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# From anatomy to therapy: Exploration of diaphragm related conditions through homeopathic eyes

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**Abstract**
The diaphragm is a vital muscle in human anatomy, primarily responsible for respiration and separating the thoracic and abdominal cavities. Its structure consists of a central tendon and muscular fibers originating from the lower ribs, sternum and lumbar vertebrae, facilitating changes in thoracic volume and pressure during breathing.
This article underscores the importance of anatomy in diagnosis of cases and the selection of homeopathic remedies.

**Keywords:** Diaphragm, hiccups, Diaphragmatic hernia, Esophageal varices, GERD, Gastroparesis, homeopathy

## Introduction

**Anatomy of Diaphragm:** The diaphragm is a thin muscular and tendinous septum that separates the chest cavity above the abdominal cavity below. It is pierced by the structures that pass between the chest and the abdomen [2]. The diaphragm is the principal muscle of respiration. It is dome shaped and consists of the peripheral muscular part, and the central fibrous part called central tendon [3].

## Origin [3]

The origin of the diaphragm is divided into three parts:

1. **Sternal part:** It consists of two fleshy slips which arise from the posterior surface of the xiphoid process.
2. **Costal part:** On each side, it consists of six fleshy slips which arise from the inner surface of lower ribs near their costal cartilages.
3. **Vertebral part:** This part arises by means of right and left crura of diaphragm and five arcuate ligaments.

## Insertion

From circumferential origin, the muscle fibres converge towards the central tendon and insert into its margins.

## Surfaces and Relations [3]

1. **Superior surface:** It projects on either side as dome or cupola into the thoracic cavity. Depressed area between the two domes is called the central tendon. The superior surface is covered by endothoracic fascia and is related to the bases of right and left pleura on the sides and to the fibrous pericardium in the middle.
2. **Inferior surface:** It is lined by the diaphragmatic fascia and parietal peritoneum.

- On the right side it is related to the right lobe of the liver, right kidney and right suprarenal gland.
- On the left side it is related to the left lobe of the liver, fundus of stomach, spleen, left kidney and left suprarenal gland.

## Shape of the Diaphragm

As seen from in front, the diaphragm curves up into right and left domes, or cupulae. The right dome reaches as high as the upper border of the 5th rib, and the left dome may reach the lower border of the 5$^{th}$ rib. The central tendon lies at the level of xiphisternal joint [2].

When seen from the side, the diaphragm has the appearance of an inverted J, the long limb extending up from the vertebral column and the shirt limb extending forward to the xiphoid process.

**Openings of the Diaphragm** [3]

**1. Major Opening**

- Vena caval opening.
- Oesophageal opening.
- Aortic opening.

| Opening | Structures passing through |
|---|---|
| Vena caval opening | Inferior vena cava<br>Right phrenic nerve |
| Oesophageal opening | Oesophagus<br>Right and left vagal trunks<br>Oesophageal branches of left gastric artery |
| Aortic opening | From right to left these are:<br>Azygos vein<br>Thoracic duct<br>Aorta |

**2. Minor Opening**

- Superior epigastric vessels.
- Musculophrenic artery.
- Lower five intercostal nerves and vessels.
- Subcostal nerves and vessels.
- Sympathetic chain.
- Greater, lesser and least splanchnic nerves.
- Hemiazygos vein.

**Nerve Supply** [2]

- **Motor nerve Supply:** The right and left phrenic nerves (C 3, 4, 5).
- **Sensory nerve Supply:** The parietal pleura and peritoneum covering the central surfaces of the diaphragm are from the phrenic nerve and the periphery of the diaphragm is from the lower dix intercostal nerves.

**Arterial Supply** [3]

1. Superior phrenic arteries.
2. Inferior phrenic arteries.
3. Pericardiophrenic arteries.
4. Musculophrenic arteries.
5. Superior epigastric arteries.
6. Lower five intercostal and subcostal arteries.

**Lymphatic Drainage**

1. Anterior diaphragmatic lymph nodes.
2. Posterior diaphragmatic lymph nodes.
3. Right lateral diaphragmatic nodes.
4. Left lateral diaphragmatic nodes.

**Functions of diaphragm**

1. Muscle of diaphragm.
2. Muscle of abdominal straining.
3. Muscle of weight lifting.
4. Thoracomuscular pump.
5. Sphincter of oesophagus.

**Clinical Anatomy of Diaphragm**

1. Hiccups.
2. Diaphragmatic hernia.
3. Diaphragmatic rupture.
4. Diaphragmatic tumor.
5. Paralysis of diaphragm.
6. Esophageal varices.
7. GERD.
8. Gastroparesis.

**Hiccups / Singultus**

They are involuntary contractions of diaphragm followed by a sudden closure of vocal cords, resulting in characteristic sound [4].

