THYROID & PARATHYROID GLANDS

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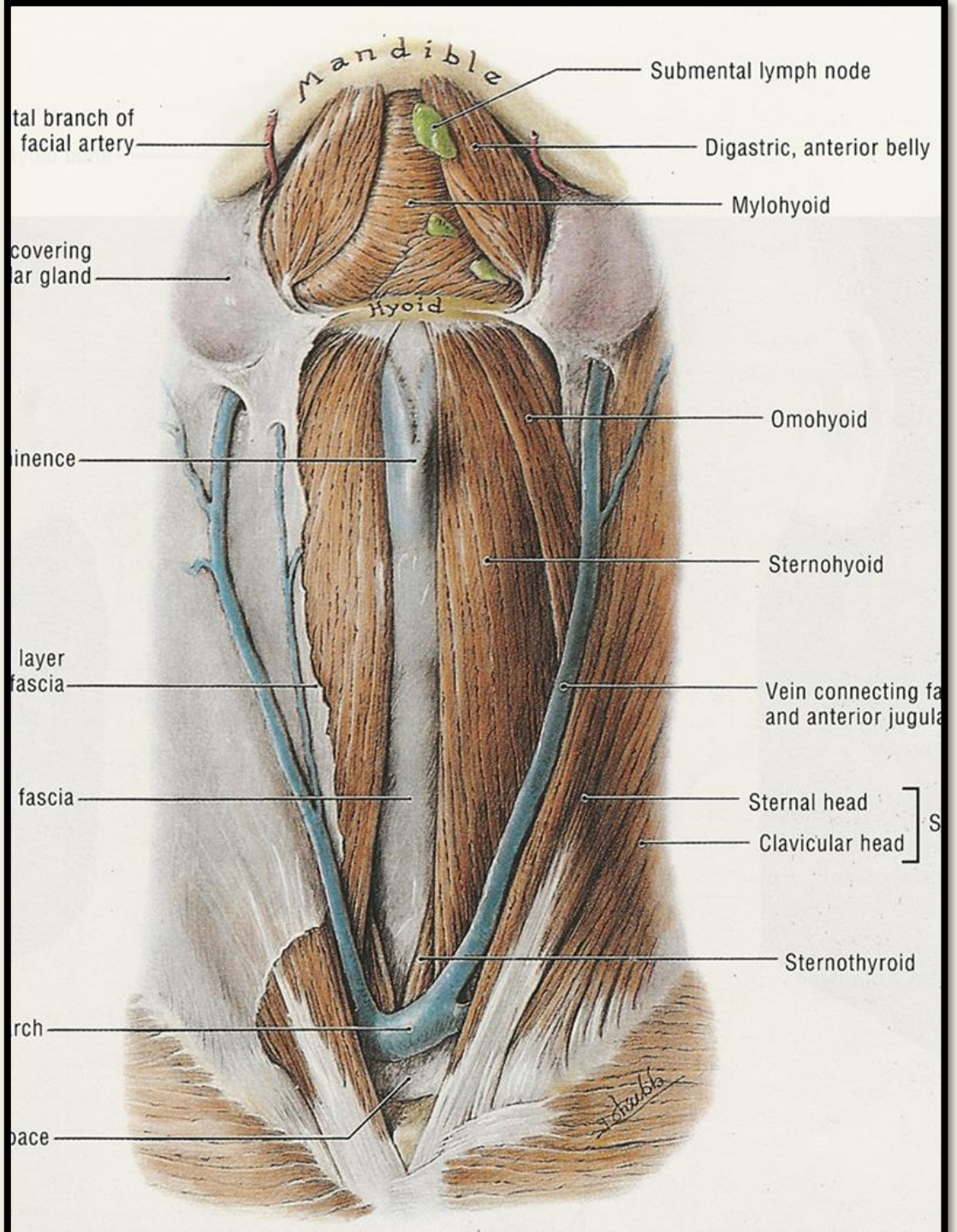


Size: it's the largest endocrine gland in the body

Weight: 25 grams

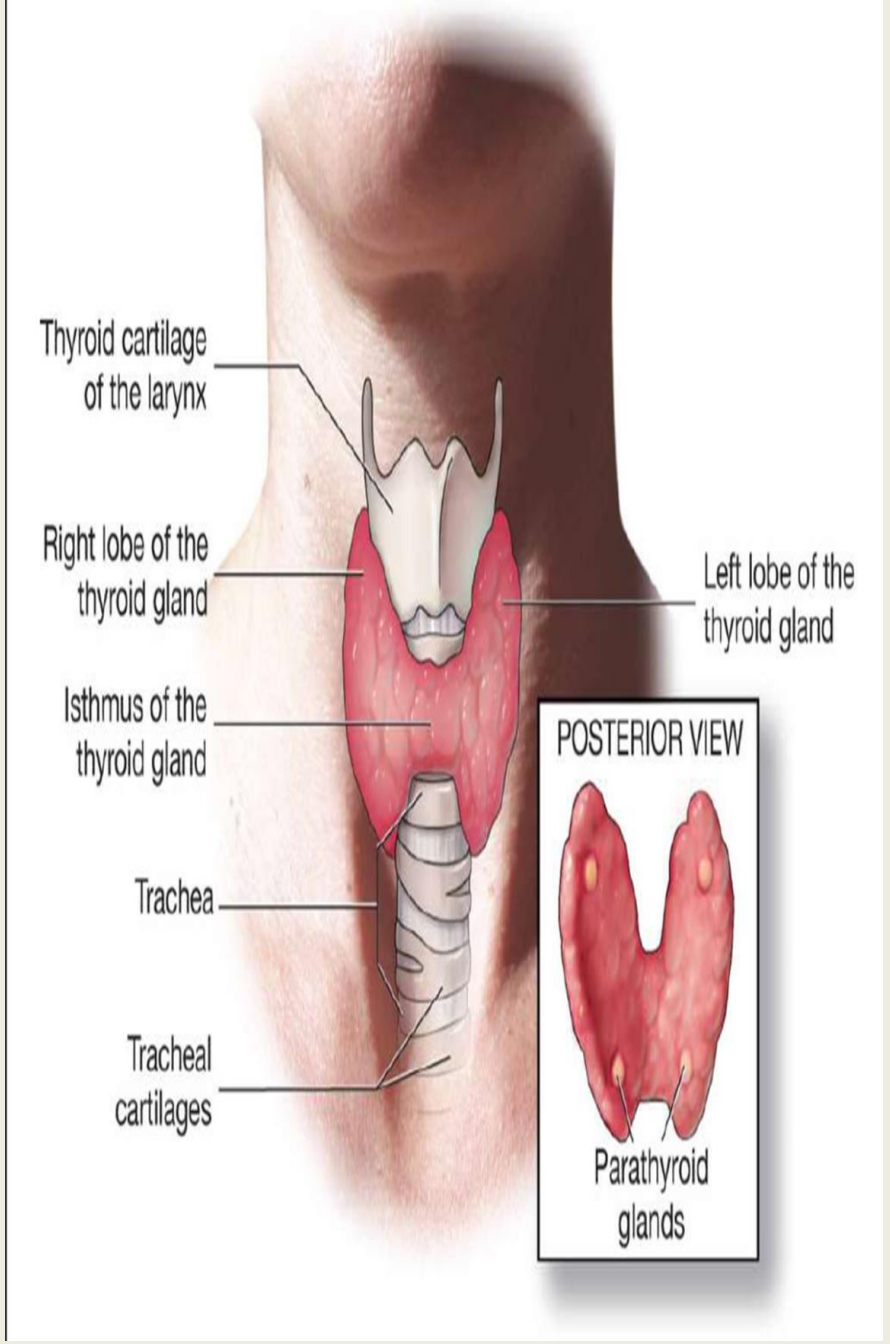
Site: It lies in the front &sides of the lower part of the neck clasping the trachea, It is ensheathed by the pretracheal fascia.

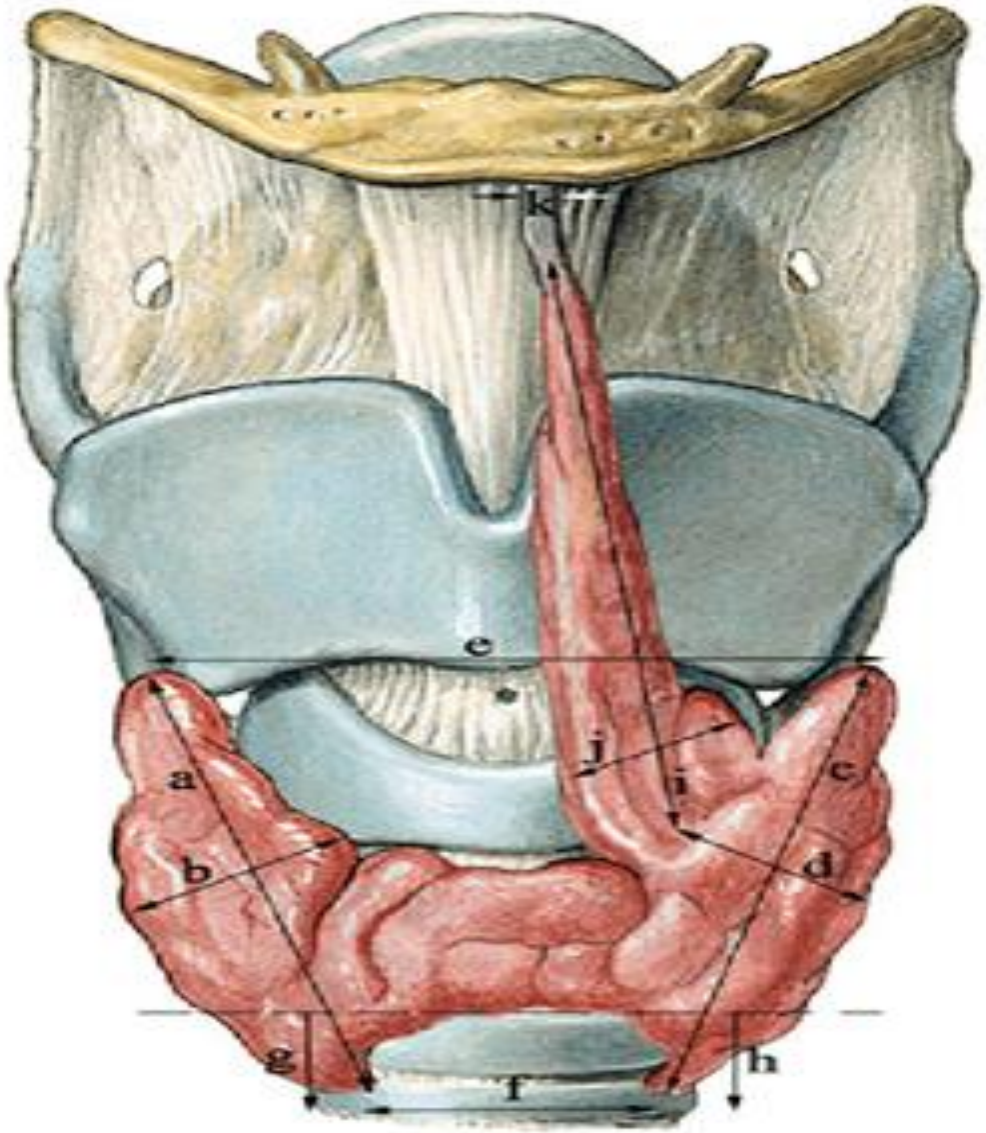
Shape: It is butterfly in shape. It consists of right and left lobes connected across the median plane by a narrow part called isthmus.

