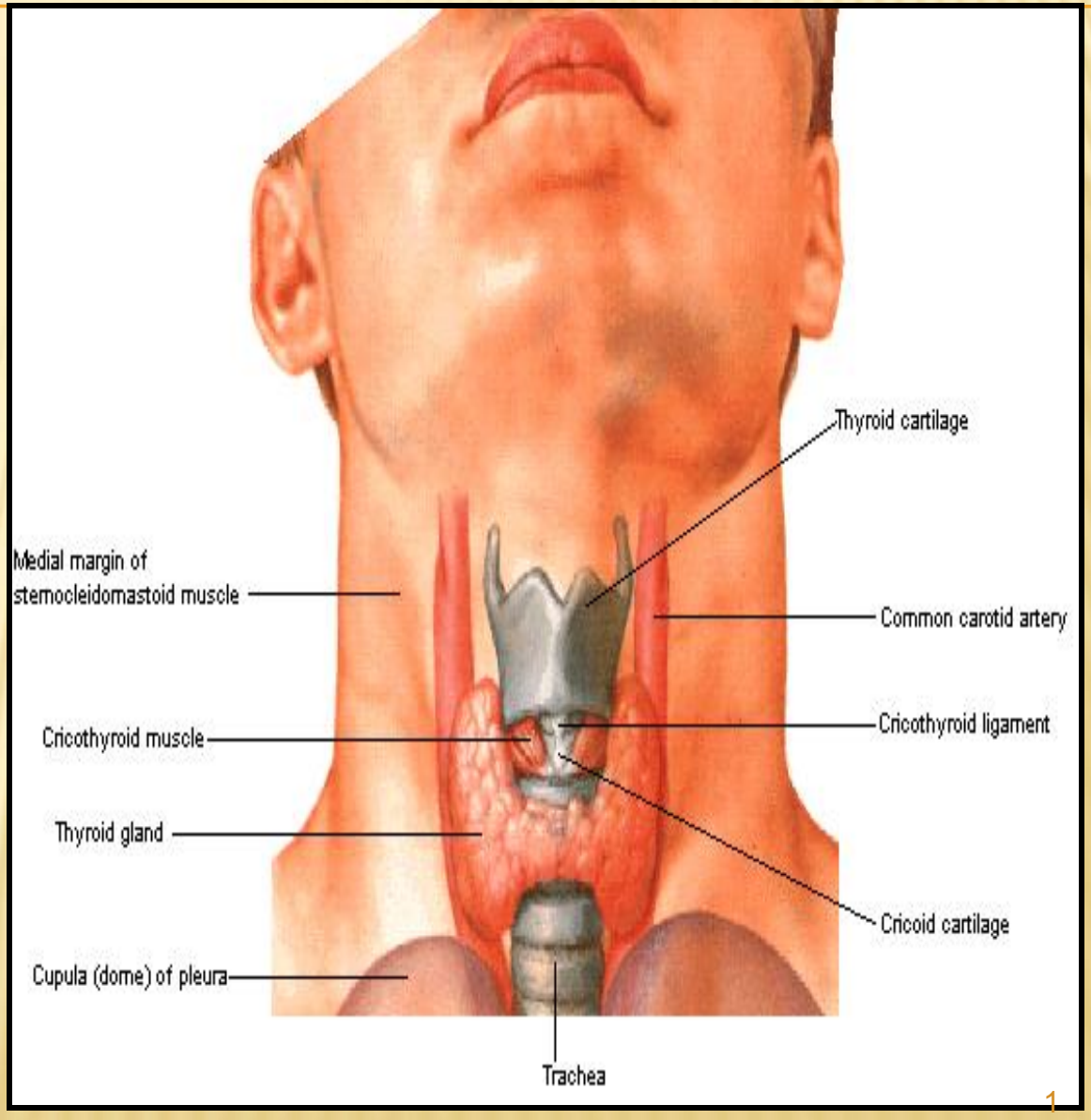
THYROID & PARATHYROID



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OBJECTIVES

- ***By the end of the lecture, the student should be able to:***
- Describe the shape, position, relations and structure of the thyroid gland.
- List the blood supply & lymphatic drainage of the thyroid gland.
- List the nerves endanger with thyroidectomy operation.
- Describe the shape, position, blood supply & lymphatic drainage of the parathyroid glands.
- Describe the **development** of the thyroid & parathyroid glands.
- Describe the **most common congenital anomalies** of the thyroid gland.

Before we go to the thyroid

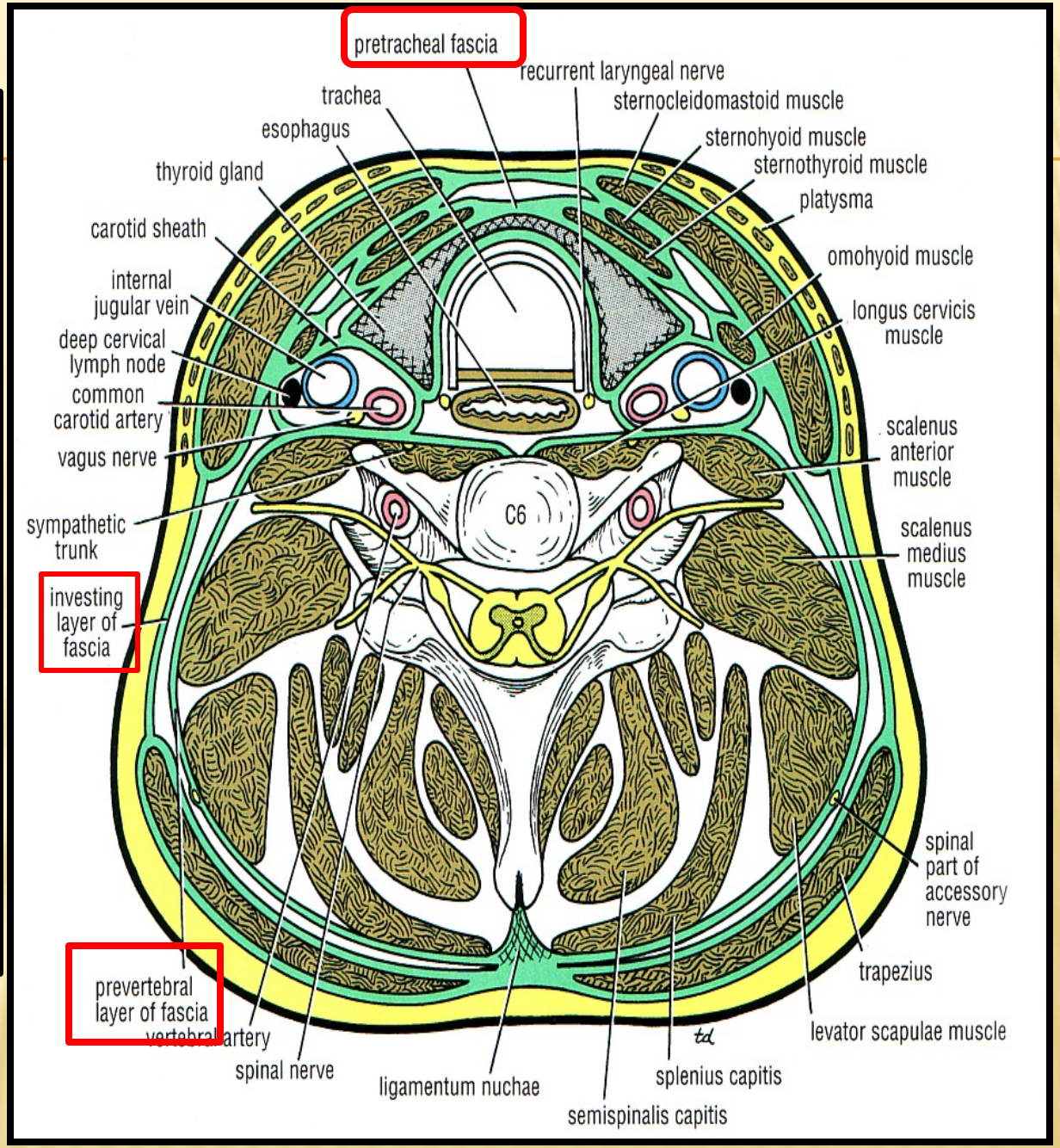
What are the parts of the deep fascia or deep cervical fascia of the neck?

It is divided mainly into 3 layers:

1- Investing layer.

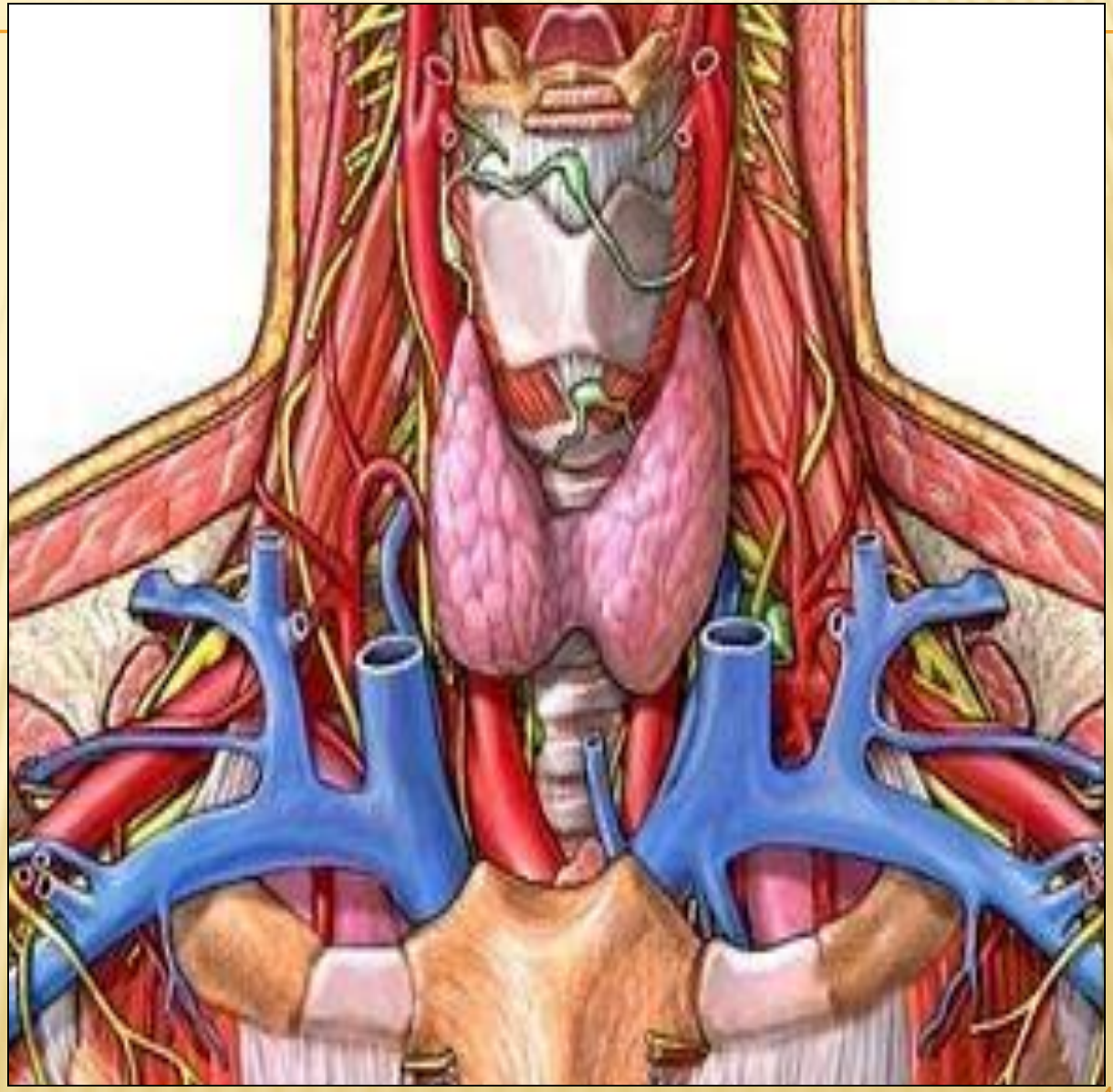
2- Pretracheal layer.

3- Prevertebral layer.



