

Mediastinum

Respiratory Block - Lecture 5

Color index:

Important

In male's slides only

In female's slides only

Extra information, explanation

Objectives:

- Define the Mediastinum
- Differentiate between the divisions of the Mediastinum
- List the boundaries and contents of each division
- Describe the relations between the important structures in each division

The Mediastinum

- It is a **thick moveable** partition between right & left pleural sacs & lungs.
- It includes all the structures which lie in the **intermediate** compartments of the thoracic cavity except the 2 lung

❖ Boundaries :

Superior:

Thoracic outlet: Anterior border: Manubrium
Inferior border: 1st rib
Posterior border: T1

Inferior:

Diaphragm

Anterior:

Sternum

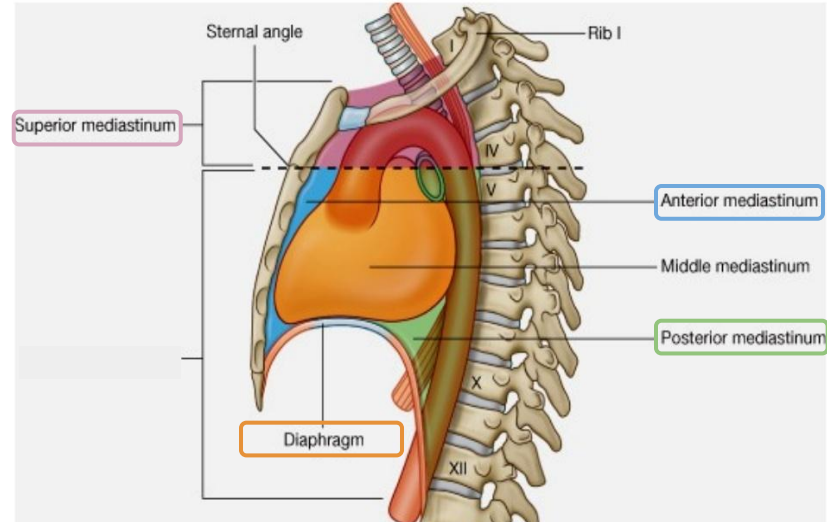
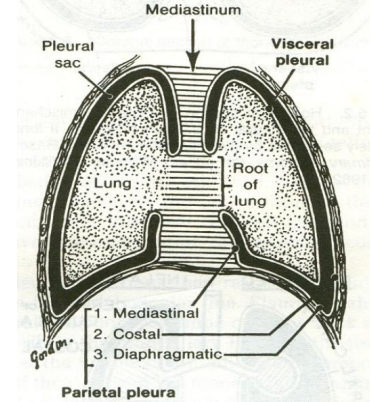
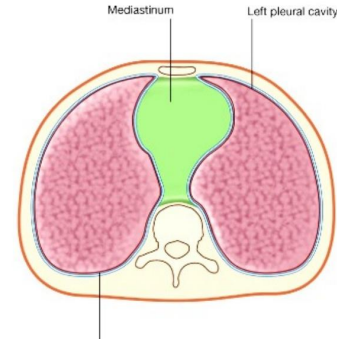
Posterior:

12 Thoracic vertebrae

Lateral:

Lungs & pleurae

TS: Mediastinum



The Mediastinum Subdivisions:

The Mediastinum: is subdivided by a **Horizontal** plane into **(1) Superior mediastinum** **(2) Inferior mediastinum**
The Horizontal plane : extends from the **Sternal angle** to the **lower border of T4** at level of 2 costal cartilage

1-Superior mediastinum

above the Horizontal plane

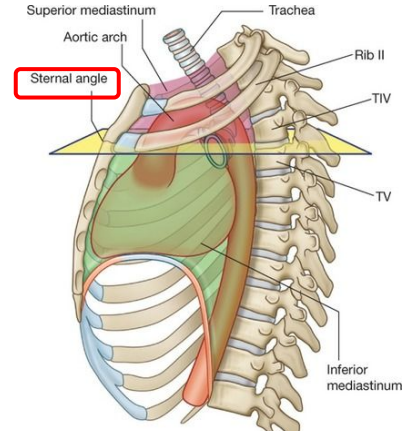
Subdivisions:

