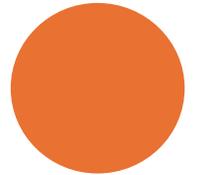


# PREPARATION FOR ESOPHAGOGRAM

- Patients need no preparation for an esophagogram
- The examination room should be clean and appropriately prepared
- The appropriate amount and type of contrast medium should be ready
- Esophagograms generally use both thin and thick barium.
- Lead aprons, compression paddle, and lead gloves should be provided in the room



Prepare patient; explain procedure



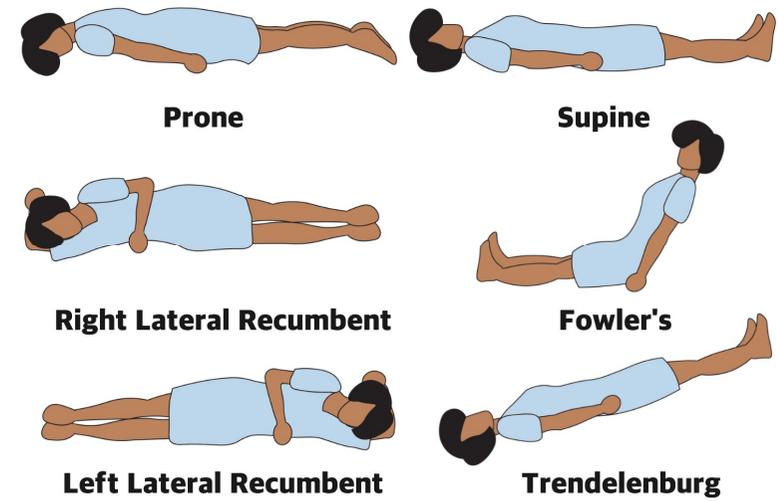
- Additional items useful in the detection of a radiolucent foreign body:
  1. Cotton balls soaked in thin barium
  2. Barium pills or gelatin capsules filled with BaSO<sub>4</sub>
  3. Marshmallows.
- After swallowing any one of these three substances, the patient is asked to swallow an additional thin barium mixture.

# Procedure Tips

- The technologist's duties during fluoroscopy are generally to:
  - follow the radiologist's instructions
  - assist the patient as needed and expedite the procedure in any manner possible.
  - The patient is in an upright or erect position
  - A cup of thin barium is placed in the patient's left hand close to the left shoulder.
  - The patient is instructed to follow the radiologist's instructions concerning how much to drink and when.
  - The radiologist observes the flow of barium with the fluoroscope

- Swallowing (deglutition) of thin barium is observed with the patient in various positions.
- Similar positions may be used while the patient swallows thick barium
- The use of thick barium allows better visualization of mucosal patterns and any lesions within the esophagus.
- The type of barium mixture to be used is determined by the radiologist.

- After upright studies, horizontal and Trendelenburg positions with thick and thin barium may follow



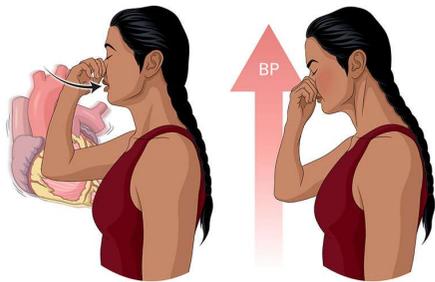
# DEMONSTRATION OF ESOPHAGEAL REFLUX

- The diagnosis of possible esophageal reflux or regurgitation of gastric contents may occur during fluoroscopy or an esophagogram.
- The following procedures may be performed to detect esophageal reflux:
  - I. Breathing exercises
  - II. Water test
  - III. Compression paddle technique
  - IV. Toe-touch maneuver