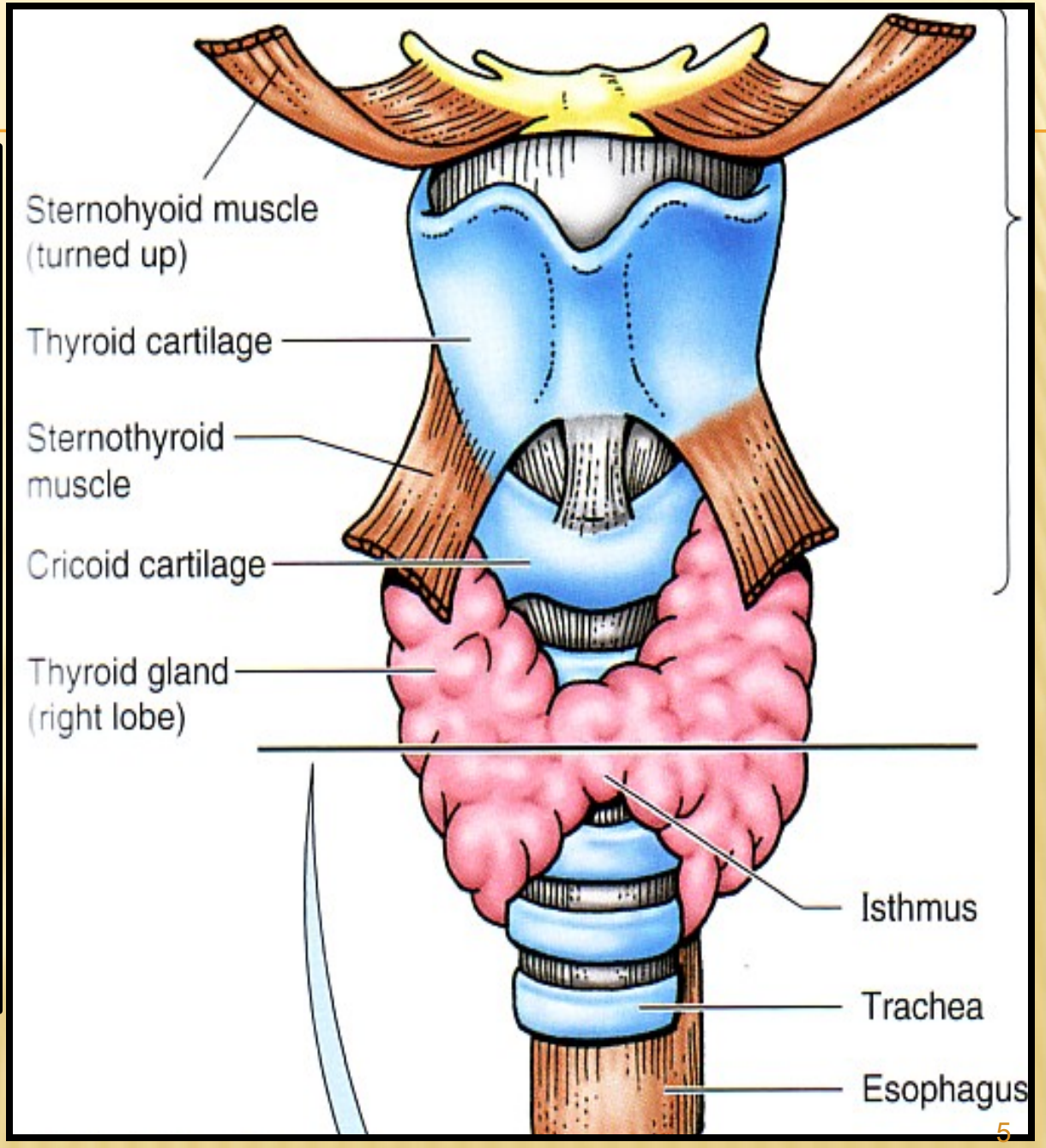
Thyroid gland

- Endocrine, butterfly shaped gland.
- Consists of right & left lobes.
- The 2 lobes are connected to each other by a narrow isthmus, which overlies the 2nd 3rd & 4th tracheal rings.
- It is surrounded by a facial sheath derived from the *pretracheal layer of the deep cervical fascia*.

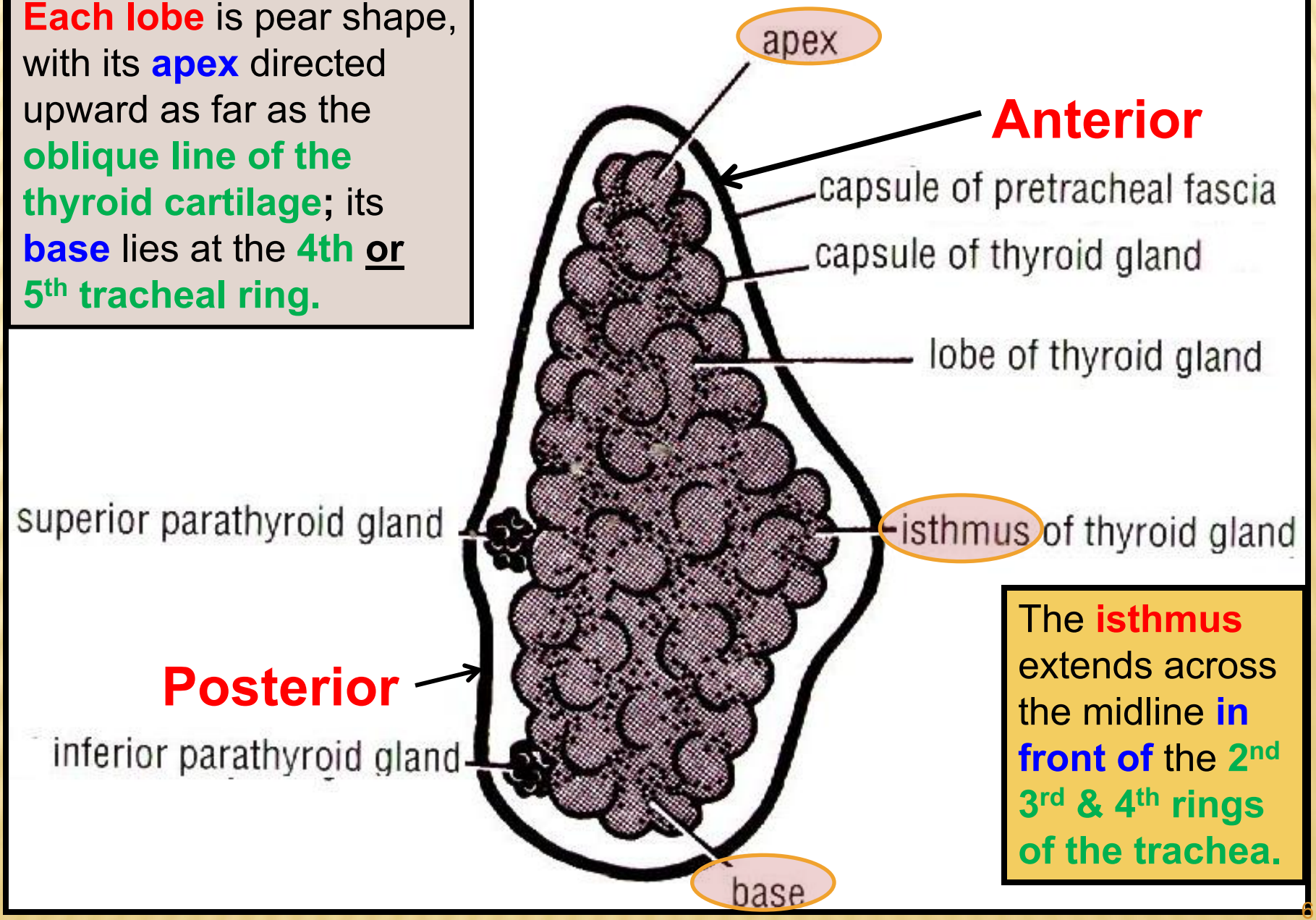


Thyroid gland

- Each lobe is pear-shaped, with its apex reaches up to the oblique line of thyroid cartilage.
- Its base lies at the level of *4th or 5th* tracheal rings.
- Inside the pretracheal facial capsule, there is another C.T capsule.
- So, it s surrounded by 2 membranes.



Each lobe is pear shape, with its **apex** directed upward as far as the **oblique line of the thyroid cartilage**; its **base** lies at the **4th** **or** **5th tracheal ring.**

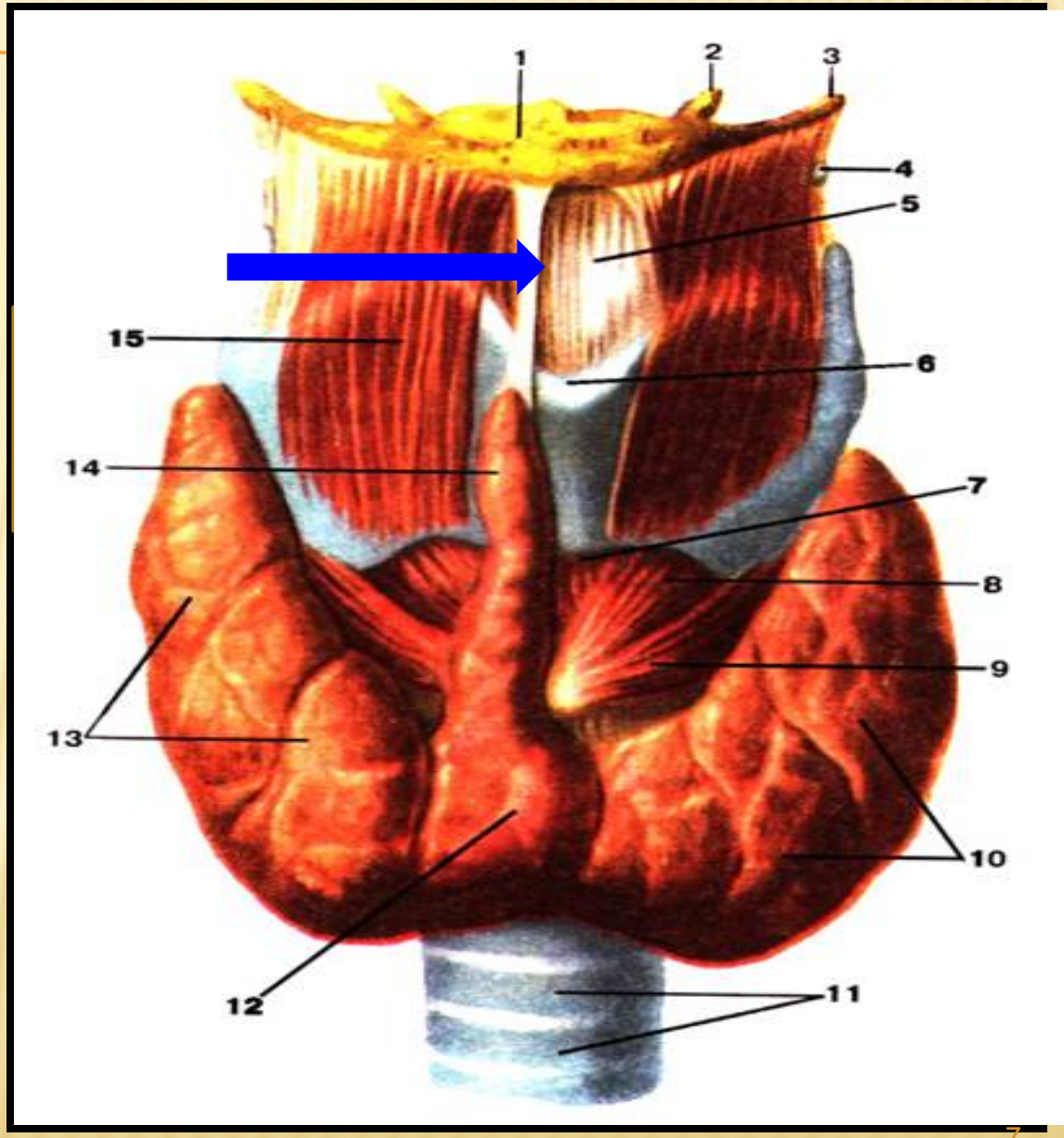


The **isthmus** extends across the midline **in front of** the **2nd 3rd & 4th rings of the trachea.**

A 3rd small pyramidal lobe is often present which **projects from** the **upper border of the isthmus** usually to left of middle line.

Pyramidal lobe is connected to hyoid bone by a **fibrous or muscular band** called ***levator glandulae thyroideae.***

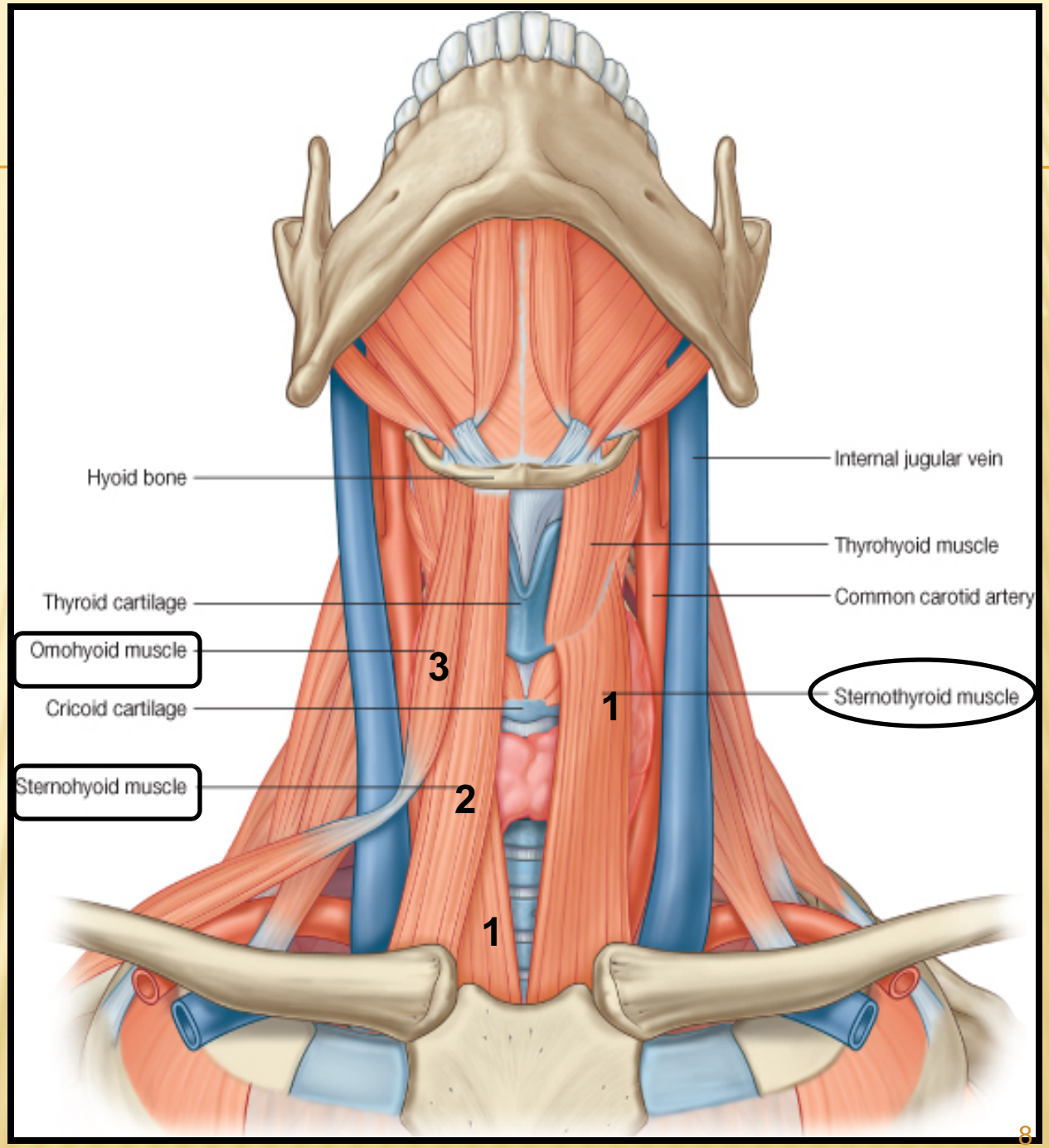
This pyramidal lobe represents in 50% of pepole the fibrosed & obliterated thyroglossal duct.



