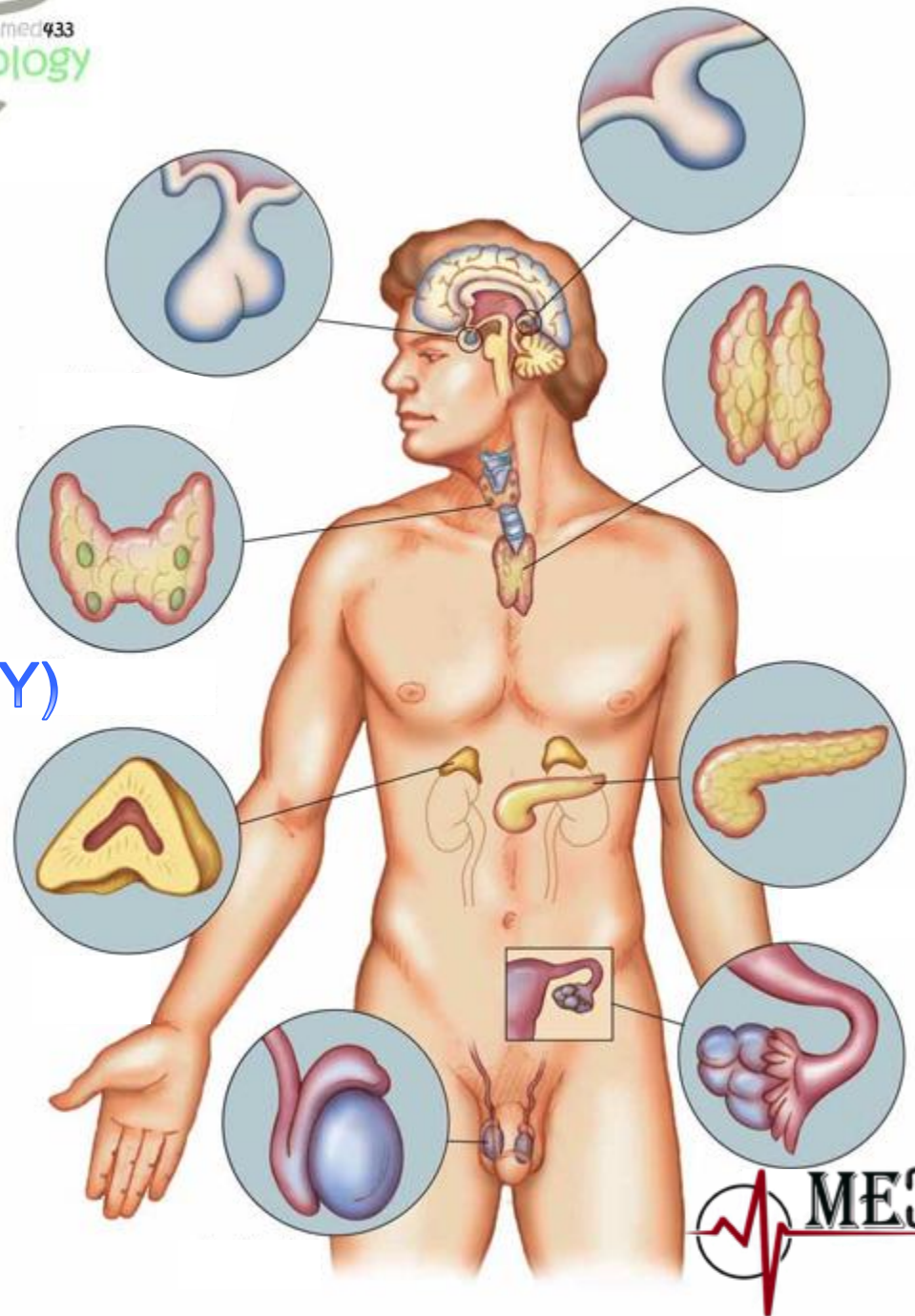
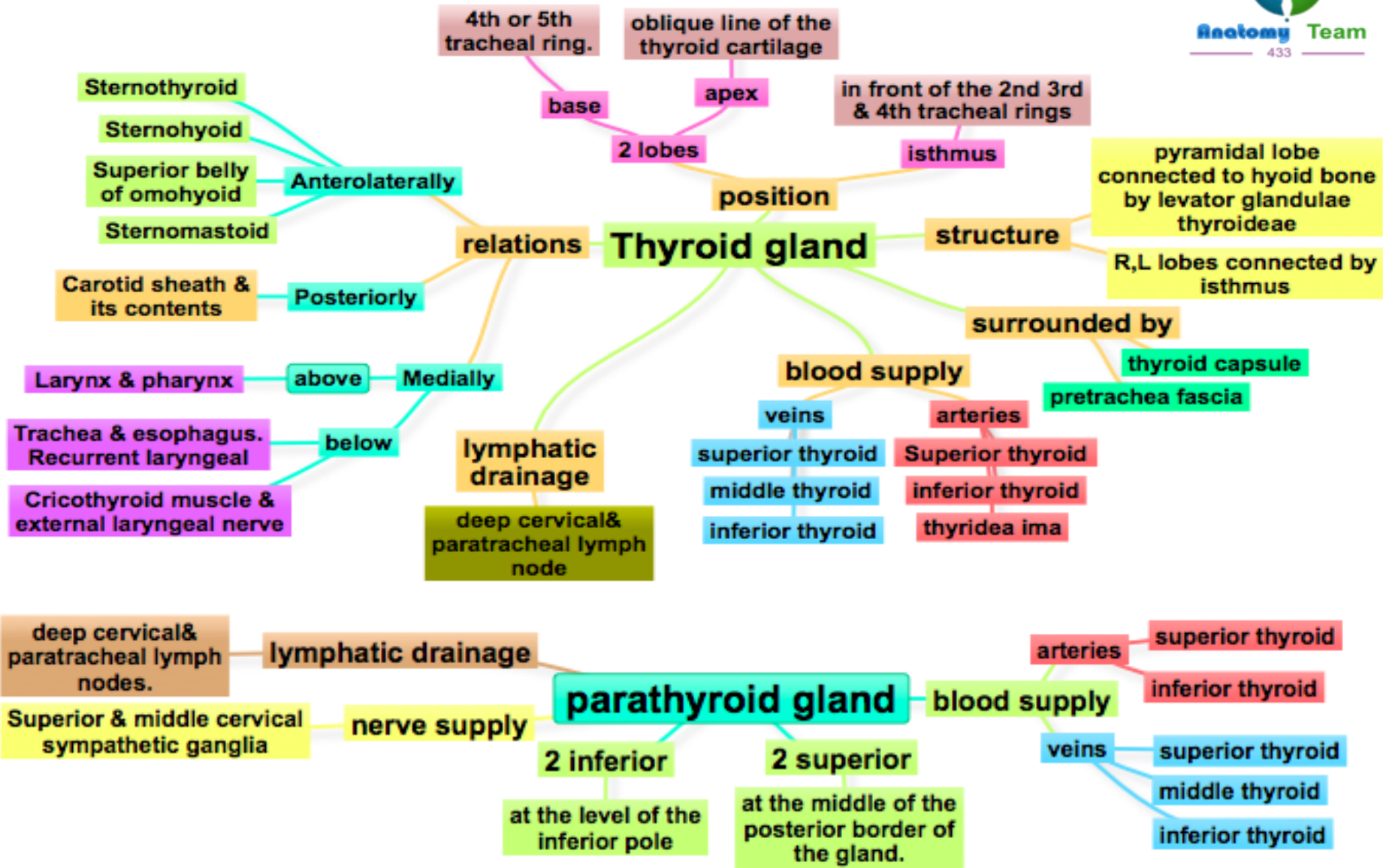


