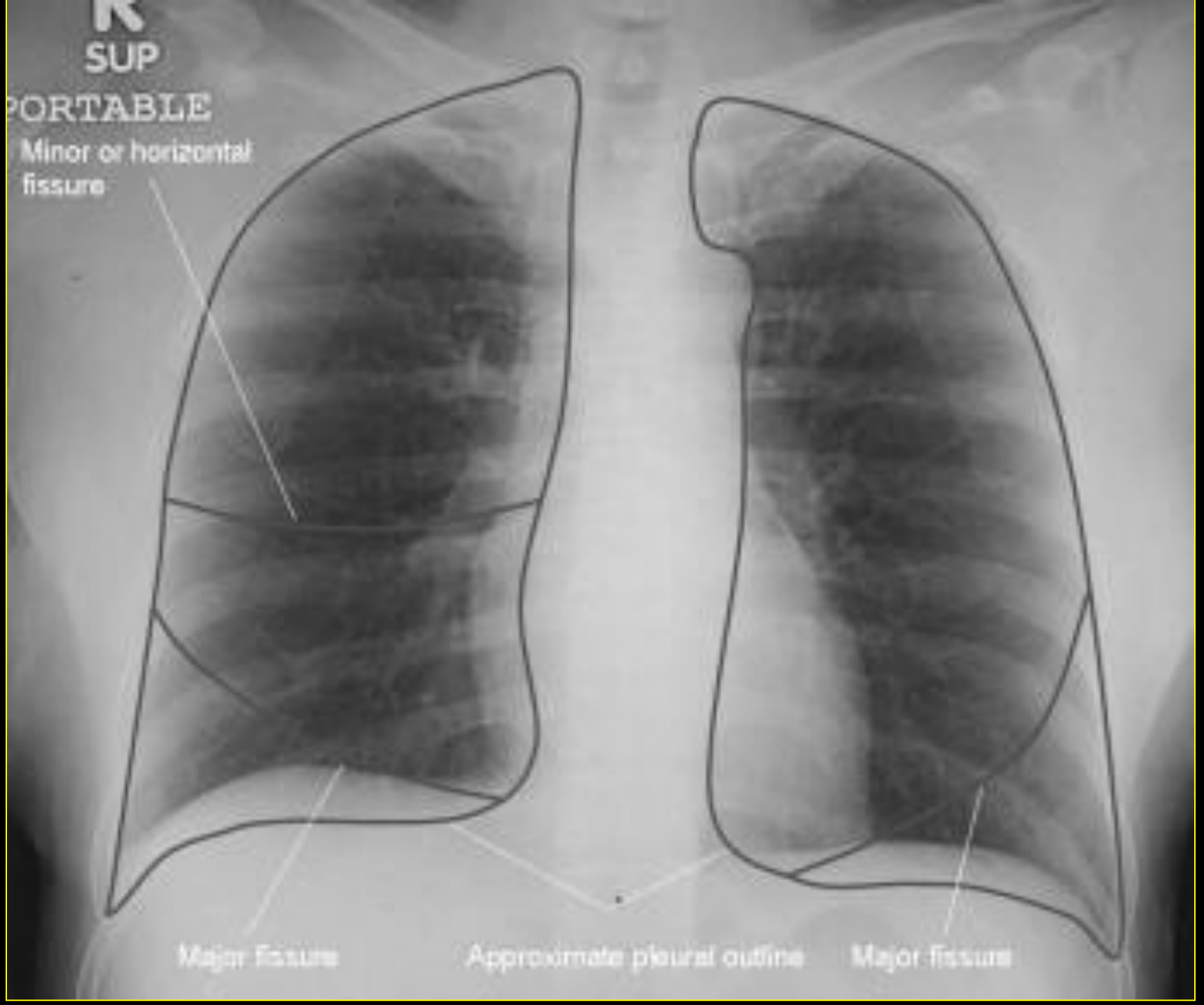


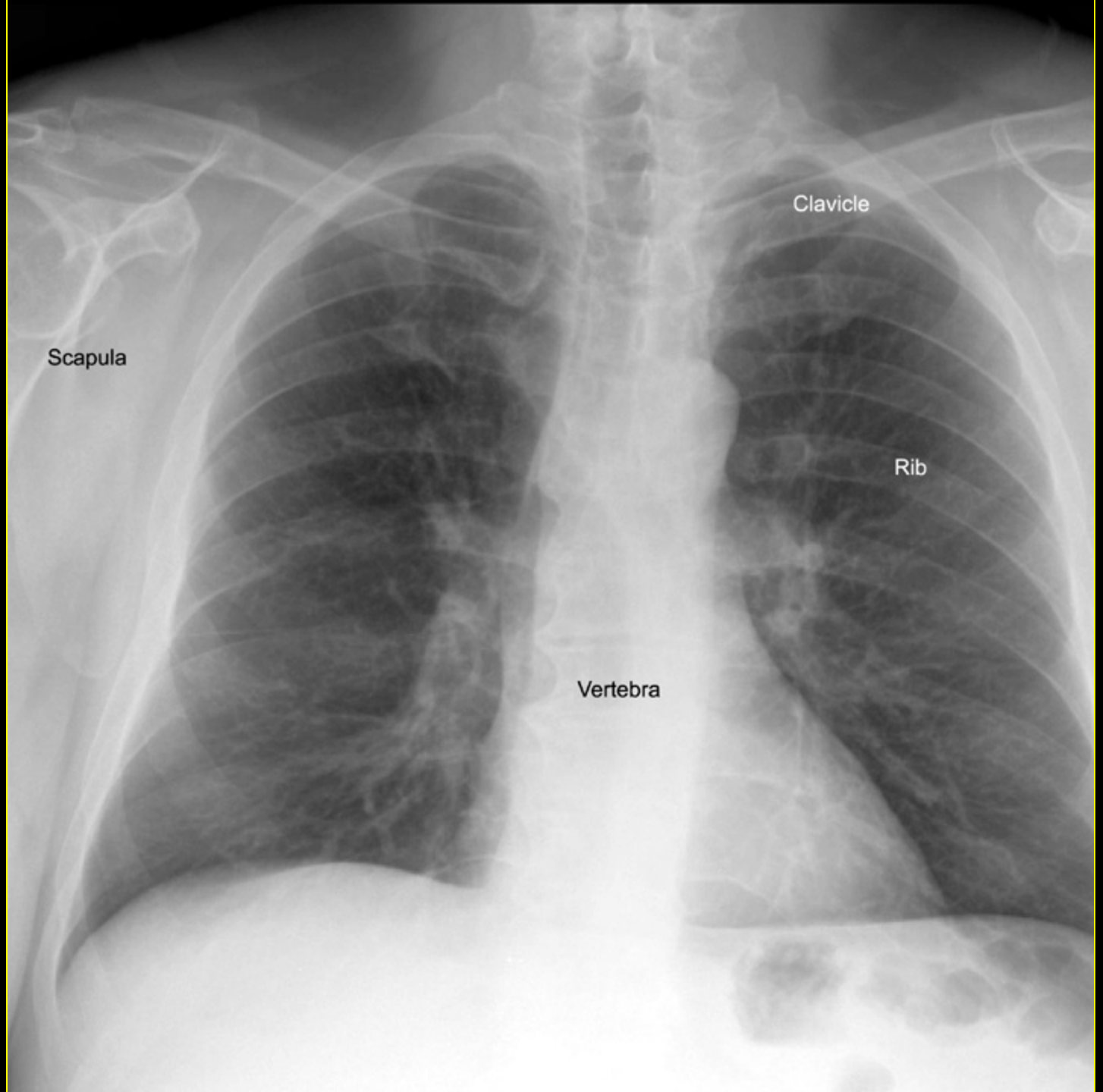

B

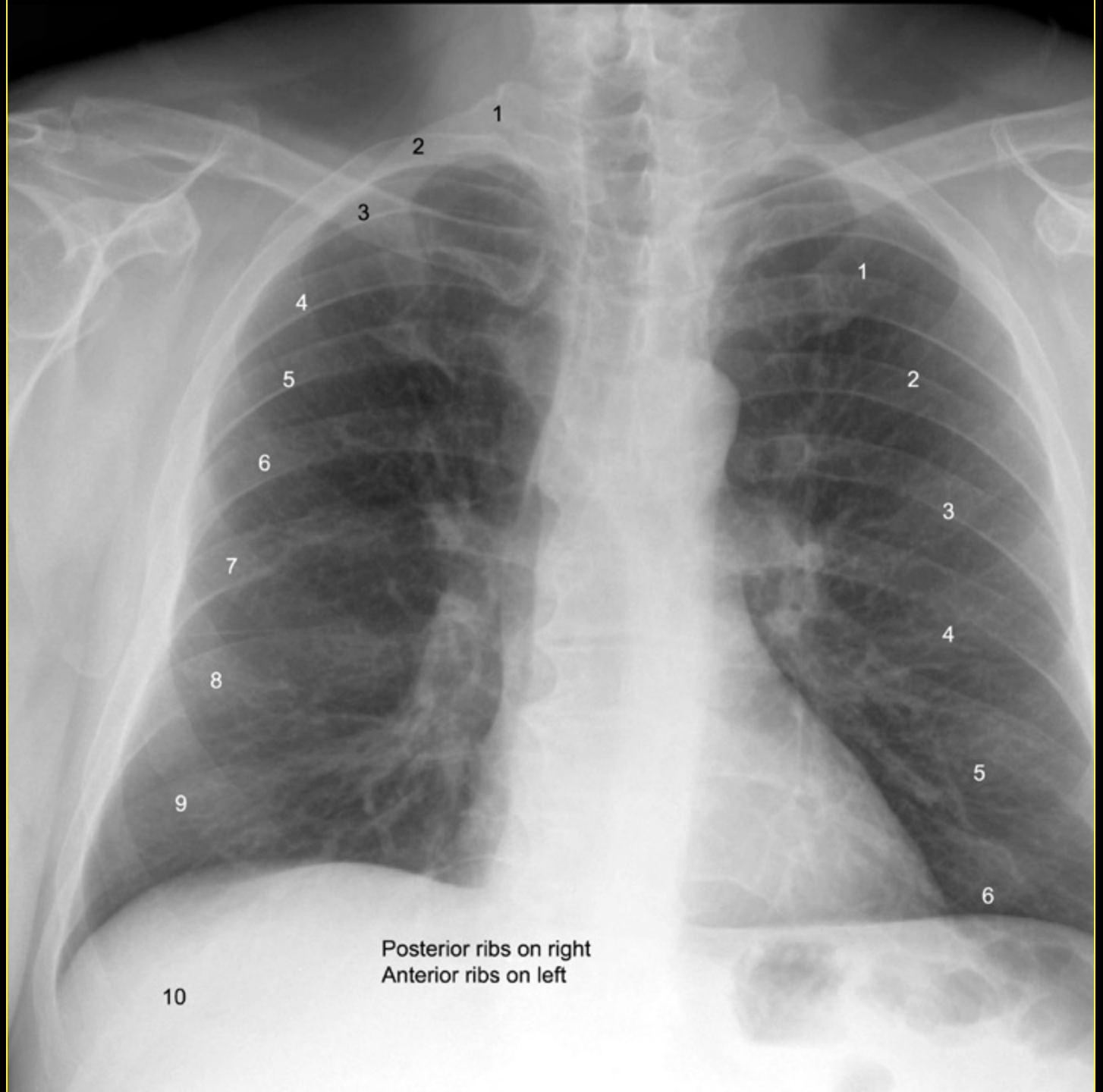
NORMAL CHEST

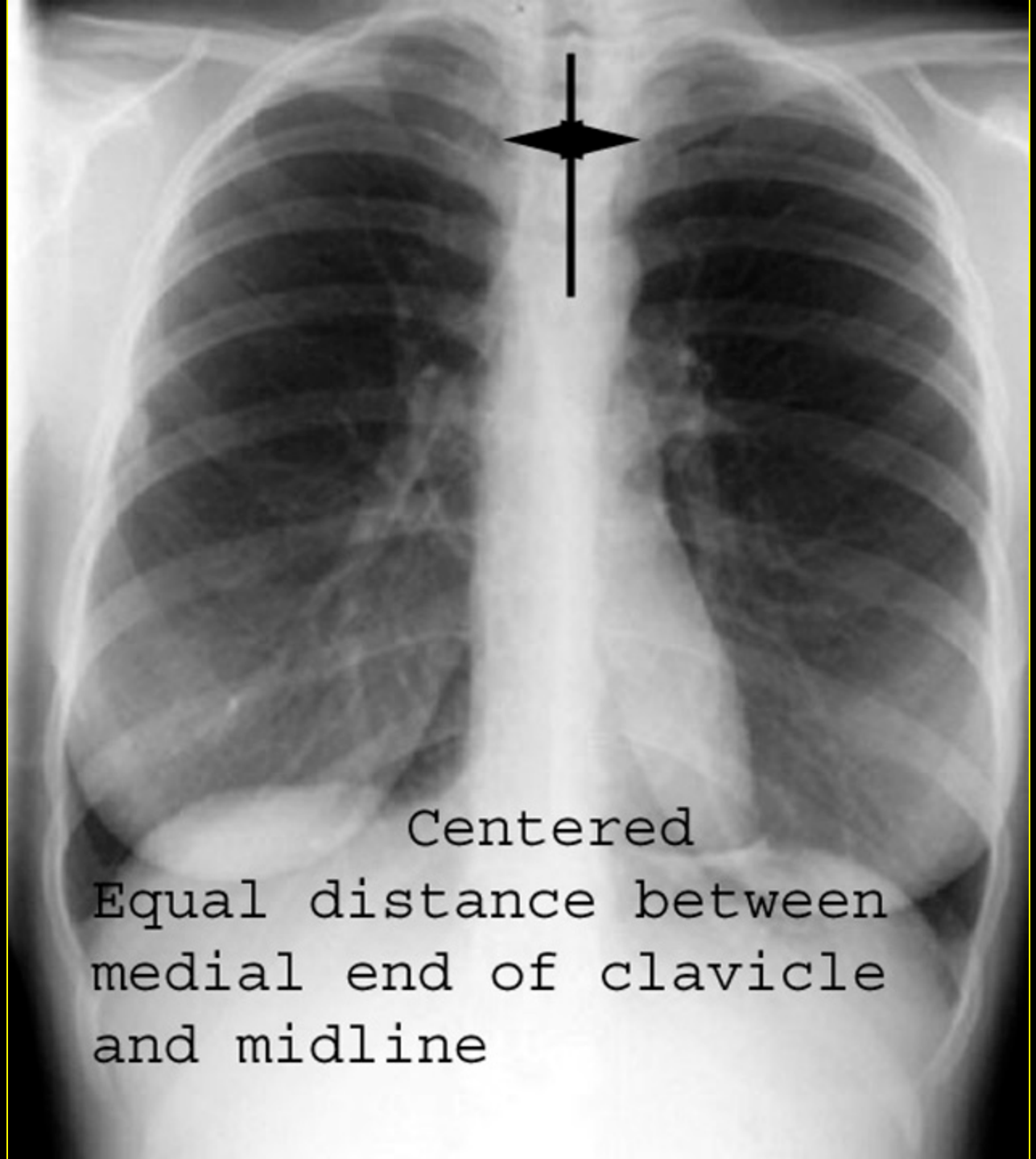


