

# Thyroid gland

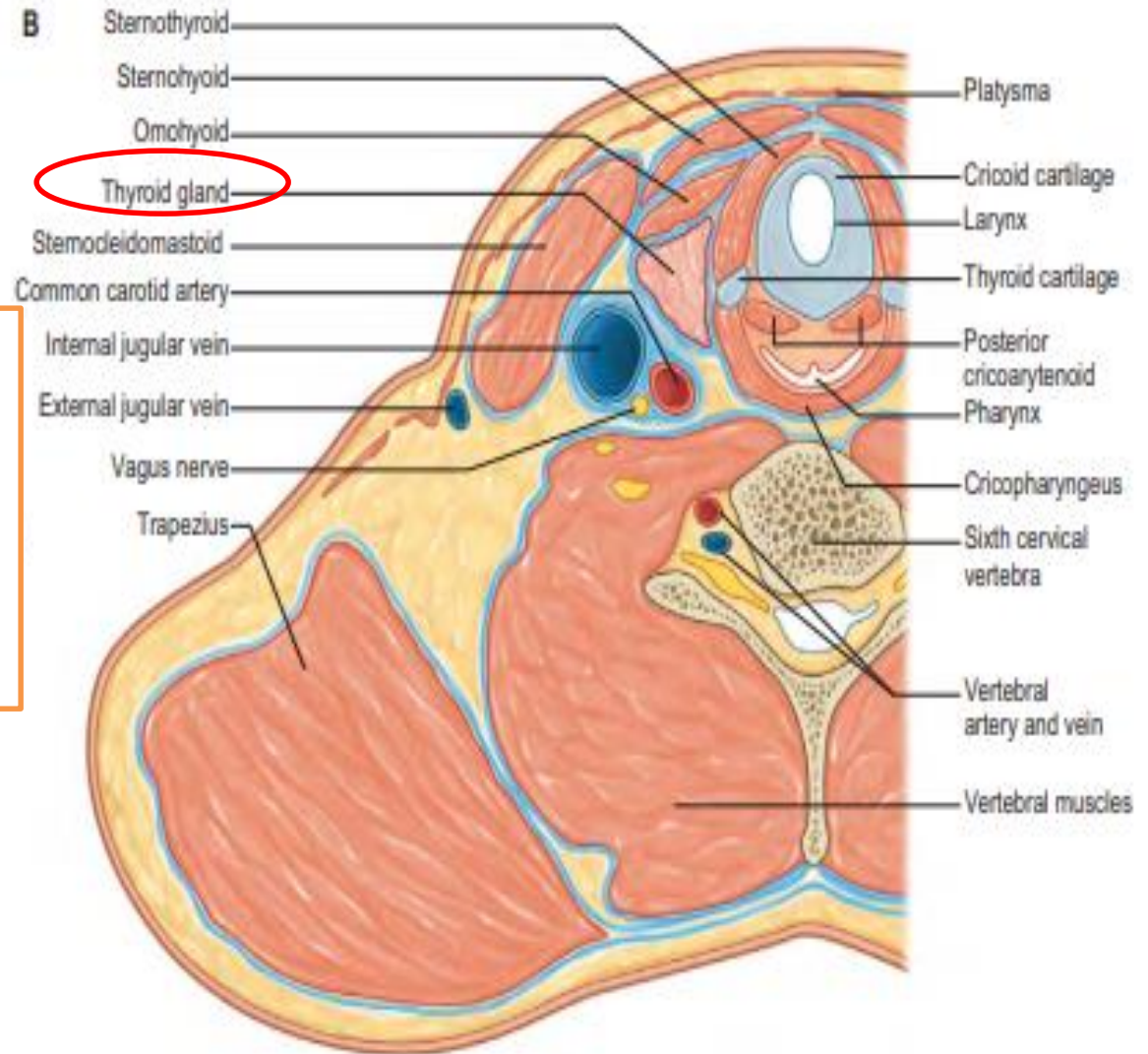
## OBJECTIVES

- 1. Recognize and understand the coverings of the thyroid gland and their clinical importance.**
- 2. Recognize and understand the main parts of the thyroid gland and their locations, relations and connections.**
- 3. Comprehend the blood supply of the thyroid gland, their relations with recurrent and external laryngeal nerves.**
- 4. Understand the embryological origins of the pituitary gland and its associated malformations.**
- 5. Grasp the clinical correlations of the midline structures of neck related to the thyroid gland and differentiate between them and the those on the lateral side of the neck.**
- 6. Recognize and understand imaging of the thyroid gland.**
- 7. Grasp the histological structure of the thyroid gland and its cells under light.**

# Gross anatomy

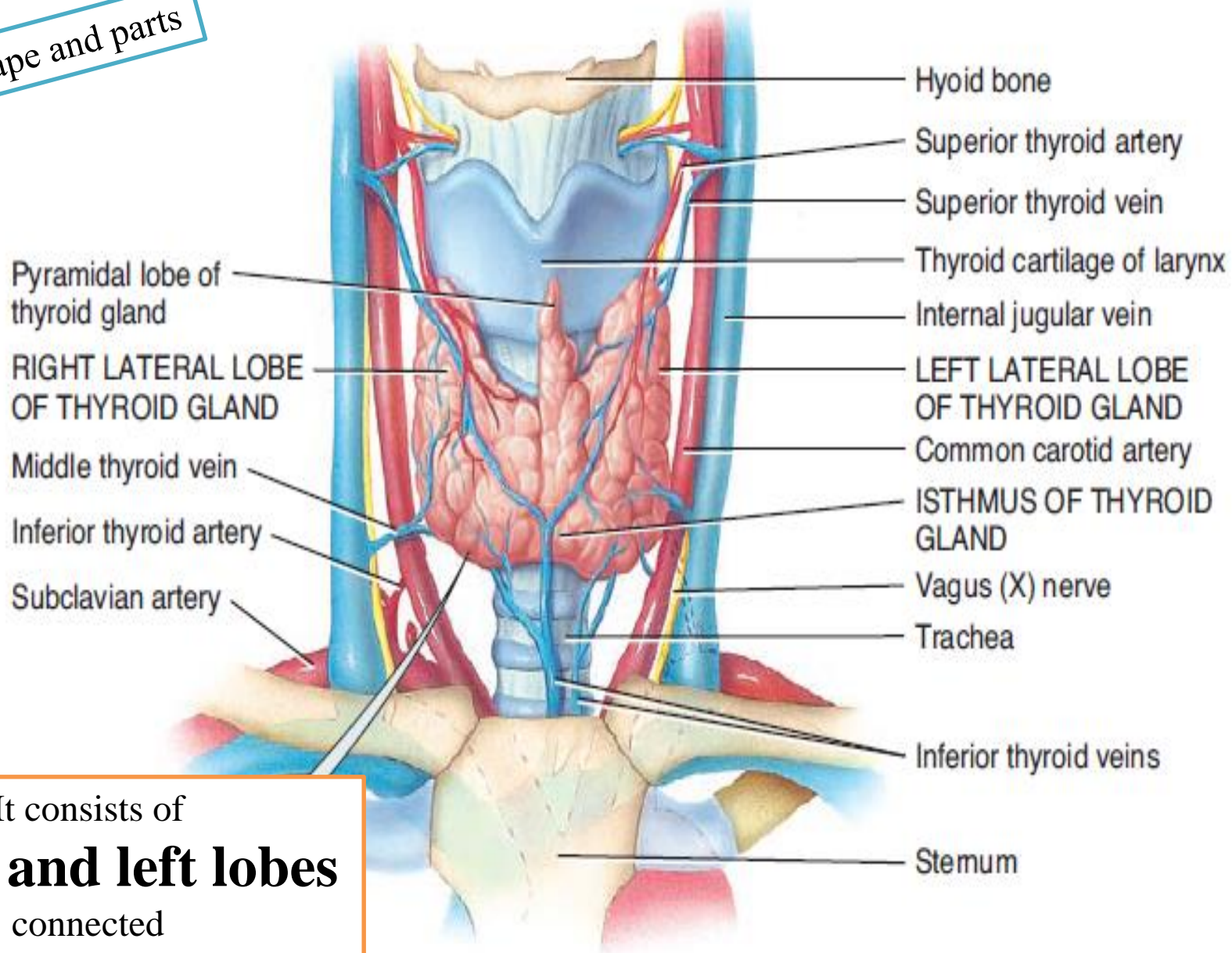
1-location

➤ It is placed **anteriorly**  
in **the lower neck**  
at the level with  
**the 5<sup>th</sup> cervical**  
to the  
**1<sup>st</sup> thoracic vertebrae**



Transverse sections through the neck at the level of the second **sixth cervical** vertebrae

2-Shape and parts



It consists of  
**Right and left lobes**  
connected  
by  
a narrow isthmus

Anterior view of thyroid gland

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### 3- Lobes

Each lobe is pear shaped

Apex  
base

its apex being directed upward as far as the oblique line on the lamina of the thyroid cartilage

its base lies below at the level of the fourth or 5<sup>th</sup> tracheal ring.