L2 THYROID AND PARATHYROID GLANDS (ANATOMY & EMBRYOLOGY)



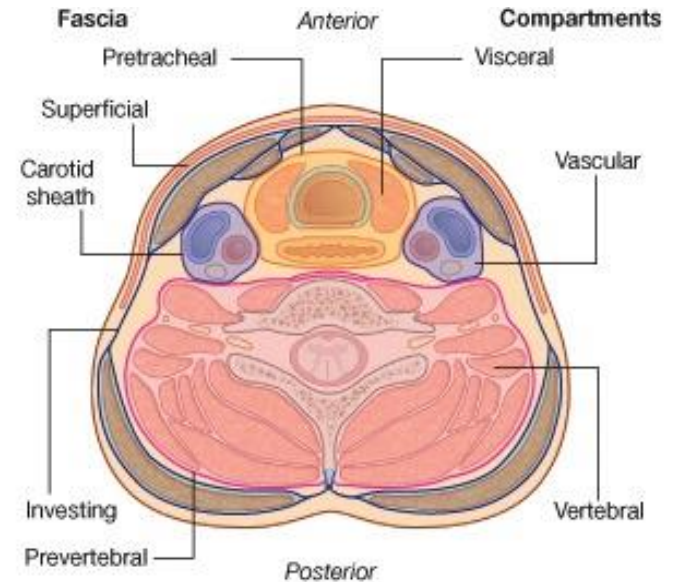
MIND MAP.



DEEP CERVICAL FASCIA

Is composed of:

- 1- **investing layer** (housing four muscles at its corners: 2 sternocleidomastoids anteriorly + 2 trapezius posteriorly)
- 2- **pretracheal layer.**
- 3- **prevertebral layer.**
- 4- **carotid sheath.**

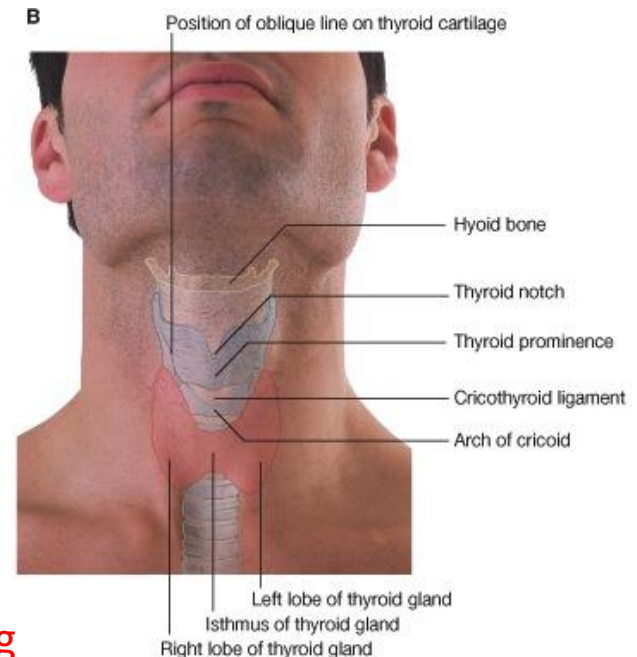


THYROID GLAND

- ✓ The **largest** endocrine gland in the body.
- ✓ Butterfly shaped.
- ✓ Composed of 2 lobes connected by an isthmus.
- ✓ Surrounded by a facial sheath derived from the **pretracheal** fascia.
 - The pretracheal fascia is **attached to the larynx.**

What is the clinical importance?

since the pretracheal fascia is attached to the larynx any mass inside the thyroid gland will move when swallowing