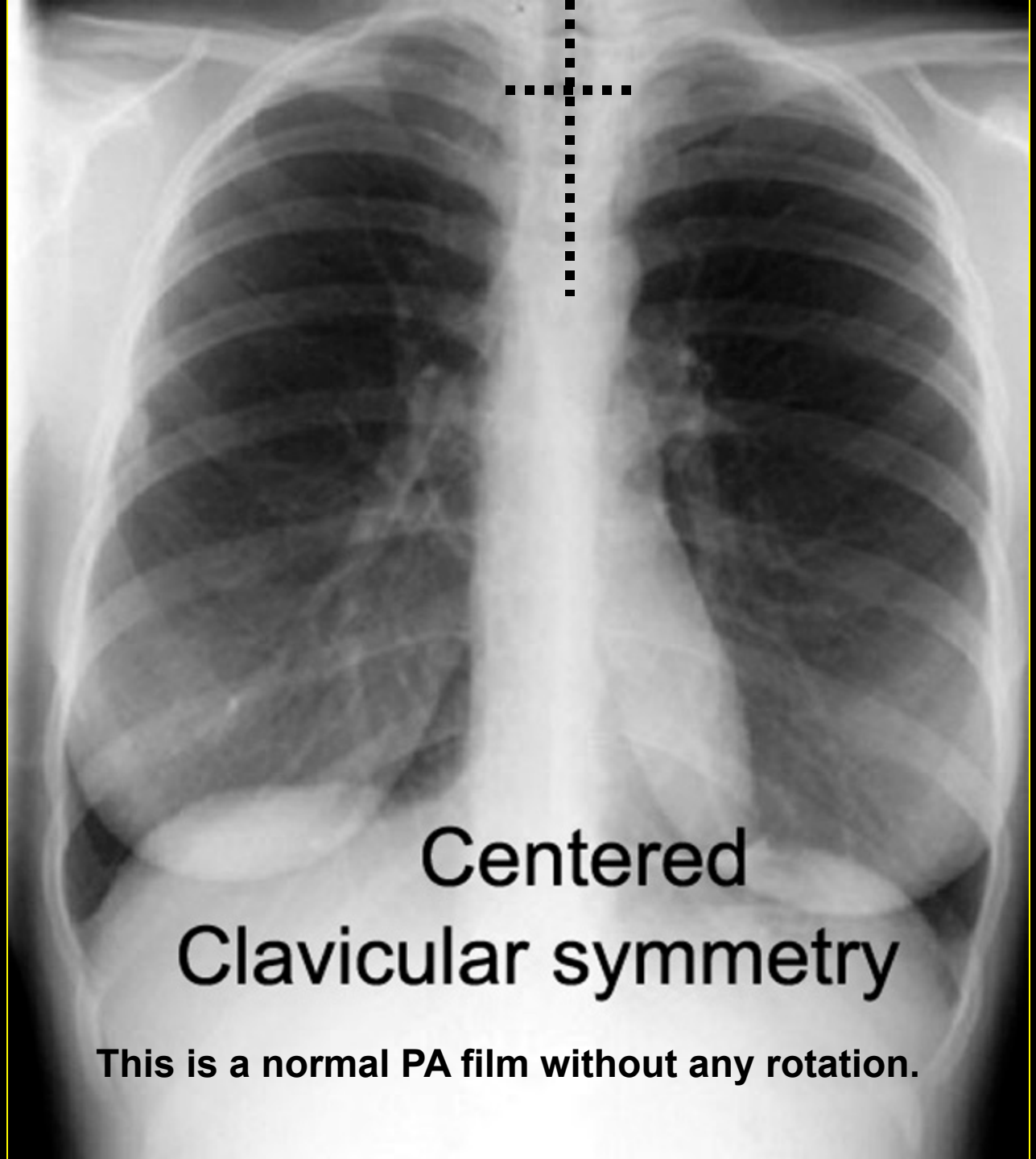



R
SUP
PORTABLE
Minor or horizontal fissure
Major fissure
Approximate pleural outline
Major fissure