- each lobe is conical in shape with **its superior pole** diverging upwards and laterally to the level of **the oblique lines of the thyroid cartilage**.

The lower poles extend downwards reaching the level of the **fifth to sixth tracheal ring**.

- **Isthmus**: connecting the 2 lateral lobes
- **Small pyramidal lobe**: (may be present) project upwards from the isthmus and may be connected to the hyoid bone by fibromuscular band **called levator glandulae thyroidea** (remnants of thyroglossal duct in the embryo)




k
e
a
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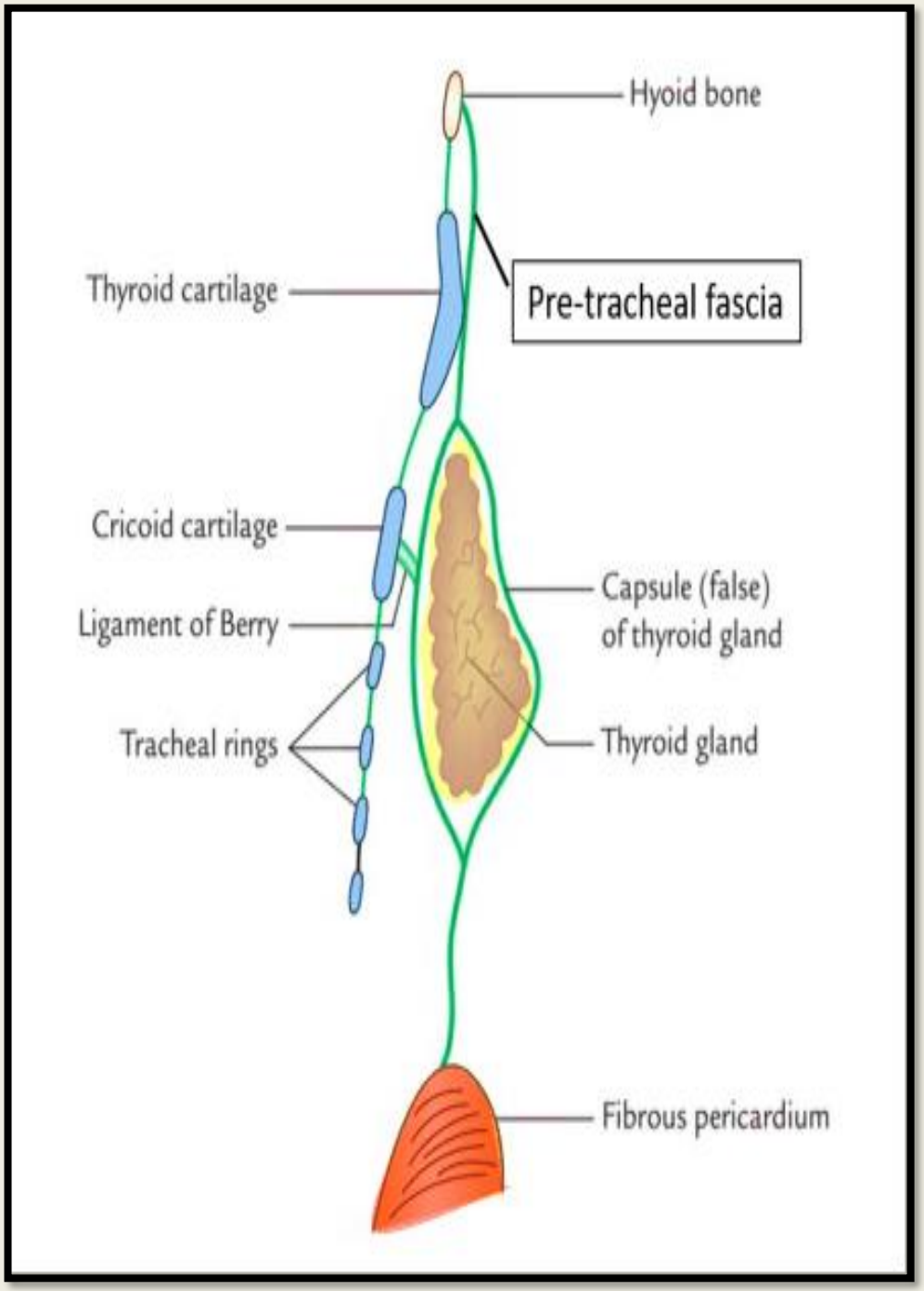
Capsule:

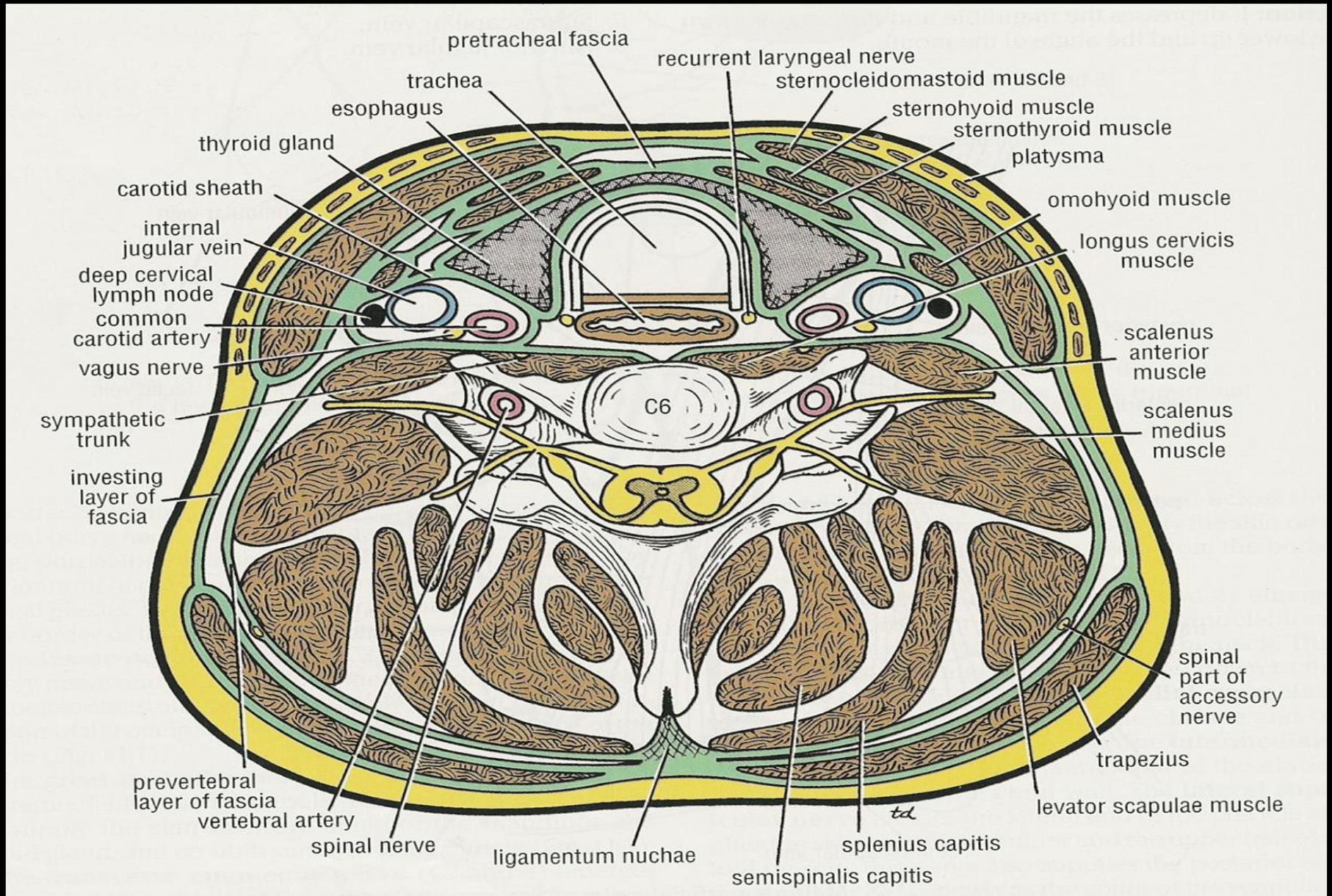
It has a true capsule which is separated from the false capsule formed of the pre-tracheal fascia by a network of nerve fibers and anastomosing vessels.