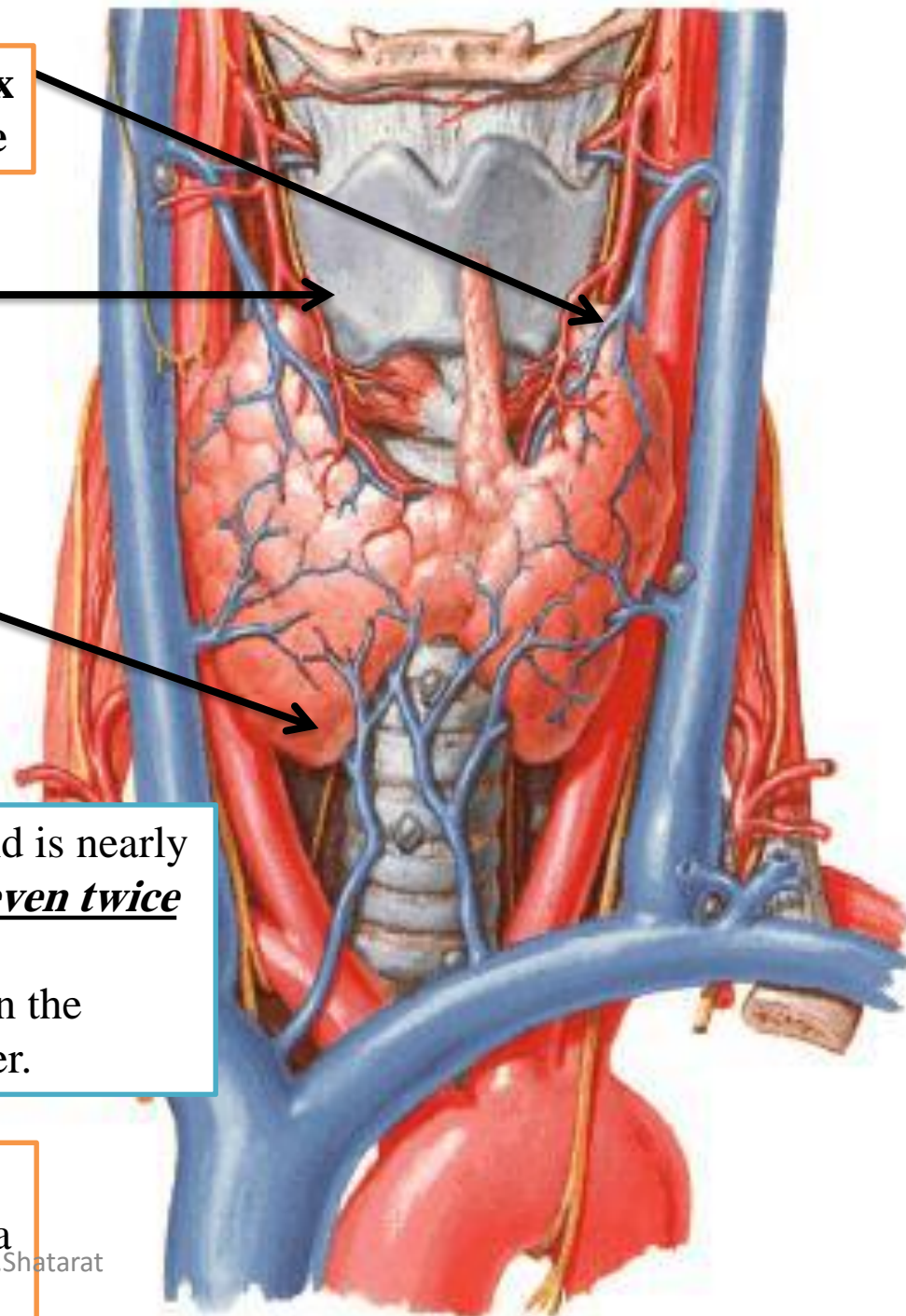
It should be noted that the normal thyroid gland is nearly always asymmetric. The right lobe may be even twice as large as the left lobe.

The right upper pole extends higher up in the neck, and the lower pole extends lower.

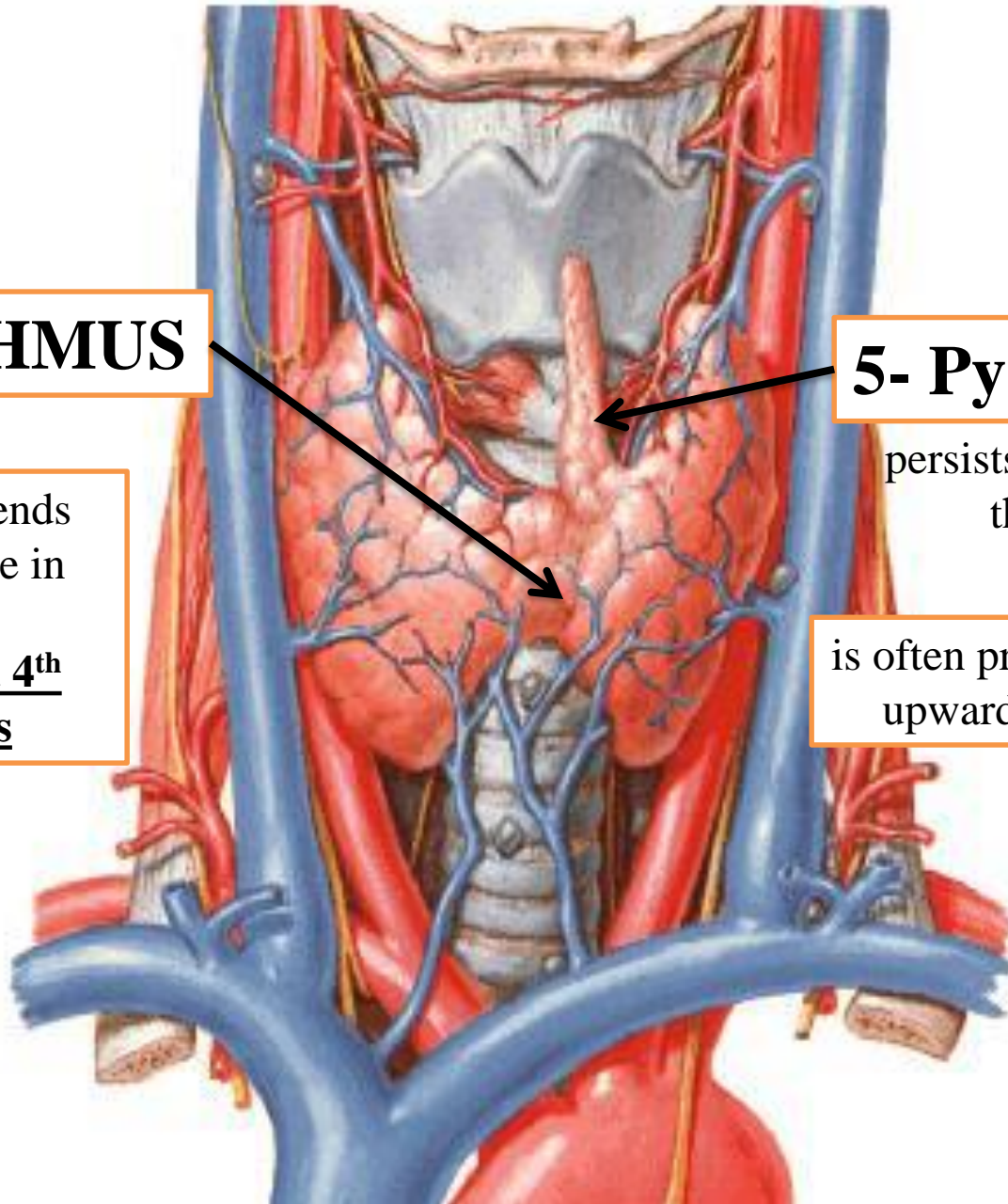
Note

The posteromedial aspects of the lobes are attached to the side of the cricoid cartilage by a **lateral thyroid ligament**

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## 4- THE ISTHMUS

The isthmus extends across the midline in front of the 2<sup>ed</sup>, 3<sup>ed</sup>, and 4<sup>th</sup> tracheal rings

## 5- Pyramidal lobe

persists in at least **15%** of the population

is often present, and it projects upward from the isthmus

### Note

A fibrous or fibromuscular band, the levator of the thyroid gland, **musculus levator glandulae thyroideae**, sometimes descends from the body of the hyoid to the isthmus or pyramidal lobe

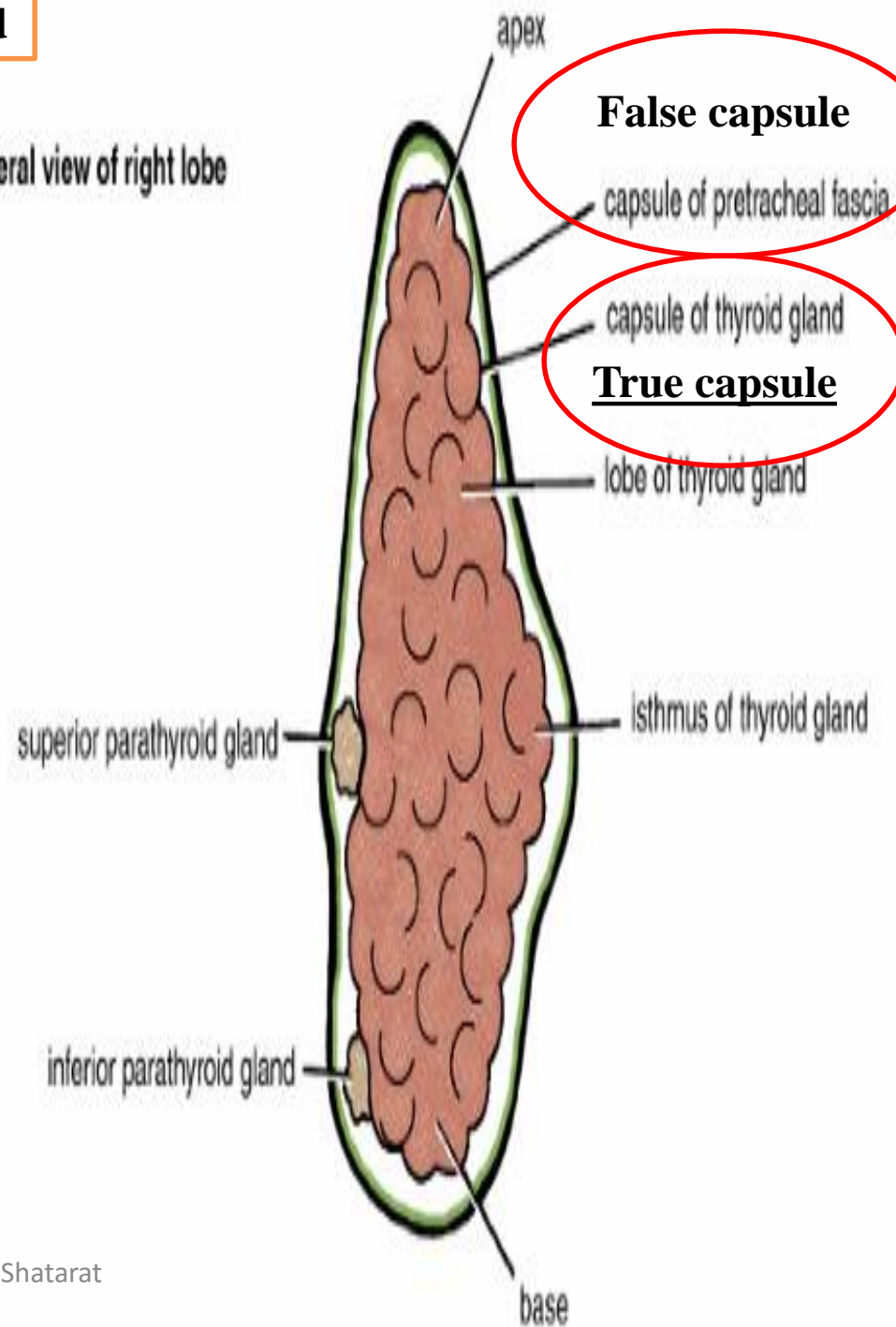
## 6- Coverings and fascia of the thyroid gland