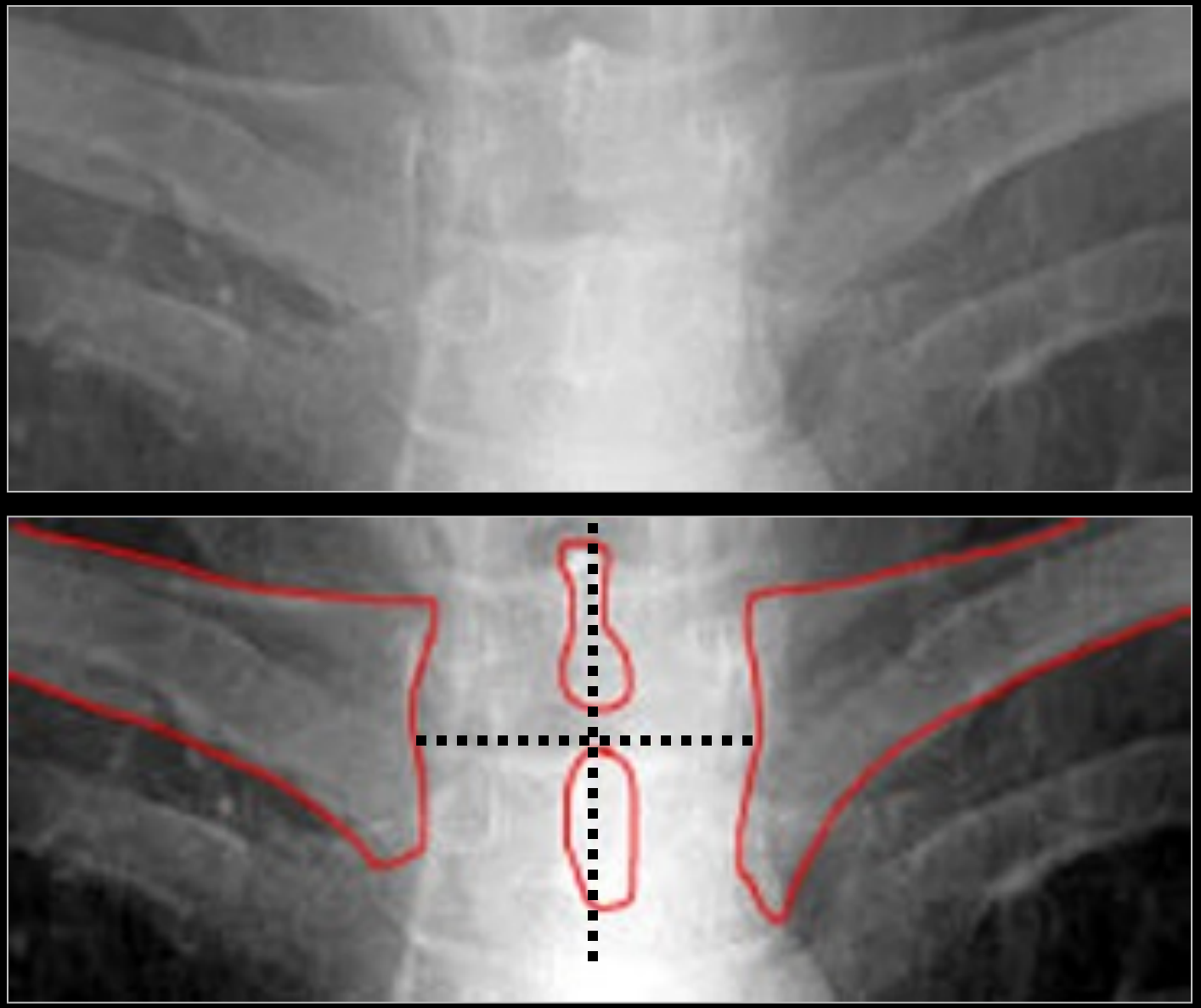

Clavicle
Scapula
Rib
Vertebra


1
2
3
4
5
6
7
8
9
10
1
2
3
4
5
6
Posterior ribs on right
Anterior ribs on left

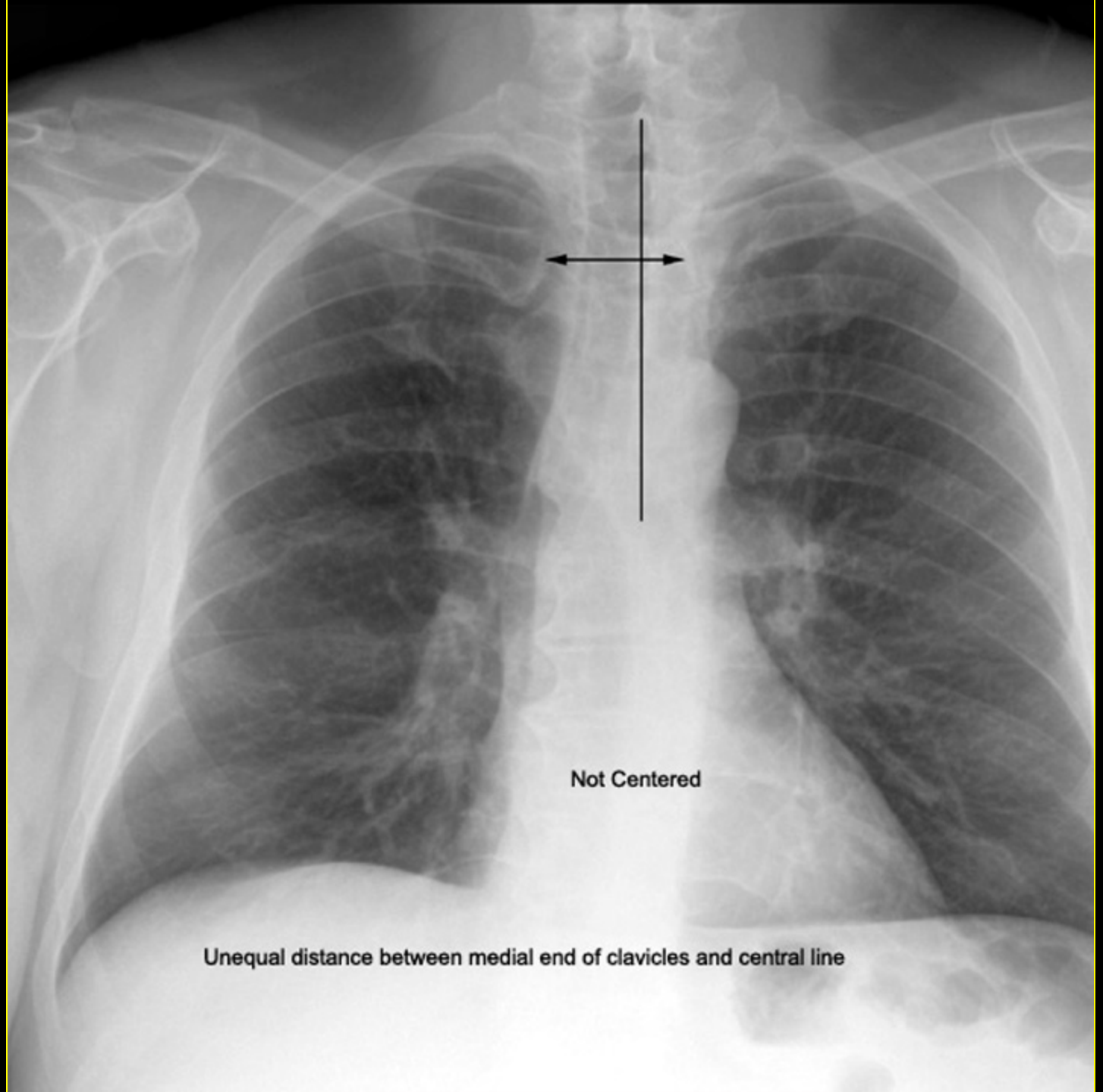