**Causes** [5]

1. Metabolic (Uremia, diabetes).
2. Toxemia (Septicemia, high fever).
3. Abdominal (Liver abscess, Peritonitis, Subphrenic abscess, etc.).
4. Thoracic (Aortic aneurysm, mediastinal glands, substernal goitre, etc.).
5. Neurological (Encephalitis, meningitis, brain tumour, etc.).
6. Psychogenic (Hysterical, neurosis).
7. Epidemic hiccoughs.

**Signs and Symptoms** [6- 8]

1. **Involuntary contractions:** Sudden involuntary contractions of the diaphragm.
2. **Sound:** A distinctive "hic" sound occurs with beach contraction.
3. **Frequency:** Episodes can be brief or prolonged
4. **Discomfort:** Mild discomfort in the throat or chest.

**Management** [9]

- Breathe into a paper bag.
- Gargle with ice water.
- Hold your breath.
- Sip cold water.

**Diaphragmatic hernia**

A diaphragmatic hernia is defined as an abnormal opening in the diaphragm that permits abdominal contents to move into the thoracic cavity, which can result in respiratory distress and other complications [10].

**Causes** [11]

**1. Congenital causes**

- Developmental defects.
- Genetic factors (Trisomy 18 and Patau syndrome).

**2. Acquired causes**

- Trauma (blunt or penetrating injury to the abdomen it chest that rupture the diaphragm).
- Increased abdominal pressure (Obesity, heavy lifting).

**Signs and Symptoms** [12]

- Difficulty in breathing.
- Bluish discoloration of the skin.
- Reduced bowel sounds.
- Vomiting.

**Management** [13]

- Small frequent meals to reduce abdominal pressure and minimize reflux.
- Avoid spicy food, citrus fruits, carbonated drinks which exacerbate symptoms.

- Increase fiber intake which prevents constipation.
- Maintain healthy weight which can reduce abdominal pressure.
- Avoid tight clothing.
- Elevate the head during sleep which can reduce night time symptoms of reflux.

**Diaphragmatic rupture**

It is defined as a tear or laceration in the diaphragm, allowing abdominal contents to enter the thoracic cavity [14].

**Causes [14]**

**Traumatic causes**

1. Blunt trauma.
2. Penetrating trauma.
3. Blast injuries.

**Non-Traumatic causes**

1. Increased intra-abdominal pressure (Severe coughing, vomiting or heavy weight lifting).
2. Congenital defects.

**Signs and symptoms [14]**

- Difficulty in breathing.
- Bluish discoloration of skin.
- Reduced or absent breath sounds on affected side.
- Presence of bowel sounds auscultated in the thorax.
- Sharp or stabbing pain in the chest, often exacerbated by movement.

**Management [15]**

- Small frequent meals.
- Increase fiber content in food.
- Adequate fluid intake.
- Elevate the head during meals.
- Avoid heavy lifting.
- Maintain healthy weight.
- Practice deep breathing.

**Diaphragmatic tumor**

It is an abnormal growth located on or within the diaphragm, which is the muscle that separates the chest from the abdominal cavity and plays a crucial role in respiration. These tumors can be benign (non-cancerous) or malignant and may originate in the diaphragm itself or spread from the other areas (metastatic tumors) [16].

**Causes [17]**

- Asbestos exposure.
- Spread from lung or breast cancer.
- Congenital factors.
- Chronic inflammation.

**Signs and symptoms [16]**

- Chest pain.
- Shortness of breath.
- Cough.
- Fatigue.
- Weight loss.
- Fever and night sweats.
- Ascites.

**Paralysis of diaphragm**

It is defined as the inability of the diaphragm to contract effectively, leading to impaired respiratory function [18].

**Causes [18]**

- Phrenic nerve injury.
- Neurological conditions (Amyotrophic lateral sclerosis, multiple sclerosis, Guillaume Barre syndrome).
- Infections.
- Tumors in the neck.

**Signs and symptoms [18]**

- Shortness of breath.
- Paradoxical breathing.
- Chest pain.
- Reduced exercise tolerance.
- Cough.
- Fatigue.
- Hypoxemia.

**Management [19]**

- High protein food.
- Eat berries, leafy greens and cruciferous vegetables to reduce inflammation.
- Adequate fluid intake.
- Small, frequent meals.
- Reduce intake of high sodium and high sugar foods.

**Esophageal varices**

These are enlarged and swollen veins in the oesophagus that develop due to increased pressure in the portal venous system, often as a result of liver cirrhosis [20].

**Causes [20]**

- Liver cirrhosis.
- Alcohol abuse.
- Thrombosis.
- Certain diseases (Schistosomiasis, budd-chiari syndrome).