The thyroid gland is surrounded by

A-False capsule

B-True capsule

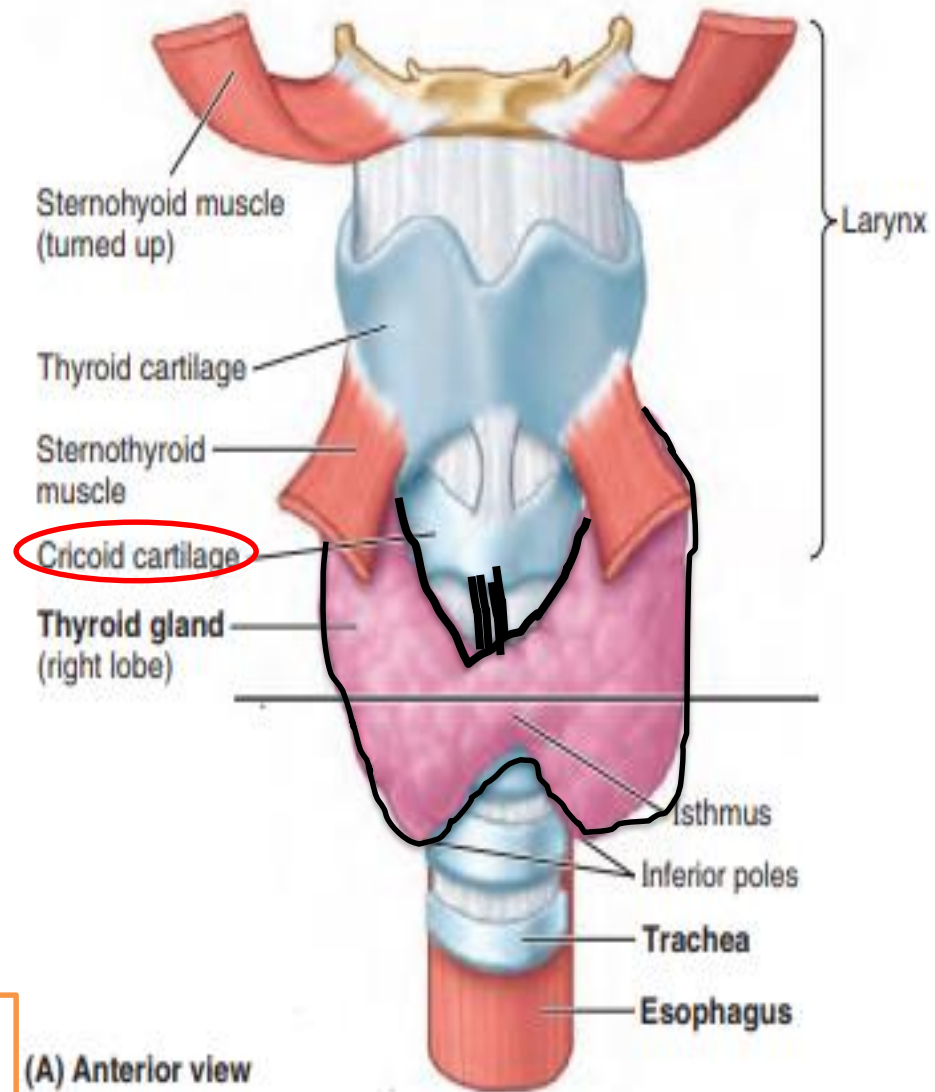
lateral view of right lobe



**A-True capsule, a thin fibrous capsule,**

which is formed by condensation of the stroma of the gland.

- It is attached by means of dense connective tissue to the cricoid cartilage (part of the larynx) and superior tracheal rings (part of the trachea).



**Clinical note**

**The True capsule** of thyroid capsule is much denser in front than behind and the enlarging gland therefore tends ***to push backwards***, burying itself round the sides and even ***the back of the trachea and oesophagus.***

cause dangerous **Dyspnea**  
**Dysphagia**



## **B- False capsule**

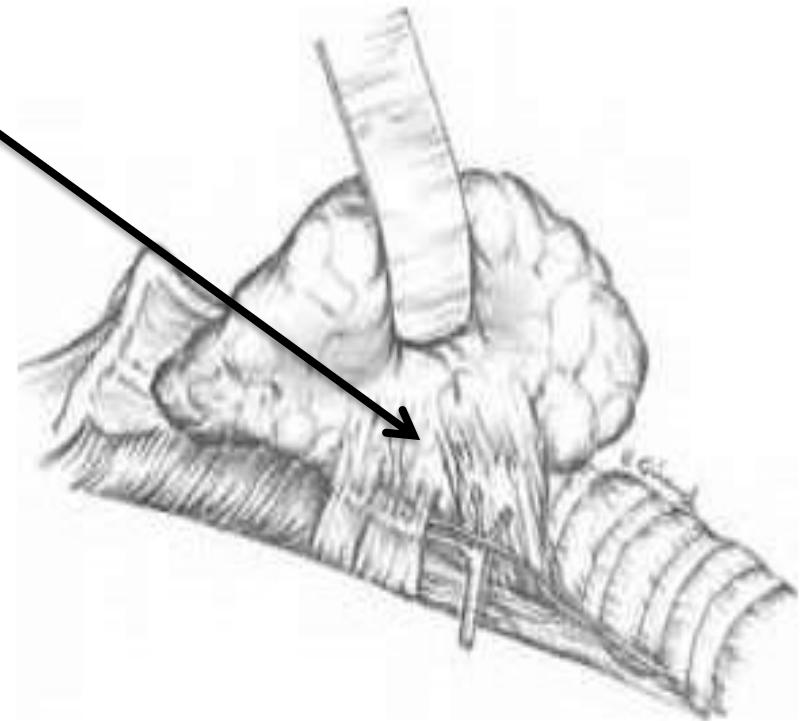
it is a loose sheath formed by the visceral portion of **the pretracheal** layer of deep cervical fascia external to the true capsule

- The false capsule thickens between the cricoid cartilage and thyroid gland to form the

## **ligament of Berry**

(The suspensory ligament of the thyroid) gland  
(attaches the thyroid gland to trachea)

all.



## The false capsule of the thyroid

gland also

attaches the gland to  
the larynx and even to the hyoid  
bone

It is clear that the false  
capsule is attached to  
Both the larynx and  
trachea

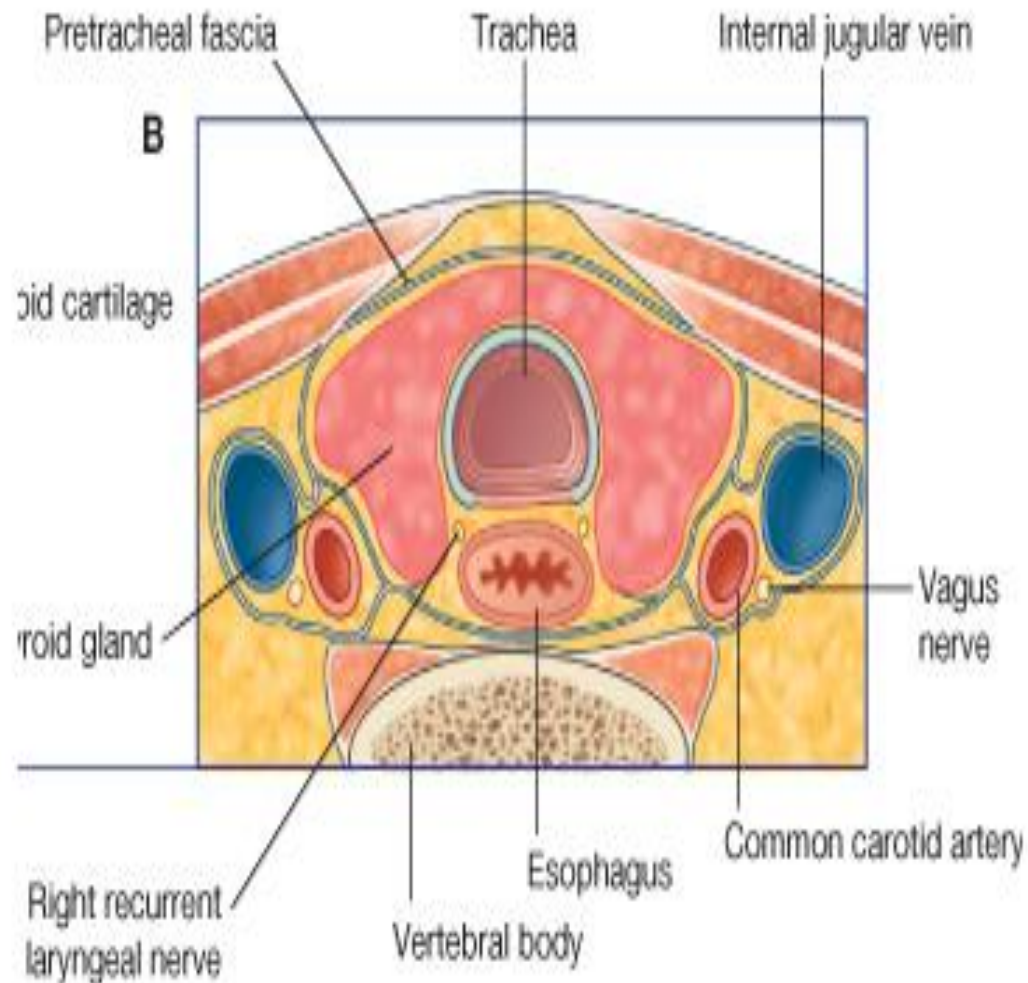
This explains why the thyroid gland  
follows the movements of the  
larynx in swallowing.