RELATION OF THYROID GLAND

Anterolaterally: (4 S).

1. **S**ternothyroid.
2. **S**ternohyoid.
3. **S**uperior belly of omohyoid
4. **S**ternomastoid.



Posteriorly:

Carotid sheath & its contents.

Medially:

Above:

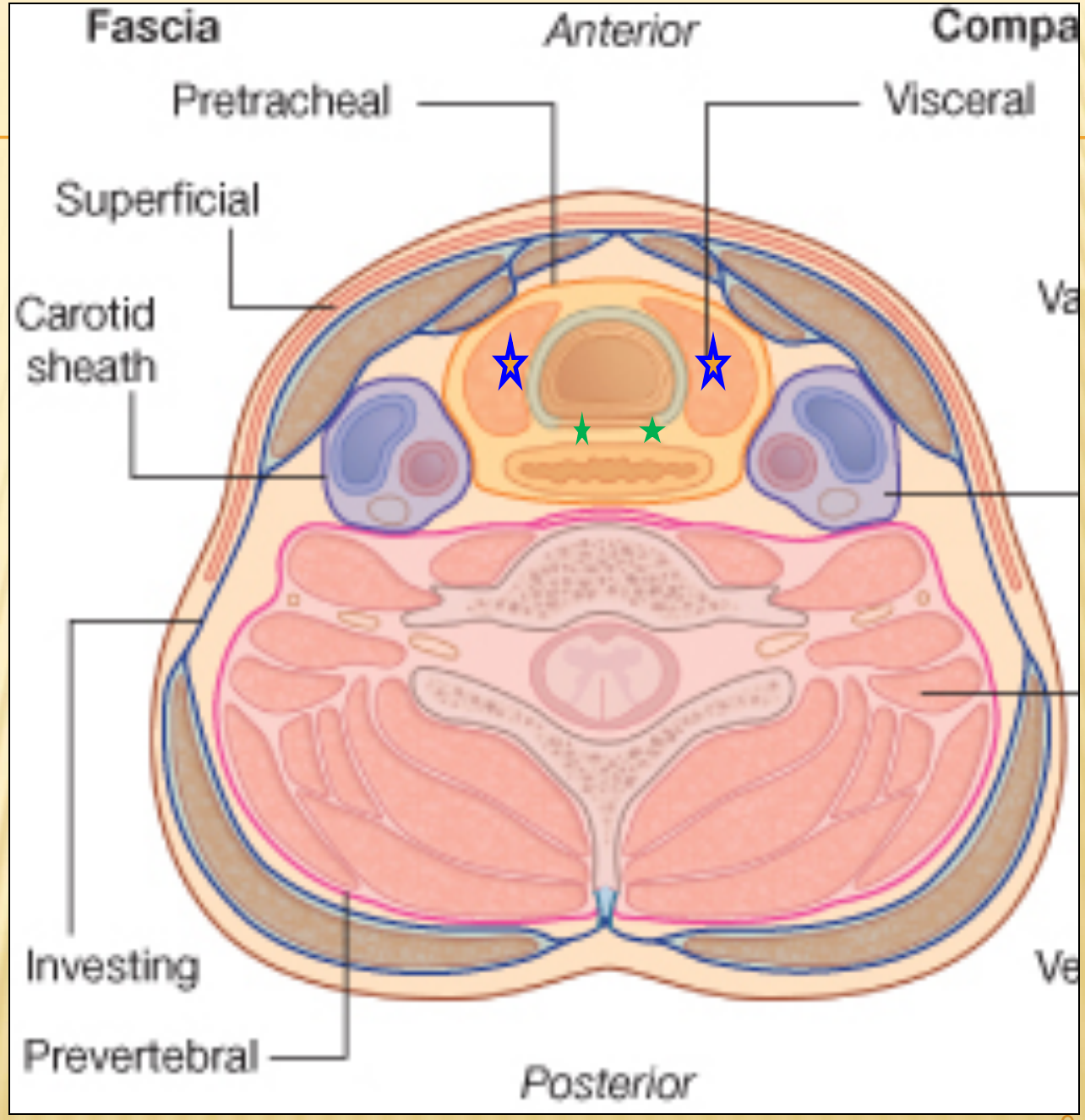
Larynx & pharynx .

Below:

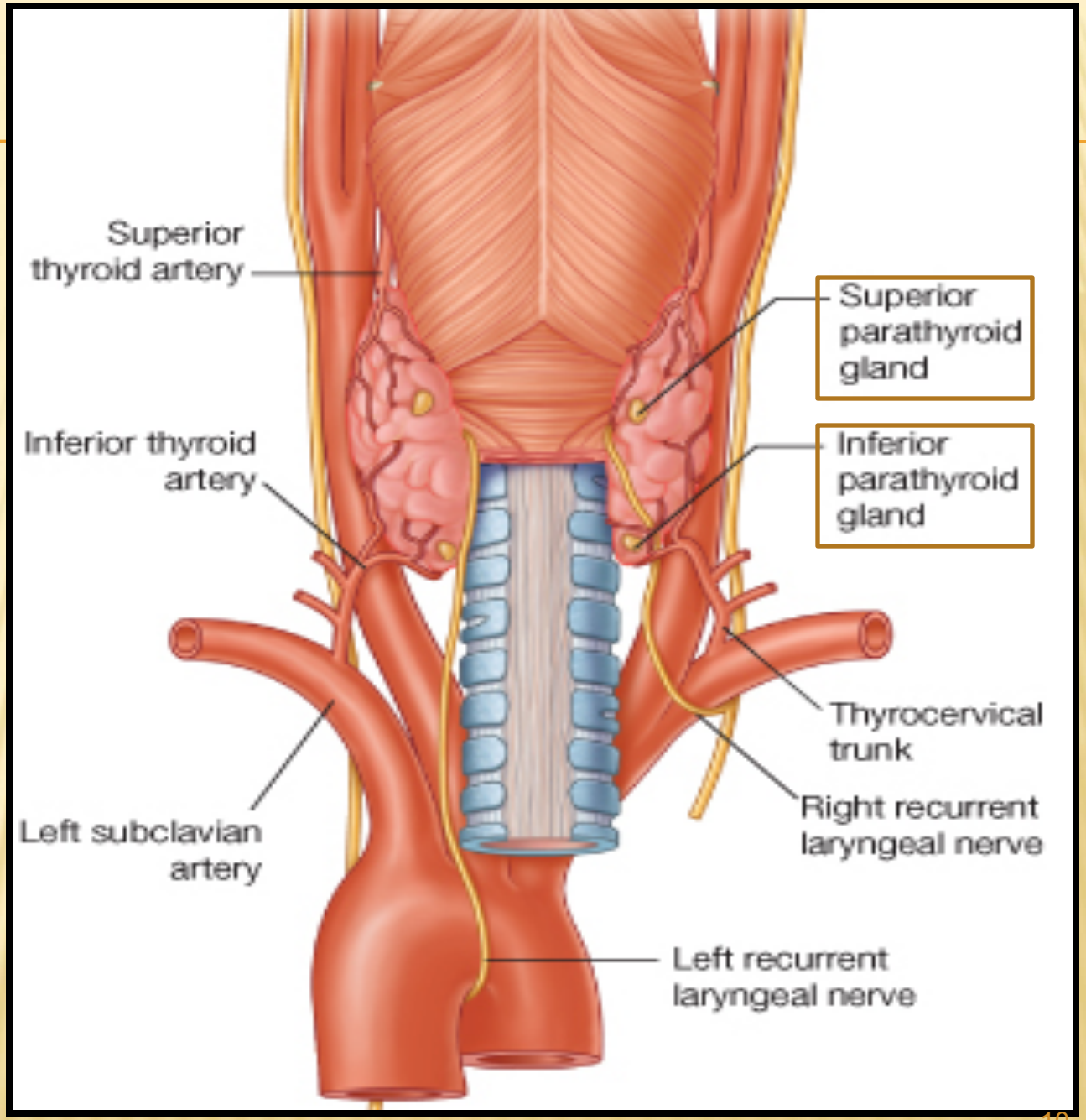
Trachea & esophagus.

Recurrent laryngeal nerve in between.

Cricothyroid muscle & *external laryngeal nerve*



- The rounded ***posterior border*** is related to the superior & inferior ***Parathyroid glands.***
- It is also related to the anastomosis between ***superior & inferior thyroid arteries.***



ARTERIAL SUPPLY

1-Superior thyroid a.:

It is a branch from the external carotid a.

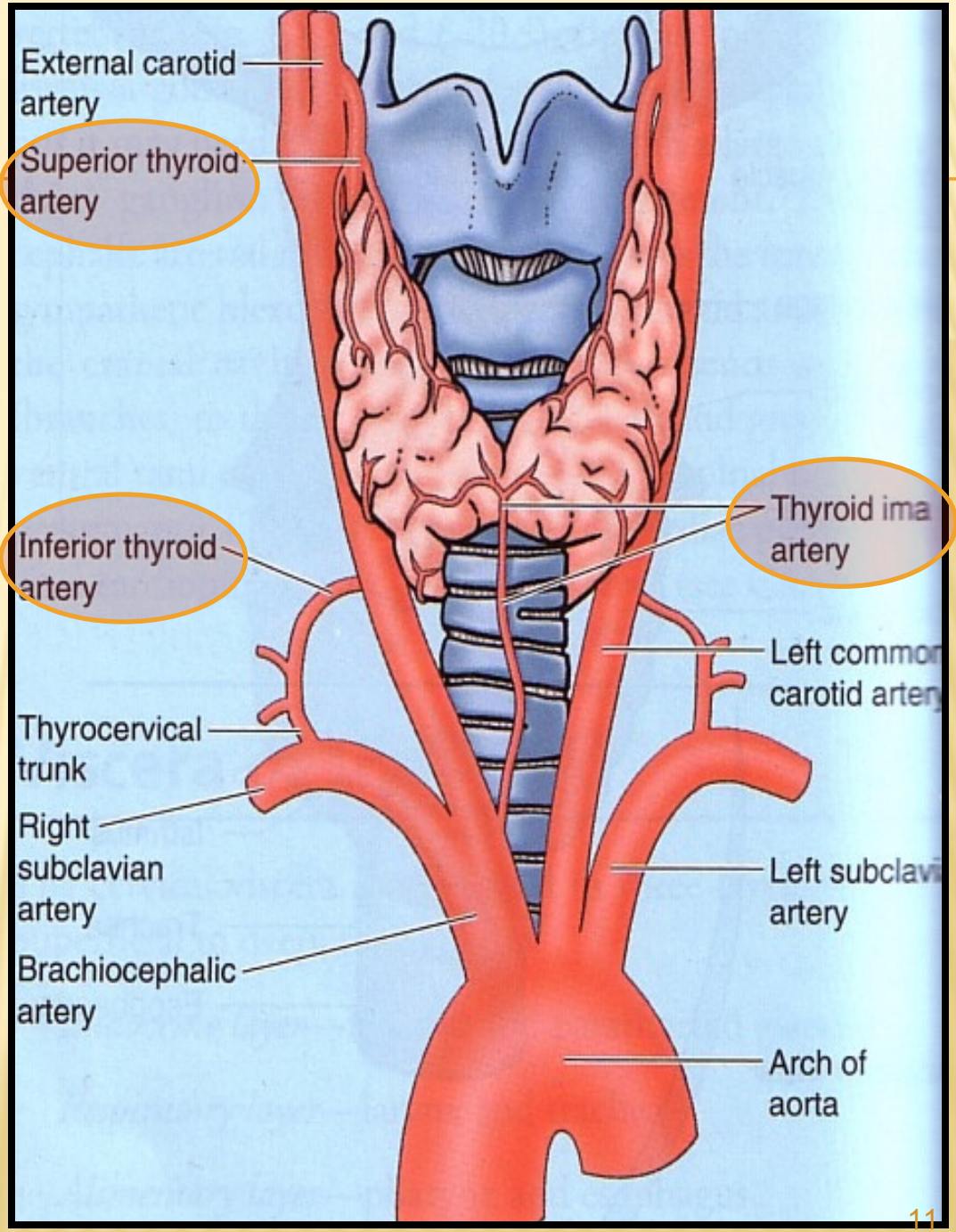
It descends to the upper pole of the lobe, with the ***external laryngeal nerve.***

It runs along the upper border of the isthmus to anastomosis with its fellow

2- Thyroidea ima artery:

If present, it arises from aortic arch or from ***brachiocephalic artery.***

It ascends in front of the trachea to reach the isthmus.