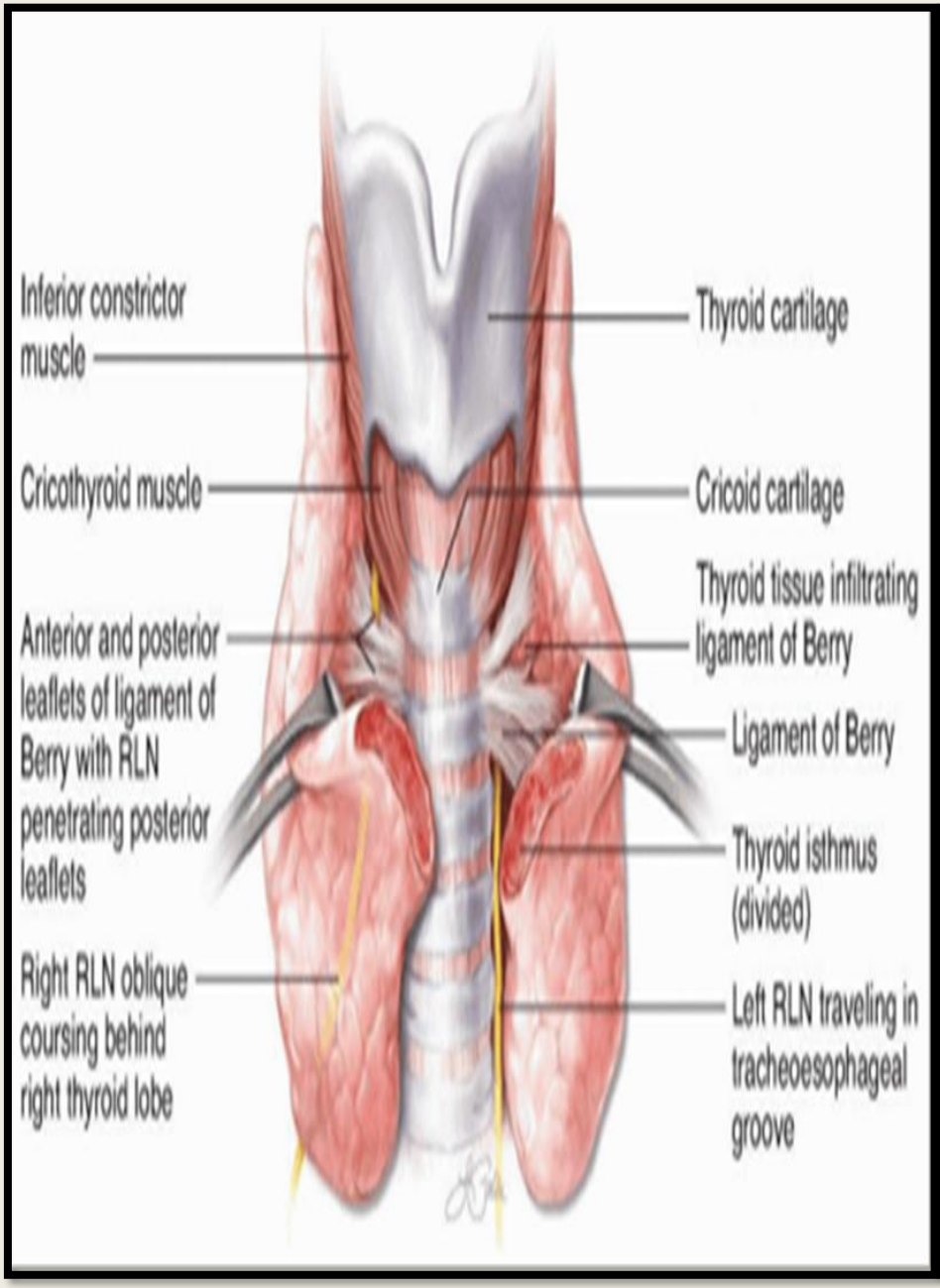
the pre-tracheal fascia is attached to:

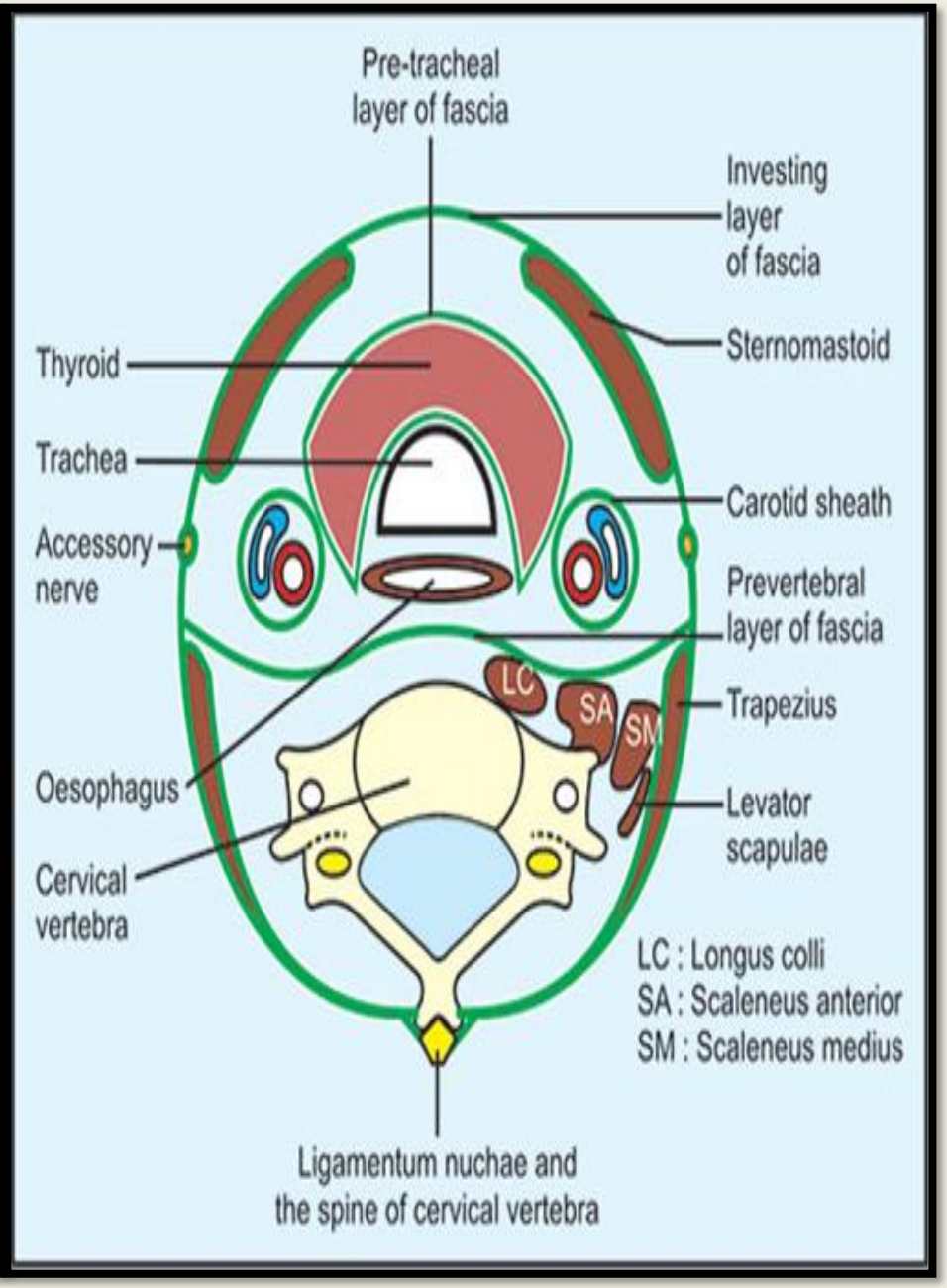
- **Upwards to oblique line of thyroid cartilage and hyoid bone which move with deglutition.**
- **Inferiorly it fuses with the adventitia of arch of aorta and fibrous pericardium.**
- **Lateral: fuses to the carotid sheath.**

There is thickening of this fascia that fix the back of each lobe to cricoid cartilage & upper tracheal ring (Suspensory ligament of thyroid or ligament of Berry). RLN is embedded in the back of this ligament.




pretracheal fascia
recurrent laryngeal nerve
trachea
sternocleidomastoid muscle
esophagus
sternohyoid muscle
sternothyroid muscle
thyroid gland
platysma
carotid sheath
omohyoid muscle
internal jugular vein
longus cervicis muscle
deep cervical lymph node
common carotid artery
scalenus anterior muscle
vagus nerve
C6
sympathetic trunk
scalenus medius muscle
investing layer of fascia
spinal part of accessory nerve
trapezius
prevertebral layer of fascia
vertebral artery
levator scapulae muscle
spinal nerve
ligamentum nuchae
splenius capitis
semispinalis capitis


Inferior constrictor muscle
Thyroid cartilage
Cricothyroid muscle
Cricoid cartilage
Thyroid tissue infiltrating ligament of Berry
Anterior and posterior leaflets of ligament of Berry with RLN penetrating posterior leaflets
Ligament of Berry
Thyroid isthmus (divided)
Right RLN oblique coursing behind right thyroid lobe
Left RLN traveling in tracheoesophageal groove


Pre-tracheal layer of fascia
Investing layer of fascia
Sternomastoid
Thyroid
Trachea
Carotid sheath
Accessory nerve
Prevertebral layer of fascia
LC
SA
SM
Trapezius
Oesophagus
Levator scapulae
Cervical vertebra
LC : Longus colli
SA : Scaleneus anterior
SM : Scaleneus medius
Ligamentum nuchae and the spine of cervical vertebra

RELATIONS OF THYROID GLAND

A- Relations of the isthmus :

Anterior relations:

1-Skin & superficial fascia.

2-Ant jugular veins.

3-Deep fascia.