# Breathing exercises

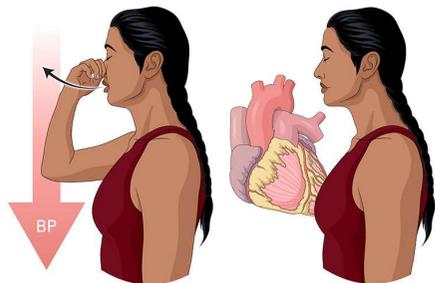
- **Valsalva maneuver:** The patient is asked to take a deep breath and, while holding the breath in, to bear down as though trying to move the bowels.
- This maneuver forces air against the closed glottis.
- A modified Valsalva maneuver as the patient pinches off the nose, closes the mouth, and tries to blow the nose.
- The cheeks should expand outward as though the patient were blowing up a balloon.
- **A Mueller maneuver** also can be performed
- The pt exhales and then tries to inhale against a closed glottis.
- The increase in intra-abdominal pressure may produce the reflux of ingested barium that would confirm the presence of esophageal reflux.
- The radiologist carefully observes the esophagogastric junction during these maneuvers.

Valsalva maneuver



① Take a breath and close mouth.

② Push out breath and strain for 15–20 secs.



③ Open mouth and breathe out.

④ If heart rate does not slow down, repeat.



# Water test

- Water test—LPO position.
- fills the fundus with barium
- The patient is asked to swallow a mouthful of water through a straw.
- Under fluoroscopy, the radiologist closely observes the esophagogastric junction.
- A positive water test occurs when significant amounts of barium regurgitate into the esophagus from the stomach.



## Compression Technique

- A compression paddle can be placed under the patient and inflated as needed
- Used in the prone position to provide pressure to the stomach region.
- The radiologist can demonstrate the obscure esophagogastric junction during this process to detect possible esophageal reflux



## Toe-Touch Maneuver

- Under fluoroscopy, the cardiac orifice is observed as the patient bends over and touches the toes.
- Esophageal reflux and hiatal hernias are sometimes demonstrated with the toe-touch maneuver.



# Radiographic Positioning

## RAO POSITION: ESOPHAGOGRAM

### Clinical Indications

- Strictures, foreign bodies, anatomic anomalies, and neoplasms of the esophagus

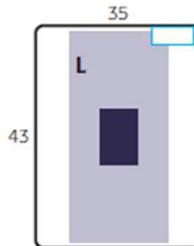
### Esophagogram

#### ROUTINE

- RAO (35° to 40°)
- Lateral
- AP (PA)

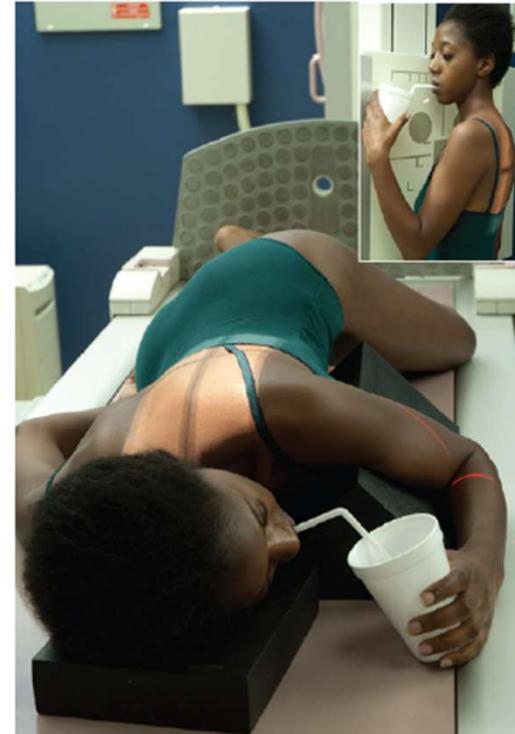
### Technical Factors

- Minimum SID—40 inches (102 cm) or 72 inches (183 cm) if patient is erect
- IR size—35 × 43 cm (14 × 17 inches), lengthwise
- Grid
- Analog or digital systems—100 to 125 kV range



**Shielding** Shield all radiosensitive tissues outside region of interest.

**Patient Position** Position patient recumbent or erect. Recumbent is preferred because of more complete filling of the esophagus (caused by the gravity factor with the erect position).