2- Inferior mediastinum

below the Horizontal plane

Subdivided into:

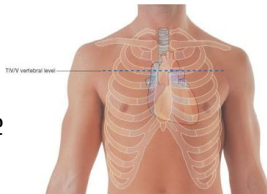
- **Anterior mediastinum** : in front of the **heart**
- **Middle mediastinum** : contains the **heart**
- **Posterior mediastinum** : behind the **heart**



Level of T4 : ★

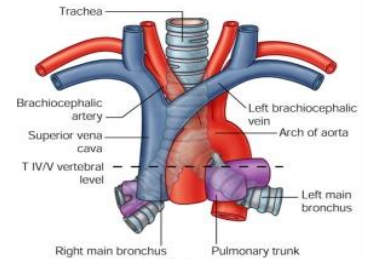
❖ It is the Level of:

1. Sternal angle
2. Second costal cartilage



❖ Why the Level of **T4** is important:

1. Bifurcation of **trachea**
2. Bifurcation of **pulmonary trunk**
3. Beginning & termination of **arch of aorta**

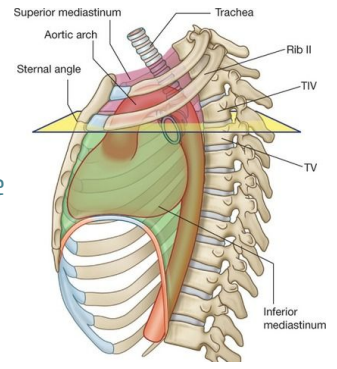


Superior mediastinum:

◆ **Boundaries:**

- **Superior:** Thoracic outlet
- **Inferior:** Horizontal plane
- **Anterior:** Manubrium of sternum
- **Posterior:** Upper 4 thoracic vertebrae

● **Lateral:** lungs & pleurae



◆ **Contents :From superficial to deep:**

Superficial:	Intermediate:	Deep:
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1 Gland:
-Thymus gland

3 Veins:
-Right & left brachiocephalic
-Superior vena cava is formed by the left and right brachiocephalic

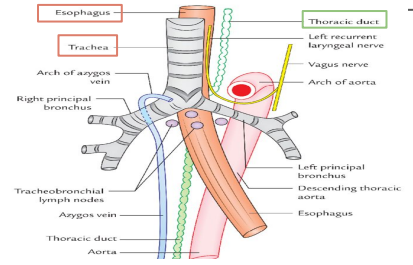
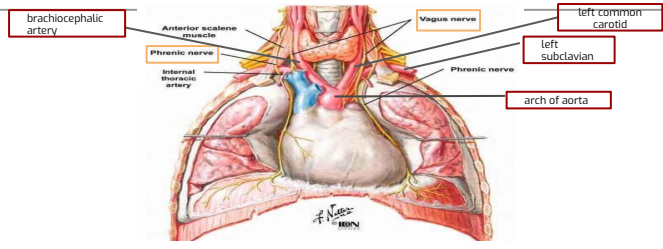
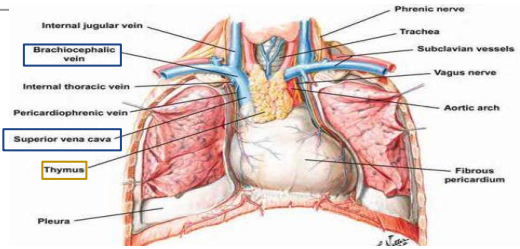
4 Arteries:
- arch of aorta & its branches:
- brachiocephalic artery
- left common carotid
- left subclavian

4 Nerves:
- right & left vagus nerve
- right & left phrenic nerve

Note: The phrenic nerve lies on the lateral position
-The vagus nerve lies on the medial position

2 Tubes:
- Trachea
- Esophagus The deepest structure

1 Duct: thoracic duct
-Lymph nodes



Inferior mediastinum Subdivisions:

First part: Anterior Mediastinum : in front of the heart

Note: It's a narrow space between the sternum and the heart

❖ **Boundaries:** the narrowest

- **Superior:** Horizontal plane
- **Inferior:** Diaphragm
- **Anterior:** Body & xiphoid of sternum
- **Posterior:** Heart
- **Lateral:** Lungs & pleurae