4-Sternohyoid & sternothyroid

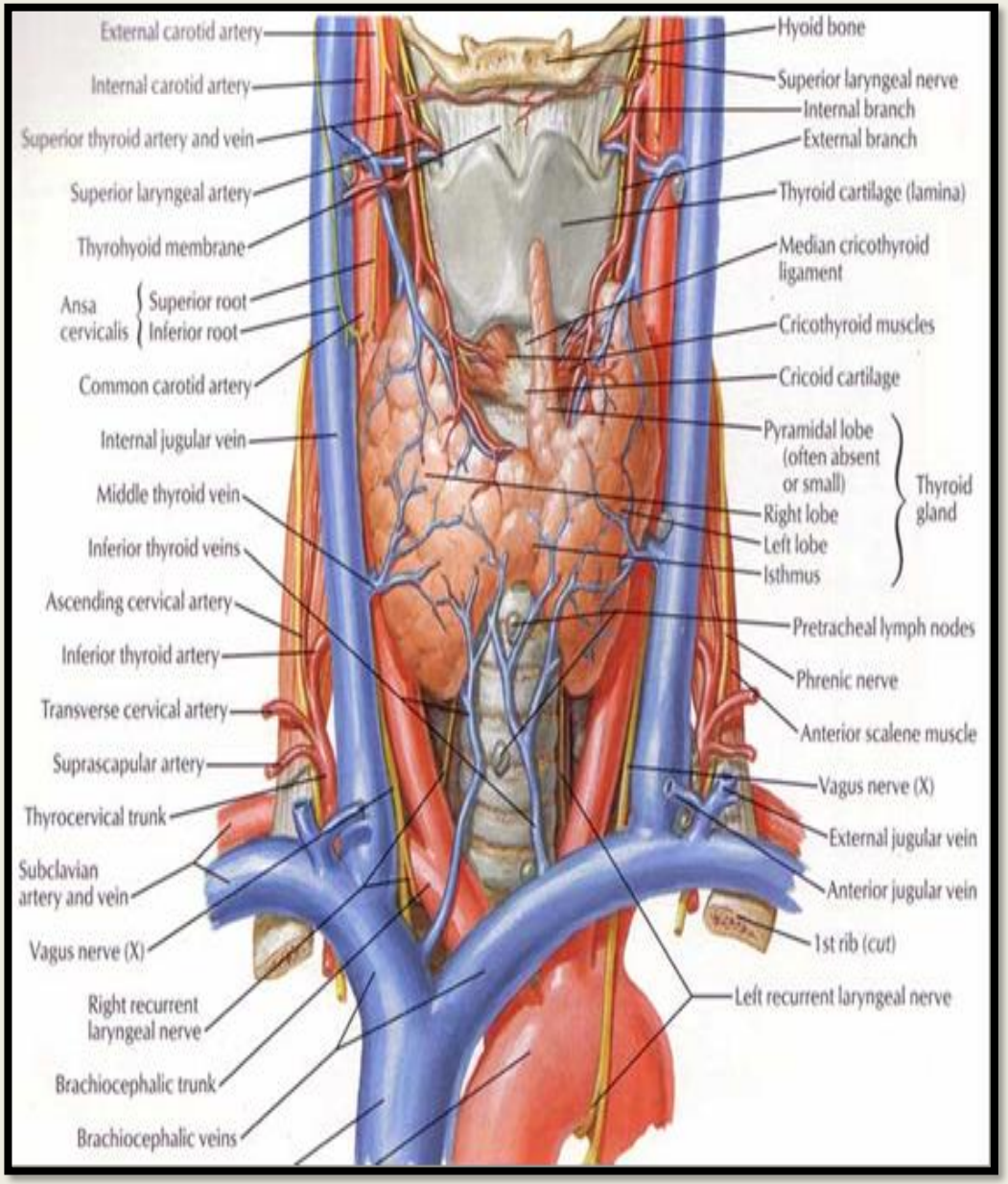
Posterior relations:

*** Trachea (2, 3, 4 rings).**

- The upper border of the isthmus is related to an anastomotic artery (between right & left superior thyroid arteries)

- The lower border of the isthmus gives rise of inferior thyroid veins and termination of thyroidea Ima artery.

- The pyramidal is conical thyroid tissue attached just to the left side of the upper border of the isthmus in about 50% of populations. It is a remnant of thyroglossal duct. Levator glandulae thyroidea is a fibromuscular band connect the apex of the pyramidal lobe to the hyoid bone.



B- Relations of the thyroid lobes

Each lateral lobe has three surfaces:

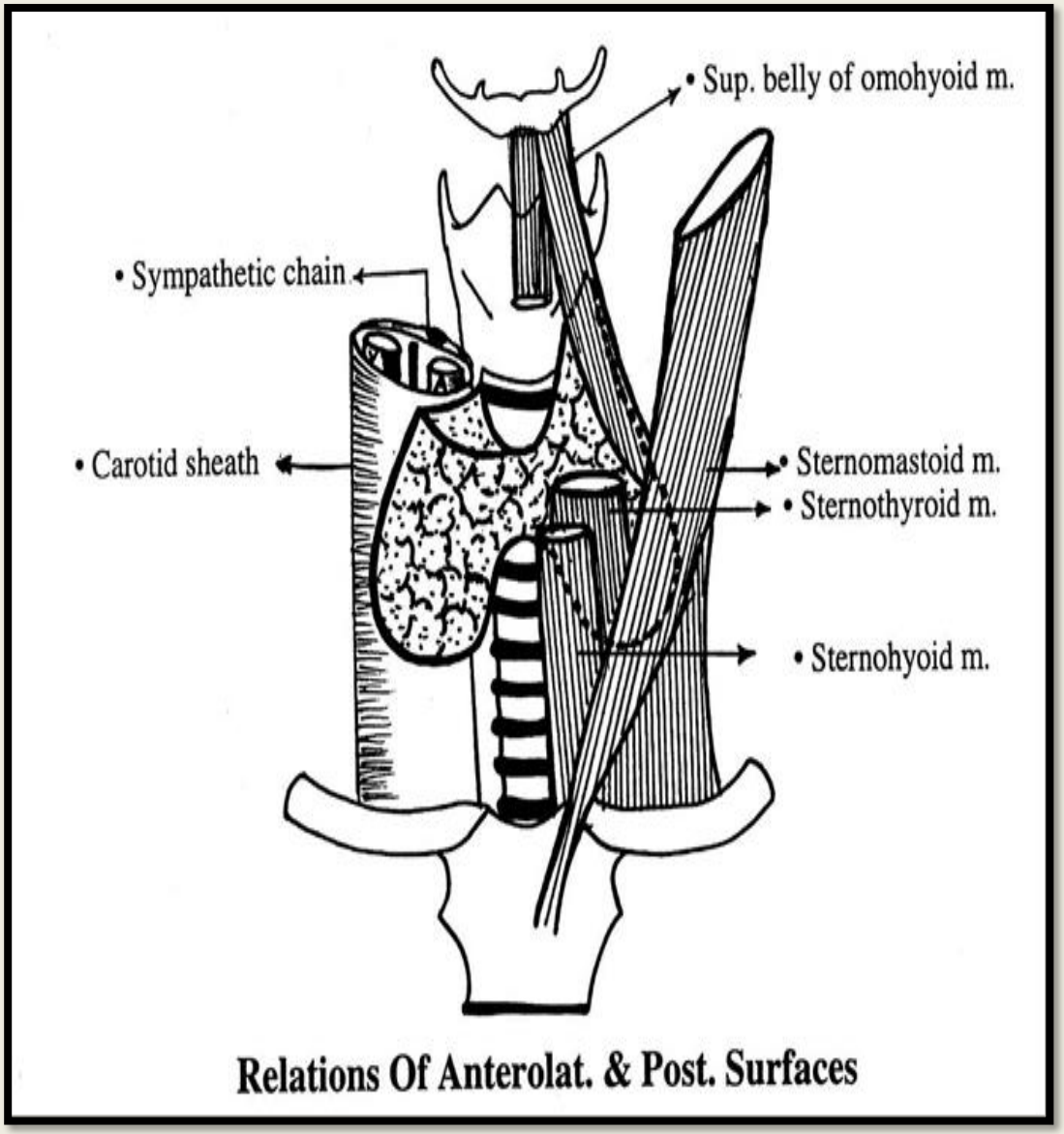
Anterolateral , medial and posterior surfaces.

(1)Anterolateral surface (superficial surface):

a)skin , superficial fascia(containing platysma muscle) & deep fascia ,

b) is related to 3 infrahyoid muscles (sternohyoid, sternothyroid, superior belly of omohyoid) overlapped by sternomastoid muscles

c) pretracheal fascia



Relations Of Anterolat. & Post. Surfaces

(2)Medial surface:

Its upper part is related to

a)**Larynx:** thyroid, cricoid cartilages & cricothyroid muscle

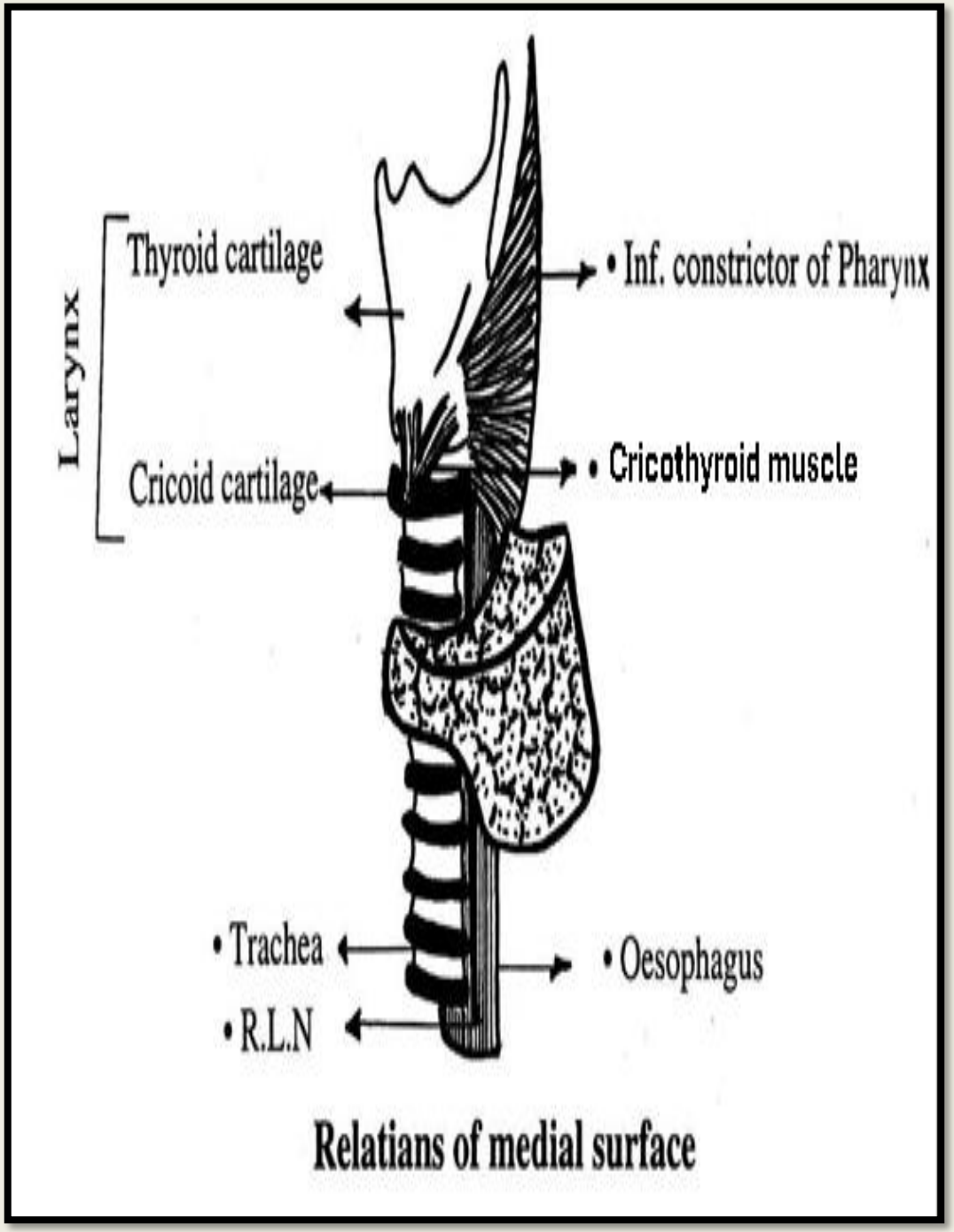
b)**Pharynx:** inferior constrictor muscle