Centered
Equal distance between
medial end of clavicle
and midline

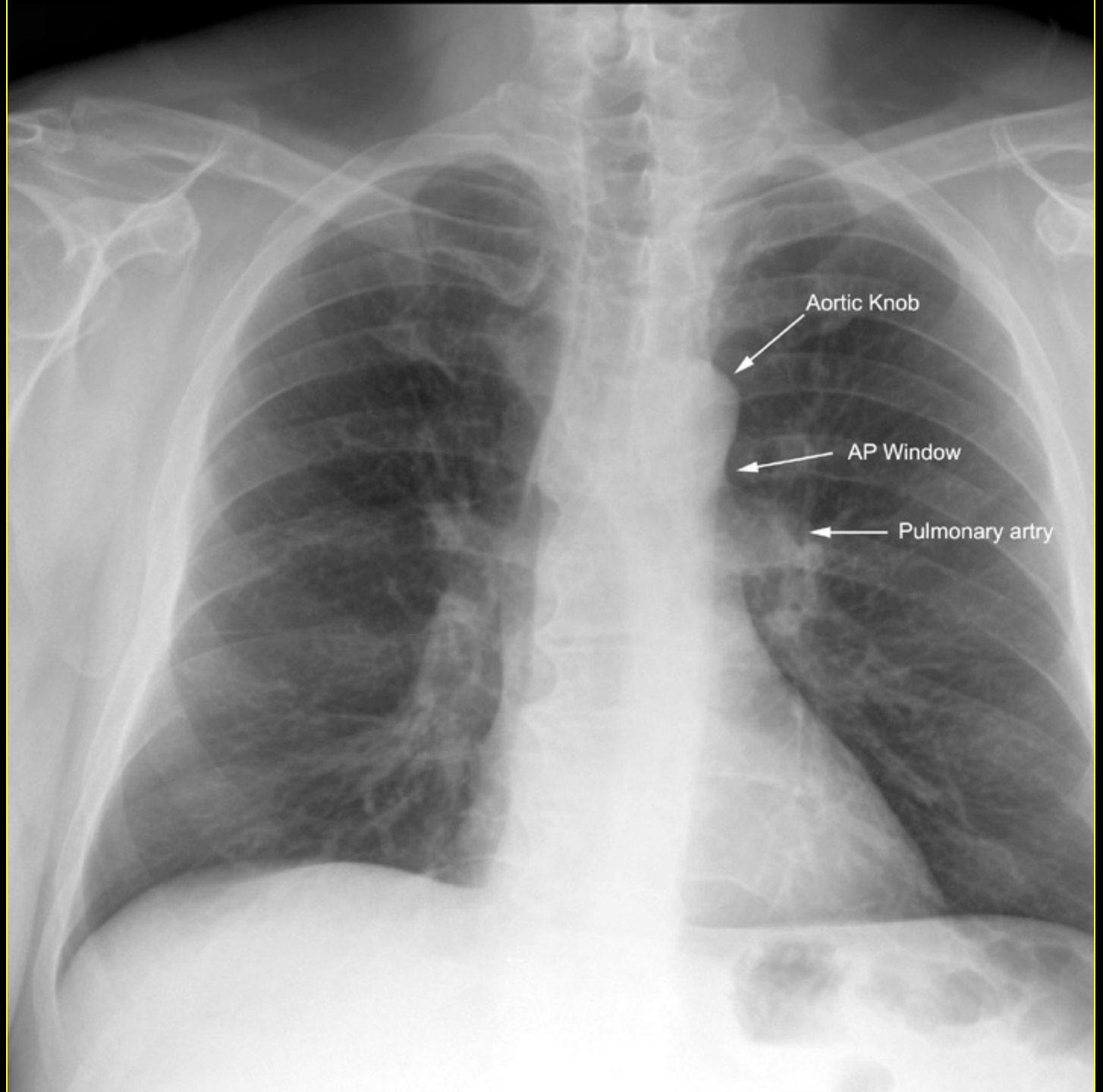


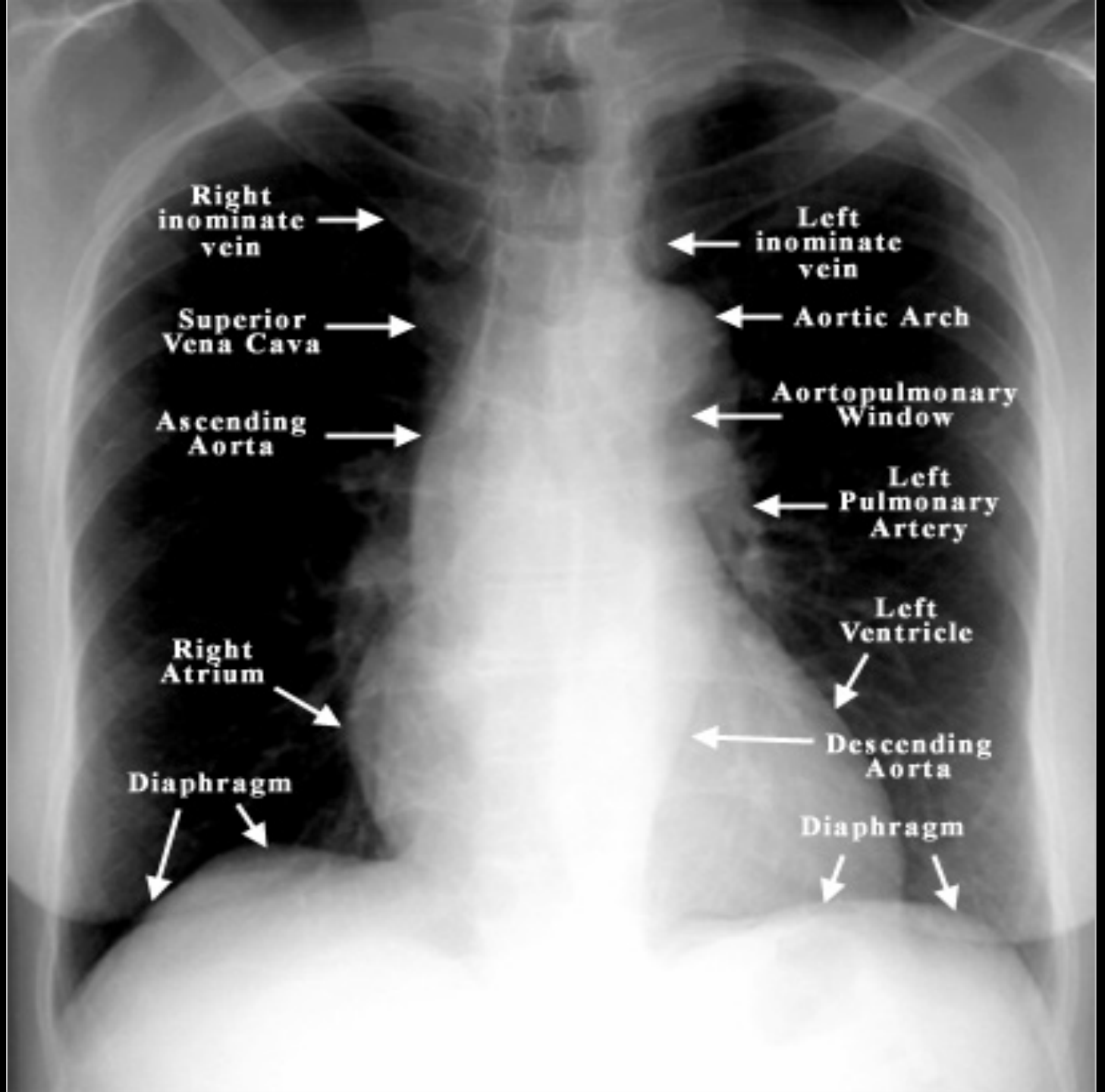
This is a normal PA film without any rotation.