❖ **Contents:**

- **Thymus gland** in the superior and anterior mediastinum
- **Lymph nodes**

Anterior Mediastinum

Middle mediastinum

Posterior mediastinum

Horizontal plane

Sternal angle

Superior
mediastinum

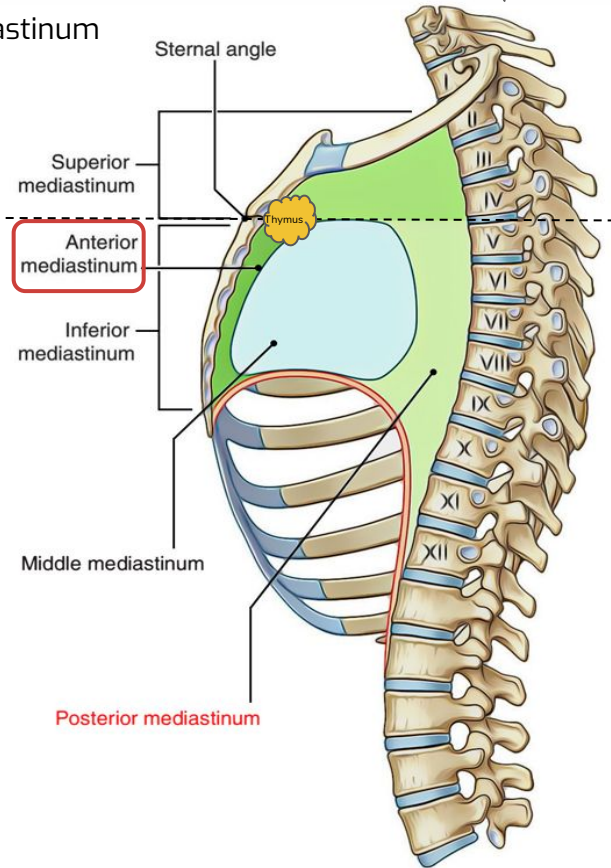
Anterior
mediastinum

Inferior
mediastinum

Middle
mediastinum

Posterior
mediastinum

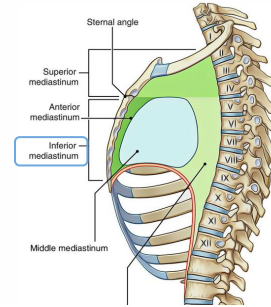
Thymus



Inferior mediastinum Subdivisions:



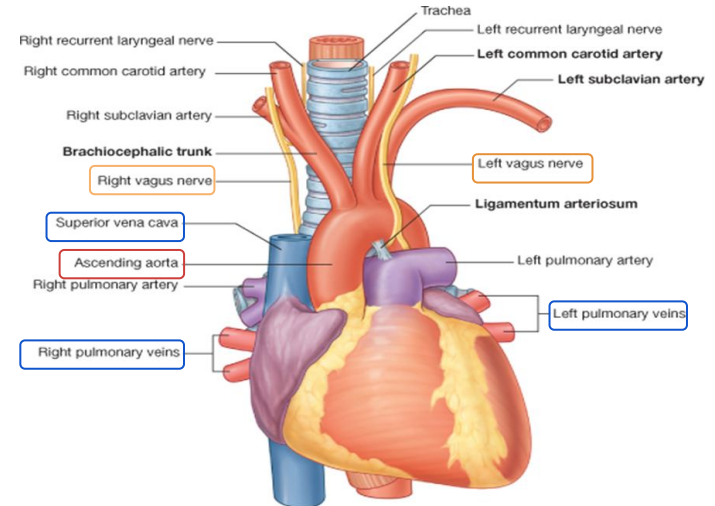
Second part: Middle Mediastinum : contains the heart