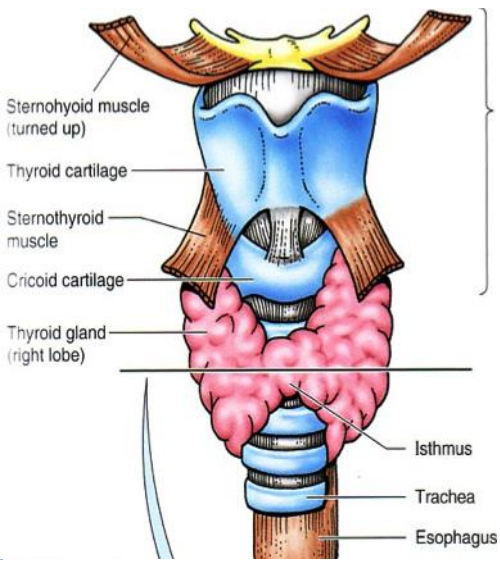
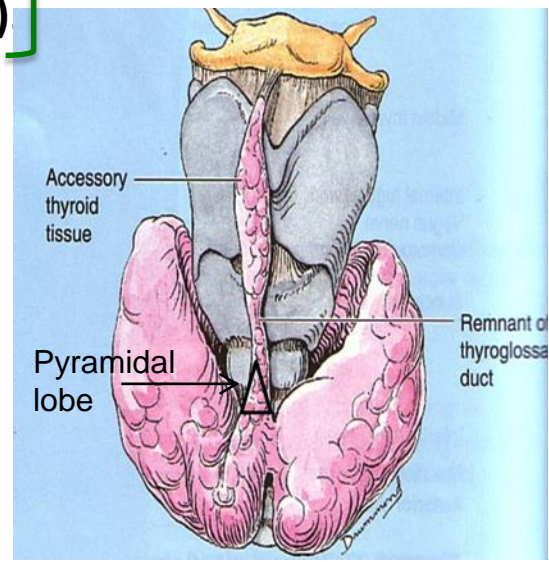
THYROID GLAND Lobes

Composed of:

- 1-Right lobe.
- 2-Left lobe.
- 3-Pyramidal lobe (in 50% of people)

Connected by **isthmus** which covers the **2nd, 3rd and 4th** tracheal rings

- If present it projects from the **upper border** of the isthmus slightly **to left of middle line**.
 - The Pyramidal lobe is connected to hyoid bone by a fibrous or muscular band called **levator glandulae thyroideae**.
 - This represents the fibrosed & obliterated thyroglossal duct.
- (see embryology)



- ✓ Each lobe is pear-shaped, with its apex reaching up to the **oblique line** of thyroid cartilage. (place of attachment of the sternothyroid muscle)
- ✓ Its base lies at the level of **4th or 5th** tracheal rings.
- ✓ Inside the pretracheal facial capsule, there is another capsule.
- ✓ So, it is surrounded **by 2 membranes**.

THYROID GLAND Relations

Anterolaterally: (4 muscles starting with S)

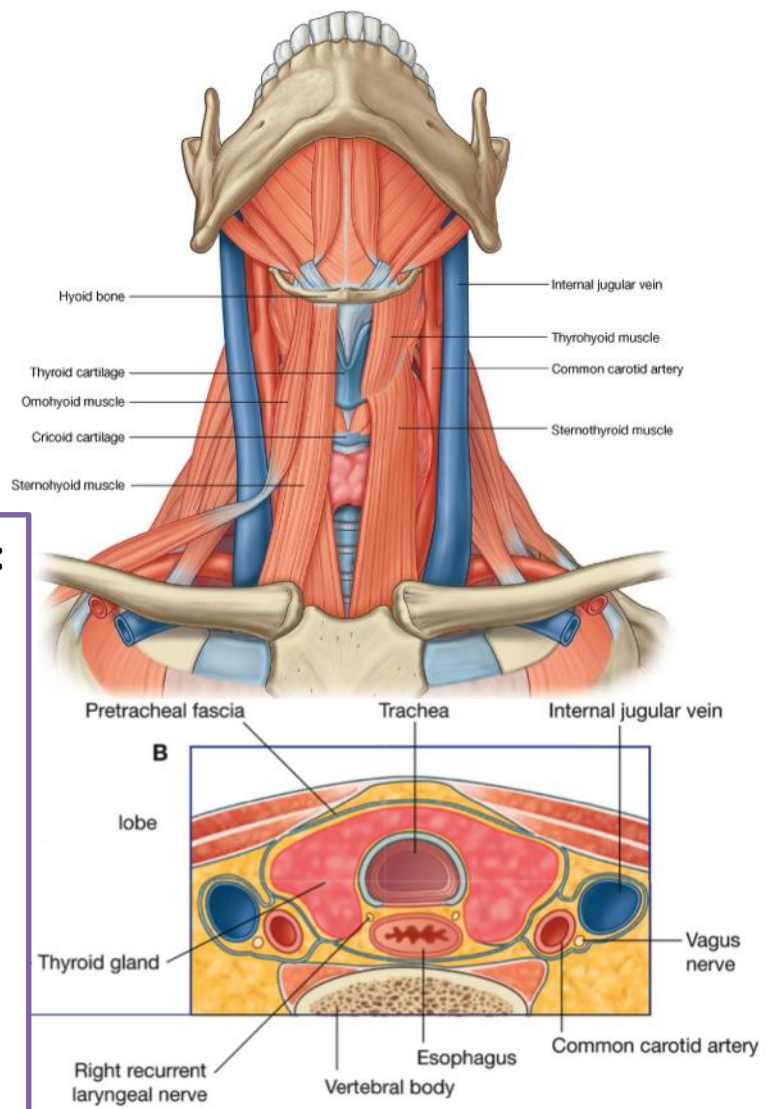
- 1- Sternothyroid.
- 2- Sternohyoid.
- 3- Superior belly of omohyoid.
- 4- Sternomastoid.