3-Inferior thyroid artery

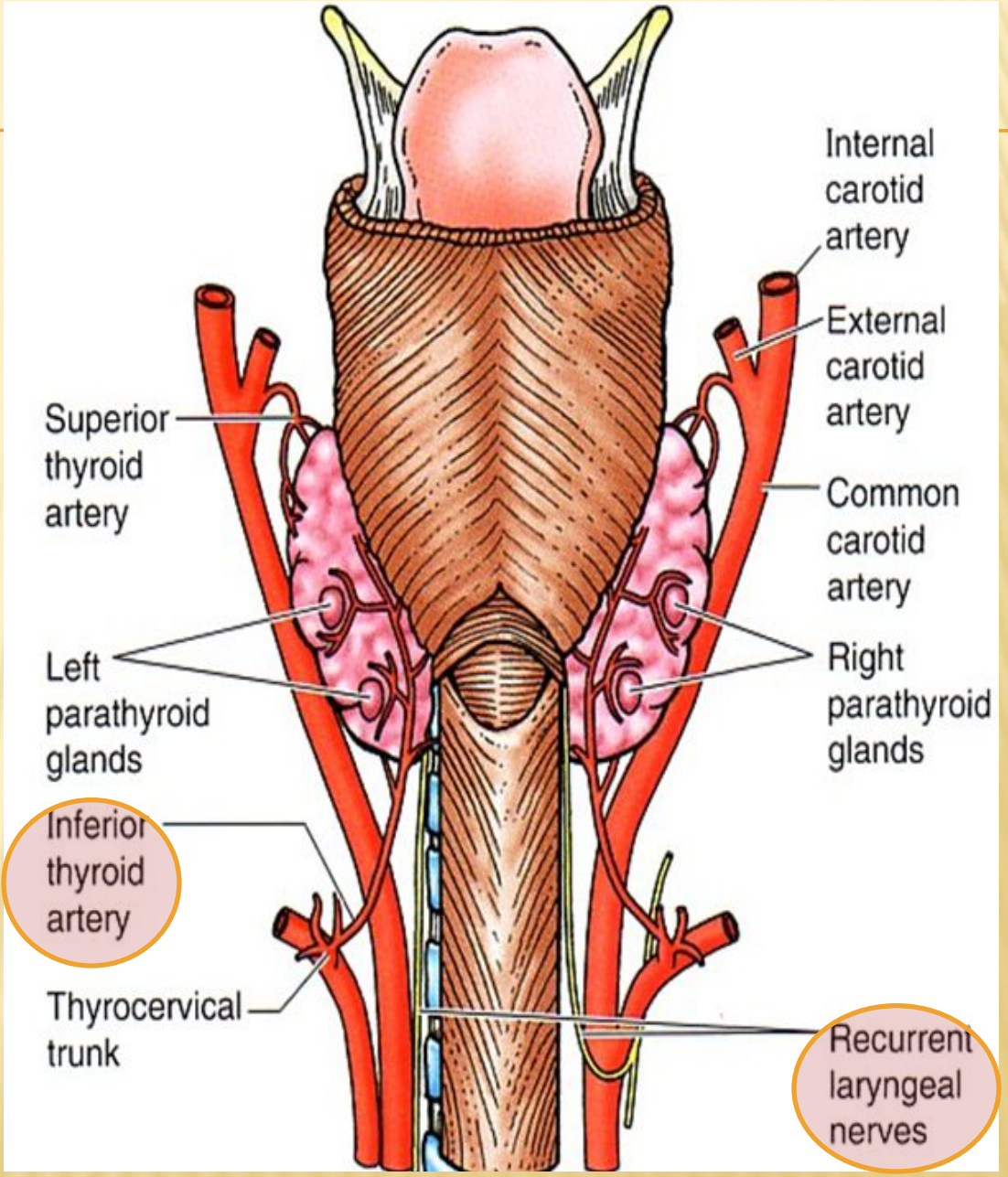
From the thyrocervical trunk of 1st part of subclavian artery,

Then it curves medially behind the carotid sheath.

It ascends behind the gland to the level of cricoid cartilage.

Then it reaches the posterior aspect of the gland & descends downwards.

The recurrent laryngeal nerve crosses either in front or behind it.!



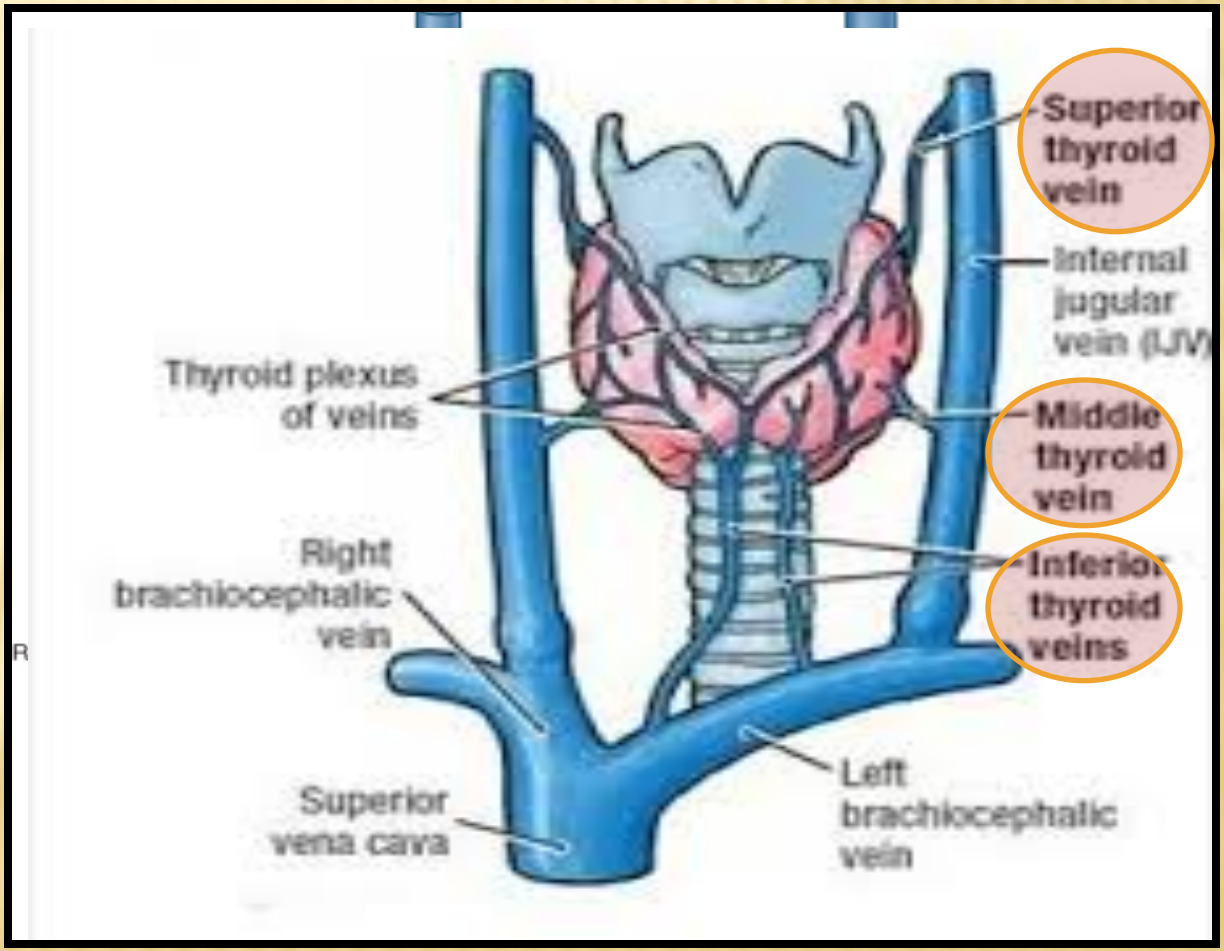
Veins of Thyroid Gland

1-Superior thyroid vein → internal jugular vein
2- Middle thyroid vein → internal jugular vein
3- Inferior thyroid vein → left brachiocephalic vein

Lymph Of the Thyroid Gland :
Deep cervical & paratracheal lymph nodes.

Innervation :

- **Sympathetic :** Cervical Sympathetic Trunk.
- **Parasympathetic :** Branches of Vagus N.



PARATHYROID GLAND

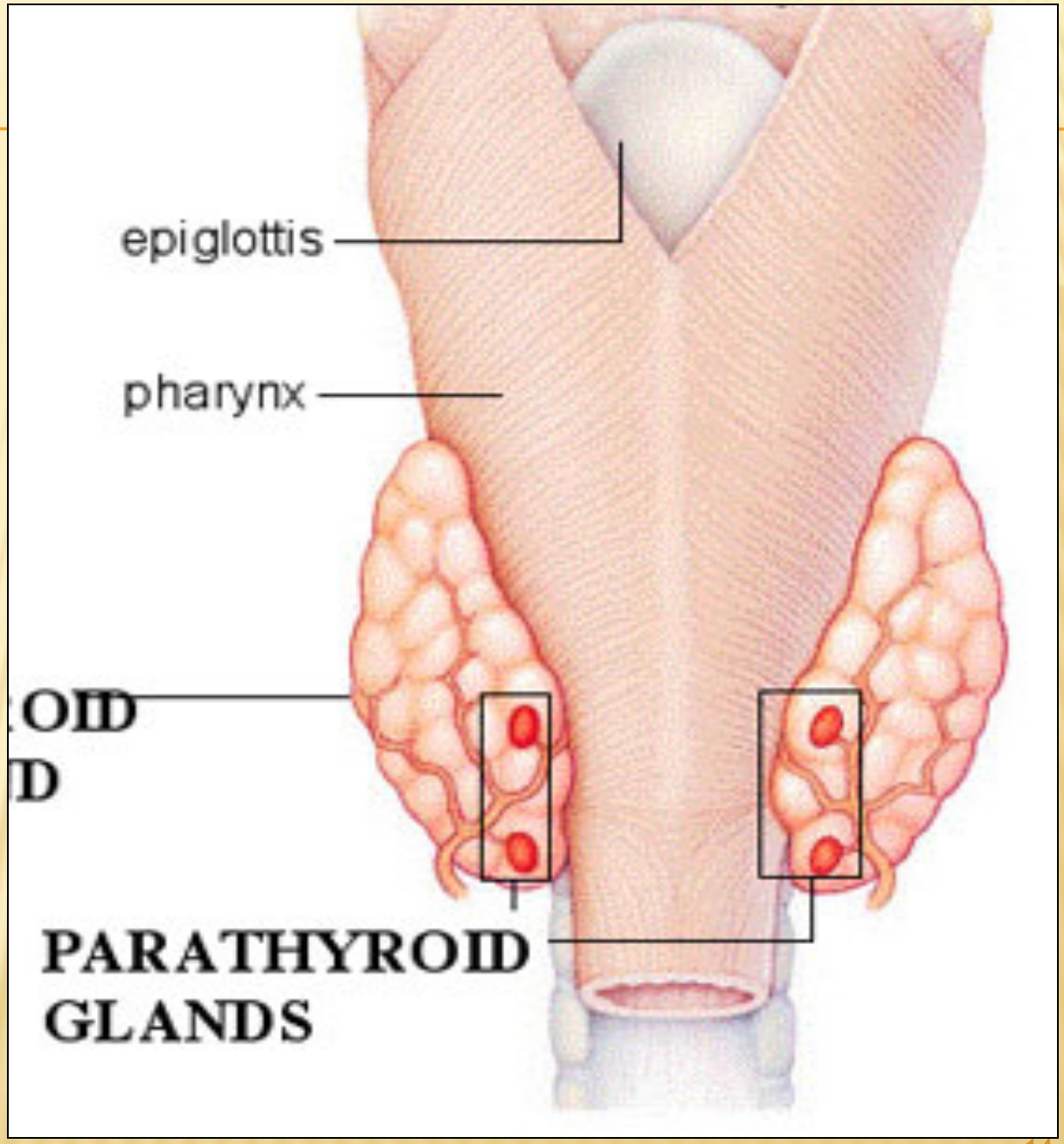
4 small ovoid bodies, about 6 mm. long.

They lie within the facial capsule of the gland, (between the 2 membranes).

2 superior parathyroid has a constant position at the **middle of the posterior border** of the gland.

2 inferior parathyroid usually at the level of the **inferior pole.**

They lie within the thyroid tissue or sometimes outside the facial capsule.