Its lower border is related to

a)**Trachea**

b)cervical **Esophagus**

c)recurrent laryngeal nerve (in between)



Relatians of medial surface

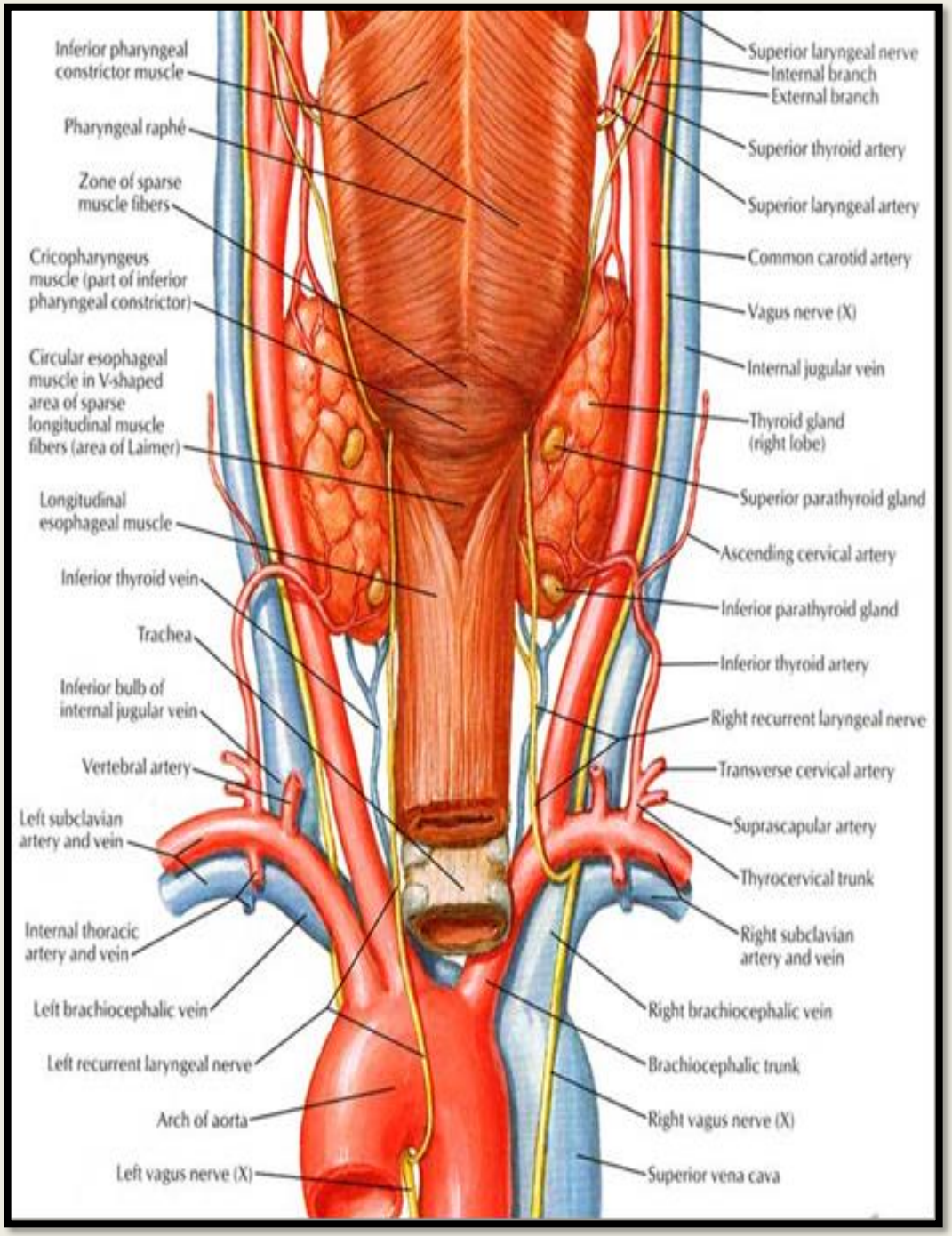
(3)Posterior surface

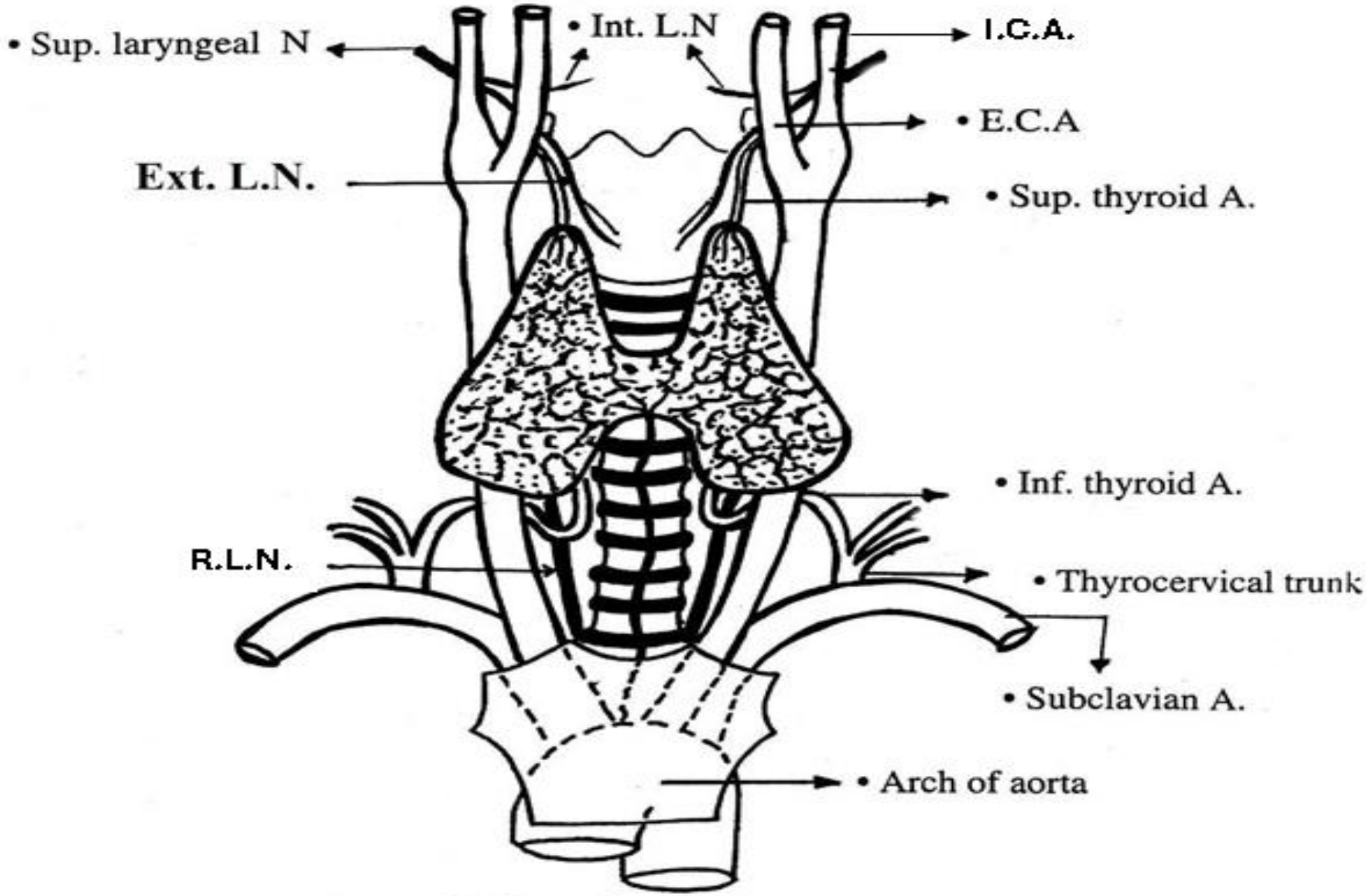
a) Two **parathyroid gland** are embedded in the posterior surface of the gland

b)**Inferior thyroid artery** (before entering the gland)