Posterolaterally:
Carotid sheath with its content:

- Common carotid artery below & internal carotid artery above.
- Internal jugular vein.
- Vagus nerve.
- Deep cervical lymph node

Posteromedially(medially):

- Above:
Larynx & pharynx
- Below:
Trachea & esophagus
- Recurrent laryngeal nerve (between trachea & esophagus).
- Cricothyroid muscle.
- External laryngeal nerve.



The posterior border of the thyroid is **rounded** and related to:

- Parathyroid glands.
- Anastomosis between superior and inferior thyroid arteries.

THYROID GLAND Blood supply

Supplied by:

1- superior thyroid artery: a branch of external carotid artery.

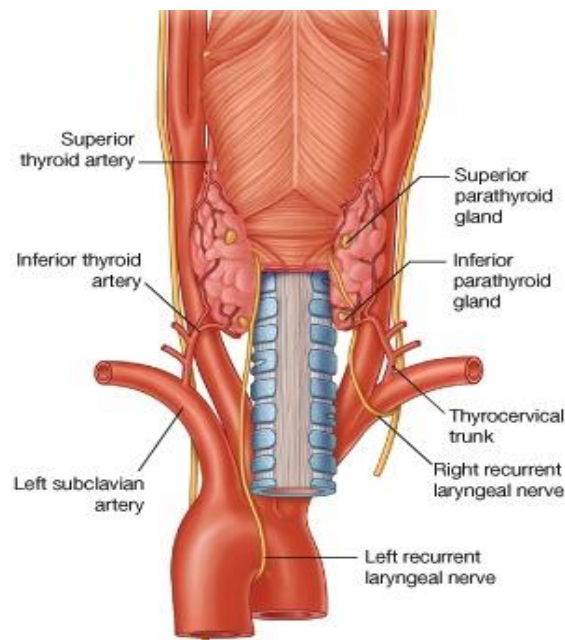
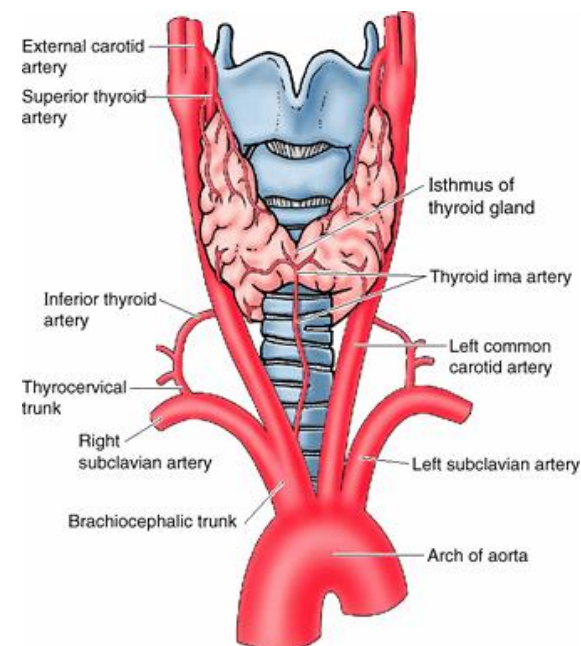
- ✓ Descends towards the pole of the lobe along **with the external laryngeal nerve**.
- ✓ Runs along the upper border of the isthmus and anastomose with the artery on the other side.

2- inferior thyroid artery: from **thyrocervical** trunk of the **1st part of subclavian artery**.

- ✓ It ascends upwards to the level of the **cricoid cartilage**. Then it **curves medially behind the carotid sheath**. Then it reaches the posterior aspect of the gland.
- ✓ **Related to the recurrent laryngeal nerve** (cross either in front or behind the artery or within its branches)

3- thyroid ima artery: (not always present)

- ✓ If present it arises either from **aortic arch** or **brachiocephalic artery**.