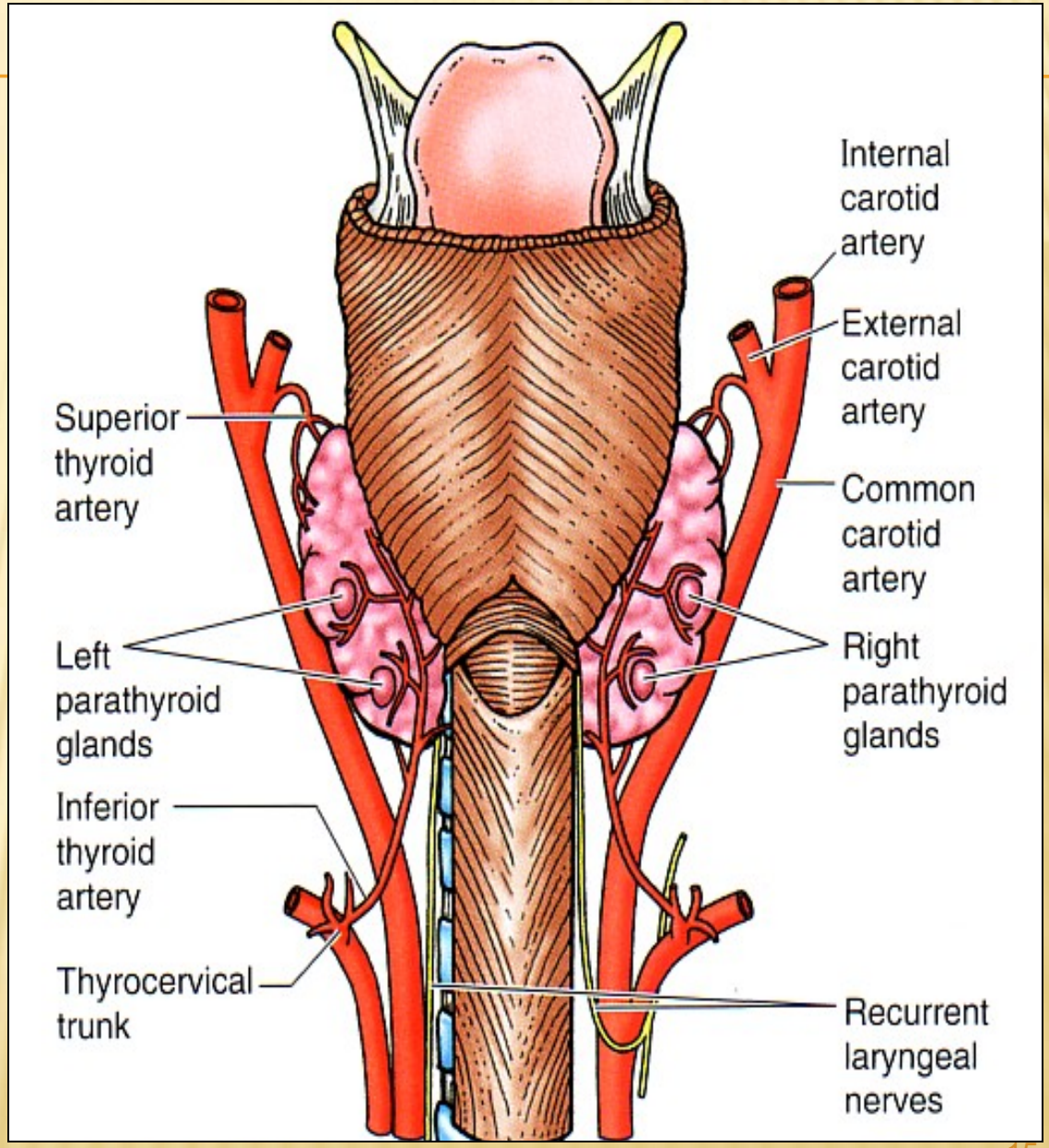


PARATHYROID GLANDS

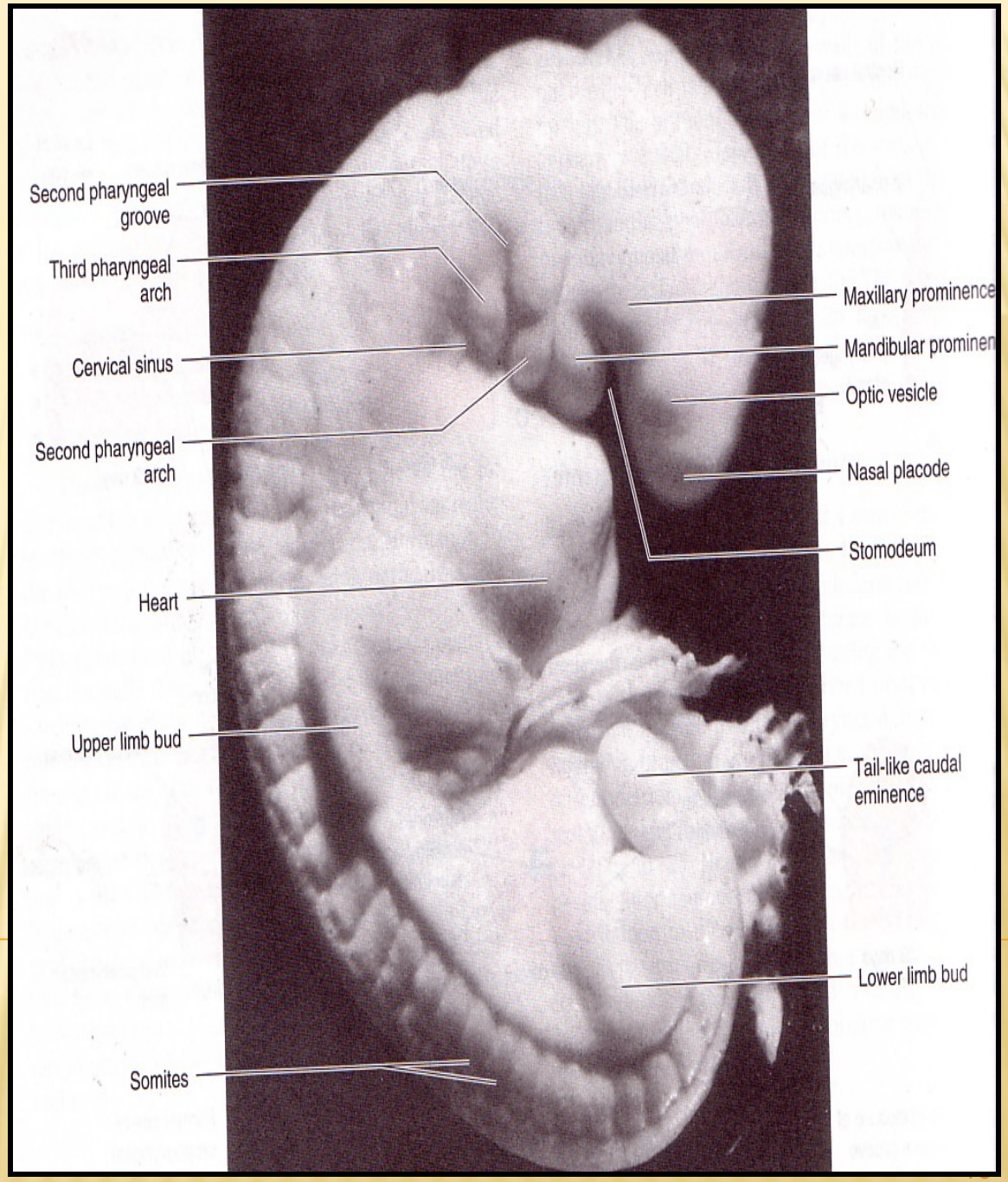
- They are **supplied by superior** & **inferior thyroid arteries.**
- **Their veins** are drained to superior, middle and inferior thyroid veins.
- **Lymph nodes:**

  Deep cervical & **paratracheal** lymph nodes.
- **Nerve supply : Sympathetic Trunk**

  Superior & middle cervical sympathetic ganglia (vasomotor).



DEVELOPMENT OF THYROID AND PARATHYROID GLANDS



Pharyngeal Apparatus

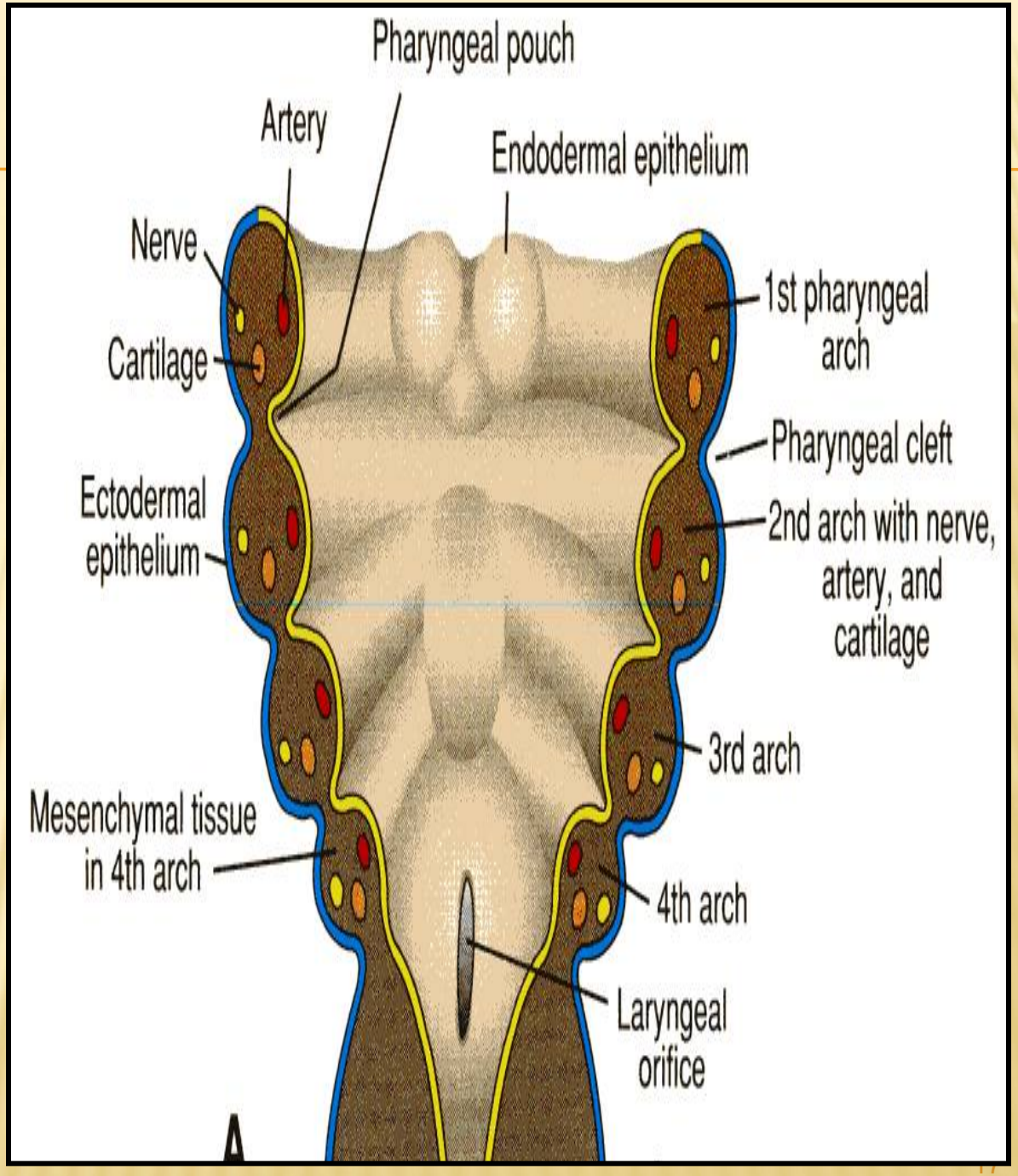
The *head & neck* region **develops from** the **pharyngeal apparatus.**

It is formed of:

1- Pharyngeal **arches**

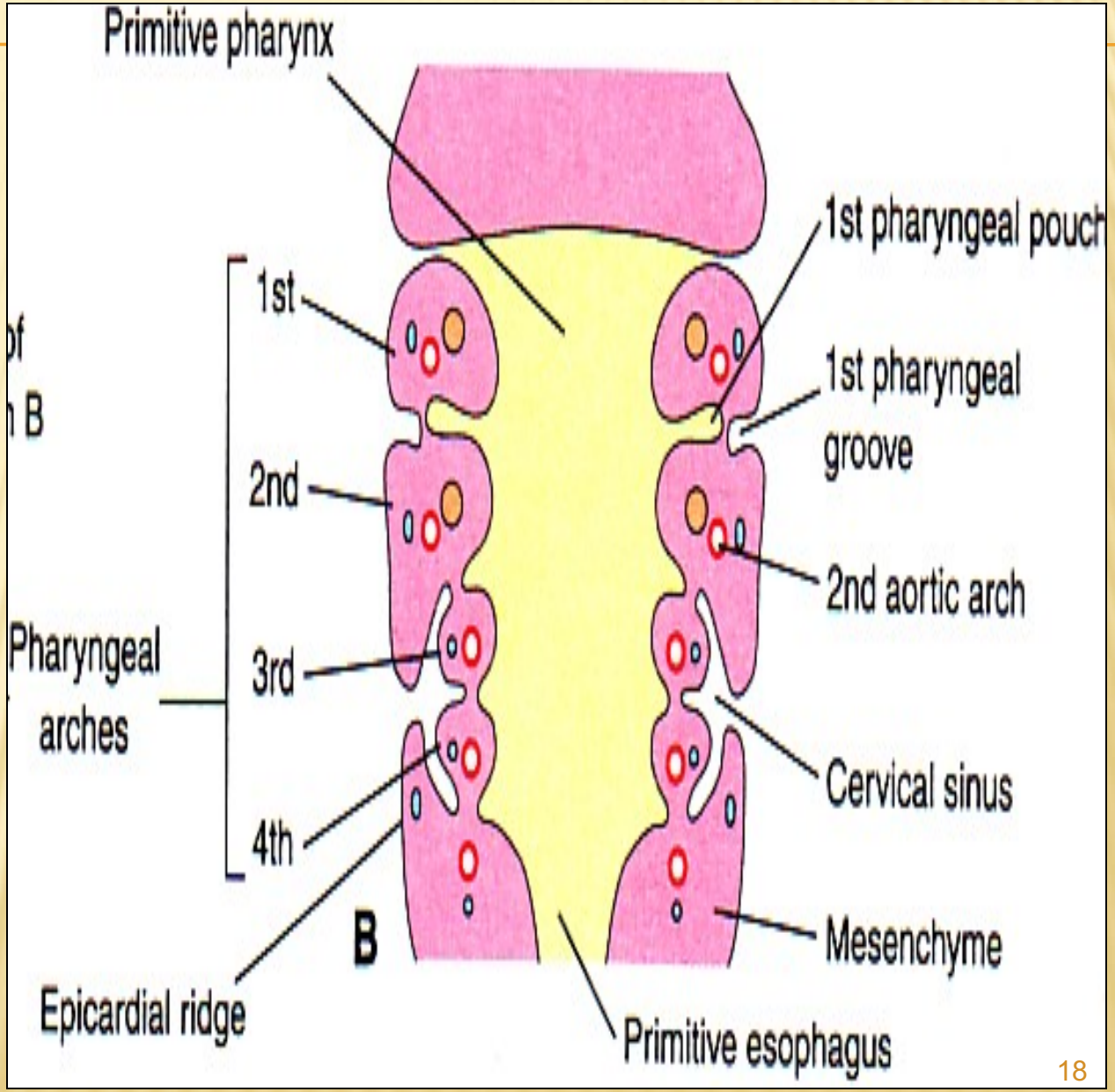
2- Pharyngeal **grooves** or **clefts (externally).**