c)**common carotid arteries**

d)**R.L.N**





Arterial Supply & Nerves Related To Thyroid Gland

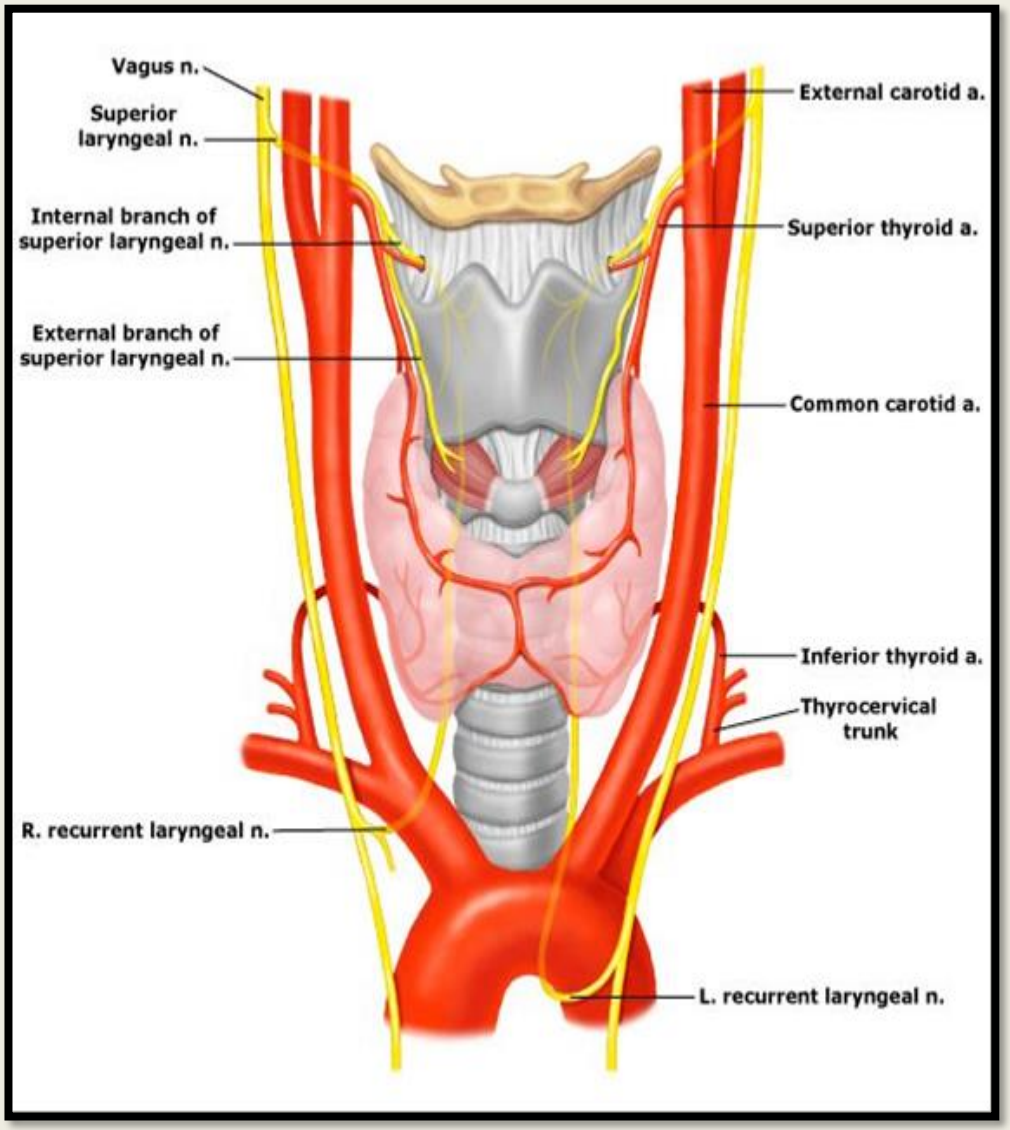
Arterial supply of the thyroid gland

The thyroid gland receives it arterial supply from:

1- The superior thyroid arteries (is the first anterior branch of the external carotid artery).

2 - Inferior thyroid arteries (arises from the thyrocervical trunk, a branch of the first part of subclavian artery).

3 - Occasionally, the thyroida ima arteries (which arises from the arch of aorta, brachiocephalic artery, or left common carotid artery. It supplies the isthmus of the thyroid gland).



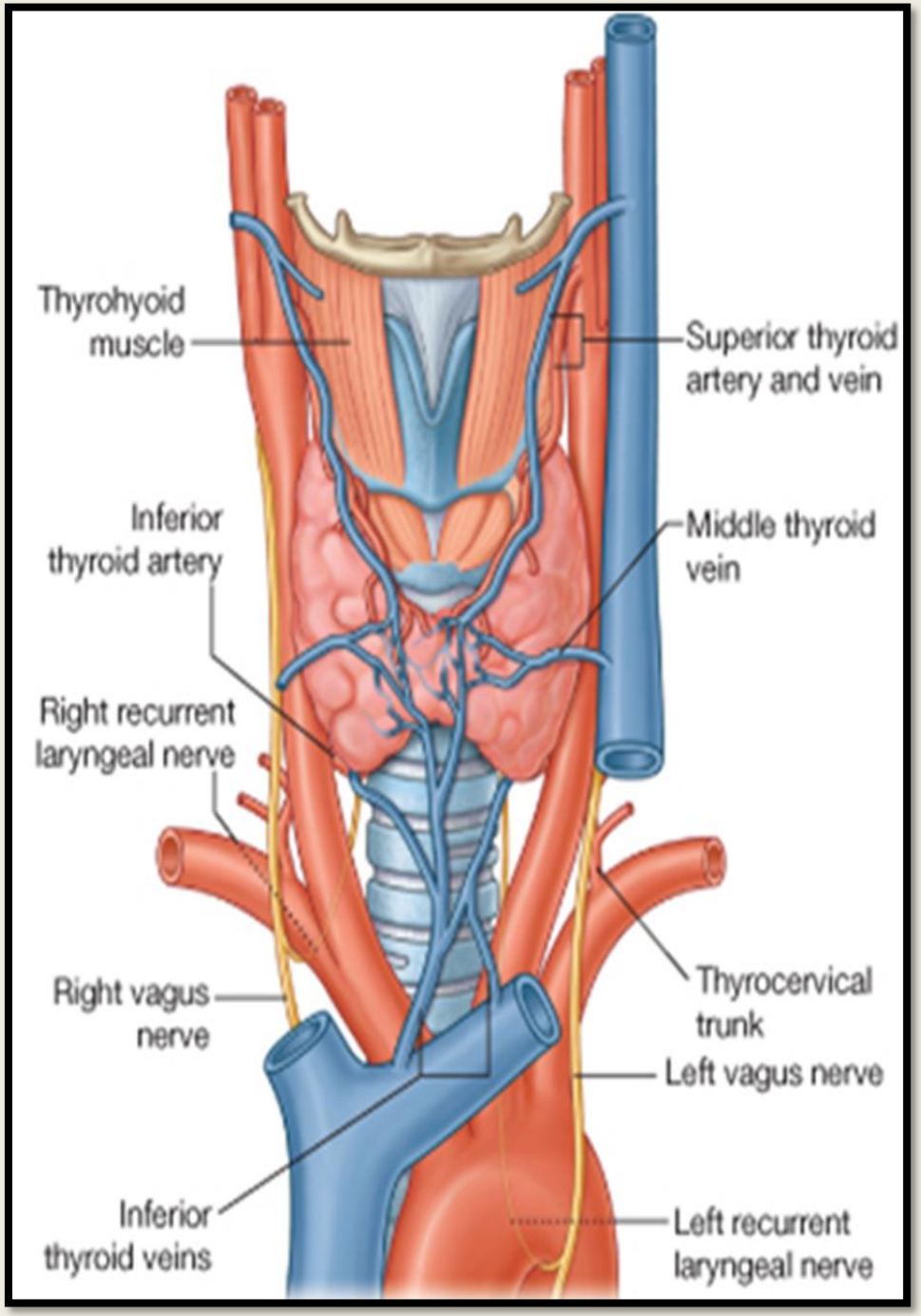
Venous drainage:

Three pairs of veins provide venous drainage to the thyroid gland.

1-The superior thyroid vein: ascends along the superior thyroid artery at the apex of the lobe and becomes a tributary of the internal jugular vein.

2-The middle thyroid vein: very short vein which arises from the middle of the lobe and ends in the internal jugular vein.

3-The inferior thyroid veins: arises from the lower border of the isthmus and adjacent part of the lobes. They descend and collect into one vein which usually ends in the left innominate vein.



Lymphatic Drainage

There is an extensive lymphatic plexus within the gland which is drained into the following nodes:

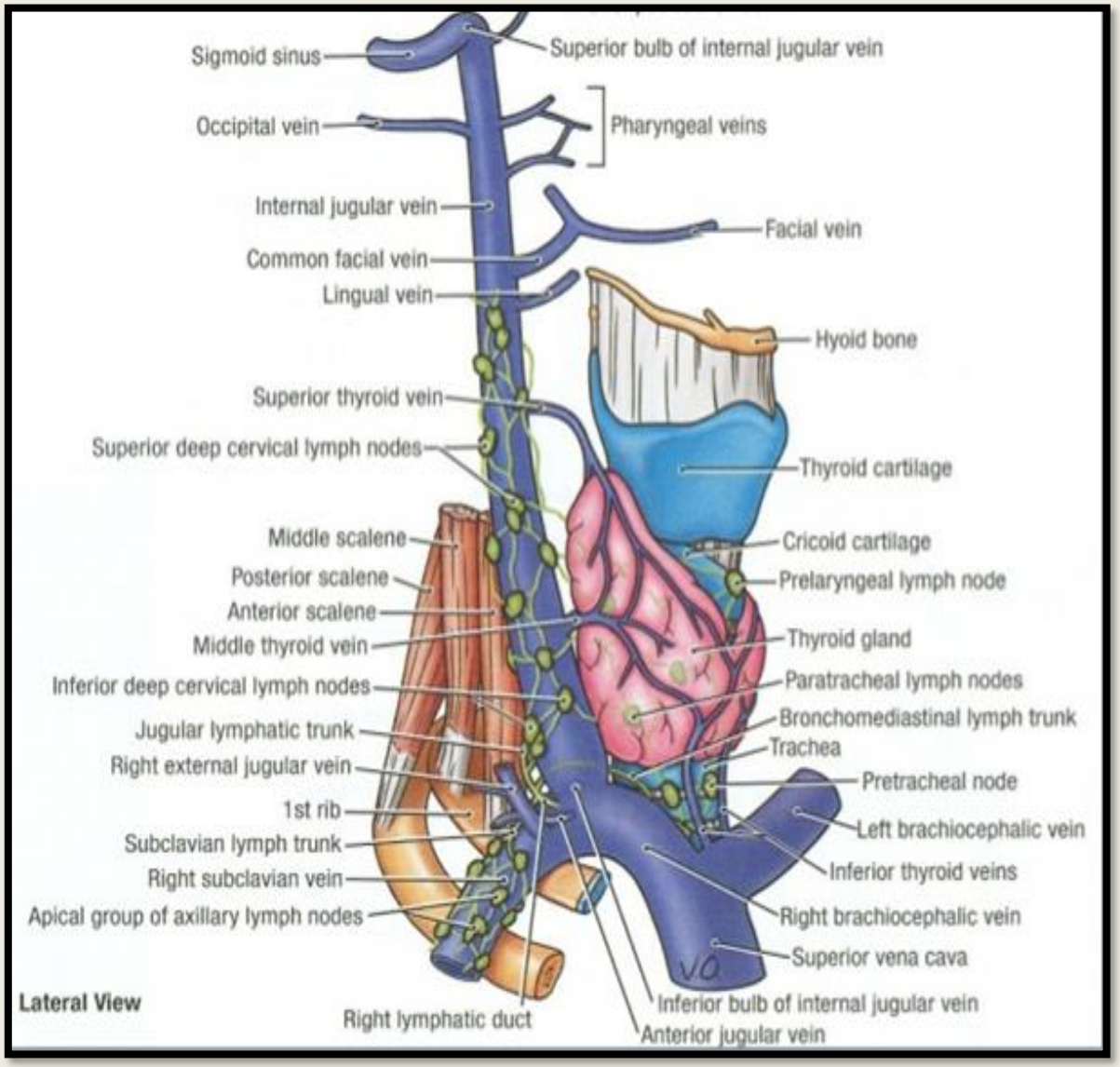
1)**Prelaryngeal nodes:** draining the upper part of the isthmus.