❖ **Site:** Between anterior & posterior mediastinum

❖ **Contents:**

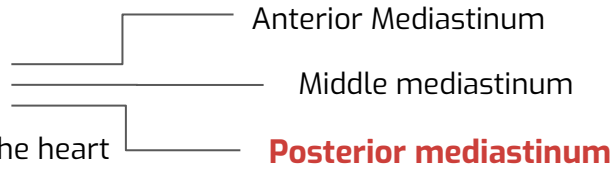
- Heart & pericardium
- Ascending Aorta
- Pulmonary trunk "which Divides into left and right pulmonary artery"
- Superior & inferior vena cava
- Right & left pulmonary veins
- Right & left phrenic nerves
- Lymph nodes



Inferior mediastinum Subdivisions:

Third part: posterior Mediastinum : behind the heart

Note: It lies between the heart and the Thoracic vertebrae



❖ Boundaries:

Superior: Horizontal plane

Inferior: Diaphragm

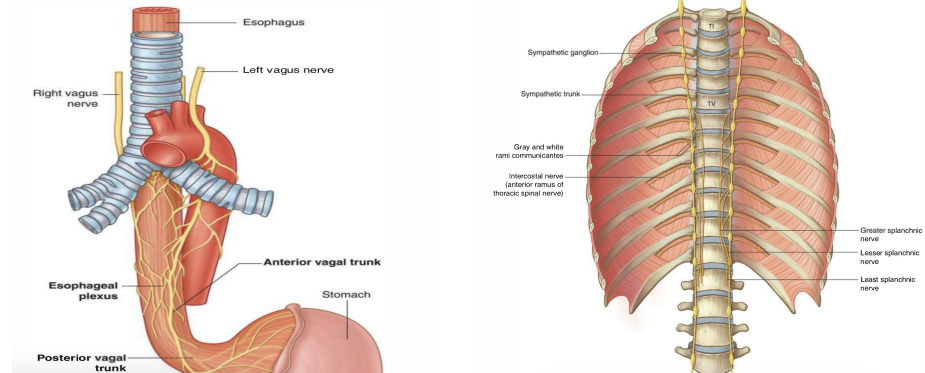
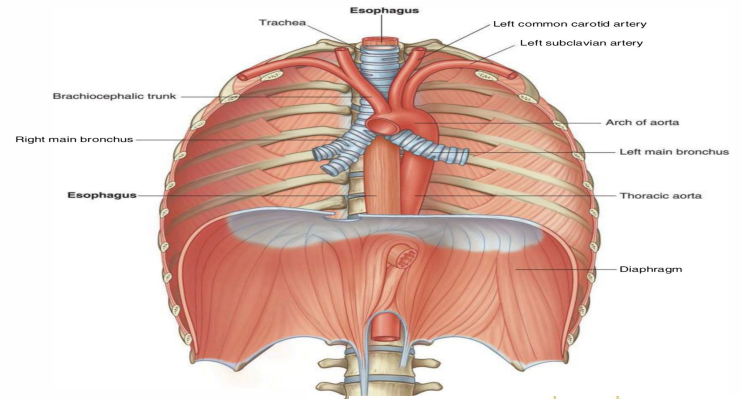
Anterior: Heart

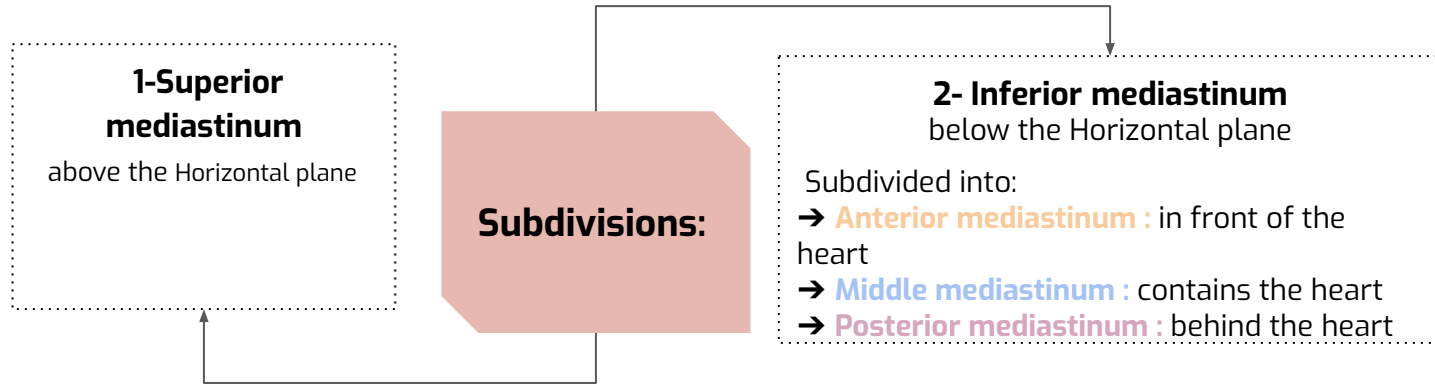
Posterior: Thoracic vertebrae from T5 to T12