4- Pharyngeal **pouches (internally).**



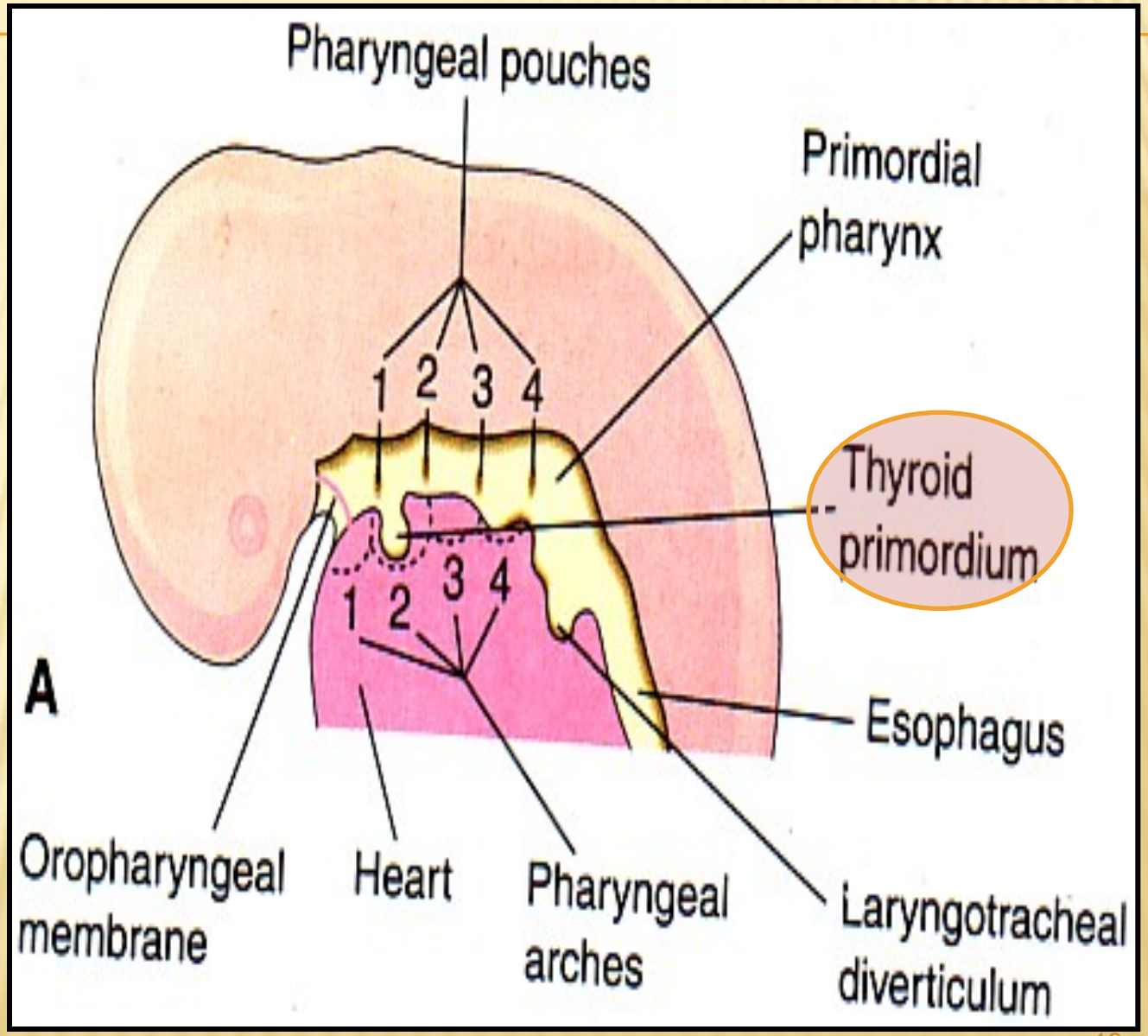
PHARYNGEAL APPARATUS

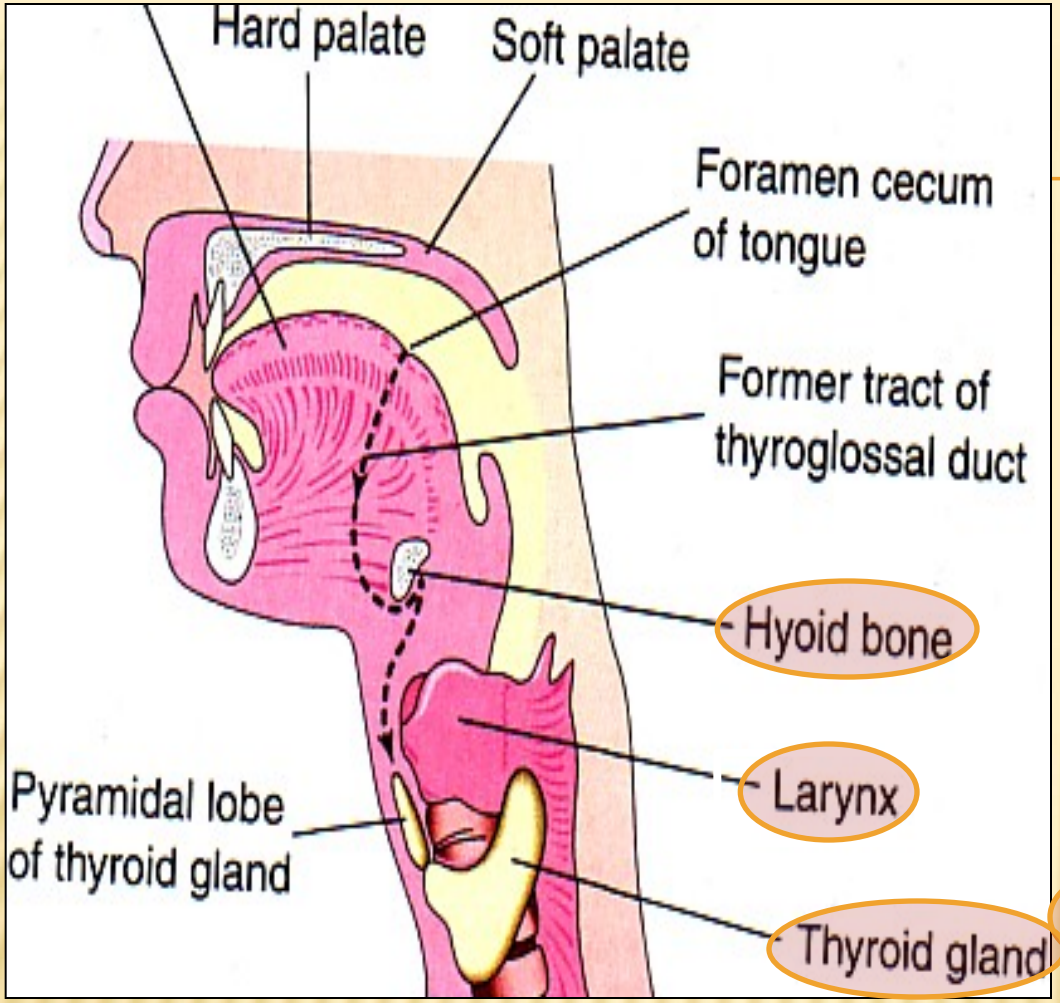
- **The mesoderm** in the head and neck regions divided into sex cubical masses called the **6 pharyngeal or branchial arches.**
- Each arch is formed of a Core of **mesoderm**, **Covered externally by ectoderm** and the space between 2 arches from outside is called **cleft** **or** **groove.**
- **Each arch is lined** from **inside** by ***endoderm*** and the space between the 2 arches from inside is called **pouch.**

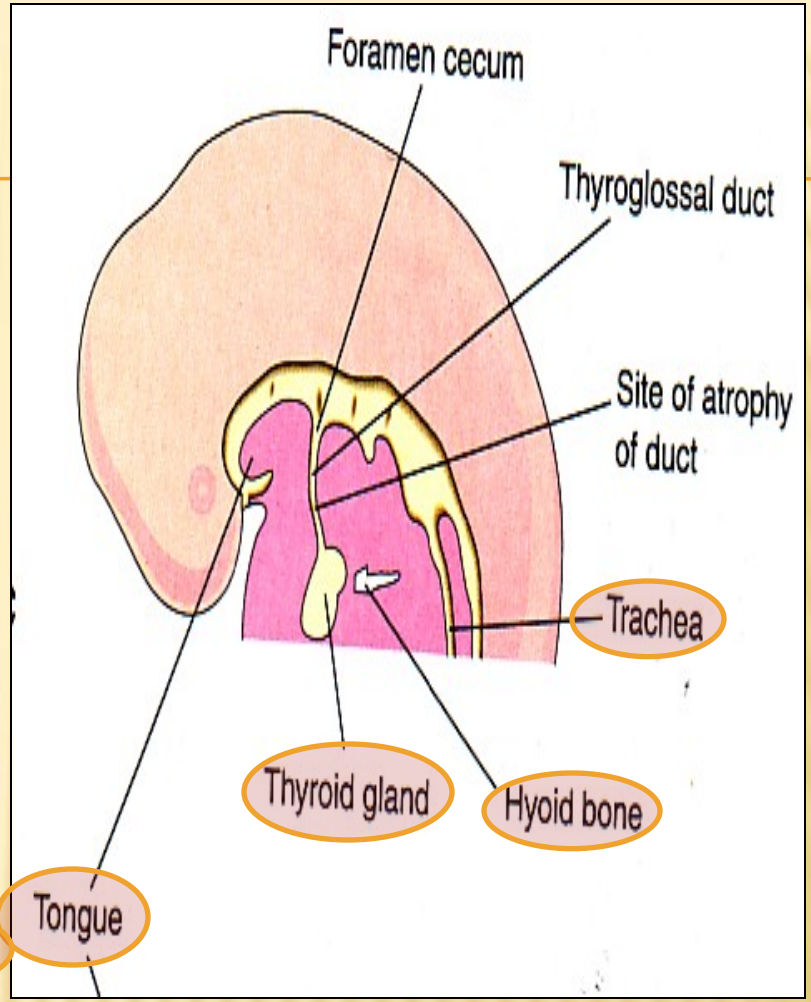


THYROID PRIMORDIUM

- By the 24th day after fertilization, the thyroid gland begins its development.
- It is the first endocrine gland to develop.
- **It develops** from the ***endoderm*** **of the floor of the primitive pharynx .**
- **It develops** from the (Thyroid primordium).





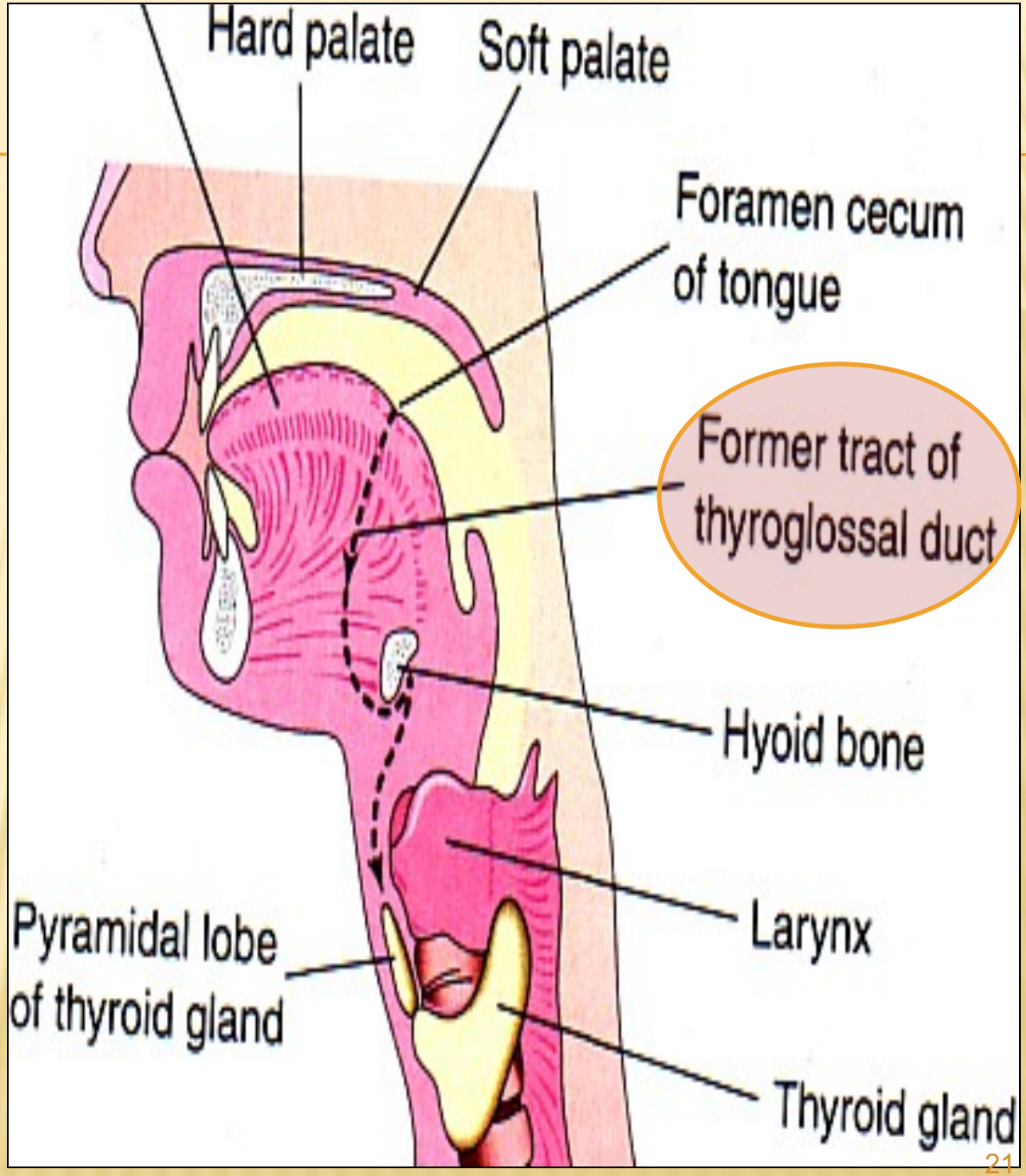


As the tongue grows, the developing thyroid gland descends downward in the neck. It descends anterior to the developing hyoid bone & laryngeal cartilages.

The thyroid is connected to the developing tongue by a narrow tube, called the thyroglossal duct.

At first the thyroid primordium is hollow, but soon it becomes solid & divided into 2 lobes and an isthmus.