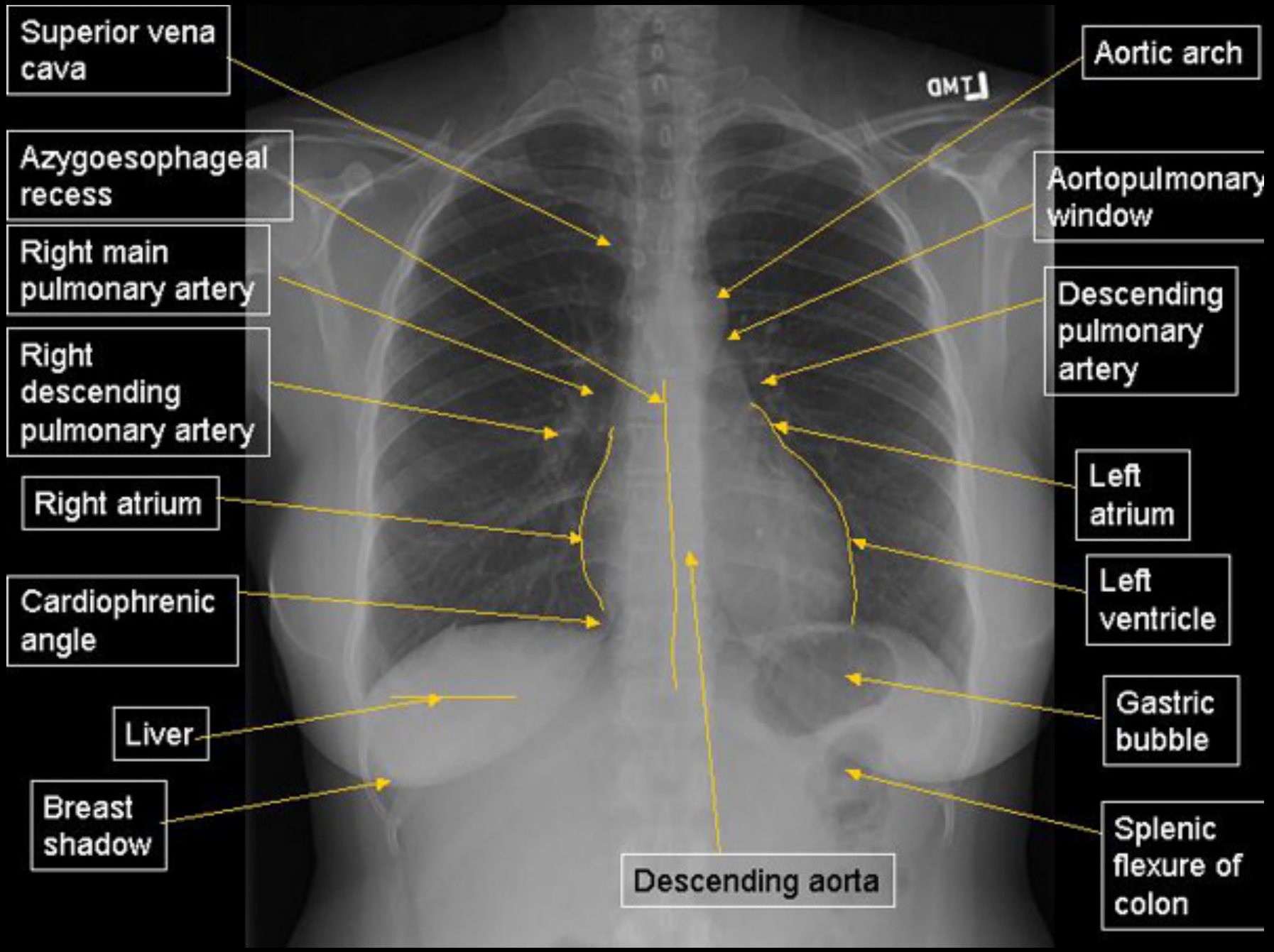


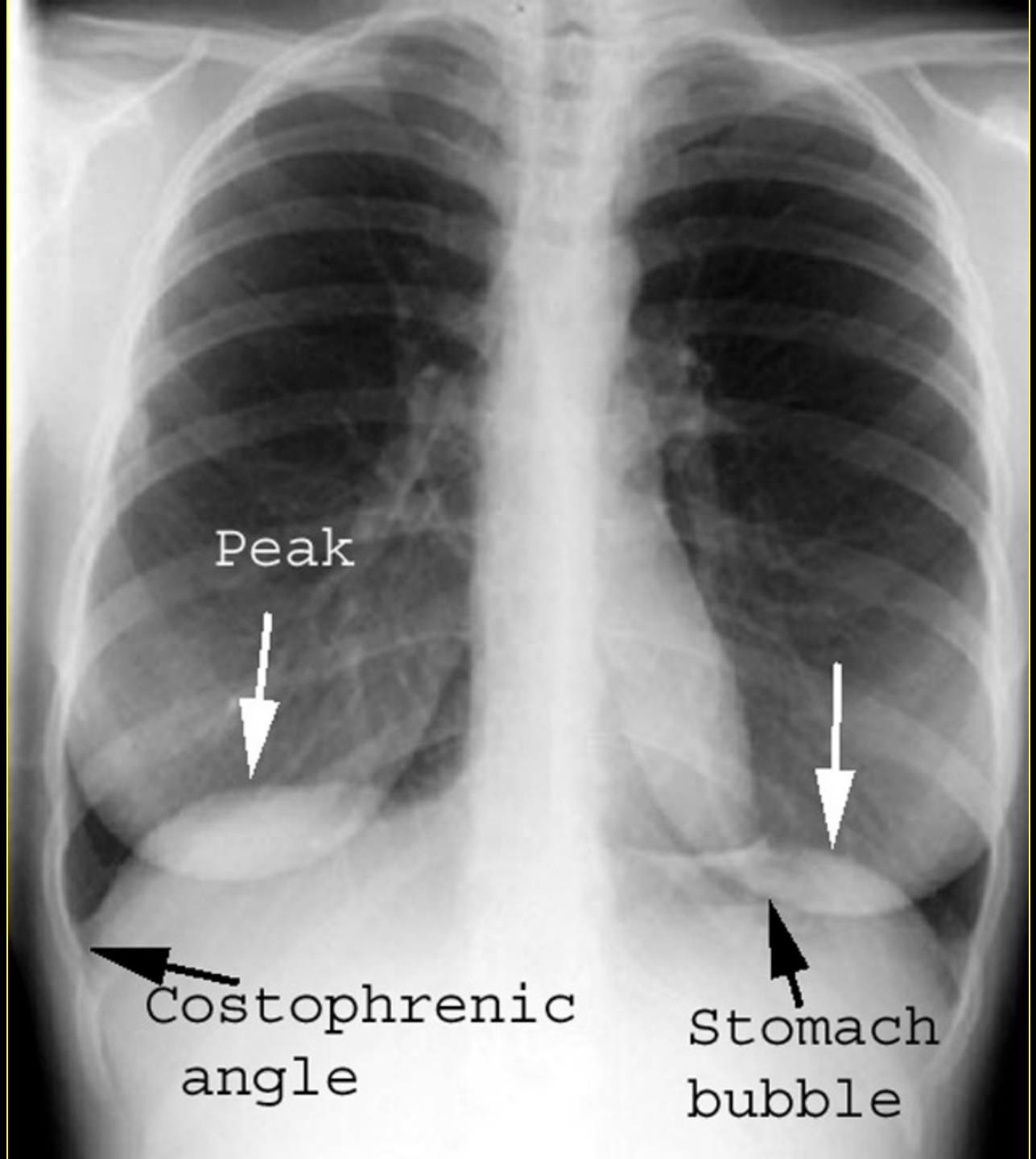
Magnification of clavicular head and spinous process alignment demonstrating a straight film.