Clinical note

This information is important because any pathologic neck  
swelling that is part of the  
thyroid gland ***will move upward when the patient is  
asked to swallow***

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The pretracheal layer of deep cervical fascia is attached to hyoid bone

And

The attachment of the sternothyroid muscles to the thyroid cartilage effectively binds down the thyroid gland to the larynx

This limits upward expansion of the gland

However, downward expansion has no limitation

a large goitre will extend downwards into the  
superior  
mediastinum

**(‘Plunging Goitre’)**

Or

Retrosternal Goiter

# 7- Relations of the Lobes

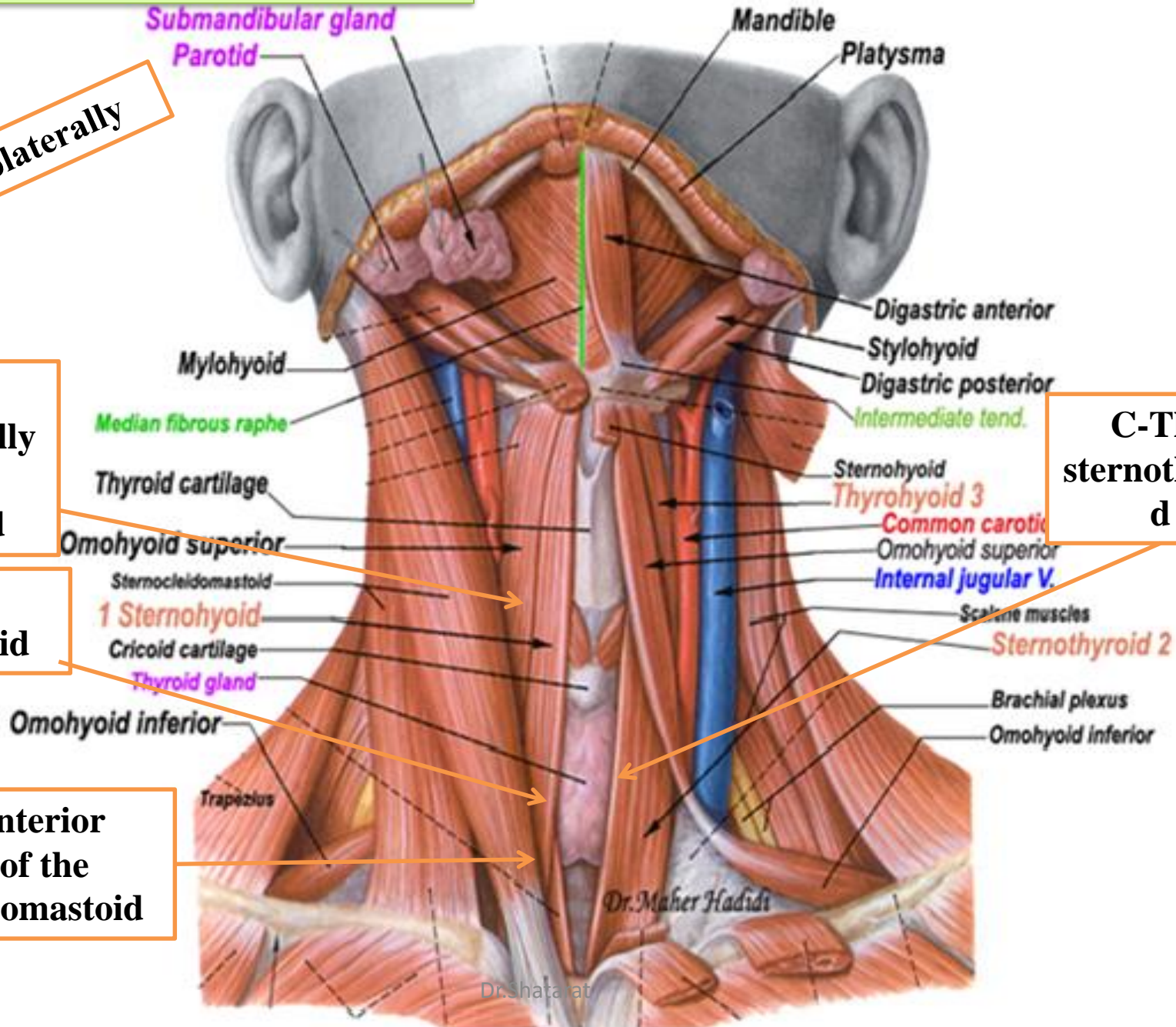
**Anterolaterally**

**A-The superior belly of the omohyoid**

**B-The sternohyoid**

**D-The anterior border of the sternocleidomastoid**

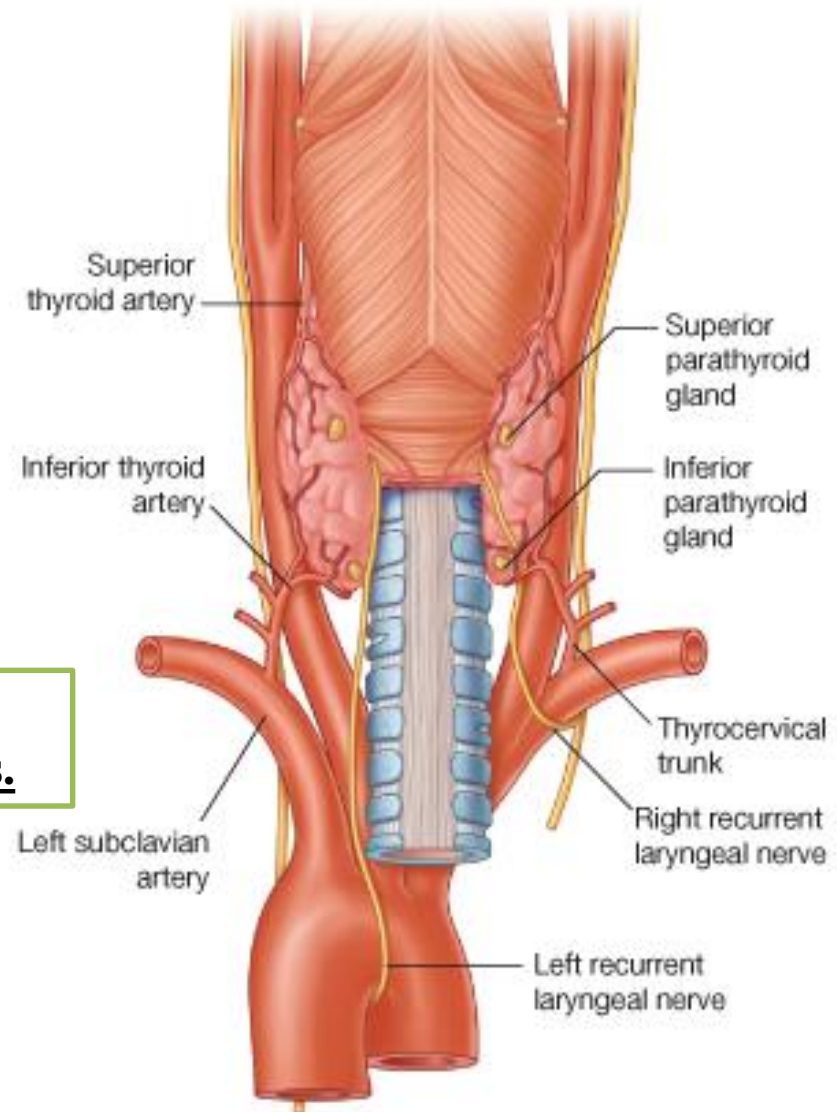
**C-The sternothyroid**



Posteriorly

The rounded posterior border of each lobe is related posteriorly to **the superior and inferior parathyroid** glands and

The anastomosis between the **superior and inferior thyroid arteries**.



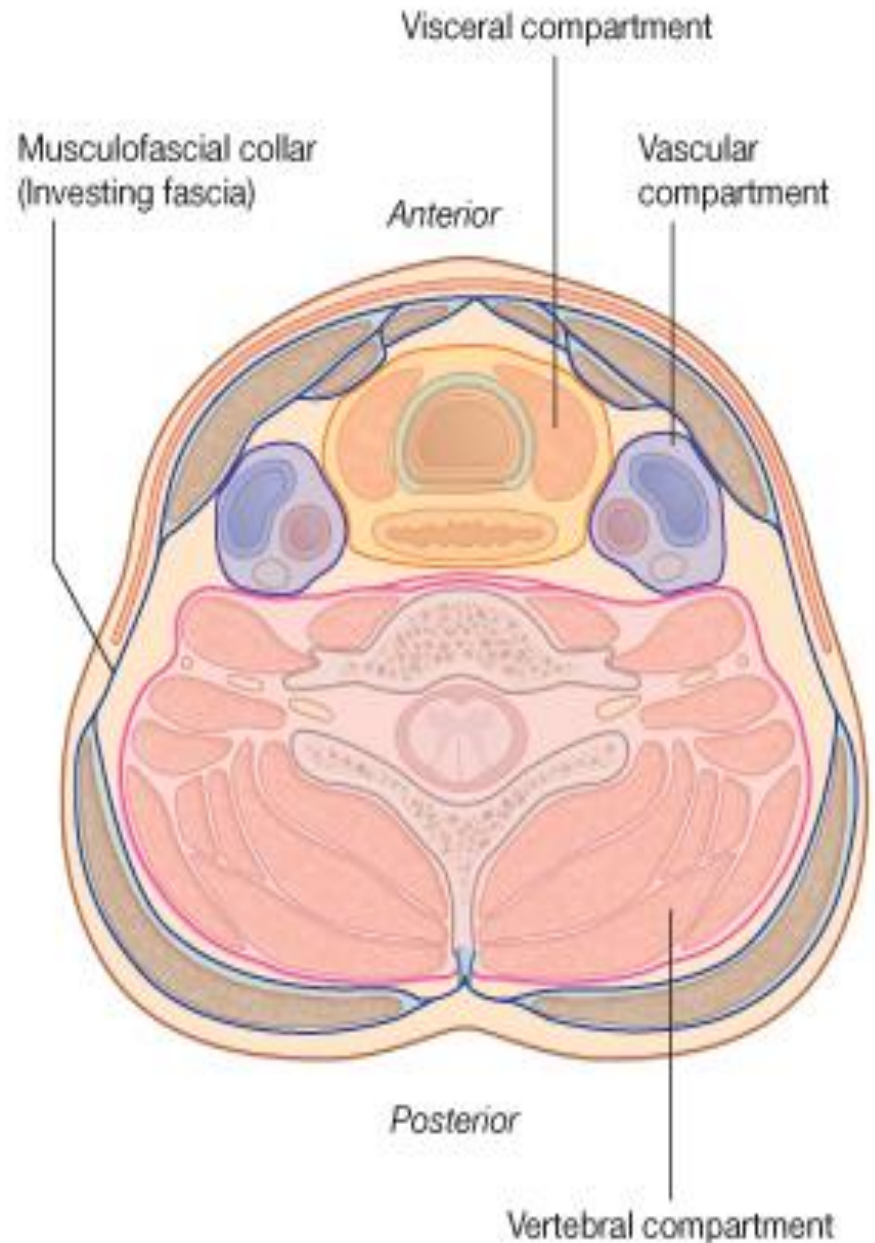
Posterior view

**Posterolaterally:  
The carotid sheath with the  
common carotid artery, the  
internal jugular vein, and the  
vagus nerve**