- 35° to 40° RAO—recumbent or erect

### Part Position

- Rotate 35° to 40° from a prone position, with the right anterior body against the IR or table.
- Place right arm down with left arm flexed at elbow and up by the patient's head, holding cup of barium, with a straw in patient's mouth.
- Flex left knee for support.
- Align midline of thorax in the oblique position to midline of IR or table.
- Place top of IR about 2 inches (5 cm) above level of shoulders to place center of IR at CR.

### CR

- CR perpendicular to IR
- CR to center of IR at level of T5 or T6 (2 to 3 inches [5 to 7.5 cm] inferior to jugular notch)

**Recommended Collimation** Collimate the lateral borders to create two-sided collimation about 5 to 6 inches (12 to 15 cm) wide. L or R marker should be placed within collimation field.

**Respiration** Suspend respiration and expose on expiration (see *Notes*).

**NOTE 1: Thick barium:** Two or three spoonfuls of thick barium should be ingested, and the exposure should be made immediately after the last bolus is swallowed. (The patient generally does not breathe immediately after a swallow.)

**NOTE 2: Thin barium:** For complete filling of the esophagus with thin barium, the patient may have to drink through a straw, with continuous swallowing and exposure made after three or four swallows without suspending respiration (using as short an exposure time as possible).

# Evaluation Criteria

- Esophagus should be visible between the vertebral column and heart.
- RAO provides better visibility of pertinent anatomy between vertebrae and heart than LAO.
- If esophagus is situated over the spine, more rotation of the body is required.
- Entire esophagus is filled or lined with contrast media.
- Upper limbs should not superimpose esophagus.
- Proper collimation is applied.
- CR is centered at level of T5 and T6 to include entire esophagus.



Fig. 12-83 RAO.

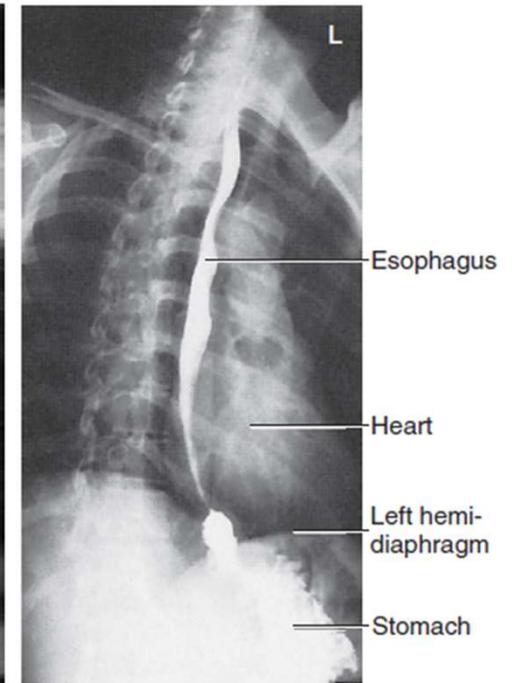


Fig. 12-84 RAO.

## LATERAL POSITION: ESOPHAGOGRAM

### Clinical Indications

- Strictures, foreign bodies, anatomic anomalies, and neoplasms of the esophagus

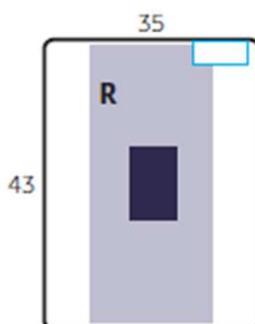
### Technical Factors

- Minimum SID—40 inches (102 cm) or 72 inches (183 cm) if erect
- IR size—35 × 43 cm (14 × 17 inches), lengthwise
- Grid
- Analog or digital systems—100 to 125 kV range

#### Esophagogram

##### ROUTINE

- RAO (35° to 40°)
- Lateral
- AP (PA)



**Fig. 12-85** Right lateral—arms up.

**Shielding** Shield all radiosensitive tissues outside region of interest.

**Patient Position** Position patient recumbent or erect (recumbent preferred).

### **Part Position**

- Place patient's arms over the head, with the elbows flexed and superimposed.
- Align **midcoronal plane to midline** of IR or table.
- Place shoulders and hips in a true lateral position.
- Place top of IR about 2 inches (5 cm) above level of shoulders, to place center of IR at CR.