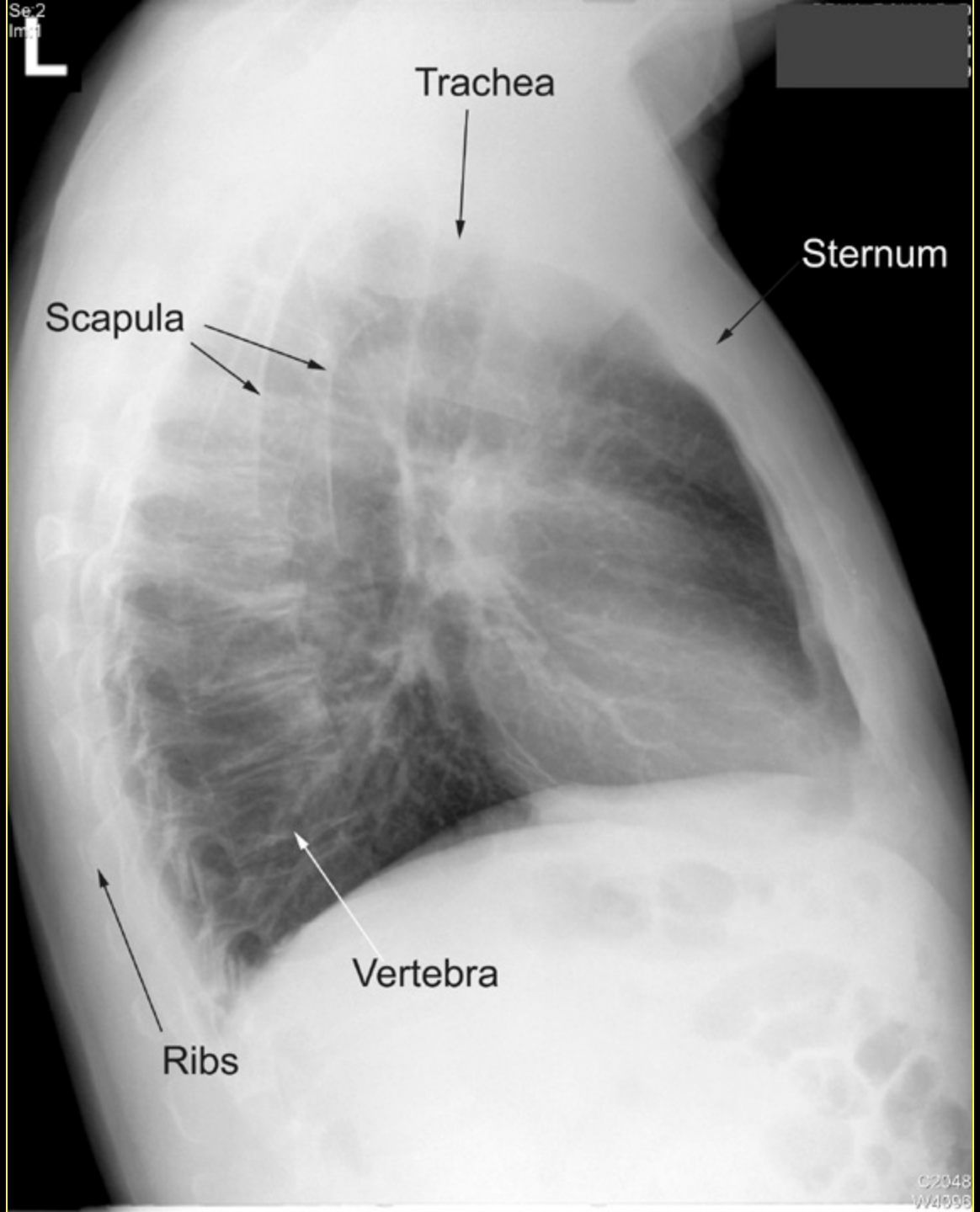

Not Centered
Unequal distance between medial end of clavicles and central line

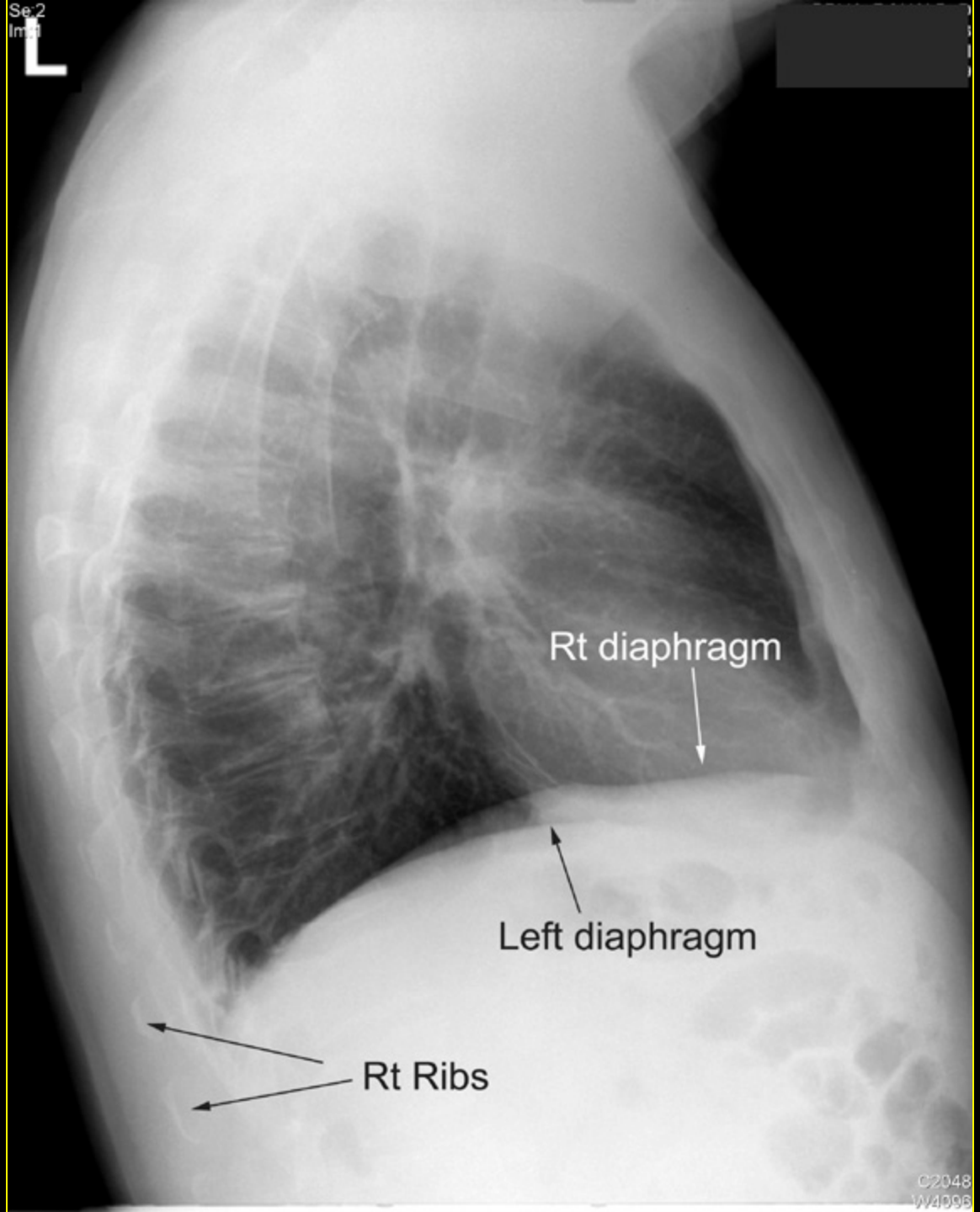

Aortic Knob
AP Window
Pulmonary artry

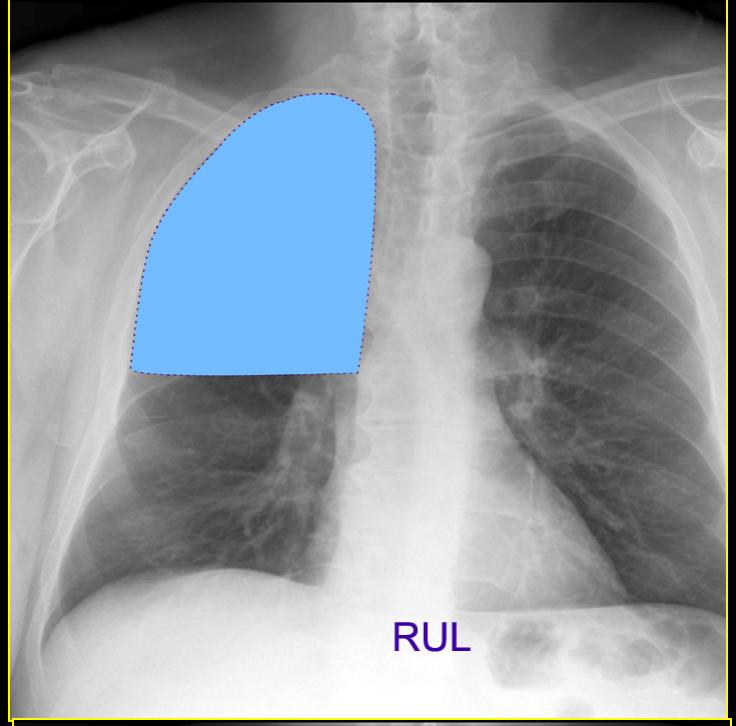

Right inominate vein
Superior Vena Cava
Ascending Aorta
Right Atrium
Diaphragm
Left inominate vein
Aortic Arch
Aortopulmonary Window
Left Pulmonary Artery
Left Ventricle
Descending Aorta
Diaphragm

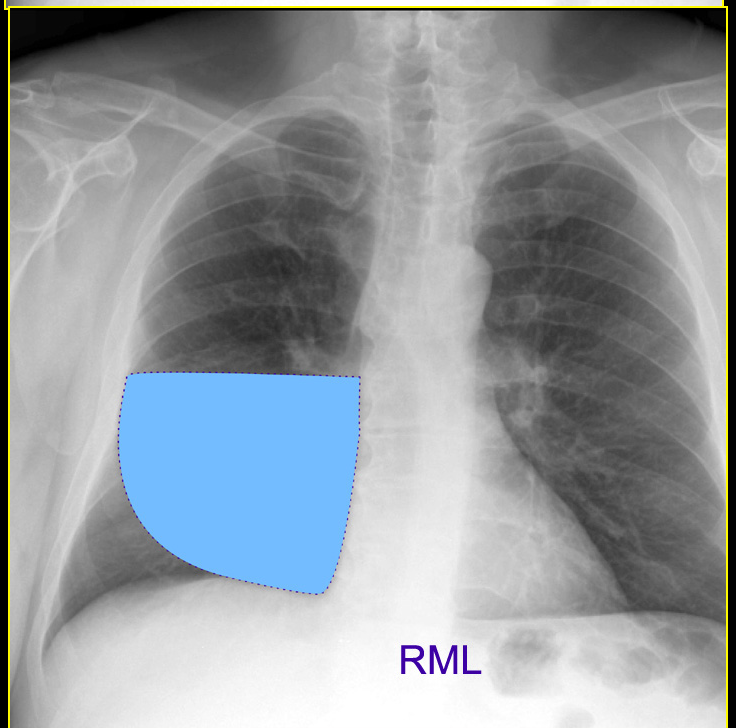

Superior vena cava
Azygoesophageal recess
Right main pulmonary artery
Right descending pulmonary artery
Right atrium
Cardiophrenic angle
Liver
Breast shadow
Aortic arch
Aortopulmonary window
Descending pulmonary artery
Left atrium
Left ventricle
Gastric bubble
Splenic flexure of colon
Descending aorta