2)**Pretracheal nodes:**, draining the lower part of the isthmus.

3)**Paratracheal nodes:** On the sides of the trachea, draining the posterior surface of the gland.

4)**Upper & Lower deep cervical nodes:** Along the internal jugular vein, forming the main lymphatic drainage of the gland.

5)**Brachiocephalic nodes:** In the superior mediastinum, draining the lower part of the gland.



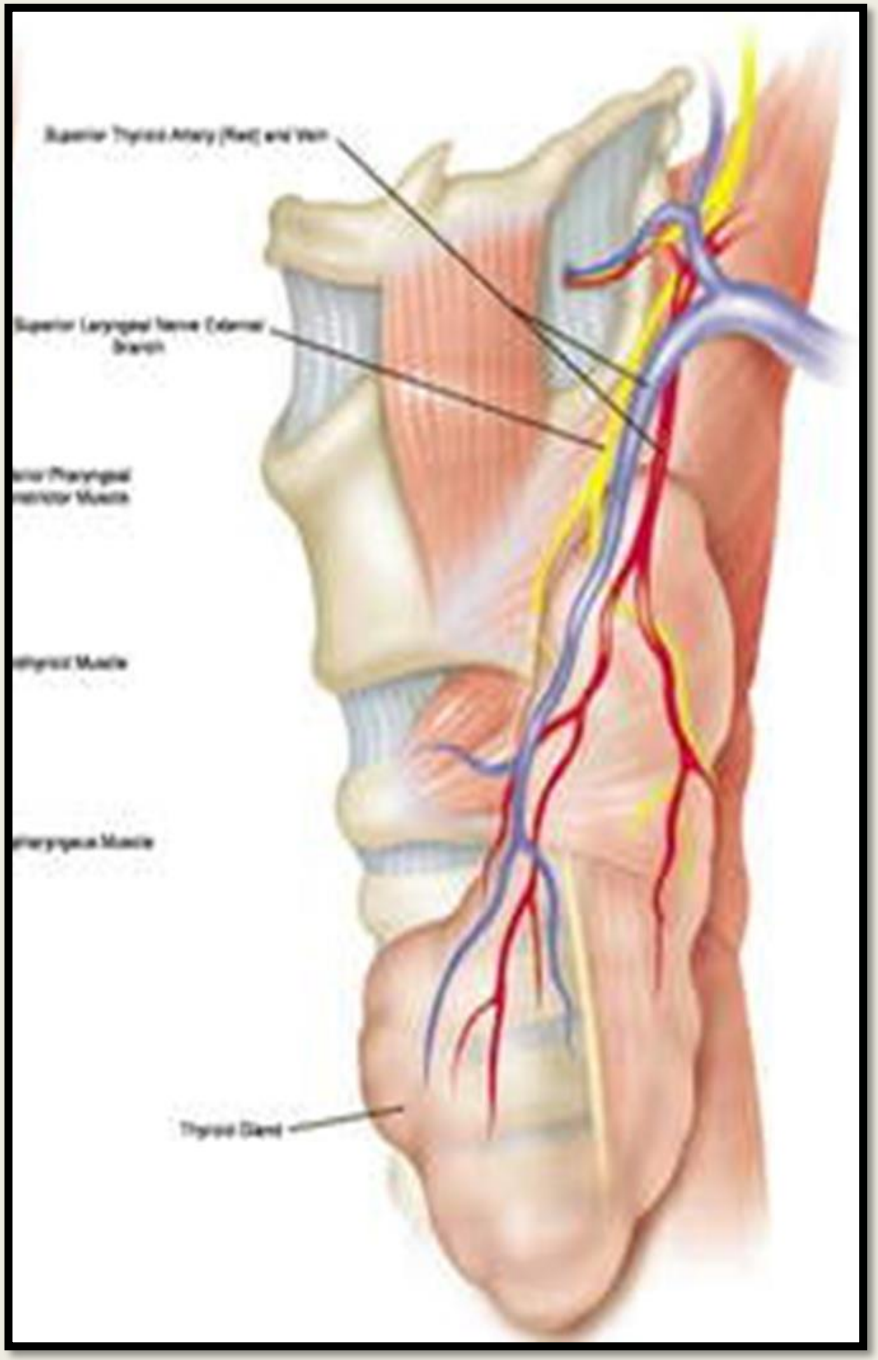
Applied anatomy

- 1) Thyroid gland moves up and down with deglutition because it is enclosed in pretracheal fascia and presence of ligament of Berry.
- 2) Goiter is the 2nd common neck swelling (the 1st is L.Ns enlargement).
- 3) The gland cannot enlarge above the oblique line of thyroid cartilage due to the attachment of sternothyroid muscle and pretracheal fascia in front of the gland.
- 4) In subtotal thyroidectomy, leave only the Postero-medial part of each lobe to protect behind it the RLNs and parathyroid glands.
- 5) Middle thyroid vein is thin short vein and should be ligated first to avoid its injury

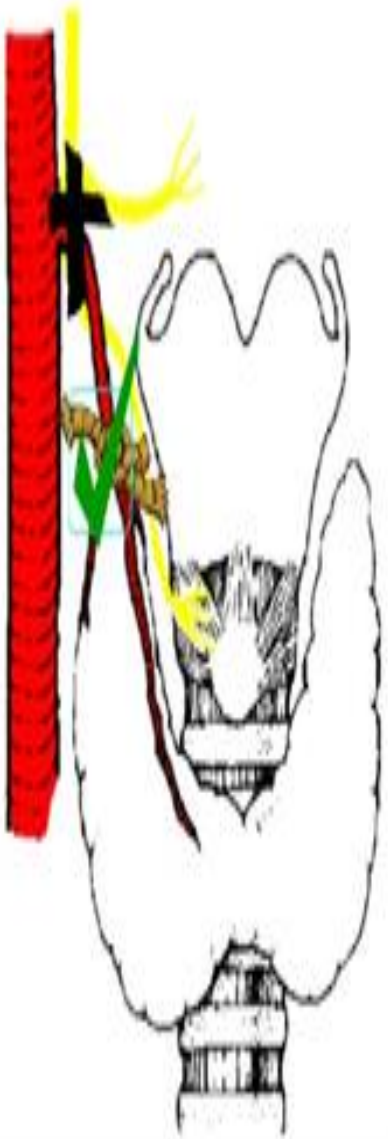
6)Superior to the upper pole of the thyroid, the external laryngeal nerve runs with the superior thyroid artery before turning medially to supply the cricothyroid muscle. In 21% the nerve is intimately associated with the superior thyroid vessels.

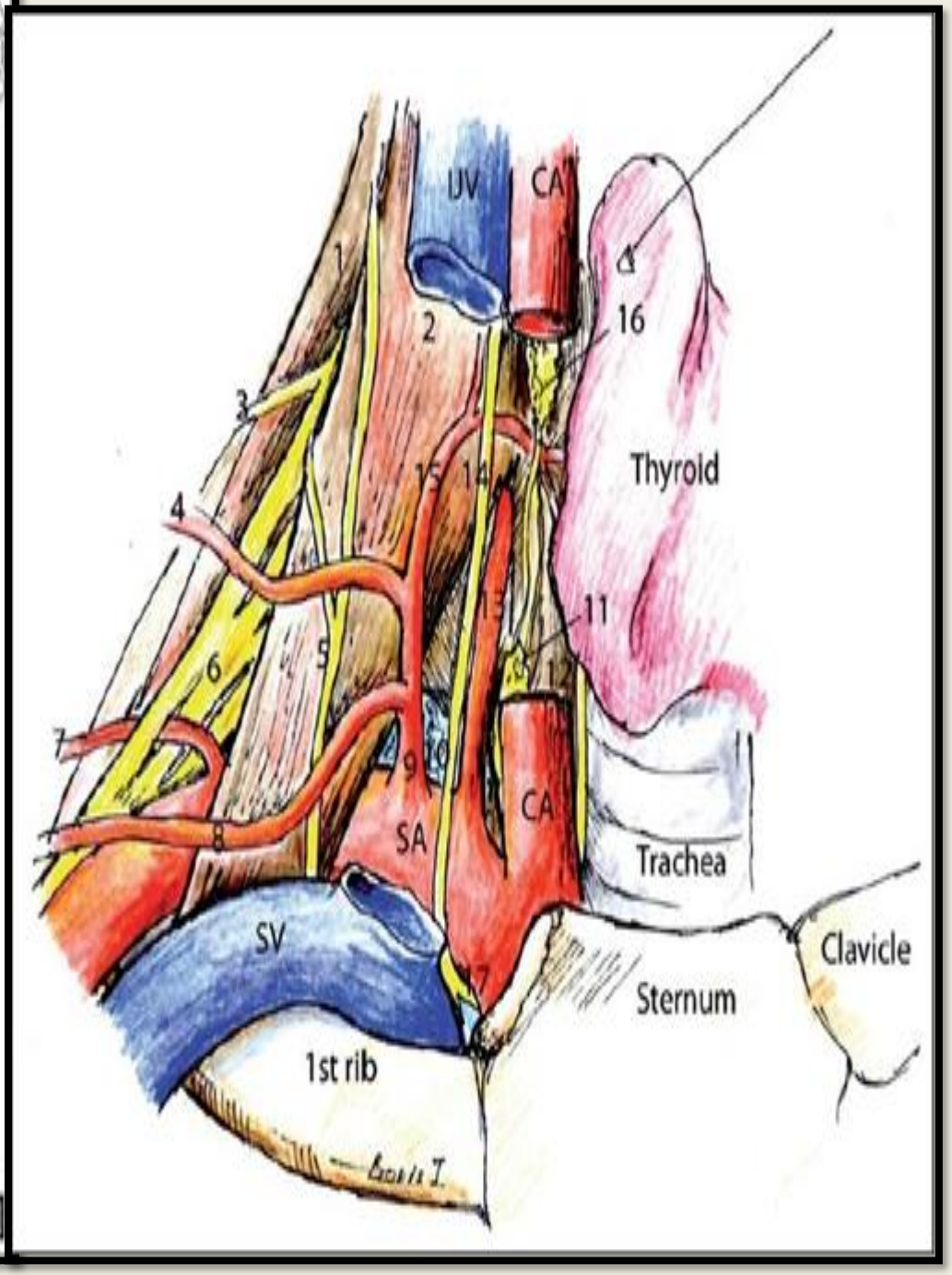
* High ligation of the superior thyroid artery during thyroidectomy may cause injury of the external laryngeal nerve.