THYROID GLAND Venous and lymphatic drainage

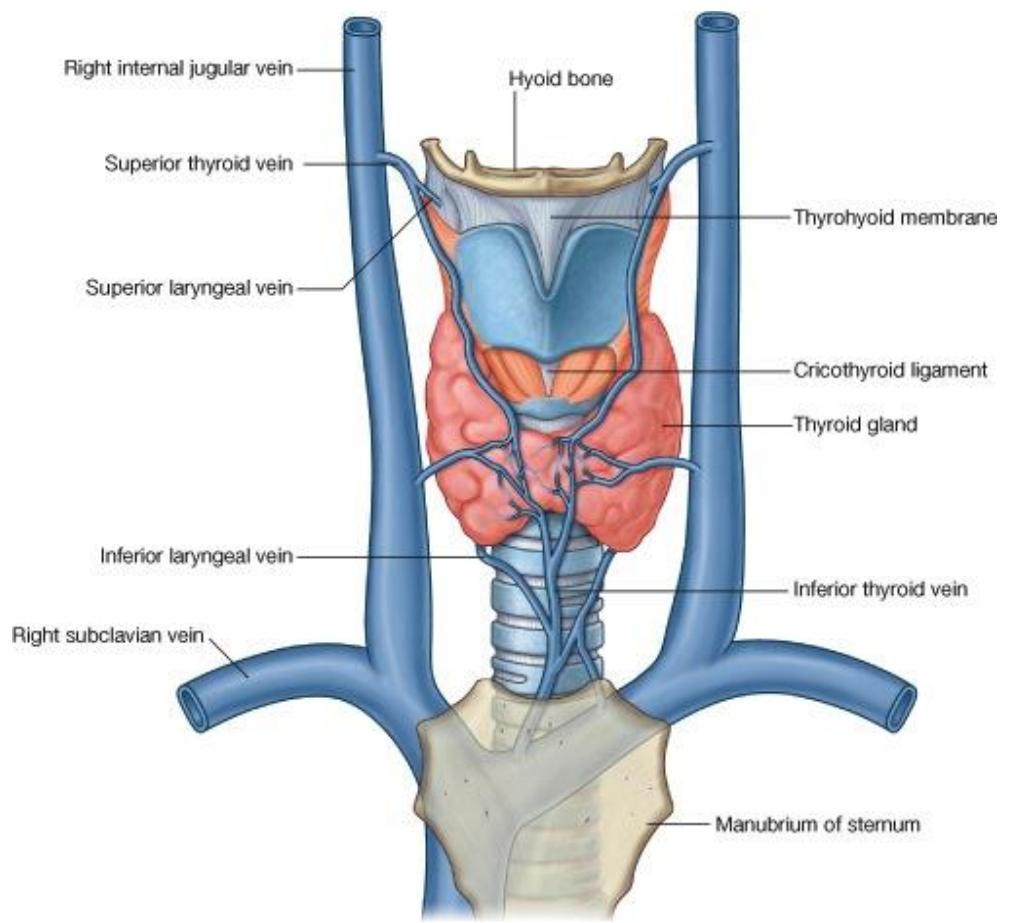
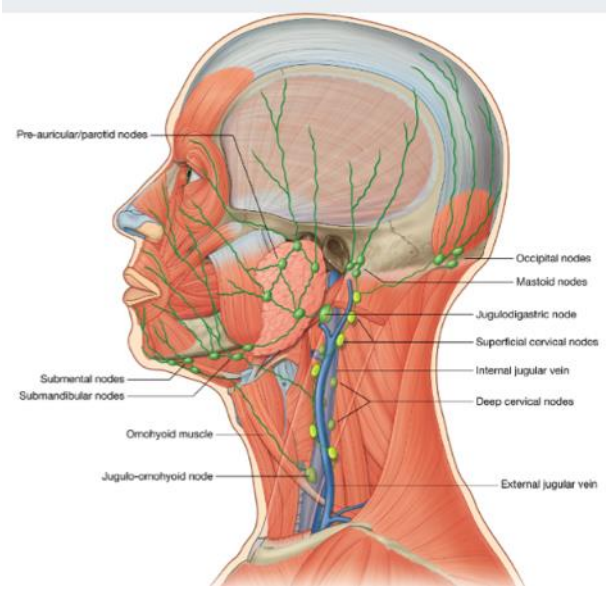
Veins:

- 1-Superior thyroid vein } Drain into **internal jugular vein**
- 2-Middle thyroid vein } Drain into **internal jugular vein**
- 3-Inferior thyroid vein — Drains into **left brachiocephalic vein**

Lymph:

Drain into:

- 1-Deep cervical lymph nodes.
- 2-Paratracheal lymph nodes.



CLINICAL NOTES Thyroidectomy

VERY IMPORTANT

When ligating thyroid arteries during thyroidectomy 2 nerves are at risk:

1- external laryngeal nerve:

- ✓ Which runs close to the **superior thyroid artery**.
- ✓ To avoid damaging this nerve the superior thyroid artery should be ligated **within the upper pole of the gland** (because it separates from the nerve inside the gland)
- ✓ Damage to this nerve (which supplies the cricothyroid muscle) will **cause hoarseness of voice**.

2-recurrent laryngeal nerve:

- ✓ Which is related to the **inferior thyroid artery**.
- ✓ The recurrent laryngeal nerve is found in a triangle bounded laterally by the **common carotid artery**, medially by the **trachea**, and superiorly by the **thyroid lobe**.
- ✓ To avoid damaging this nerve the inferior thyroid artery should **ligated away from the gland** (because it approaches the nerve close to the gland).
- ✓ Damage to this nerve follows **semon's law** which states:
 - **Complete transection** of the nerve will cause the vocal cords to stop **midway between abduction and adduction**.
 - **Surgical trauma** of the nerve will cause the vocal cords to be **held at adduction(closed)**, because the fibers of the abductor muscle (posterior cricoarytenoid) are on the periphery of the nerve.

Impaired breathing and speech

PARATHYROID GLANDS

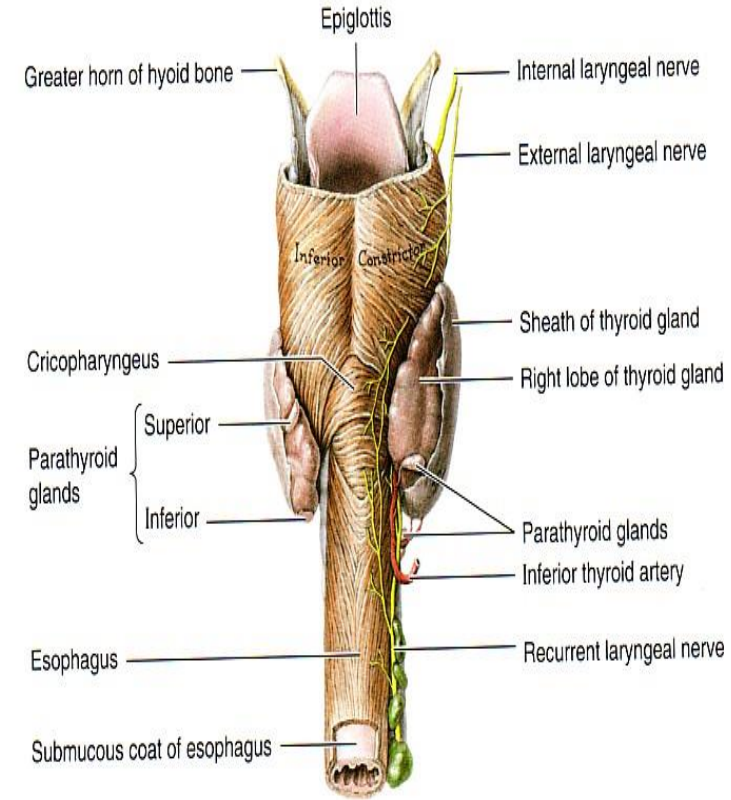
- ✓ 4 Small ovoid masses 6 mm long
- ✓ They lie within the facial capsule of the gland (between the 2 membranes)

Two superior parathyroids:
 In the middle of the posterior border of the gland.