### **CR**

- CR perpendicular to IR
- CR to level of T5 or T6 (2 to 3 inches [5 to 7.5 cm] inferior to jugular notch)

**Recommended Collimation** Collimate along the lateral borders to create two-sided collimation about 5 to 6 inches (12 to 15 cm) wide. L or R marker should be placed within collimation field.

**Respiration** Suspend respiration and expose on expiration.

**NOTE:** See preceding page for barium swallow instructions.

# Optional swimmer's lateral position

- Allows for better demonstration of the upper esophagus without the superimposition of arms and shoulders.
- Position hips and shoulders in true lateral position;
- Separate shoulders from esophageal region by placing upside shoulder down and back, with arm behind back.
- Place downside shoulder and arm up and in front to hold cup of barium.



**Fig. 12-86** Optional—swimmer's lateral for better visualization of upper esophagus.

# Ev. Creiteria

- The entire esophagus is seen between the thoracic spine and heart.
- True lateral is indicated by direct superimposition of posterior ribs.
- Patient's arms should not superimpose esophagus
- The entire esophagus is filled or lined with contrast media.
- Proper collimation is applied



**Fig. 12-87** Lateral—arms up.

## AP (PA) PROJECTION: ESOPHAGOGRAM

### Clinical Indications

- Strictures, foreign bodies, anatomic anomalies, and neoplasms of the esophagus  
This projection may not be as diagnostic as the RAO or lateral position.

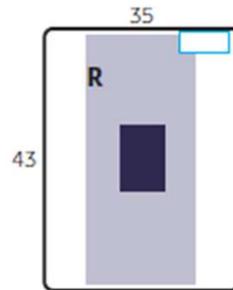
### Technical Factors

- Minimum SID—40 inches (102 cm) or 72 inches (183 cm) if erect
- IR size—35 × 43 cm (14 × 17 inches), lengthwise
- Grid
- Analog or digital systems—100 to 125 kV range

### Esophagogram

#### ROUTINE

- RAO (35° to 40°)
- Lateral
- AP (PA)



**Fig. 12-88** Recumbent AP projection.

**Shielding** Shield all radiosensitive tissues outside region of interest.

**Patient Position** Position patient recumbent or erect (recumbent preferred).

### Part Position

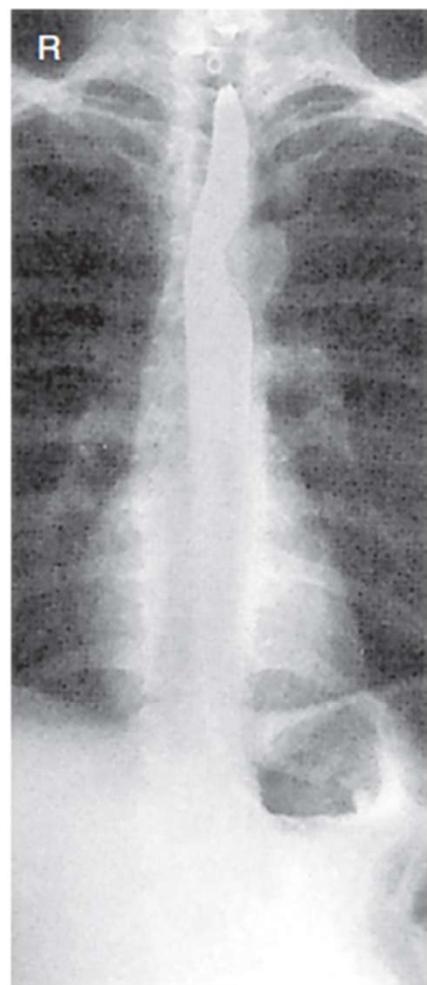
- Align MSP to midline of IR or table.
- Ensure that shoulders and hips are **not rotated**.
- Place right arm up to hold cup of barium.
- Place top of IR about 2 inches (5 cm) above top of shoulder, to place CR at center of IR.