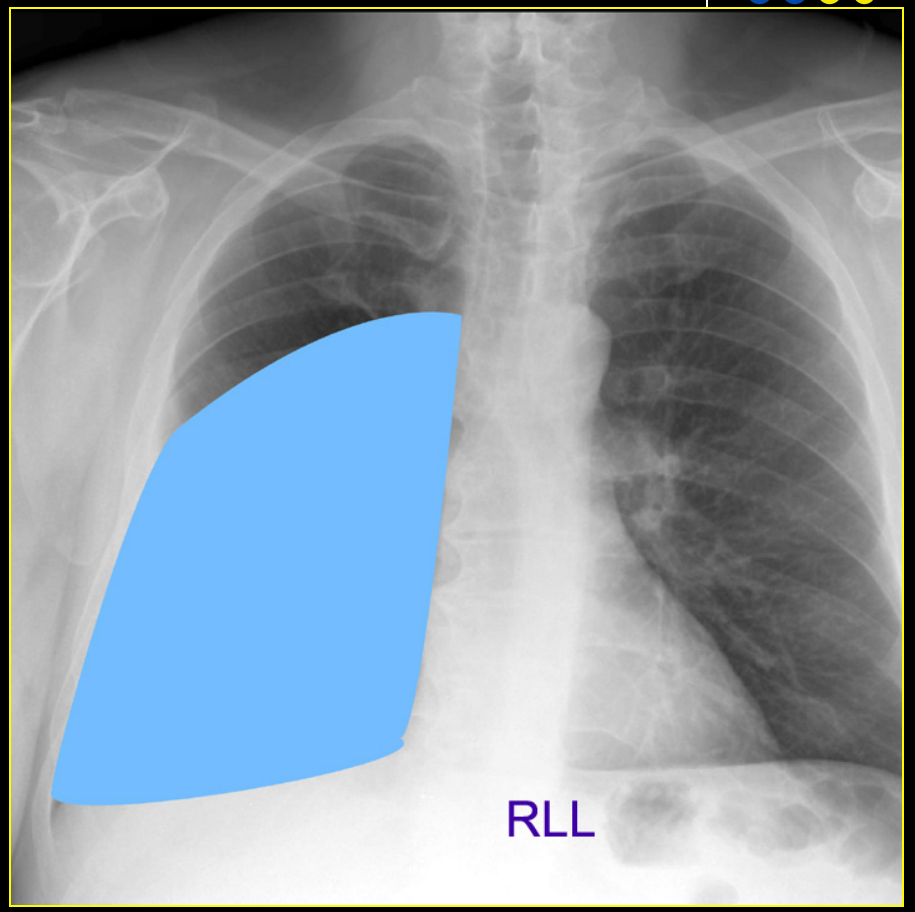

Peak
Costophrenic angle
Stomach bubble

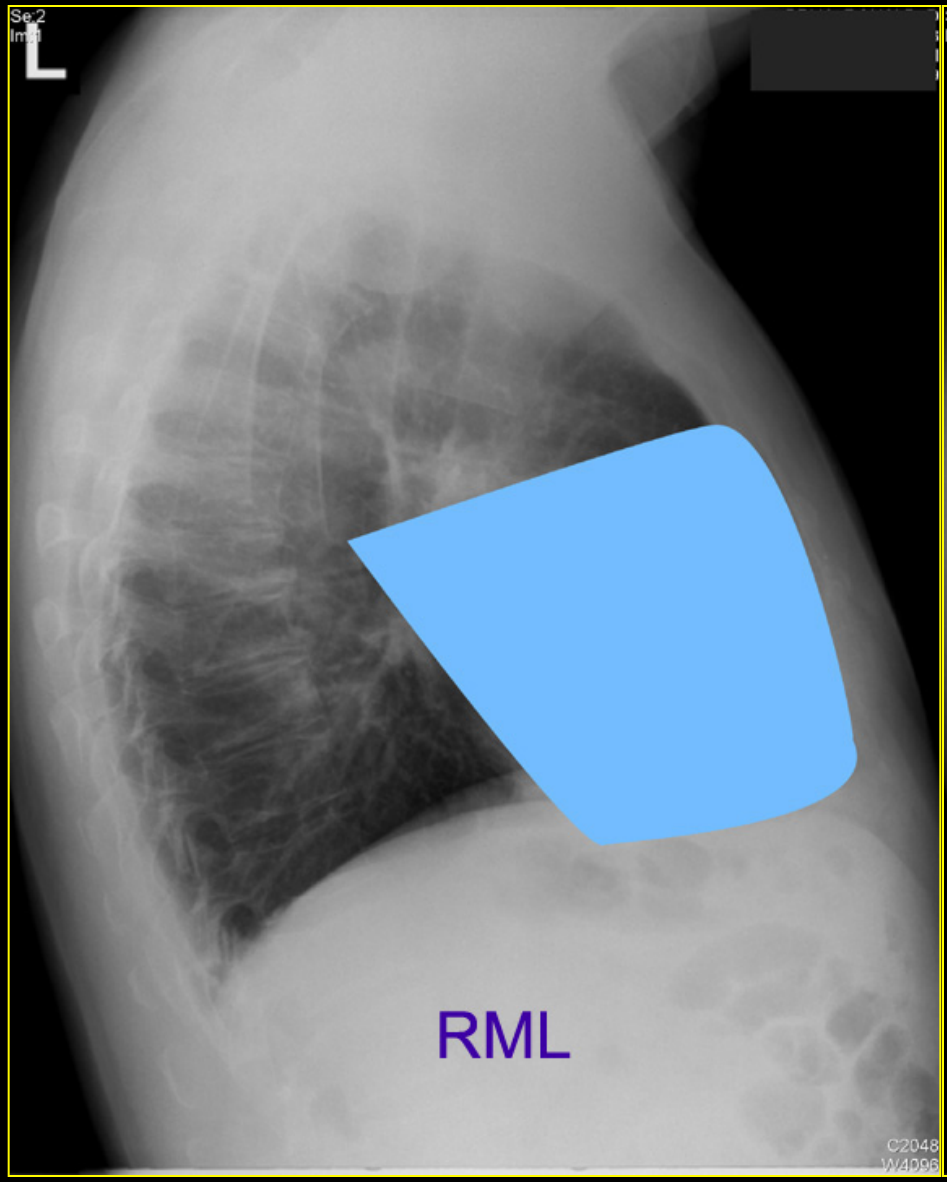

Trachea
Sternum
Scapula
Vertebra
Ribs

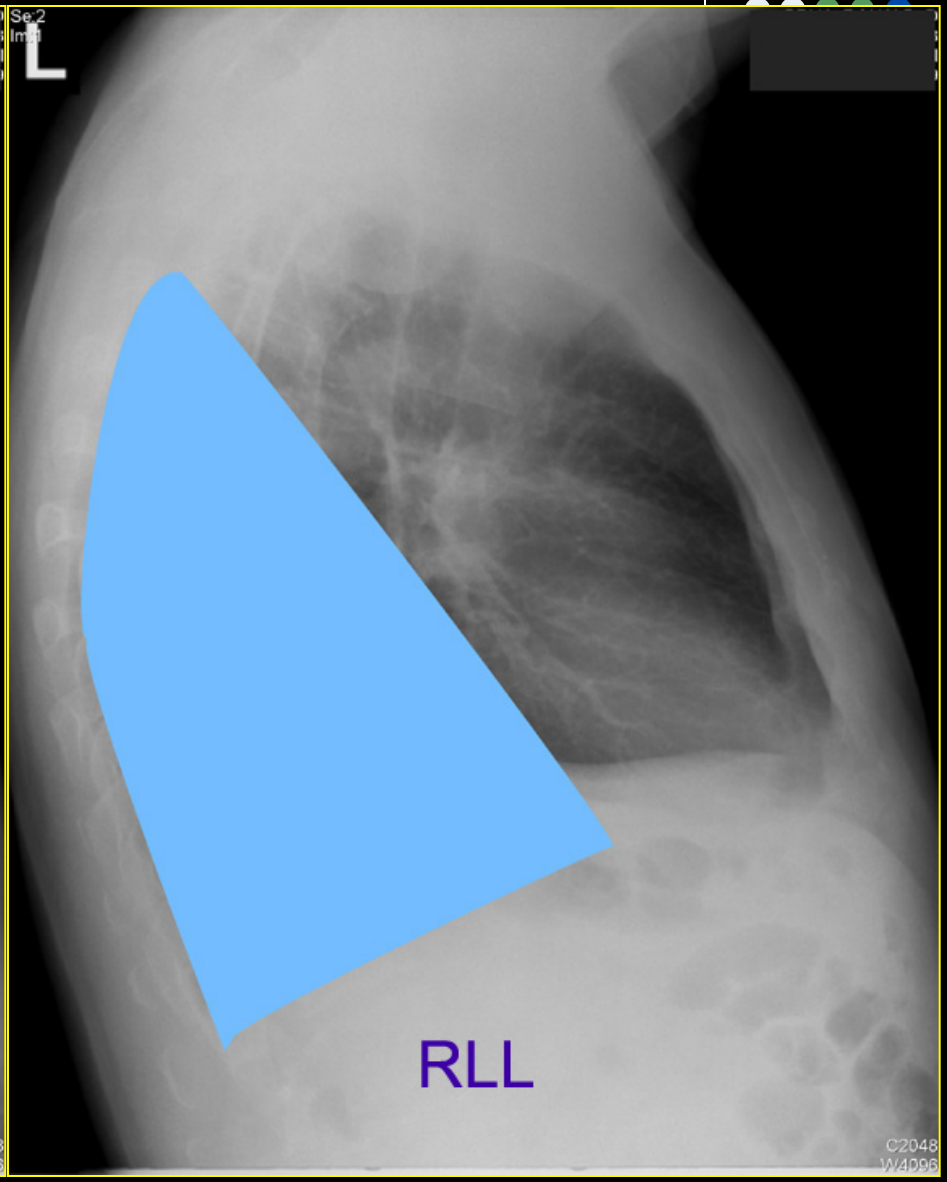

Rt diaphragm
Left diaphragm
Rt Ribs

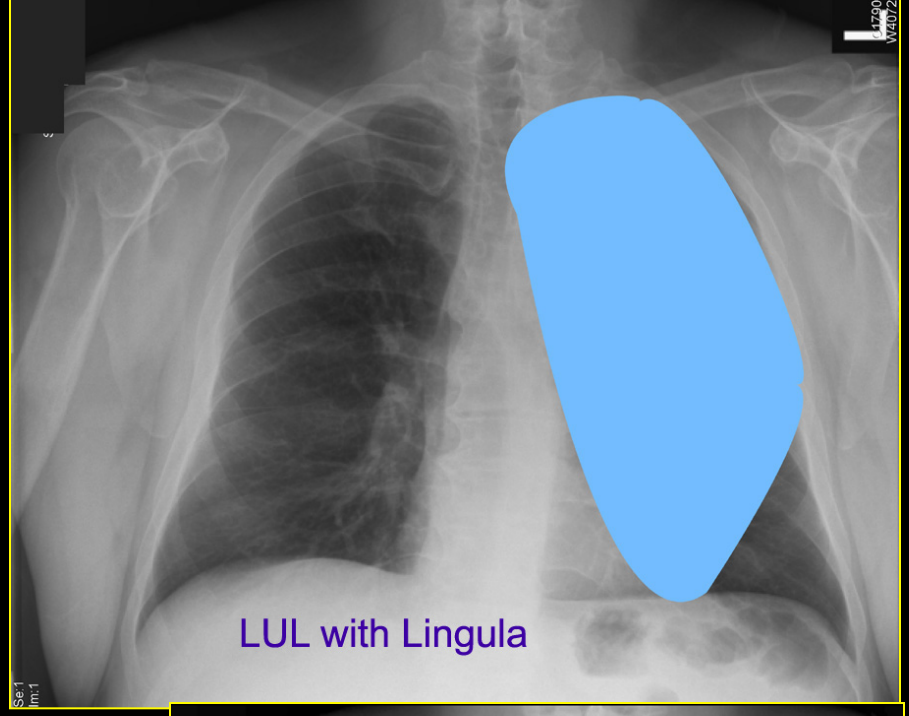

RUL

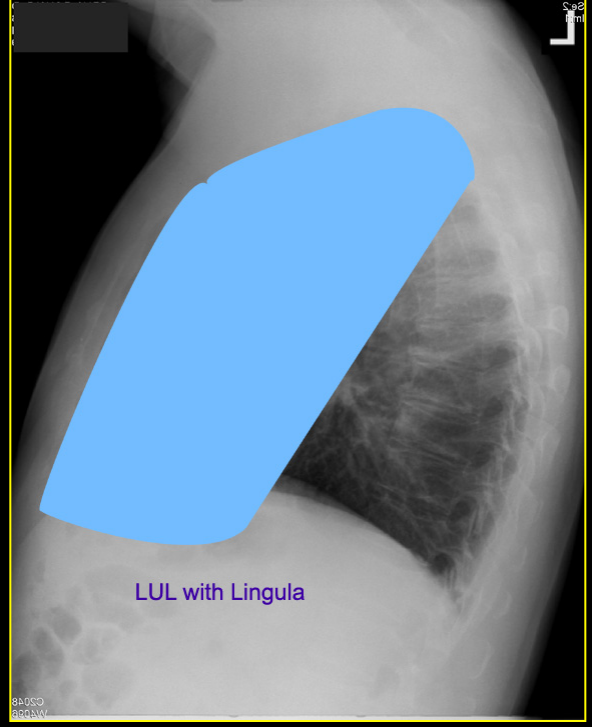

RML

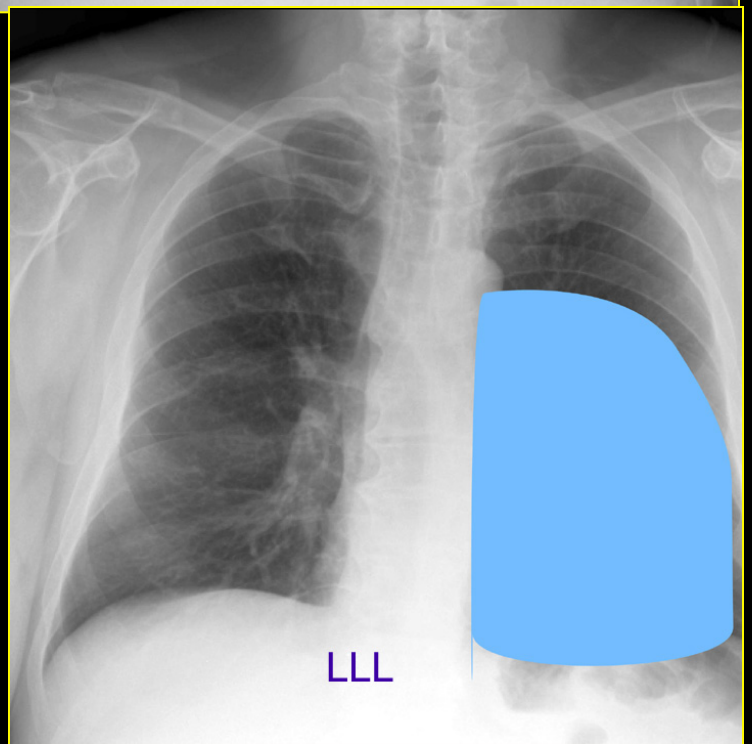

RLL