Two inferior parathyroids:
 Which have a variable position either within the thyroid tissue or outside the facial capsule (sometimes retrosternal)

Arterial supply:
 1. **Superior thyroid artery.**
 2. **Inferior thyroid artery.**(more important)

Venous drainage:
 1. **Superior thyroid vein.**
 2. **Middle thyroid vein.**
 3. **Inferior thyroid vein.**



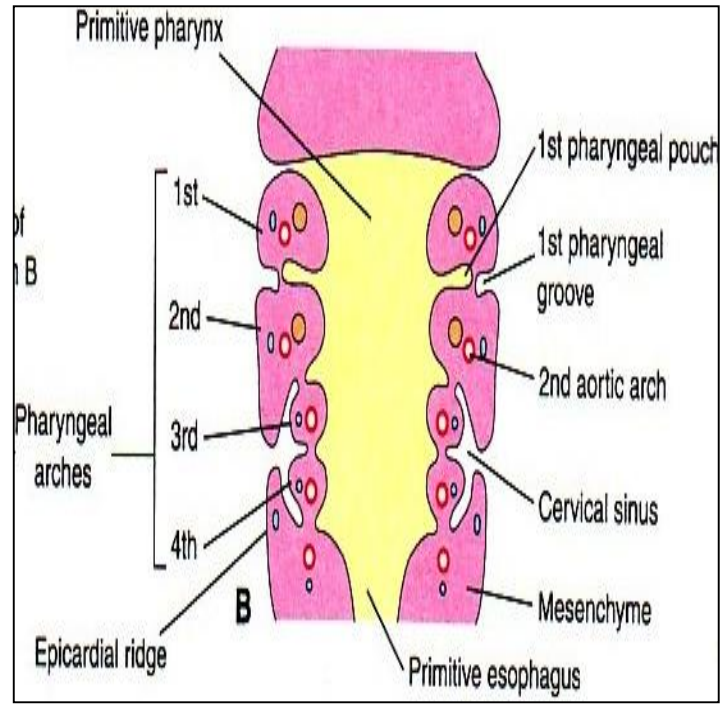
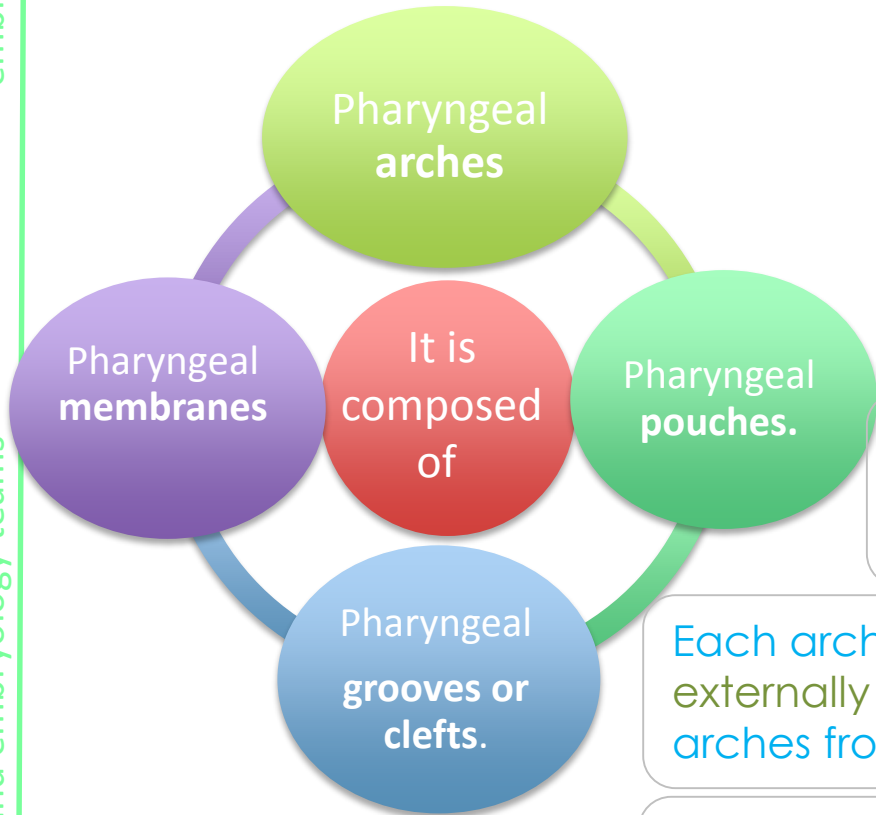
Lymph:
Deep cervical & Paratracheal lymph nodes

Nerve supply:
Superior & middle cervical sympathetic ganglia.

Development of thyroid and parathyroid glands

#Pharyngeal Apparatus:

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



The mesoderm in the head and neck regions divided into six 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.