### CR

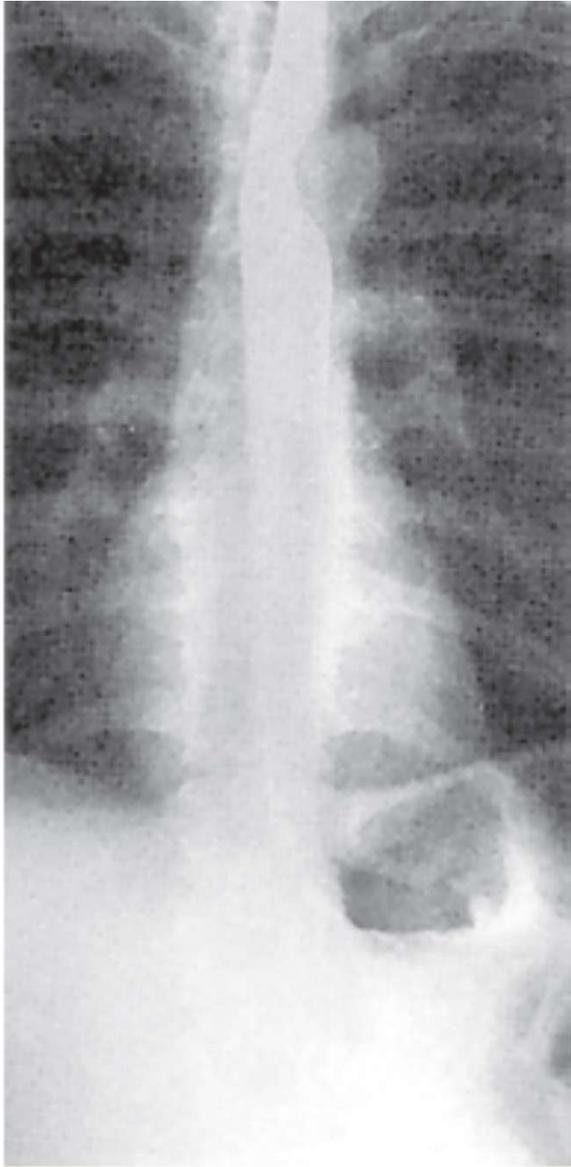
- CR perpendicular to IR
- CR to MSP, 1 inch (2.5 cm) inferior to sternal angle (T5-T6) or approximately 3 inches (7.5 cm) inferior to jugular notch

**Recommended Collimation** Use tight side collimation to result in a collimation field that is about 5 to 6 inches (12 to 15 cm) wide. L or R marker should be placed within collimation field.

**Respiration** Suspend respiration and expose on expiration.



**Fig. 12-89** AP projection.



## Ev. Criteria

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- The entire esophagus is filled with barium
- No rotation of the patient's body is evidenced by the symmetry of sternoclavicular joints.
- Proper collimation is applied.

**Fig. 12-89** AP projection.

## LAO POSITION: ESOPHAGOGRAM

### Clinical Indications

- Strictures, foreign bodies, anatomic anomalies, and neoplasms of the esophagus

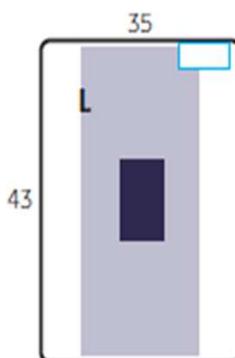
### Esophagogram

SPECIAL

- LAO

### Technical Factors

- Minimum SID—40 inches (102 cm) or 72 inches (183 cm) if erect
- IR size—35 × 43 cm (14 × 17 inches), lengthwise
- Grid
- Analog or digital systems—100 to 125 kV range