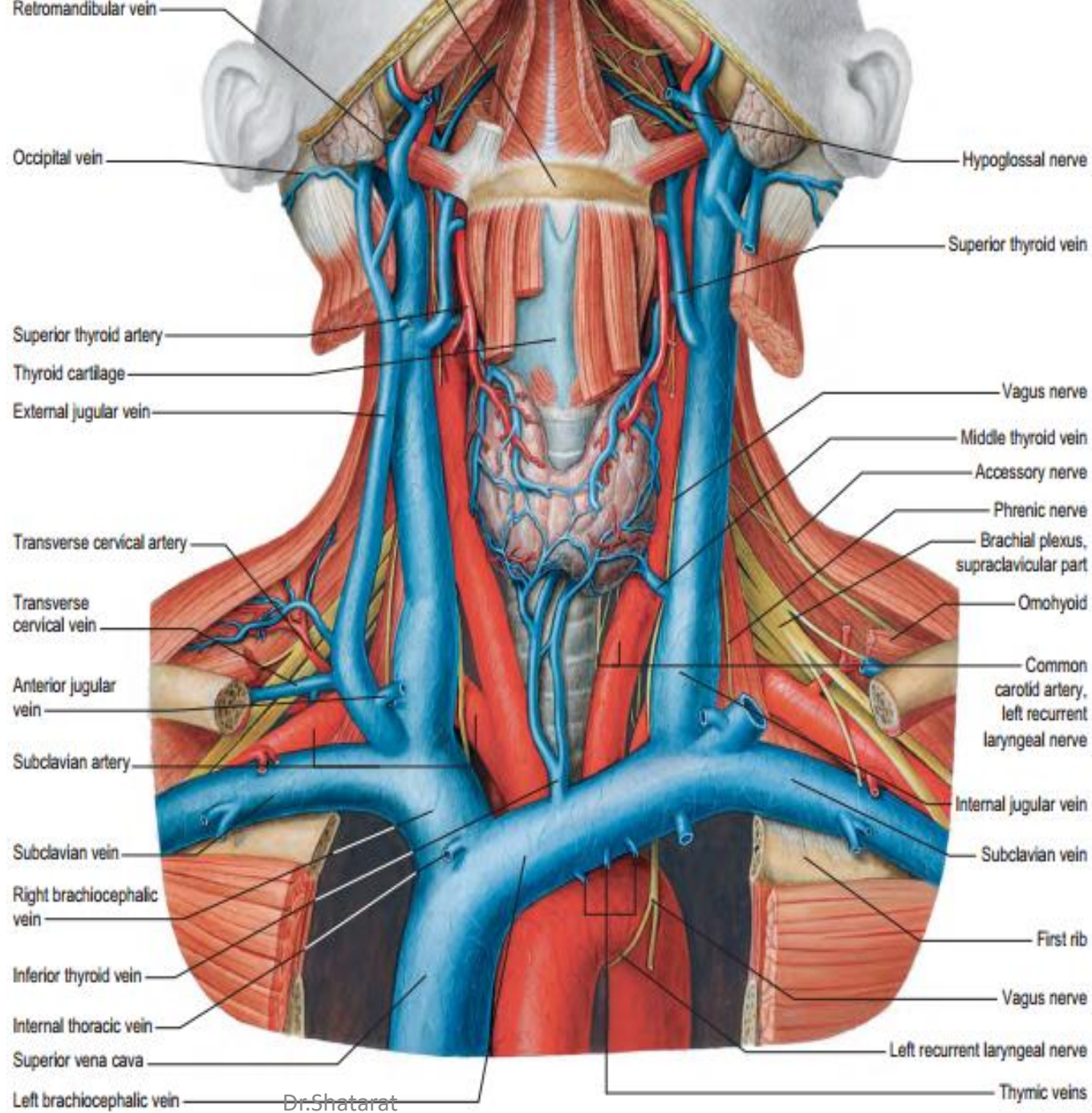
**Medially:**

The larynx, the trachea, the pharynx,  
and the esophagus. Associated with  
these structures are the cricothyroid  
muscle and its nerve supply, the  
external laryngeal nerve. In the  
groove between the esophagus and  
the trachea is

**the recurrent  
laryngeal nerve**

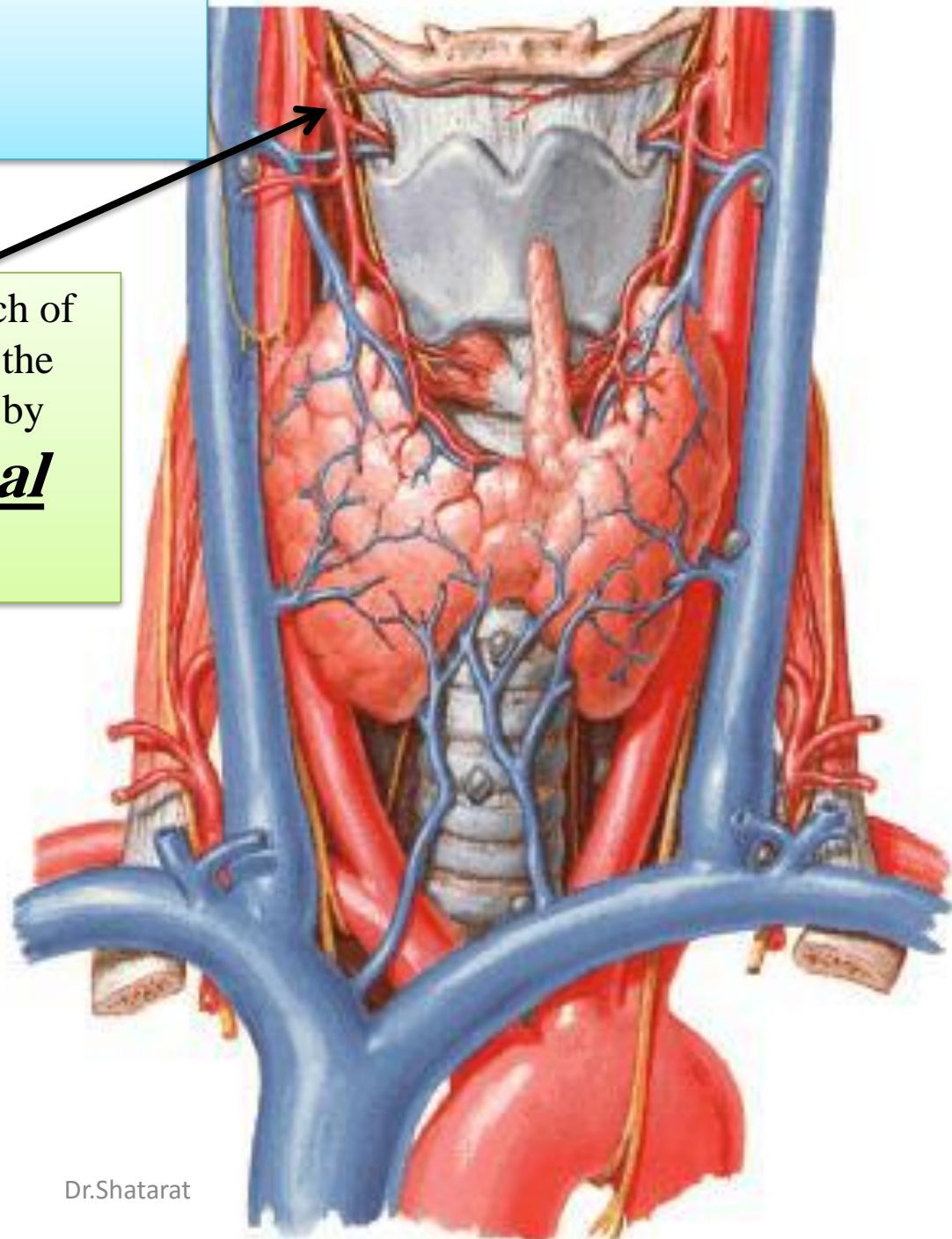


# 8-Blood Supply



- A-The superior thyroid artery
- B-The inferior thyroid artery
- C- Sometimes the thyroidea ima.