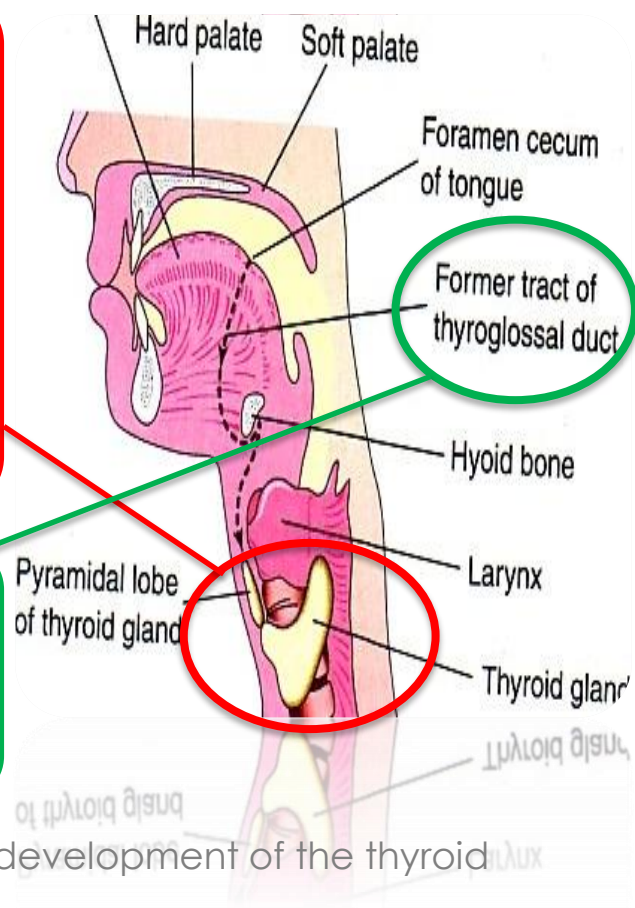
It develops from the **endoderm** of the floor of the primitive pharynx at the junction of the anterior 2/3rd & posterior 1/3rd of the tongue (**foramen cecum**) *
 It develops from the (Thyroid primordium)

1

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

2

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



3

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

4

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

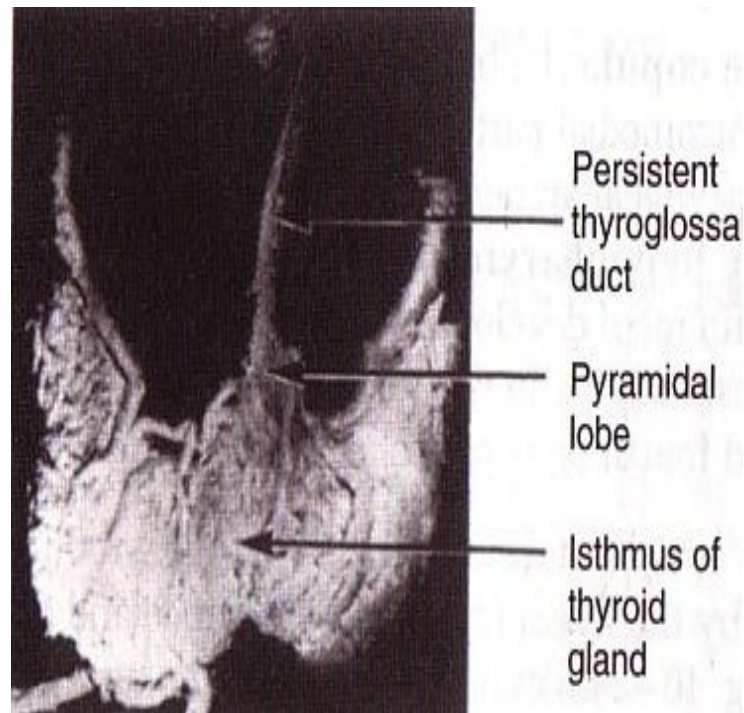
* The site of beginning of the development of the thyroid primordium.

#Thyroid gland.. Cont

Its upper end of duct (thyroglossal duct) persists in the dorsum of the tongue as the foramen cecum.

The distal part of the duct may persist 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 thyroidea**



#Pharyngeal Pouches

How many pharyngeal pouches do we have ?
four pairs of pharyngeal pouches. And the 5th one is absent or rudimentary.

Where does the 1st pair of pouches lie ?
between the first and second pharyngeal arches.

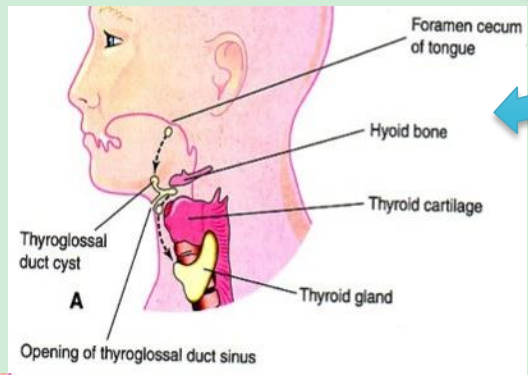
How does these pouches develop ?
The pairs of pouches develop in a craniocaudal sequence between the arches.

#Congenital Anomalies

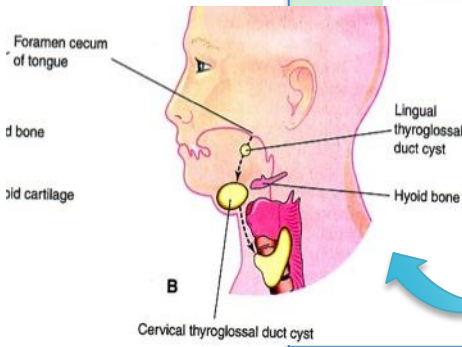
Most of thyroglossal duct cysts are located just inferior to hyoid bone.

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.