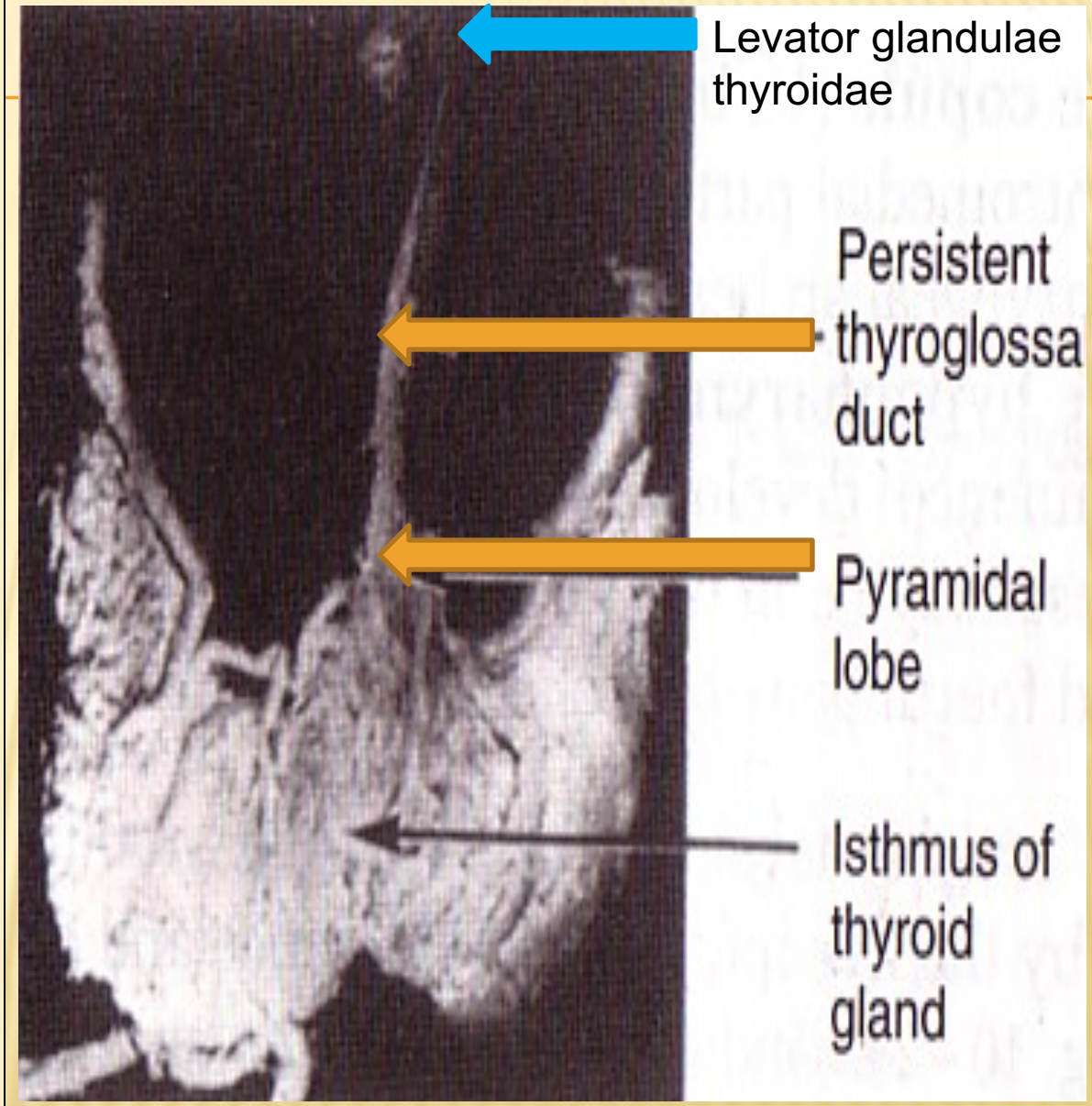
By 7th week (50 th day) the gland takes its final shape & position, and the thyroglossal duct begins to fibroses and degenerates.



The upper end of duct persists in the dorsum of the tongue as the **foramen cecum.**

The distal part of the duct may persists in 50% of people to form the **pyramidal lobe.**

The pyramidal lobe may be attached to the hyoid bone by fibrous or smooth muscle; the **Levator glandulae thyroidae.**



Congenital Anomalies

1- Congenital hypothyroidism.
2- Persistence of thyroglossal duct.
3- Thyroglossal duct cyst.
4- Ectopic thyroid gland.
5- Accessory thyroid tissue.
6- Agenesis of the thyroid gland.

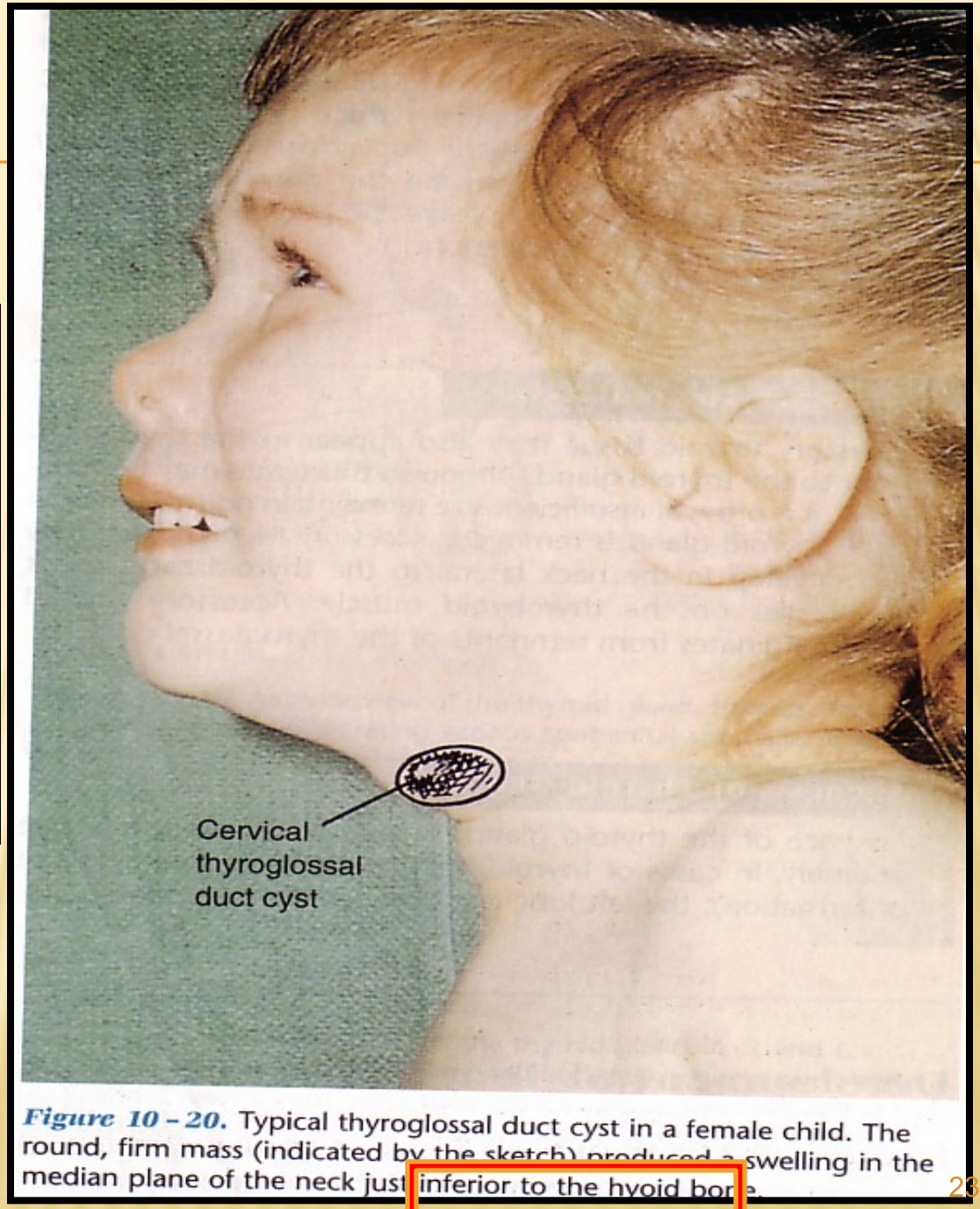
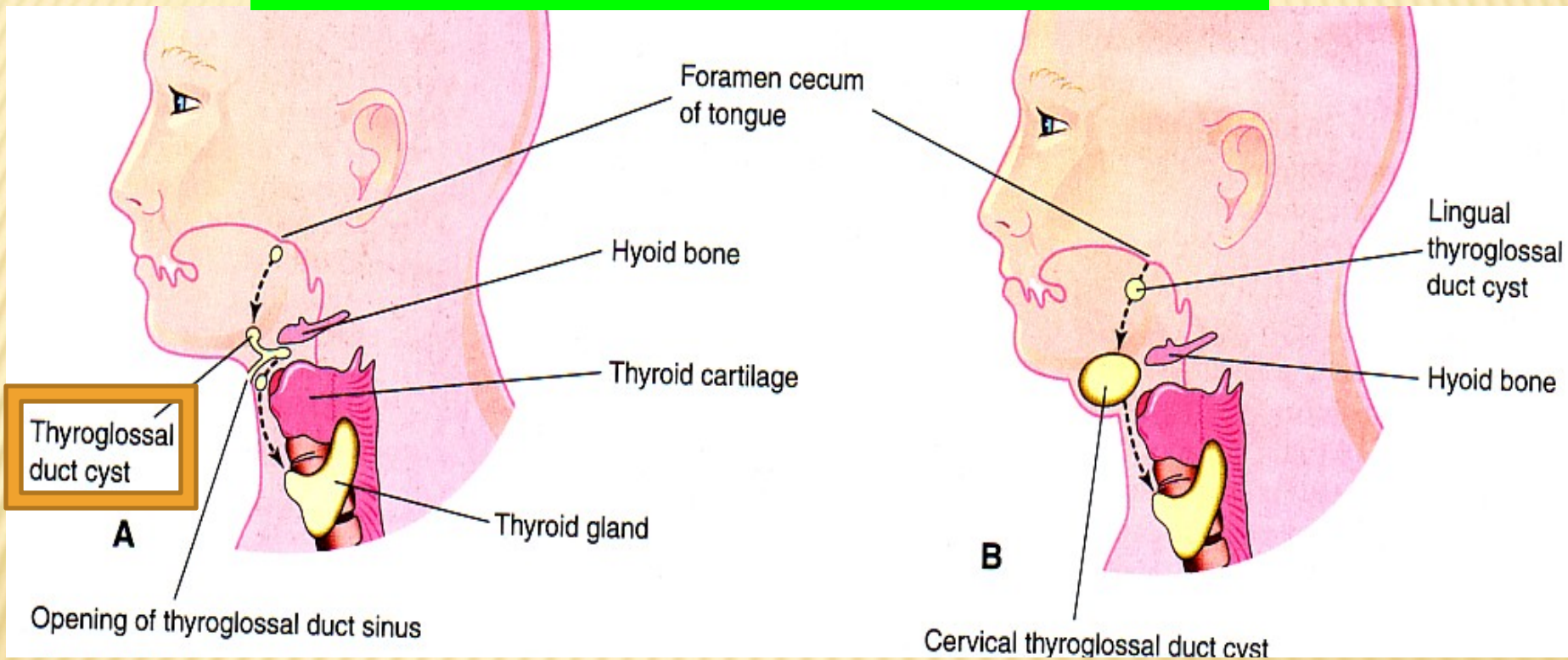


Figure 10 – 20. Typical thyroglossal duct cyst in a female child. The round, firm mass (indicated by the sketch) produced a swelling in the median plane of the neck just inferior to the hyoid bone.

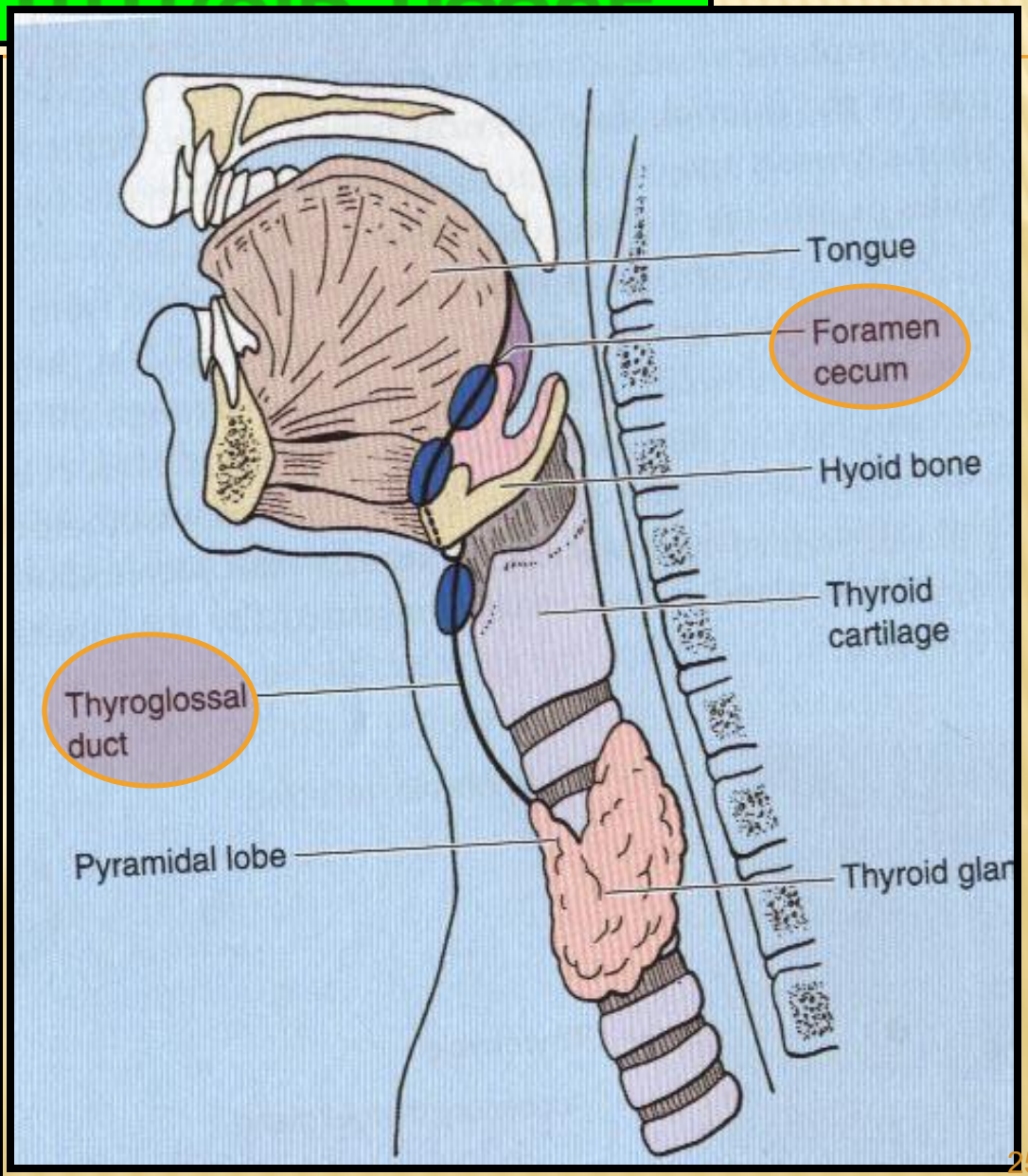
Thyroglossal cyst



- **A,** showing the possible locations of **thyroglossal duct cysts** at the broken line indicating the course of the duct.
A thyroglossal duct sinus is illustrated.
- **B,** illustrating **lingual & cervical thyroglossal duct cysts.**
- **Most of thyroglossal duct cysts are located just anterior & inferior to hyoid bone.**