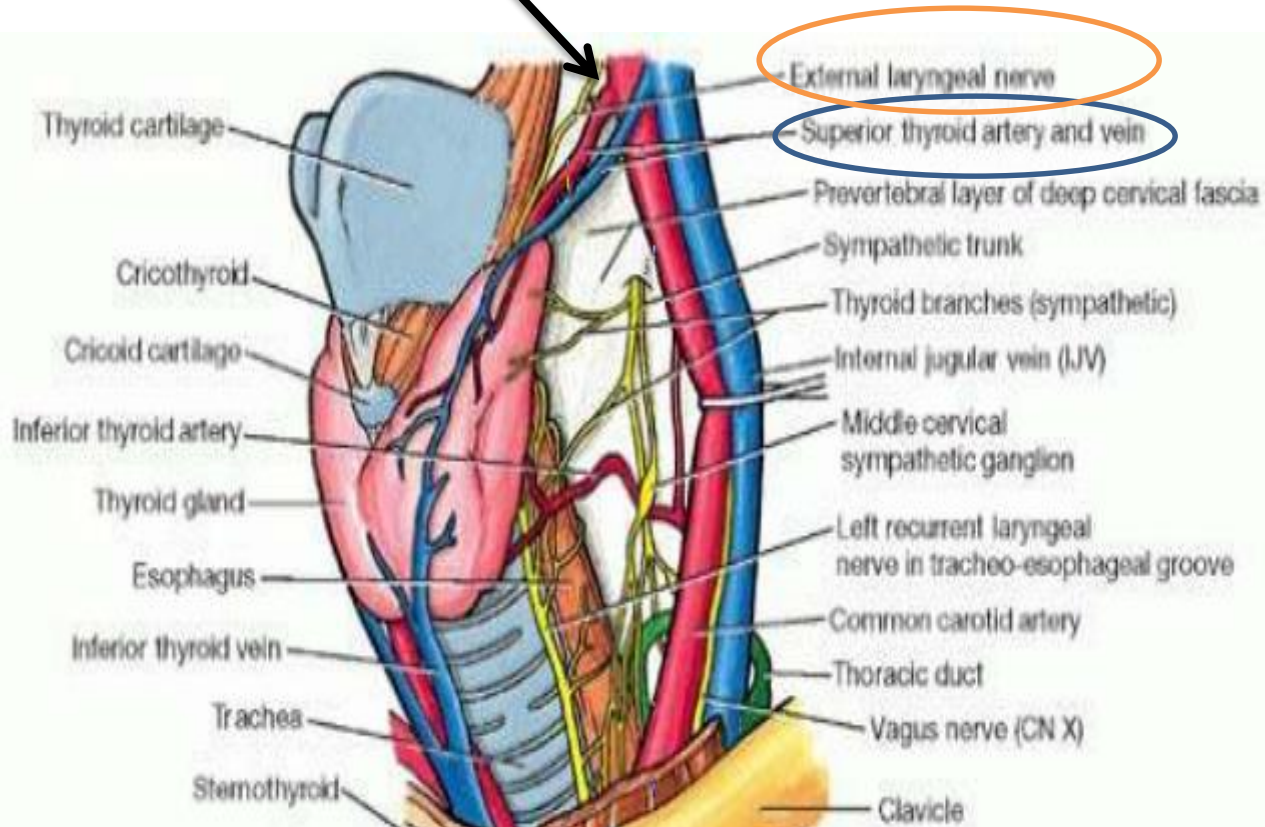
**A-The superior thyroid artery**, a branch of the external carotid artery, descends to the upper pole of each lobe, accompanied by **The External Laryngeal Nerve**





The **superior thyroid artery on each side** is related to the external laryngeal nerve, which supplies the cricothyroid muscle.

Damage to the external laryngeal nerve results in an inability to tense the vocal folds and in **hoarseness**



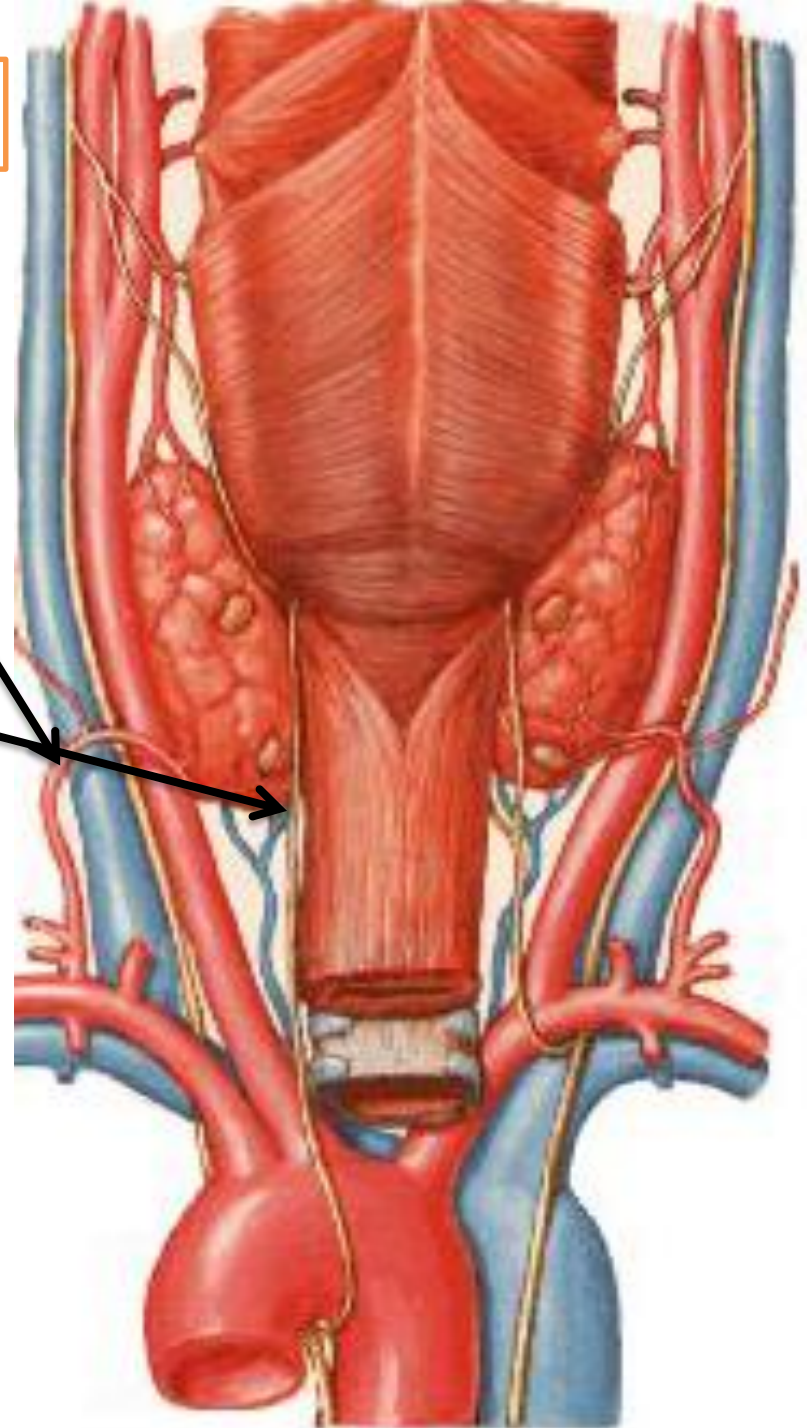
Thus, *The Superior Thyroid Artery during surgery on the thyroid,* is *ligated near the gland* to avoid injury to the external laryngeal nerve

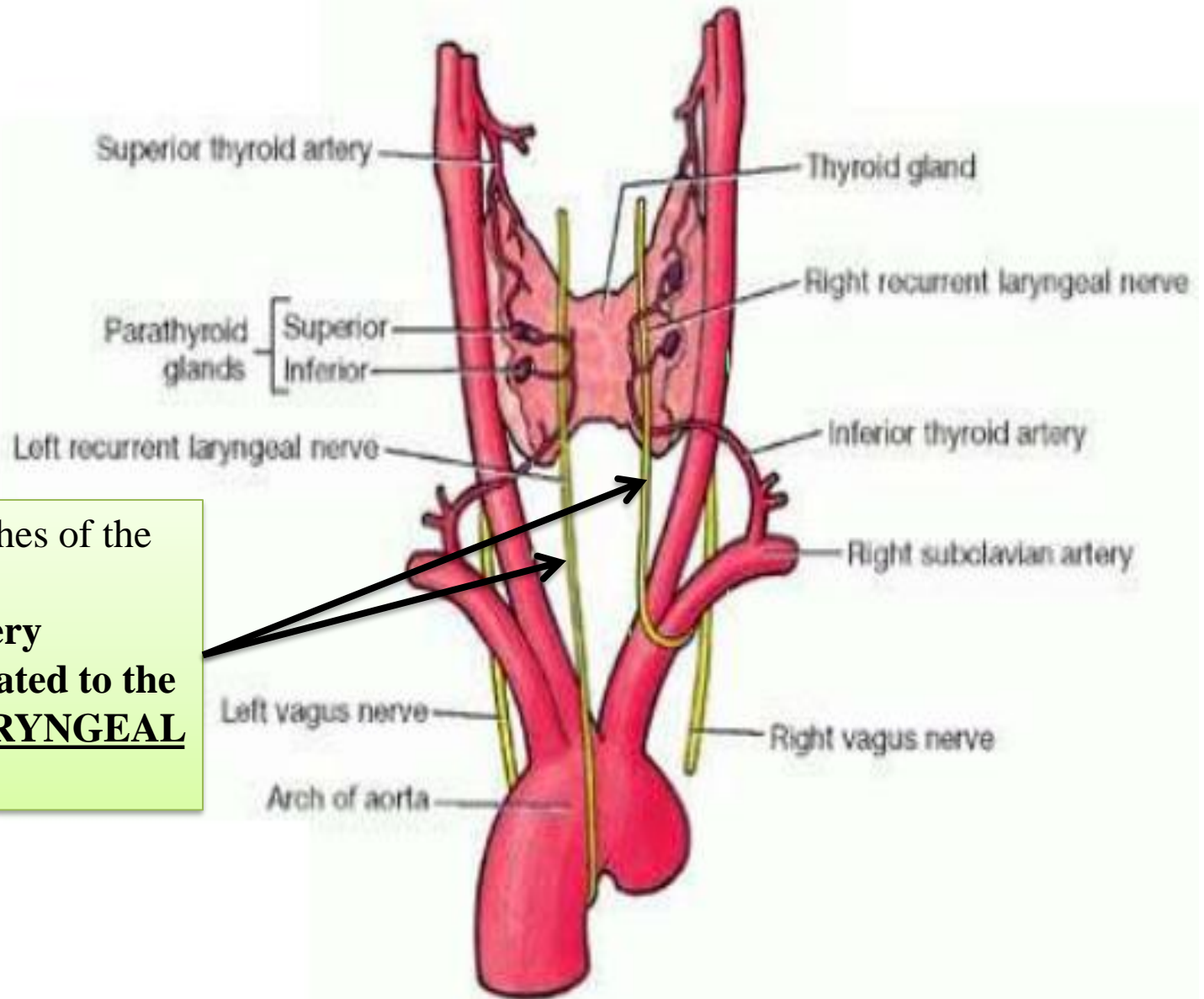
## **B-The inferior thyroid artery**

- a branch of **the thyrocervical trunk**, ascends behind the gland to the level of the cricoid cartilage.
- It then turns medially and downward to reach the posterior border of the gland.