**Signs and Symptoms [20]**

- Vomiting of bright red or coffee grounds.
- Melena.
- Hypotension.
- Confusion.
- Rapid heartbeat.
- Weakness.

**Management**

- Low sodium diet.
- High protein food.
- Frequent small meals.
- Avoid alcohol.
- Stay hydrated.

**Gastroesophageal reflux disease**

It is a chronic condition where stomach contents, including acid, flows back into the oesophagus leading to inflammation and discomfort [21].

**Causes**

- Lower esophageal sphincter dysfunction.
- Hiatal hernia.
- Obesity.
- Pregnancy.
- Dietary factors (chocolate, fatty food).

- Lifestyle factors (smoking, alcohol).

**Signs and symptoms**
- Hearburn.
- Regurgitation.
- Dysphagia.
- Chronic cough.
- Sore throat.
- Chest pain.

**Management** [22]
- Avoid citrus fruits, chocolate.
- Eat smaller meals.
- Stay upright after eating.
- Limit alcohol and Tobacco.
- Increase fiber intake.
- Avoid tight clothing.
- Elevate head while sleeping.

**Gastroparesis**
It is a condition characterized by delayed gastric emptying, where the stomach takes too long to empty its contents into the small intestine [23].

**Causes** [23]
- Diabetes.
- Neurological disorders like Parkinson's disease or multiple sclerosis.
- Surgical procedures.
- Medication.
- Idiopathic.

**Signs and symptoms** [23]
- Nausea and vomiting.
- Early satiety.
- Bloating.
- Abdominal pain.
- Loss of appetite.
- Heartburn.

**Management** [23]
- Eat, small, frequent meals.
- Choose easily digestible foods.
- Avoid high fiber foods.
- Gentle physical exercise.
- Manage blood sugar levels.

**Homeopathic Management** [24-26]

**1. Arsenicum album**
There is shortness of breath which gets aggravated at night. Intense burning in the stomach, anxiety in the stomach. Vomiting of blood. Stomach is extremely irritable. Abdomen is swollen, tender and painful. Unquenchable thirst for small quantities of cold water in shorter intervals. Great anguish and restlessness. Wants to change the place continuously, fear of death and being left alone. Patient thinks that she is going to die and it is useless to take medicines. < After midnight, from cold > warm drinks

**2. *Bryonia alba***
Intense localised pain in the chest worse with deep movement. Quick difficult respiration. Dry cough is painful. Bitter eructations. Nausea and faintness when rising up. Restlessness. Thirst for large quantities of coldwater. < Warmth, in the morning > lying on the painful side, rest, cold drinks.

**3. Calcarea carbonica**
The patient is fat, fair, flabby with a hot abdomen. There is excessive weight and strain in abdominal muscles. Patient has an aversion to meat, boiled things. Craves for indigestible things. Frequent eructations. Ravenous hunger. Mentally tired, anxious, weak and sluggish due to prolonged exertion.

**4. Causticum**
Patients may experience weakness or paralysis of the diaphragm, leading to difficulty in breathing. A feeling of constriction or heaviness in the chest, often accompanied by a need to take deep breaths. Painful dry cough. Cannot lie down at night. Hoarseness with pain in chest. < clear fine weather, cold winds > warmth.

**5. Gelsemium sempervirens**
Ailments from fear and anxiety. Slowness of breathing, with great prostration. Hiccoughs get worse in the evening. Sensation of emptiness and weakness at the pit of the stomach. <Tobacco smoking, damp weather >continued motion

**6. Lycopodium clavatum**
Feeling of fullness and pressure in the chest leading to difficulty in breathing. Tensive, constructive, burning pain in chest. Hiccoughs. Eating ever so little creates fullness. Sour eructations. Excessive hunger. < 4 to 8 pm, warm food > motion, being uncovered

**7. Nux vomica**
Aliments from excessive alcohol consumption. Spasmodic constrictions. Oppressed breathing. Shallow respiration. Cough brings on bruised pain in the epigastric region. Regurgitation of food. Sense of pressure in abdomen. Loves fat and tolerates them well. Wants to vomit but cannot.

**8. Phosphorus**
Patients may experience a sensation of heaviness in the chest, leading to difficulty in breathing. A dry, persistent cough often accompanies these symptoms particularly exacerbated by cold exposure. Increased sensitivity to external stimuli. < Evening, change if weather, cold >warmth

**Conclusion**
In the realm of homeopathy, the efficacy of treatment for diaphragmatic dysfunction emphasizes holistic approaches that consider the interconnectivity of bodily systems. This article underscores the importance of integrating anatomical knowledge with clinical practice and homeopathy to develop comprehensive treatment strategies for conditions affecting the diaphragm. It also provides the knowledge regarding the general management tips for diaphragm related disorders, ultimately promoting better health and overall well-being.

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