Lateral: Lungs & pleurae

❖ Contents:

1. Esophagus
2. **Vagus nerves:** Around esophagus
3. **Thoracic duct:** Posterior to esophagus
4. **Azygos vein:** Posterior & to the **right** of esophagus
5. **Descending aorta:** Posterior & to the **left** of esophagus
"Ascending Aorta is present in the Middle Mediastinum"
6. Right & left **sympathetic** trunks
7. **Mediastinal** Lymph nodes





IMPORTANT NOTE: There are six structure present in more than one region in mediastinum

Three in **superior** and **posterior** mediastinum:

→ **Thoracic duct** ,Esophagus , **vagus nerves**

Two in **superior** and **middle** mediastinum:

→ **phrenic nerves** ,superior vena cava

One in **superior** and **anterior** mediastinum:

→ **Thymus gland**

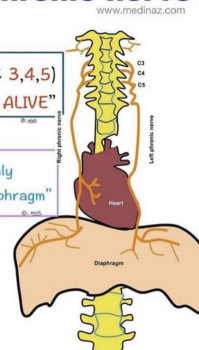
Note : lymph nodes present in all mediastinum regions

Roots of Phrenic nerve

(C3,C4,C5)

"Three, Four, FIVE (C 3,4,5)
keep the diaphragm ALIVE"

"Phrenic nerve is the only
motor supply to the diaphragm"



Important structure in Mediastinum:

Vagus nerve⁽¹⁾

- ❖ It is the **10th cranial nerve**. (It descends through the Superior & Posterior mediastina)
- The **right vagus descends** to the right side of trachea, forms the **posterior** esophageal plexus & continues in abdomen as **posterior** gastric nerve.
- The **left vagus descends** between left common carotid & left subclavian arteries, forms the **anterior** esophageal plexus & continues in abdomen as **anterior** gastric nerve.

Phrenic nerve⁽²⁾

Root value : □ **C3,4,5**
(They pass through the Superior & Middle mediastina)

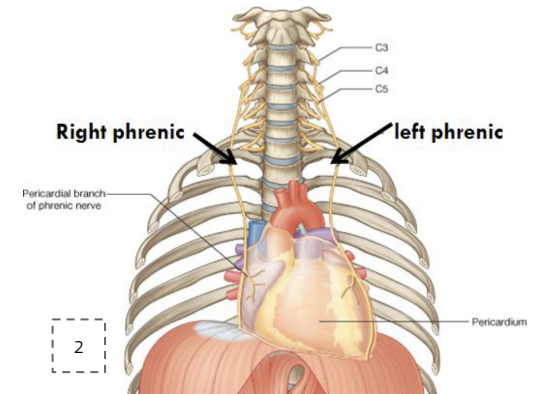
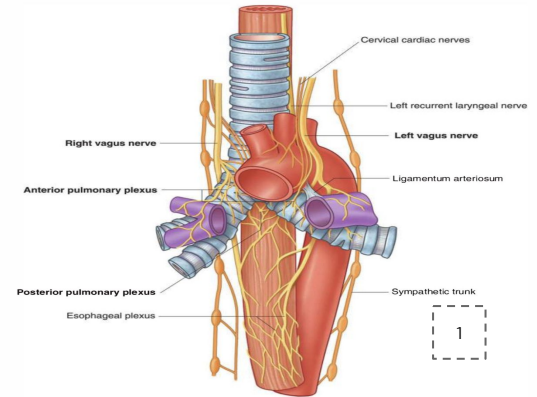
Course in thorax:

- -The **right phrenic descends** on the right side of SVC & heart.
- The **left phrenic descends** on the left side of heart.