### **The recurrent laryngeal nerve**

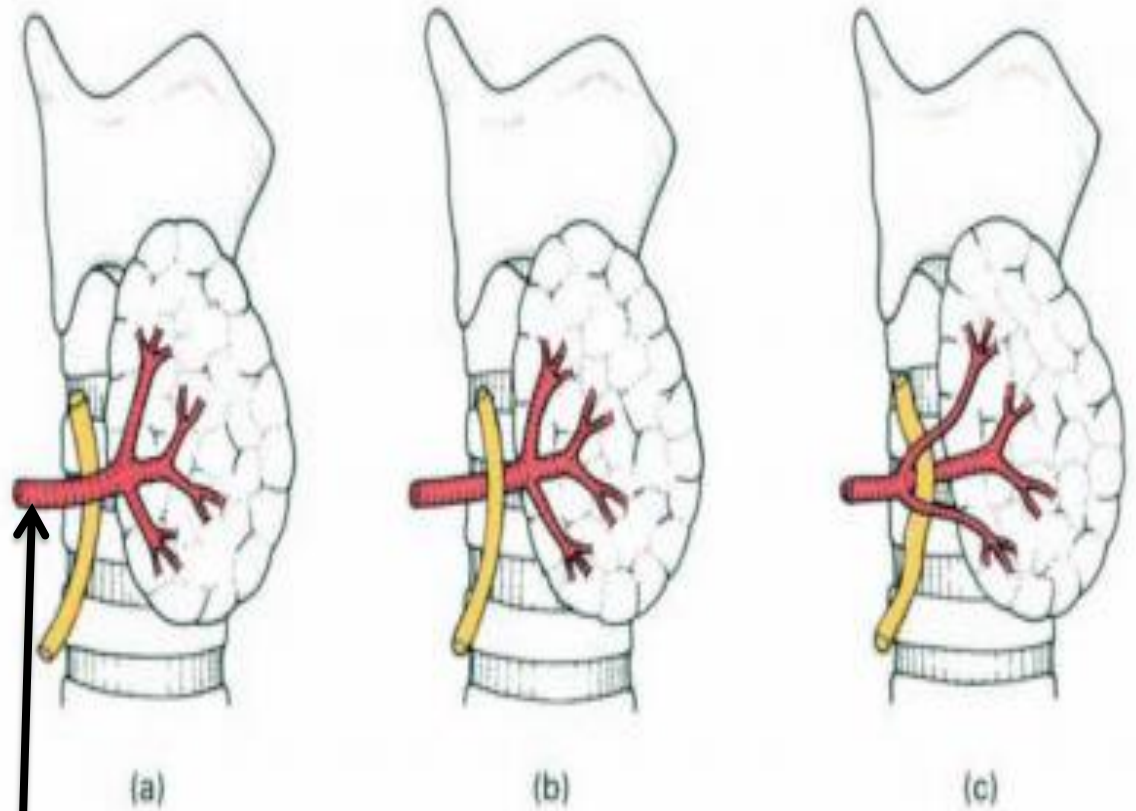
crosses either in front of or behind the artery, or it may pass between its branches.





The terminal branches of the inferior thyroid artery on each side are related to the RECURRENT LARYNGEAL NERVE.

**Fig. 191** The relationship of the recurrent laryngeal nerve to the thyroid gland and the inferior thyroid artery. (a) The nerve is usually deep to the artery but (b) may be superficial to it or (c) pass through its branches. In these diagrams the lateral lobe of the thyroid is pulled forwards, as it would be in a thyroidectomy.



Thus, ***THE INFERIOR THYROID ARTERY*** during ***surgery on the thyroid***, is ***ligated away from the gland*** to avoid injury to the recurrent laryngeal nerve

**C-The thyroidea ima,** In approximately 10% of people, a thyroid ima artery

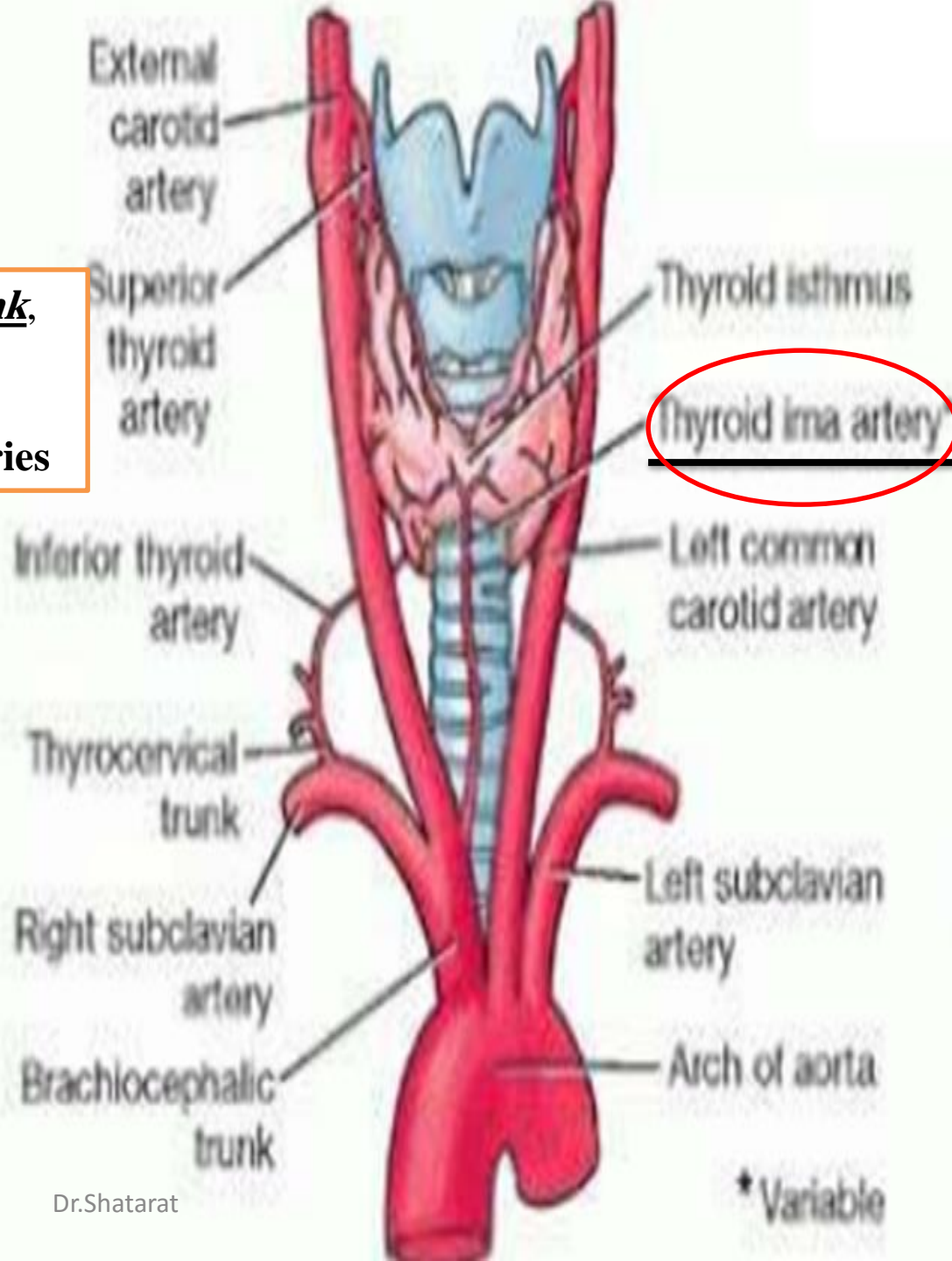
**Variable** arises from *the brachiocephalic trunk,* *or the arch of the aorta,* from the right common carotid subclavian, or internal thoracic arteries

ascends on the anterior surface of the trachea, which it supplies, and continues to the isthmus of the thyroid gland.

**Clinical note**

The possible presence of this artery must be considered when performing procedures **in the midline of the neck inferior to the isthmus because it is a potential source of bleeding**

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### **Lesions of the Laryngeal Nerves**

The muscles of the larynx are innervated by the recurrent laryngeal nerves, with the exception of the cricothyroid muscle, which is supplied by the external laryngeal nerve. Both these nerves are vulnerable during operations **on the thyroid gland because of the close relationship between them and the arteries of the gland.**

To be discussed next year

## 9-The veins from the thyroid gland

### A-Superior thyroid vein

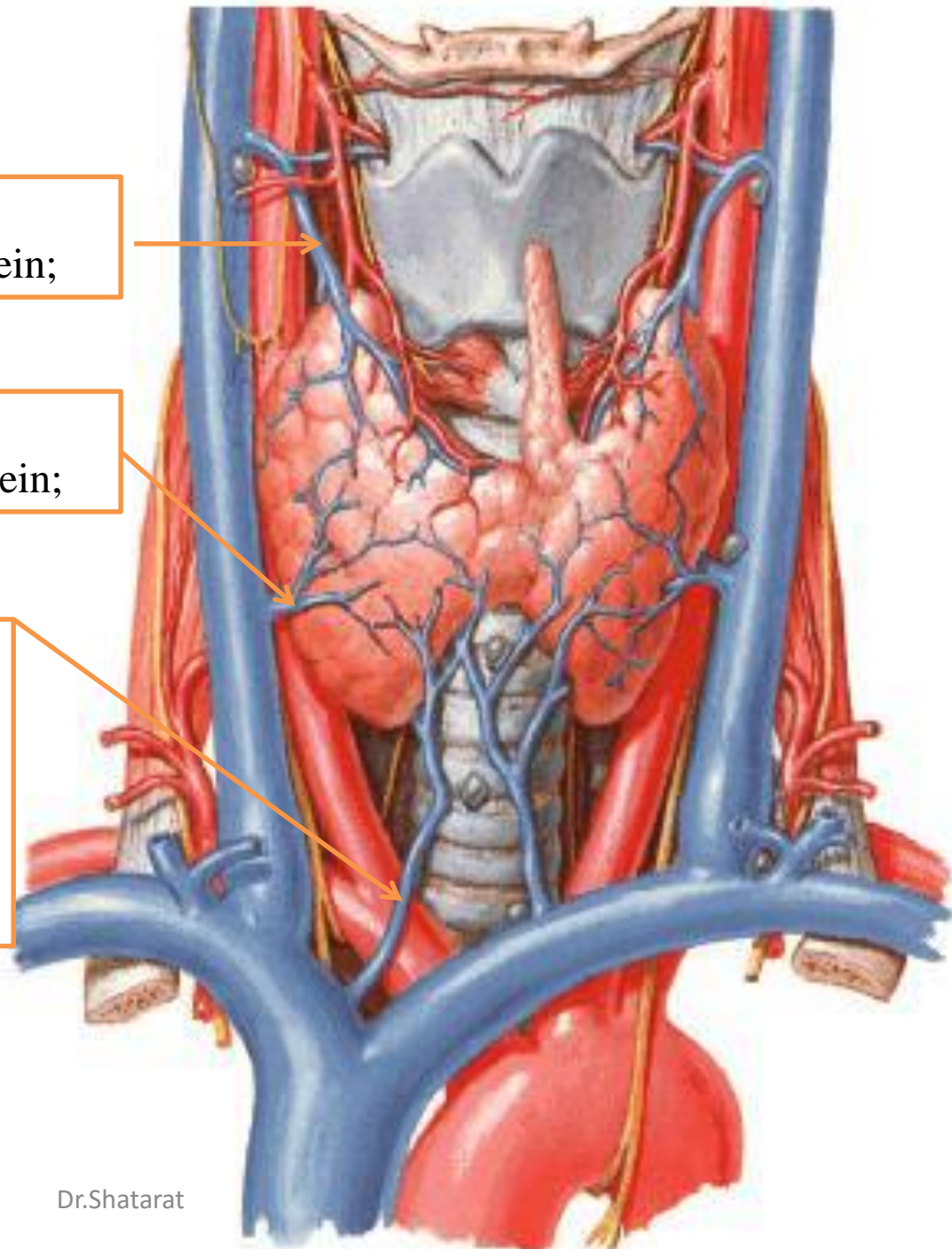
which drains into the internal jugular vein;

