OBJECTIVES

1. Define basic terminology of radiographic interpretations.
2. List at least 3 common features to identify when viewing a chest x-ray.
3. Perform basic interpretations of chest radiographs.

INTRODUCTION

PLAIN films are generated when the patient is positioned in the path of the x-ray beam, with a film plate on the other side of the patient.

INTRODUCTION

Plain films give you a one-dimensional representation of a three-dimensional patient; therefore,

ONE VIEW IS NOT ENOUGH!
INTRODUCTION

• Radiology Techs and Radiologists are your friends!
• Communicate the information you need.
• They can move the patient in such a way to obtain subtle abnormalities on the film.
• ASK for suggestions on alternative positions & imaging to get the info needed.

INTRODUCTION

Xrays are a diagnostic TOOL only!


THE BASICS

TERMINOLOGY

• Roentgen-international unit of xray energy and is colorless.
• Radiopaque*-resists the passage of xrays through them.
• Radiolucent*-allows the passage of xrays depending on their (radio)density.

* Denotes these are extremely important to know & understand

Xrays have limitations:
• Sometimes abnormalities don t initially show.
• Sometimes we miss an abnormality.
• Sometimes the radiologist misses an abnormality.
• A normal xray does not always mean a "normal" patient.
THE BASICS

What we see on an xray:

SHADOWS

Radiopaque shadows appear WHITE.
Radiolucent shadows appear DARK.

THE BASICS

The more x-rays that strike a film, the darker the shadow;
the fewer that strike it, the lighter the shadow.

Dark or Light?
The shadow of air
The shadow of bone

“Colors” of an x-ray are really SHADOWS that range from dark (radiolucent) to light (radiopaque) and the different shades of GRAY in between.

Colors = GRAYNESS

BORDERS (interfaces) are the points where two materials of different densities meet.

The degree of sharpness depends on the difference in the densities between two materials. 
THE BASICS

Describe this “Xray”:


THE BASICS

When looking at an Xray, first do a “quick scan” to determine any obvious abnormality:

• Body (Bony) abnormalities?
• Surface (Soft) tissue abnormalities?
• And other abnormalities?


THE BASICS

Then,
A  Acknowledge this is the patient.
B  Be a good film (RIP).
C  Collections of gas shadows-darkish.
D  Densities of water fluid levels-whitish.
E  Everything’s to look at (bones, heart, etc.).
F  Funny-looking things (ETT’s, NGT’s, etc.).

THE BASICS

Many films allow for comparison on only one film.

For example:
• Pelvic films show both hips
• CXRs allow for comparison of the body’s symmetry.

SUMMARY:
• Radiopaque vs radiolucent materials.
• Gray colors reflect shadows of light & dark.
• Borders are the meeting points of different densities.
• BSA = a quick scan.
• ABCDEF = more detailed analysis.
• Compare to known normals.

THE CHEST

• Think of the chest as an upside down tree.
THE CHEST

- **Trunk**: The spinal column - vertebral interspaces should be visible to the level of the clavicles only.
- **Branches**: The clavicles & 12 ribs.

General Approach: AP View

- **R Rotation**: Clavicles & vertebrae form a cross.
- **I Inspiration**: Minimum of 8 ribs visible.
- **P Penetration**: Intervertebral spaces visible to clavicles only.

Proper penetration (the right amount of roentgens used):

- Normally, above the clavicles you should just be able to make out the intervertebral spaces and see little, if any, of the vertebral body outline.

Overexposure: Too many roentgens used; there is more visible radiolucency (darkness) than is expected.

Underexposure: Not enough roentgens used; there is more visible radiopaqueness (whiteness) than is expected.
General Approach: AP View (cont’d)

- **Costaphrenic Angles** – Should always be sharp; where the diaphragm meets an imaginary line drawn down an axillary line.

- **Heart Borders** – Should be sharp; edge to edge width of the heart at its widest point should be less than one-half of the total width of the chest.

- **Hilum** – Hilum refers to the point of entry of blood vessels into an organ. Shadows of smaller vessels form the hilar markings.

- **Lung Markings** – a combination of airways, vessels, and lung parenchyma that look like soft, streaky lines.

- **Diaphragm Domes** – Should be slightly rounded; right is slightly higher than left.
**THE CHEST**

Lung Markings
Note: Absence of lung markings = no lung!

Diaphragm Domes

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**THE CHEST**

Imaginary Lines

- Right Lung
- Left Lung

Leslie Muma, RN, MSN, NP

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**THE CHEST**

Draw imaginary lines to distinguish the segments of the right and left lobes.

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**THE CHEST**

General Approach: Lateral View

- **D** Diaphragm Domes – two borders should be visible.
- **V** Vertebral (interspaces) – radiopaque to about midpoint, then becoming radiolucent.
- **R** Retrosternal/Retrocardiac – colors should be similar.
THE CHEST

Diaphragm Domes
Retrosternal space
Retrocardiac space

THE CHEST

Lateral CXR (cont’d)

"L" on the film indicates the left side of the chest is touching the x-ray plate; therefore, the roentgen is passing through the RIGHT lung fields first.

THE CHEST

Draw imaginary lines to distinguish the segments of the RIGHT lobes (since this is where the roentgen is passing first).

When the right side of the chest is touching the x-ray plate, the roentgen is passing through the LEFT lung fields first.

Draw imaginary lines to distinguish the segments of the LEFT lobes (since this is where the roentgen is passing first).
THE CHEST

SUMMARY

• Tree-like chest should be symmetrical
• RIP rotation, inspiration, penetration
• CHHiLD Costaphrenic angles, heart borders, hilum, lung markings, diaphragm
• DVR Diaphragm domes, vertebral spaces, retrosternal/retrocardiac spaces
• Imaginary Lines Distinguish between segments of right and left lungs

CASE PRESENTATIONS

18 mo with fever, wheeze, & cough

18 mo with fever, wheeze, & cough
18 mo with fever, wheeze, & cough

How would YOU document this xray reading?

*Answer:* Hyperinflation, mild perihilar radiopacities c/w bronchiolitis
(Radiologist read this as perihilar infiltrates)

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6 y.o. fever & cough

How would YOU document this xray reading?

*Answer:* Mild radiopaque density c/w LLL pneumonia.
(Radiologist read this as LLL pneumonia)
25 y.o. with cough for 3 months

How would YOU document this xray reading?

*Answer:* Radiopaque density in the RML & RLL with effusion

(Radiologist read this as being consistent with lymphoma).

**SUMMARY**

- Defined basic terms: Radiopaque and Radiolucent.
- Discussed three of the most common features to note when interpreting a chest xray: RIP.
- Performed basic interpretations of case studies.
THANKS!

Any Questions?