□ **Both nerves terminate in the diaphragm.**

Supply:

- 1) Motor & sensory fibers to diaphragm.
- 2) Sensory fibers to pleurae (mediastinal and central part of diaphragmatic pleura) & pericardium (fibrous and parietal layer of serous pericardium).

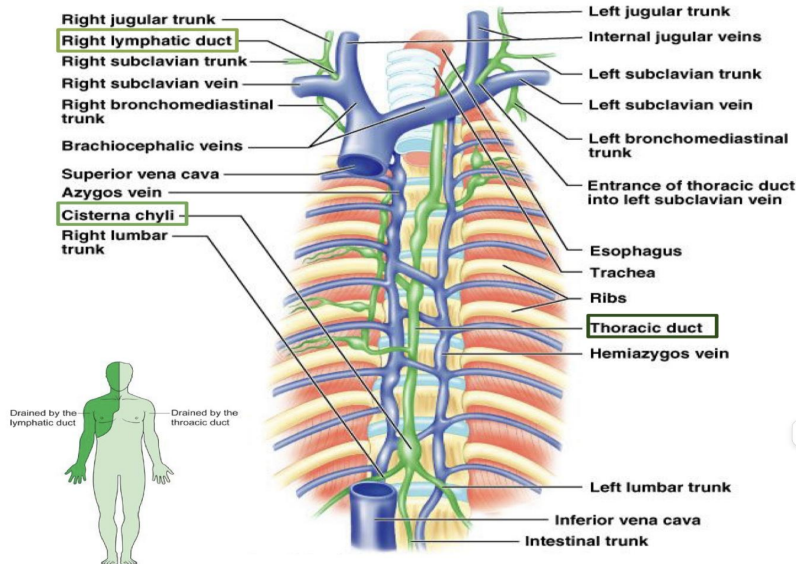


Lymphatic vessels in thorax

Lymph from the **right side** of the head, neck, thorax, & upper limb drains into the **Right lymphatic duct** and ends in the **right brachiocephalic vein**

Lymph from the **left side** of the head, neck, thorax, & upper limb drains directly into the **Thoracic duct**

Lymph from the **lower half** of the body drains into the **Cisterna chyli** then to the **Thoracic duct**.



Thoracic duct

Beginning:

It is the continuation of cisterna chyli (at the level of L1)

Course:

It passes through the aortic opening of the diaphragm

It ascends in **posterior** mediastinum (**posterior** to esophagus)

It ascends in **superior** mediastinum (to the **left** of esophagus)

Tributaries: (it receives)

Lymphatics from all the body **EXCEPT**: right side of the thorax, right upper limb, right side of the head and neck

End:

It ends in the **left** brachiocephalic vein

N.B:

the right lymphatic duct receives lymphatic from right side of the thorax, right upper limb, and right side of the head and neck. It ends in the right brachiocephalic vein.

Aorta

❖ Ascending Aorta:

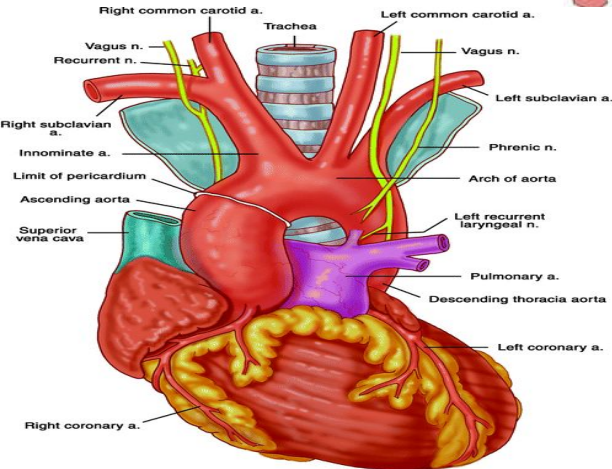
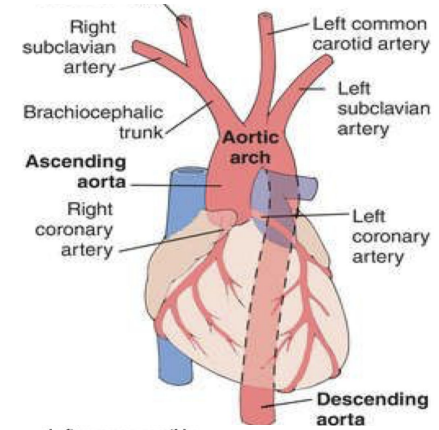
- **Beginning:** at aortic orifice of **left** ventricle.
- **Course:** in **middle** mediastinum
- **End:** continues as arch of aorta (at level of T4)