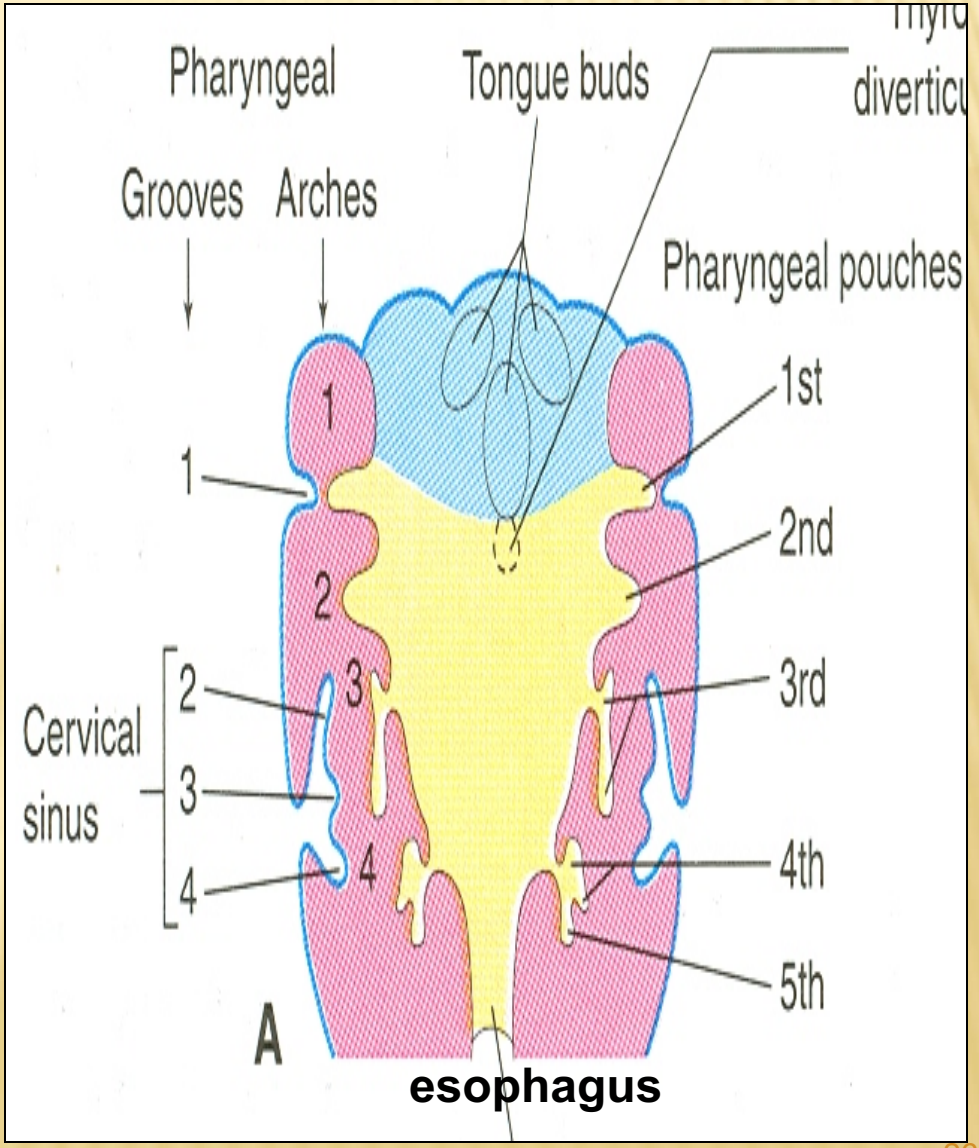
ECTOPIC THYROID TISSUE

- The thyroid glands develops high up close to foramen cecum of the developing tongue.
- Then it descends along the thyroglossal duct to reach its final position by the 7th week.
- Ectopic : Descent of the thyroid could be arrested at any point, or extends down behind the sternum in the thorax.



Pharyngeal Pouches

- These are pairs of pouches develop in a craniocaudal sequence between the arches internally.
- The first pair of pouches lies between the first and second pharyngeal arches.
- There are four pairs of pharyngeal pouches.
- The fifth pair of pouches is absent or rudimentary.



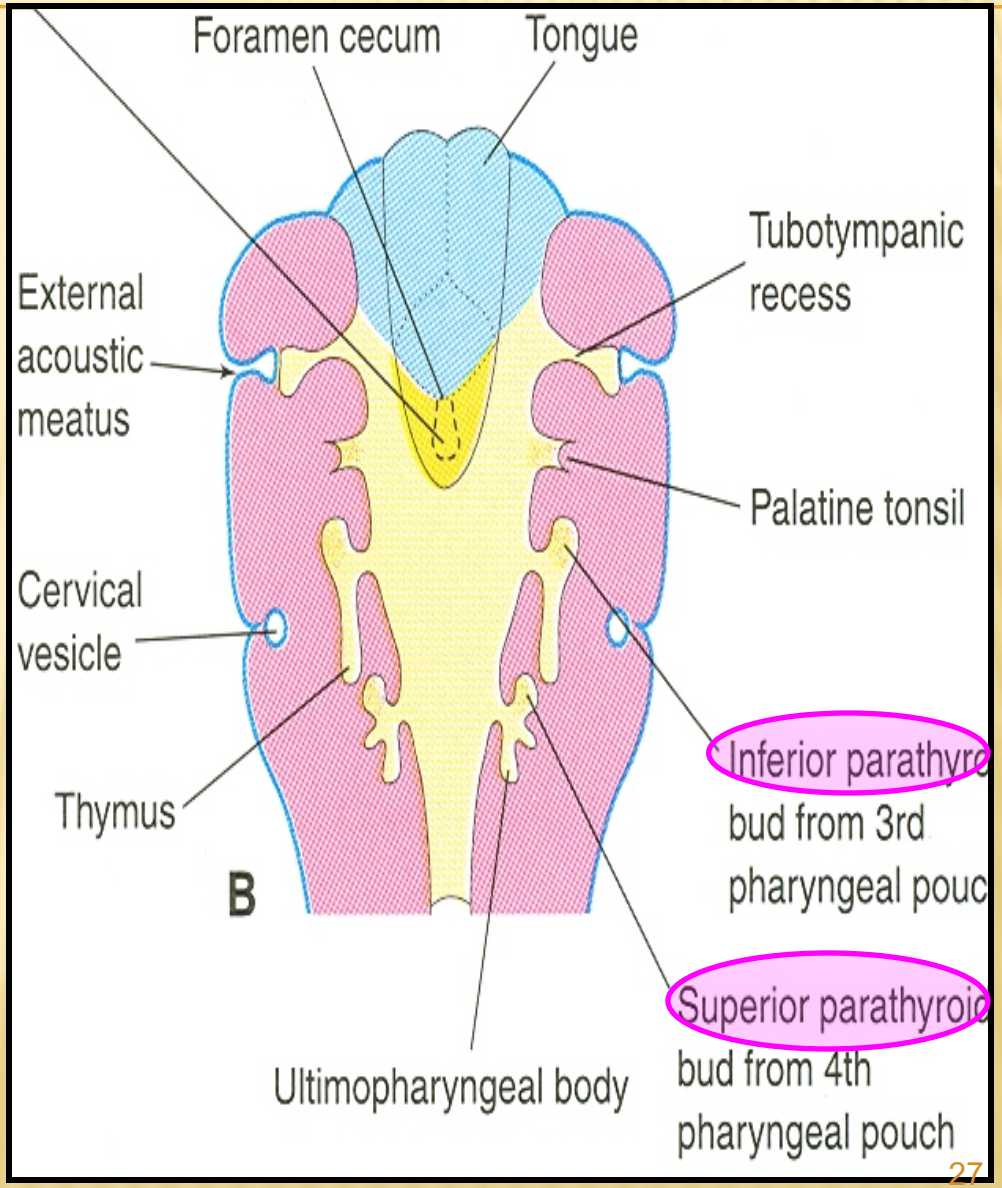
DEVELOPMENT OF THE PARATHYROIDS

Each of the 3rd & 4th pharyngeal pouch develops into dorsal and ventral parts.

By the sixth week : the Dorsal part of the 3rd pouch develops into inferior parathyroid bud,

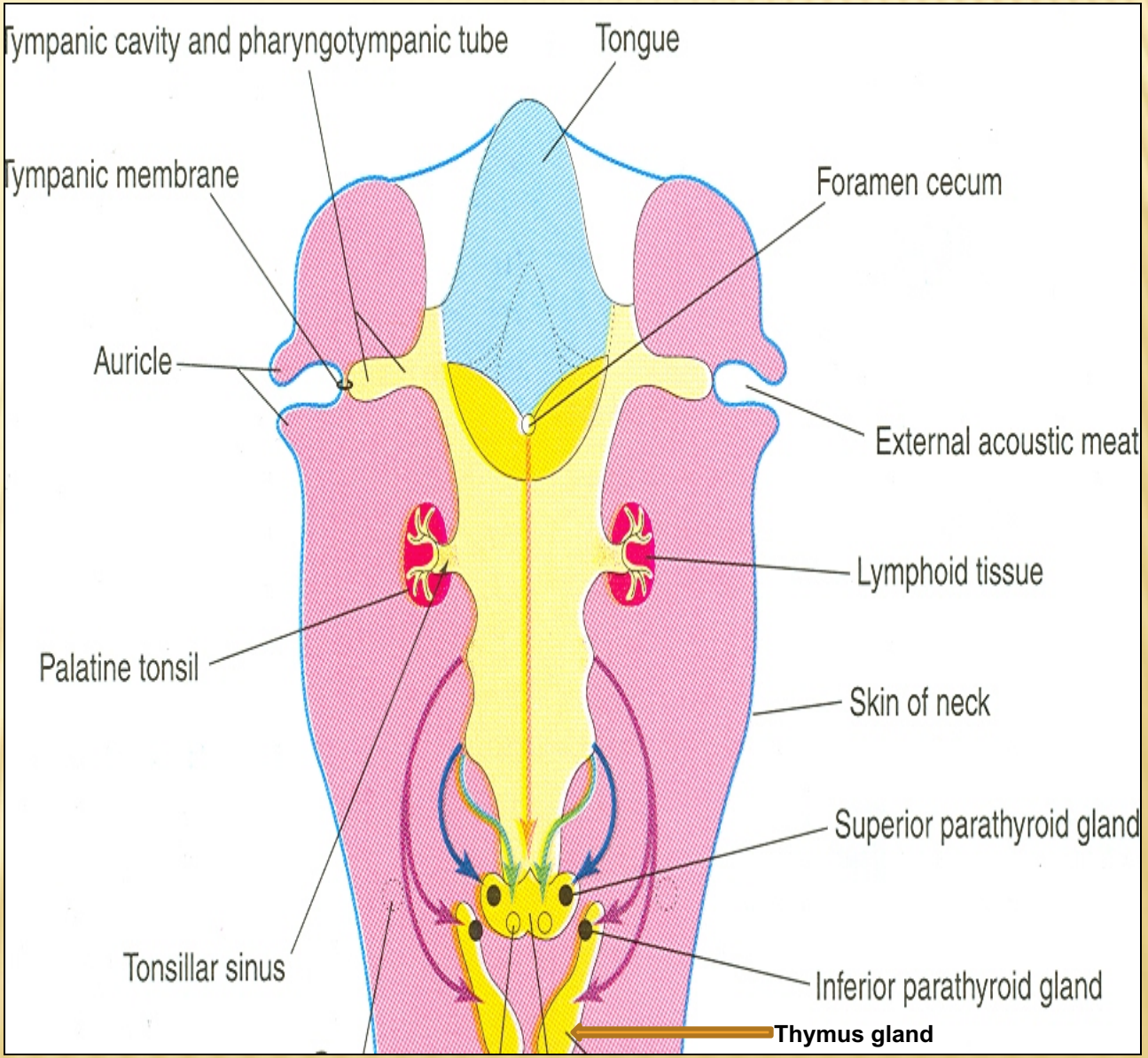
while the dorsal part of the 4th pouch develops into the superior parathyroid bud.

The ventral part of 3rd pouch gives the thymus gland primordium while the ventral part of the 4th forms what is called Ultimopharyngeal body.



DEVELOPMENT OF THE PARATHYROIDS

- As the thymus primordium develops, it descends downward to the thorax, behind the sternum in superior mediastinum,
- It draws the inferior parathyroid **bud** to a lower level than the superior parathyroid.
- **Both parathyroid glands lie behind the thyroid gland.**



Clinical notes

▪The **External laryngeal nerve** runs close to the **superior thyroid artery** before turning medially to supply the cricothyroid muscle. High ligation of the superior thyroid artery **during thyroidectomy places this nerve at risk of injury,** so it should be ligated within the upper pole of the gland. **Its lesion** will **cause horsiness of voice.**

▪**The inferior thyroid artery** is closely associated with the **recurrent laryngeal nerve**. This nerve can be found , in a triangle bounded laterally by the **common carotid artery**, medially by the **trachea,** and superiorly by the **thyroid lobe**.

▪The relationship of the **recurrent laryngeal nerve** and the **inferior thyroid artery** is **highly variable** in that the nerve can lie deep or superficial to the artery, or between the branches of the artery, and be different on either side of the neck.

So, Consideration of this nerve and its branches must be given during thyroidectomy.

NB. RLN lesion may results in **impaired breathing & speech.**

THANK YOU

TEST YOUR SELF!

- Which of the following nerves is endanger in ligation of the superior thyroid artery?
- A. External laryngeal
- B. Recurrent laryngeal.
- C. Internal laryngeal.
- D. Superior laryngeal.
- Which of the following structures lies anterior to the thyroid lobe?
- A. Inferior belly of omohyoid.
- B. Internal jugular vein.
- C. Vagus nerve.
- D. Sternohyoid.