**Shielding** Shield all radiosensitive tissues outside the region of interest.

**Patient Position** Position patient recumbent or erect (recumbent preferred).



**Fig. 12-90** Recumbent LAO position.

### Part Position

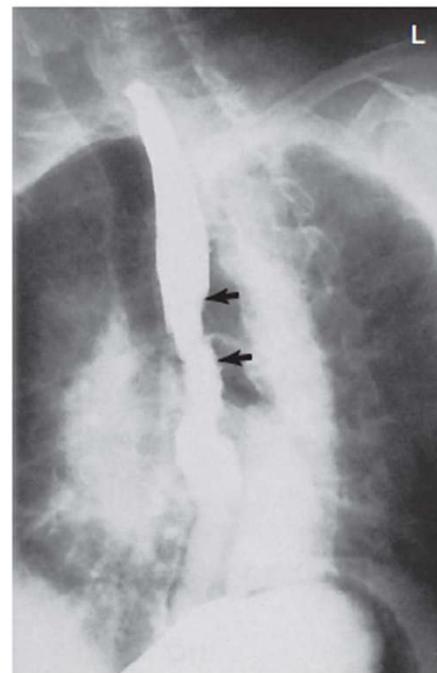
- Rotate 35° to 40° from a PA, with the left anterior body against IR or table.
- Place left arm down by patient's side, with right arm flexed at elbow and up by patient's head.
- Flex right knee for support.
- Place top of IR about 2 inches (5 cm) above level of shoulders, to place CR at center of IR.

### CR

- CR perpendicular to IR
- CR to level of T5 or T6 (2 to 3 inches [5 to 7.5 cm] inferior to jugular notch)

**Recommended Collimation** Collimate lateral borders to create two-sided collimation about 5 to 6 inches (12 to 15 cm) wide. L or R marker should be placed within collimation field.

**Respiration** Suspend respiration and expose on expiration.



**Fig. 12-91** LAO—demonstrating a constricted area of esophagus, probably carcinoma (*arrows*).

## EV. Criteria

- Esophagus is seen between hilar region of lungs and thoracic spine.
- Entire esophagus is filled with contrast medium.
- The patient's upper limbs should not superimpose the esophagus.
- Proper collimation is applied.

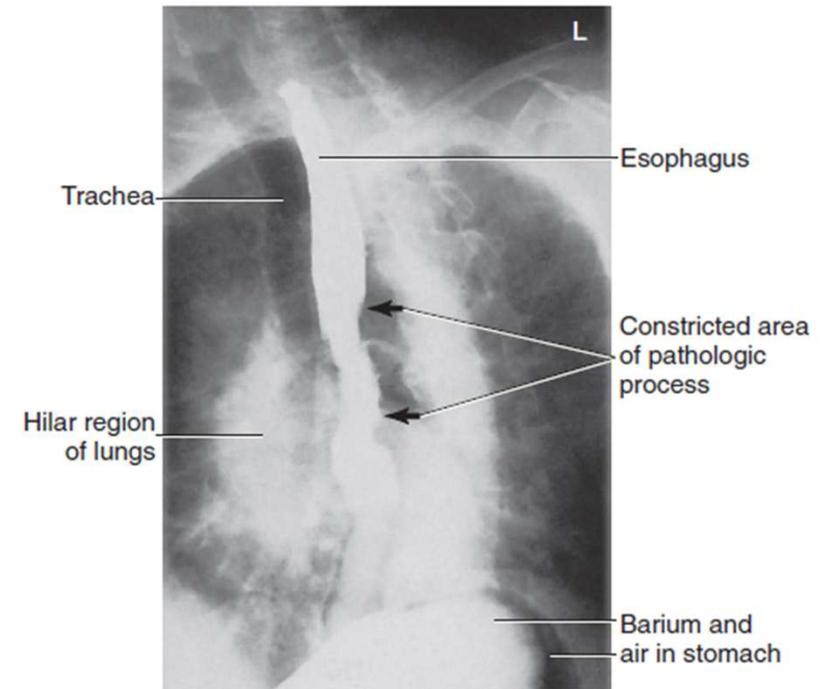


Fig. 12-92 LAO position.