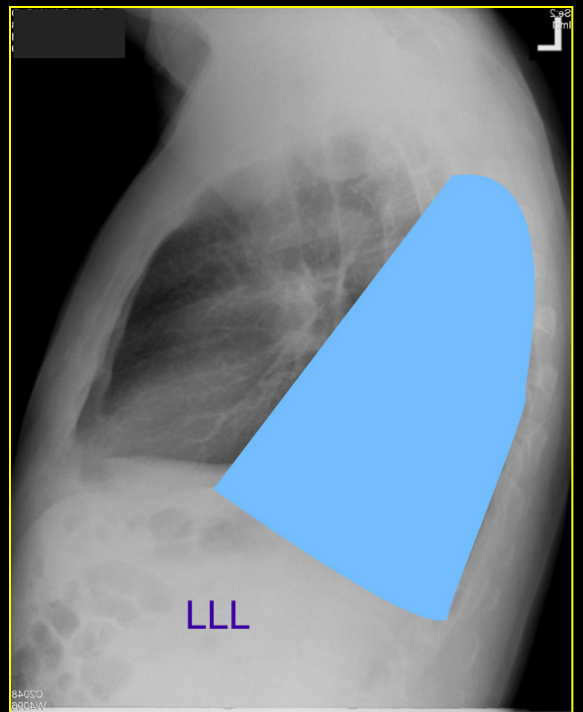

RML


RLL


LUL with Lingula


LUL with Lingula

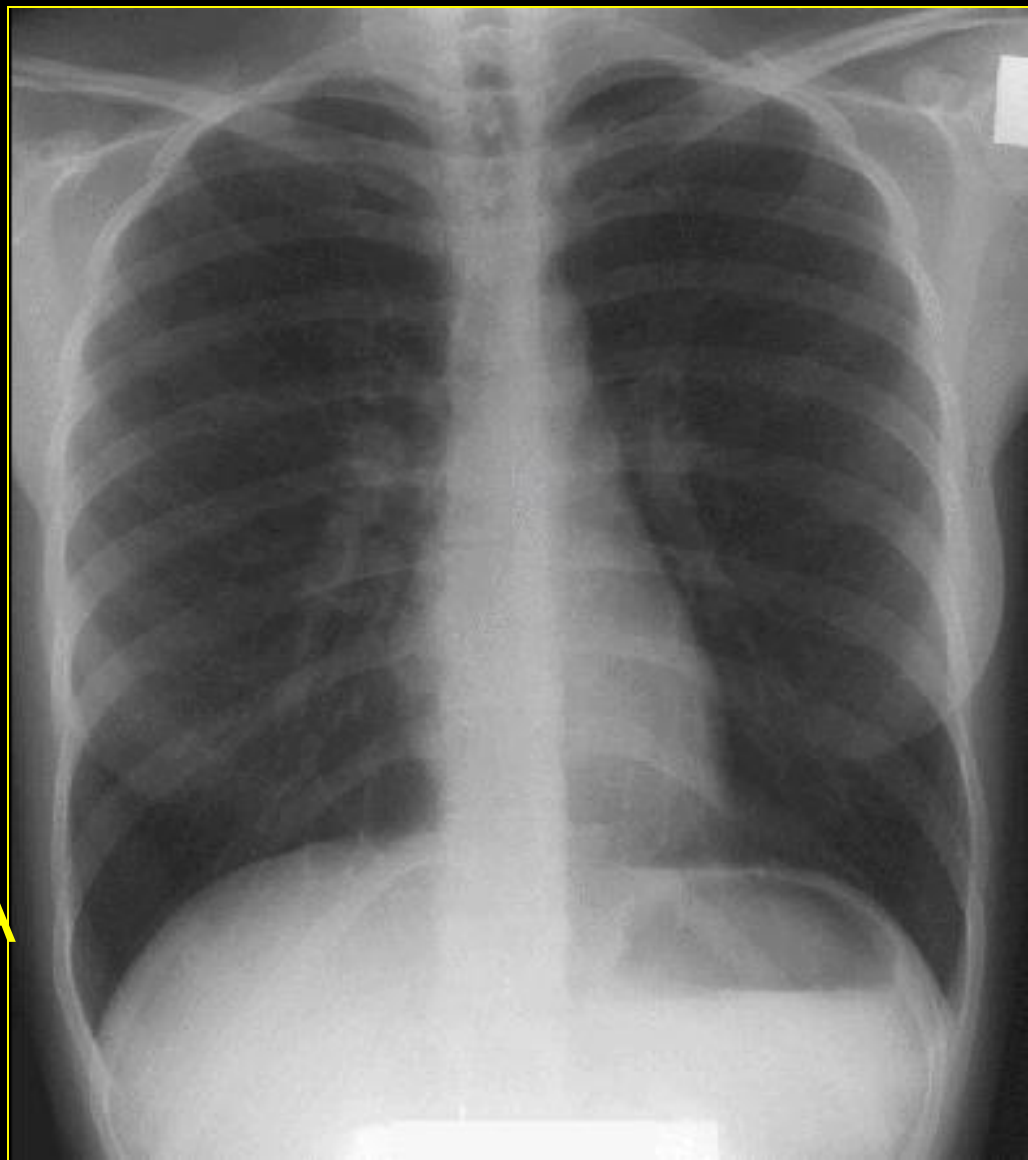

LLL

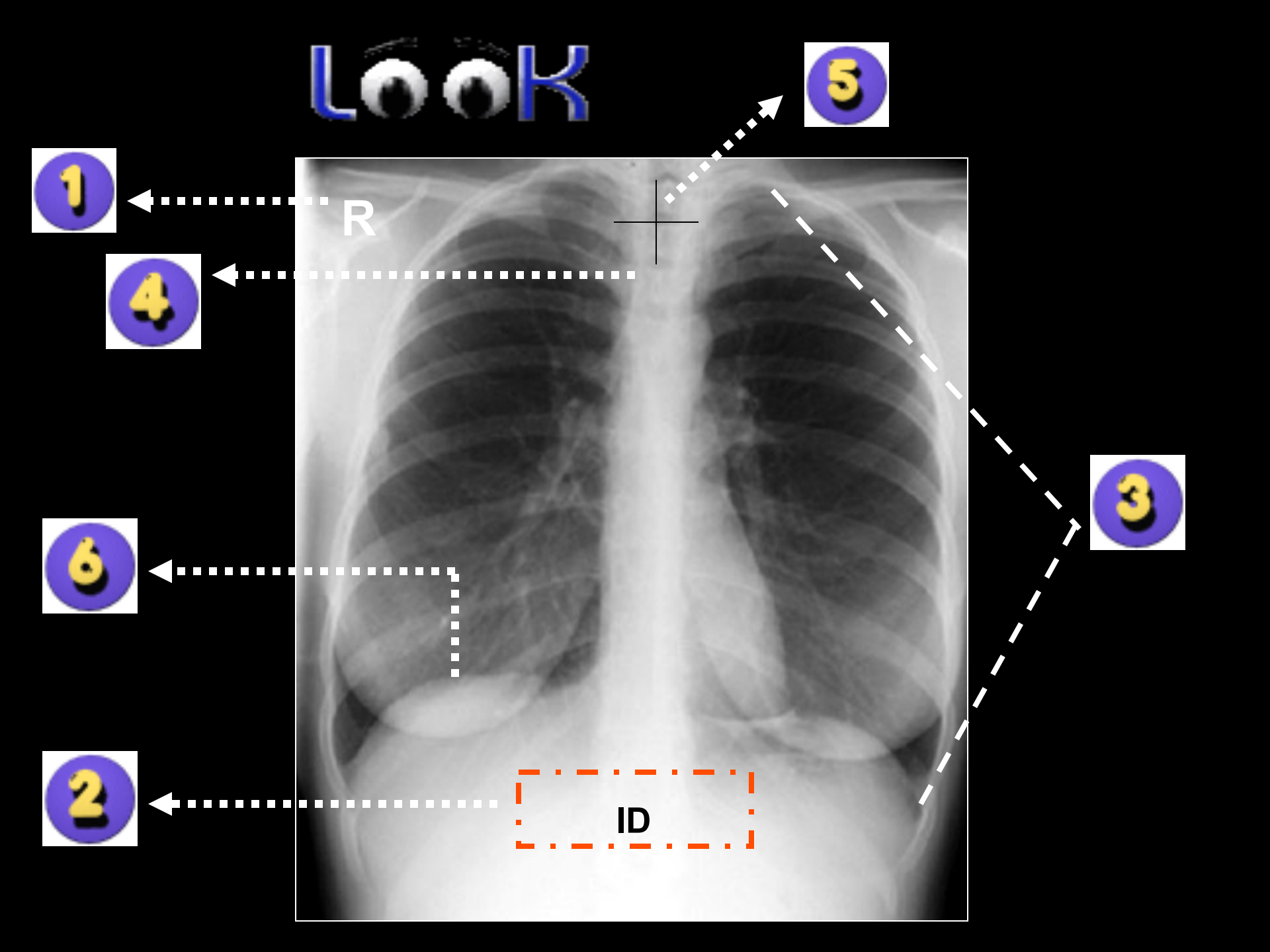

LLL

NORMAL CHEST RADIOGRAPHY

EVALUATION :

- ✓SOFT TISSUE
- ✓LUNGS
- ✓HEART
- ✓SINUS
- ✓HILA
- ✓MEDIASTINUM
- ✓DIAFRAGMA & PLEURA
- ✓RIBS




LOOK
1
2
3
4
5
6
R
ID

ありがとうございました

TERIMA KASIH

谢谢

Thank You