7) Ligature of the inferior thyroid artery near the lower pole of the thyroid gland can lead to injury of the recurrent laryngeal nerve this artery should be ligated as lateral as possible from the base of the thyroid lobe to avoid injury of this nerve).



- To avoid injury to the external laryngeal nerve, the superior thyroid artery is ligated and sectioned near the superior pole of the thyroid gland where it is **not** so closely related to the nerve as it is at its origin.





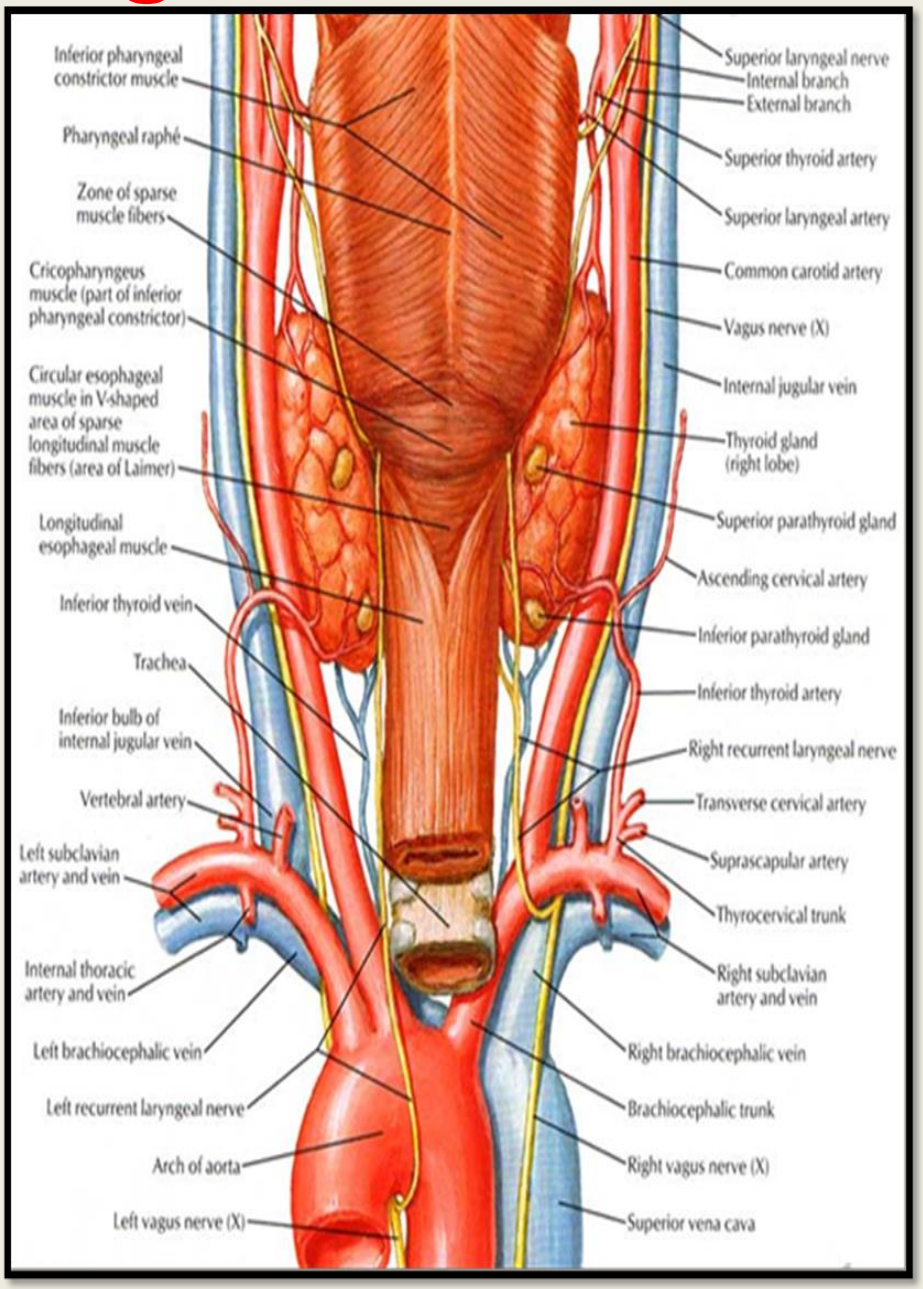
Parathyroid glands

The parathyroid glands are small (20-40 mg , 2x4x6 mm) , yellow , oval endocrine glands , responsible to produce parathormone hormone, which acts to control calcium levels in the body.

Position:

The parathyroid glands are located on the medial half of the posterior surface of the lateral lobes of the thyroid gland , usually situated external to the true capsule of the gland but within its sheath.

Superior & inferior parathyroid glands are usually located respectively approximately 1cm superior & inferior to the point of entry of the inferior thyroid arteries into the thyroid gland .



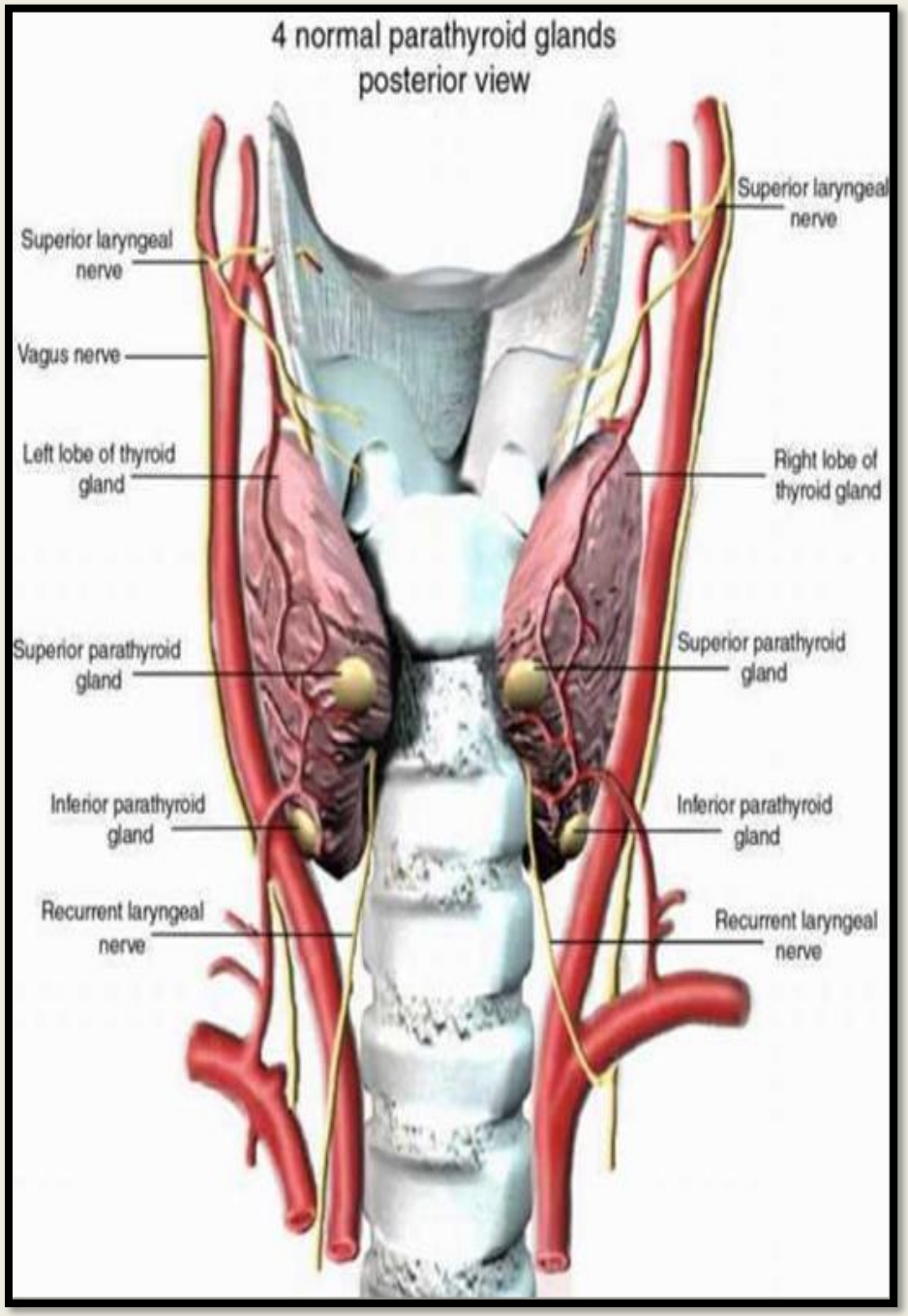
Superior parathyroid glands are more constant in position , than inferior ones

-the inferior parathyroid glands are usually found near the inferior poles of the thyroid gland.

Number: Most people have four parathyroid glands, although variation in number is common (2-8).

Relations:

- **Anterior:** Thyroid gland .**Posterior:** Common carotid artery



- **Arterial supply: inferior thyroid artery**
- **The parathyroid veins drain into the thyroid venous plexus.**
- **Lymphatic drainage (like thyroid gland) but mainly to paratracheal lymph nodes.**

Applied anatomy

- During total thyroidectomy preserve at least one parathyroid.
- If all parathyroid glands are removed or devascularized, at least one parathyroid gland is implanted in the subcutaneous tissues of arm to avoid its injury by subsequent neck surgery or radiotherapy.
- Removal of all the parathyroid glands would cause hypocalcemia , leading to tetany (numbness , severe muscle twitches and cramps). This will need urgent treatment to avoid spasm of laryngeal muscles .