❖ Arch of Aorta:

- **Course:** in **superior** mediastinum
- **End:** continues as **descending** thoracic aorta (at level of T4)

❖ Descending Aorta:

- **Course:** in **posterior** mediastinum
- **End:** continues as abdominal aorta after it passes through diaphragm



MCQ

Q1: All of the following structure are located in the middle mediastinum except for:

- A. Lymph nodes
- B. Pericardium
- C. Left subclavian artery
- D. Left Phrenic nerve

Q4: The mediastinum is subdivided by a Horizontal plane (extending from the Sternal angle to the lower border of

- A. C4
- B. T4
- C. T6
- D. T2

Q2: The aorta is located in which mediastinal compartment(s)?

- A. Anterior only
- B. Anterior and middle
- C. Middle only
- D. Middle and posterior

Q5: How many boundaries surround the mediastinum

- A. 2
- B. 3
- C. 4
- D. 5

Q3: The anterior mediastinum lies anterior to the:

- A. heart
- B. Thoracic vertebrae (T4)
- C. Lungs and pleura
- D. Diaphragm

Q6: Which of the following is at the level of T4:

- A. Bifurcation of the larynx
- B. Bifurcation of the aorta
- C. Bifurcation of pulmonary trunk
- D. 1st costal cartilage

answer key:
1: C
2: D
3: A
4: B
5: D
6: C

MCQ

Q7: Which is correct about the Right vagus nerve :

- A.**continues in the abdomen as the anterior gastric nerve.
- B.**descends on the right side of SVC
- C.**forms the posterior esophageal plexus
- D.**descends in front of the trachea

Q10: Lymph from the lower half of the body drains into:

- A.**Cisterna chyli
- B.**Right lymphatic duct
- C.**right brachiocephalic vein
- D.**pulmonary trunk

Q8: a structures present in both superior & posterior mediastinum

- A.**Superior vena cava
- B.**Pulmonary trunk
- C.**Trachea
- D.**Esophagus

Q11: phrenic nerves terminate in:

- A.**Diaphragm
- B.**horizontal plane
- C.**trachea
- D.**Cisterna chyli

Q9: Thoracic duct ends in:

- A.**left brachiocephalic vein
- B.**superior vena cava
- C.**Cisterna chyli
- D.** It just never ends...

Q12: which of the following is correct about phrenic nerve:

- A.**The left phrenic descends on the right side of heart.
- B.**The right phrenic descends on the left side of SVC
- C.** motor fibers to diaphragm only
- D.** sensory to pleurae & pericardium only

12:D
11:A
10:A
9:A
8:D
7:C
key:
answer

MCQ

Q13: Which one of the following structures is present in the superior mediastinum?

- A. Ascending aorta
- B. Arch of aorta
- C. Descending aorta
- D. Pulmonary trunk

Q14: Which one of the following structures lies on the left side of the esophagus in the posterior mediastinum?

- A. Superior vena cava
- B. Pulmonary trunk
- C. Descending aorta
- D. Azygos vein

SAQ :

1 : what are the 3 important anatomical events that happen at the level of T4. ?

2 : Lymph from the lower half of the body drains into the then to the

3 : Identify the following structure .



SAQ Answers

- 1 : A. Bifurcation of **trachea**
B. Bifurcation of **pulmonary trunk**
C Beginning & termination of **arch of aorta**.

2 : Lymph from the lower half of the body drains into the **Cisterna chyli** then to the **Thoracic duct**.

3 : That's obviously you!

Team leaders

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Abeer Awwad

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- Shayma Abdullah
- Sumo Abdulrahman
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