### B-The middle thyroid vein

which drains into the internal jugular vein;

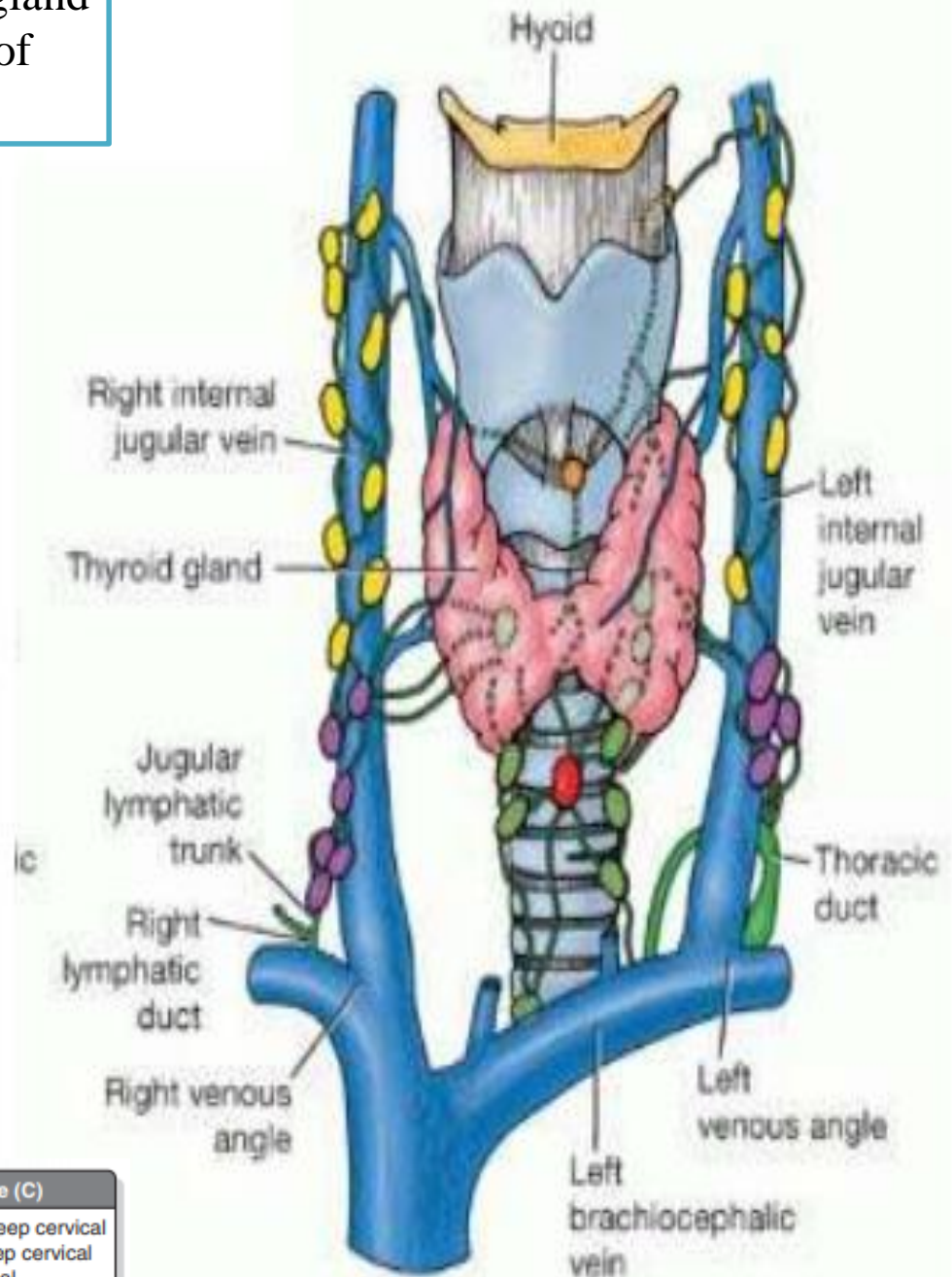
### C-The inferior thyroid vein

The inferior thyroid veins of the two sides anastomose with one another as they descend in front of the trachea. They drain into the left brachiocephalic vein in the thorax



**10-The lymphatic vessels** of the thyroid gland communicate with a capsular network of lymphatic vessels

From this network, the vessels pass initially to **prelaryngeal, pretracheal, and paratracheal** lymph nodes, which drain in turn to the superior and inferior deep cervical nodes  
Inferior to the thyroid gland, the lymphatic vessels pass directly to the inferior deep cervical lymph nodes



Lymph drainage (C)	
Yellow	Superior deep cervical
Green	Inferior deep cervical
Purple	Prelaryngeal
Orange	Paratracheal
Red	Pretracheal

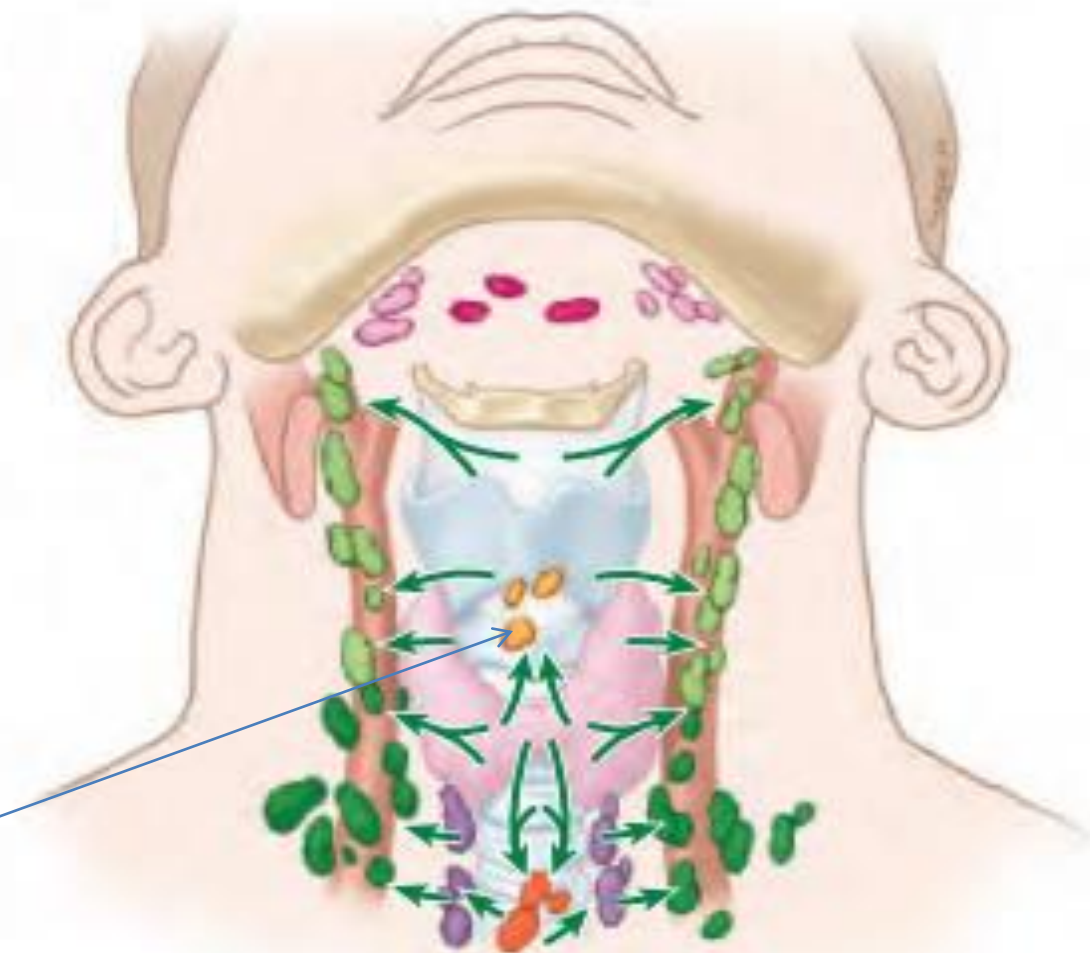
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The uppermost, just above the thyroid isthmus, in front of the cricoid cartilage, and medial to a pyramidal lobe, if present, is a constant node group of one to five nodes, which has been termed

## The Delphian node

enlargement of which is indicative of metastasis from **thyroid or laryngeal carcinoma**.



	Superior deep cervical		Prelaryngeal
	Inferior deep cervical		Paratracheal
	Submental		Pretracheal
	Submandibular		

**FIGURE 8.29.** Lymphatic drainage of thyroid gland, larynx, and trachea. The *arrows* indicate the direction of lymph flow.