DIAPHRAGM

• Thin fibro muscular partition between abdomen and thorax

• Important muscle of respiration
- **Extent**

<table>
<thead>
<tr>
<th>Normal Breathing</th>
<th>Full Expiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>At level of 4th Rib</td>
</tr>
<tr>
<td></td>
<td>nipple</td>
</tr>
<tr>
<td>Left</td>
<td>One rib lower 5th rib</td>
</tr>
<tr>
<td></td>
<td>5th rib</td>
</tr>
</tbody>
</table>
FEATURES

• Has fibrous central tendon
• Depressed in centre
• Raised on right and left side as domes or cupola
ATTACHMENT

**Origin:**
- Sternal part – Inner surface of xiphoid
- Costal part – Lower 6 costal cartilages
- Vertebral – By crura
  - right
  - left

Arcuate ligame
- Medial
- Lateral
- Median

**Insertion:**
- Central Tendon
OPENINGS IN DIAPHRAGM

• Venacaval – 8th thoracic vertebra
  – inf venacava,
  -right phrenic nerve
• Oesophageal – 10th thoracic vertebra
  – oesophagus,
  -right & left vagal trunks,
    -oesophageal branches of lt gastric vs
    -lymphatics
• Aortic (Aortic hiatus) – 12th thoracic vertebra
  – abdominal aorta,
  -thoracic duct,
  -azygos vein
OTHER OPENINGS
Superior epigastric vessels – sternal and costal origin
Subcostal nerve & vessel – posterior to lateral arcuate lig
Sympathetic trunk  - posterior to medial arcuate lig
Splanchnic nerves    - pierce crura
Left phrenic n     - pierce left dome
SUPERIOR
- Lung & pleura on dome
- Pericardium on central tendon

INFERNIOR-lined by peritonium
- Right – right lobe of liver,
  right kidney,
  right suprarenal
- Left- fundus of stomach,
  spleen
  left kidney,
  left suprarenal
Nerve supply

Phrenic nerve

Intercostal nerve

Efferent

Afferent
Blood supply

- Pericardiophrenic
- Musculophrenic
- Inf phrenic
ACTION

• Increases vertical diameter of thoracic cavity

FUNCTIONS

• Muscle of inspiration
• Muscle of abdominal straining
• Thoracoabdominal pump – forcing blood from IVC to rt. Atrium
• Weight- lifting muscle
CLINICAL APPLICATIONS

1. Diaphragmatic hernias
   • acquired
• **Congenital**

• Due to defect in development
• Bochdalek’s hernia – lumbocostal gap
• Retero sternal hernia-through foamen of Morgagni
2. Paralysis of diaphragm
3. Hiccups
MECHANISM OF RESPIRATION

Increase in

- vertical diameter by diaphragmatic contraction
- Anteroposterior diameter by pump handle movement of sternum
- Transverse diameter by bucket handle movements of lower ribs