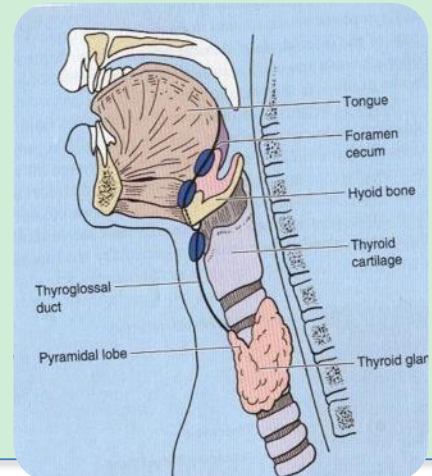


Ectopic Thyroid tissue

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.

Descent of the thyroid could be arrested at any point, or extends down behind the sternum in the thorax.



#DEVELOPMENT OF THE PARATHYROIDS

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

#By 6th week :

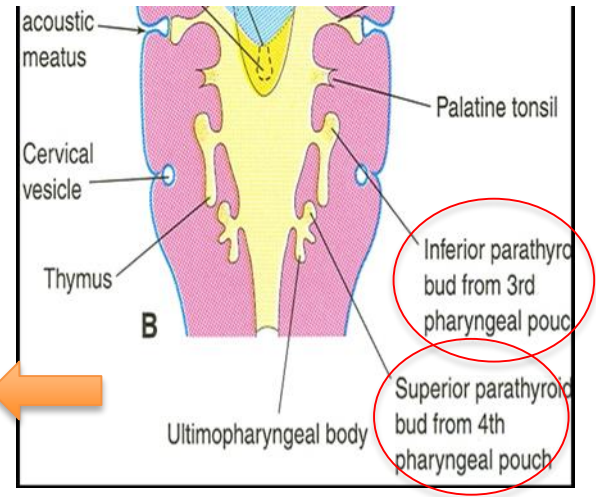
the **Dorsal** part of the 3rd pouch develops into **inferior parathyroid bud**.

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

The **ventral** part of 3rd pouch gives the **thymus gland primordium**

the **ventral** part of the 4th forms what is called **Ultimopharyngeal body**.

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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.

Timeline summary

24th day after fertilization

The thyroid gland begins its development.

7th week (50th day)

The thyroid gland takes its final shape & position, and the thyroglossal duct begins to fibrose and degenerate.

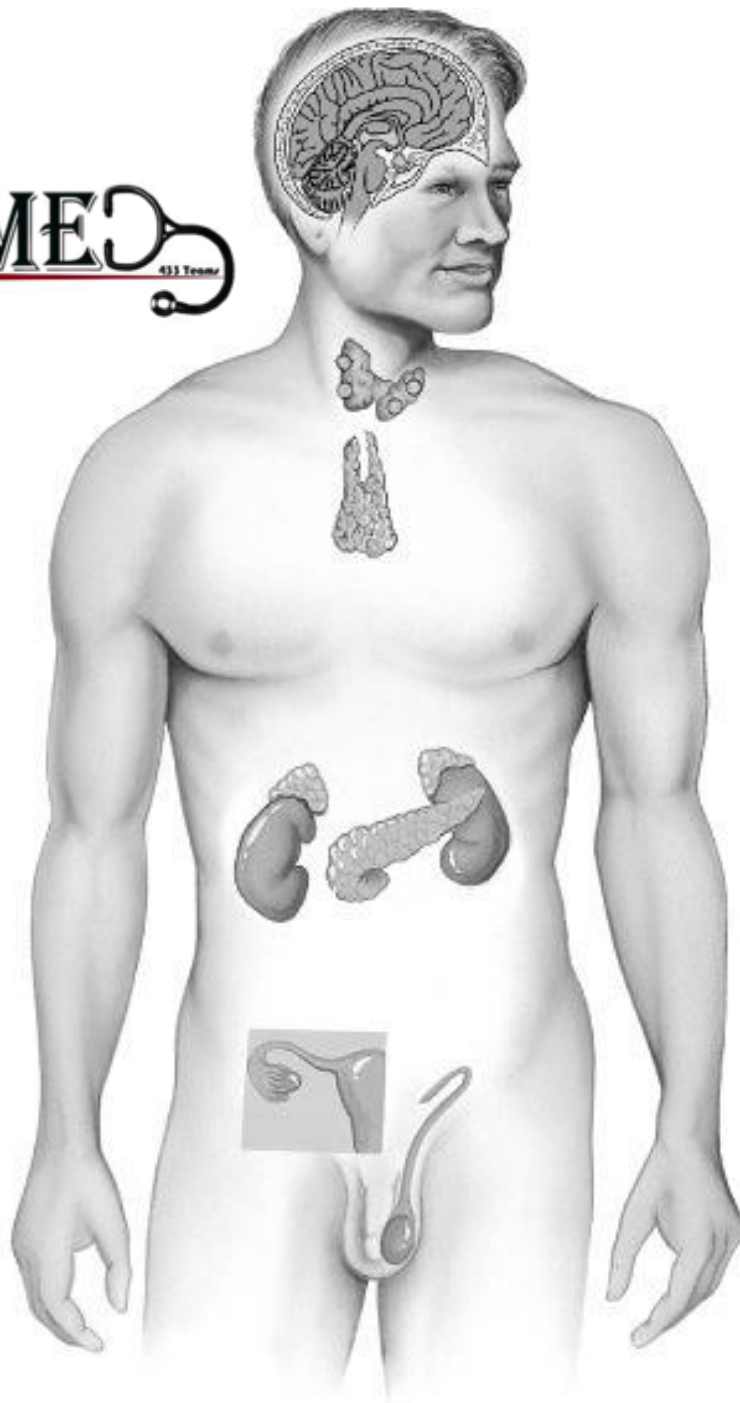
Sixth week

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.



Pharyngeal pouches

<https://www.youtube.com/watch?v=WiE7LJu3AL4>



GOOD LUCK

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