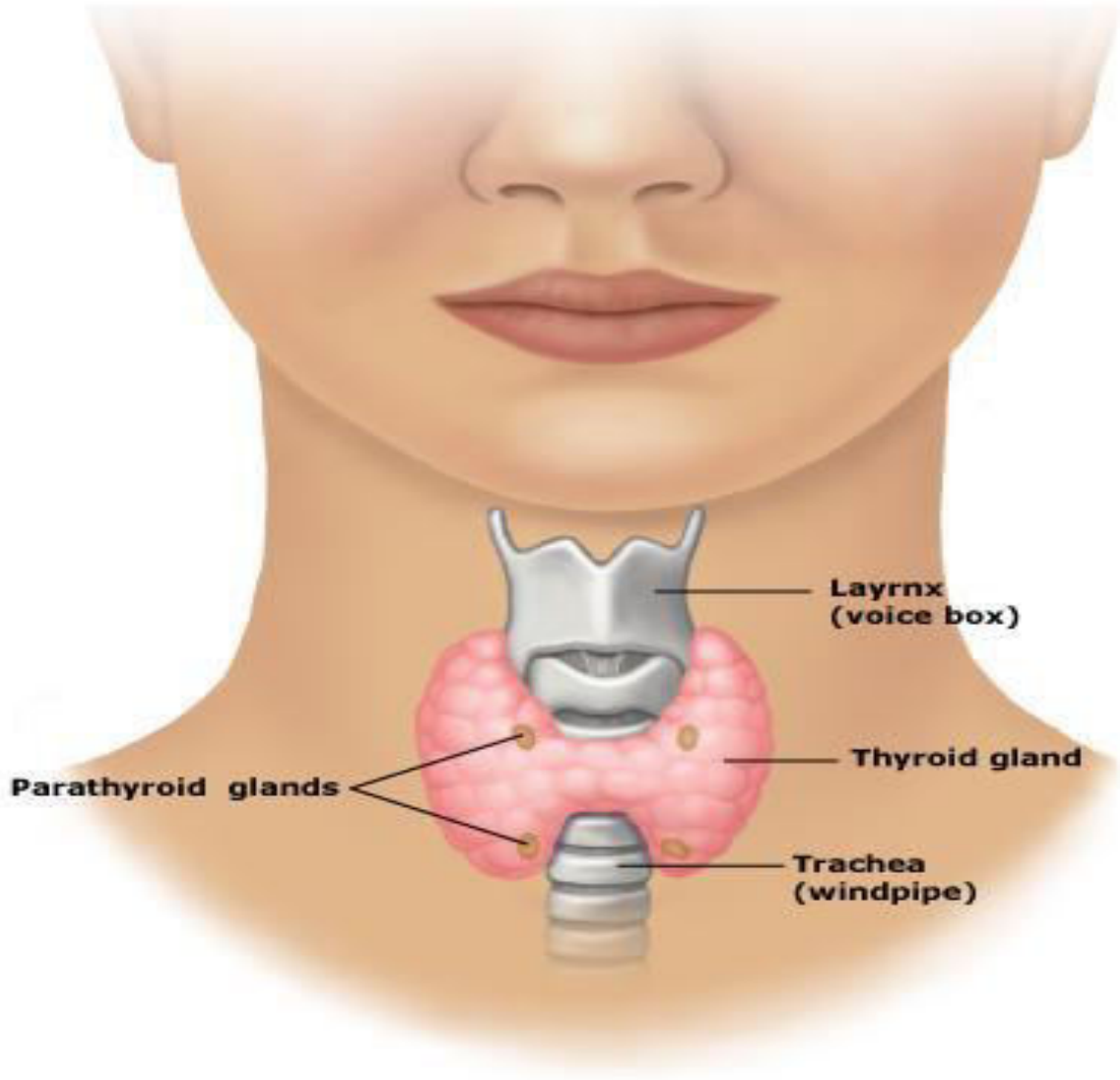
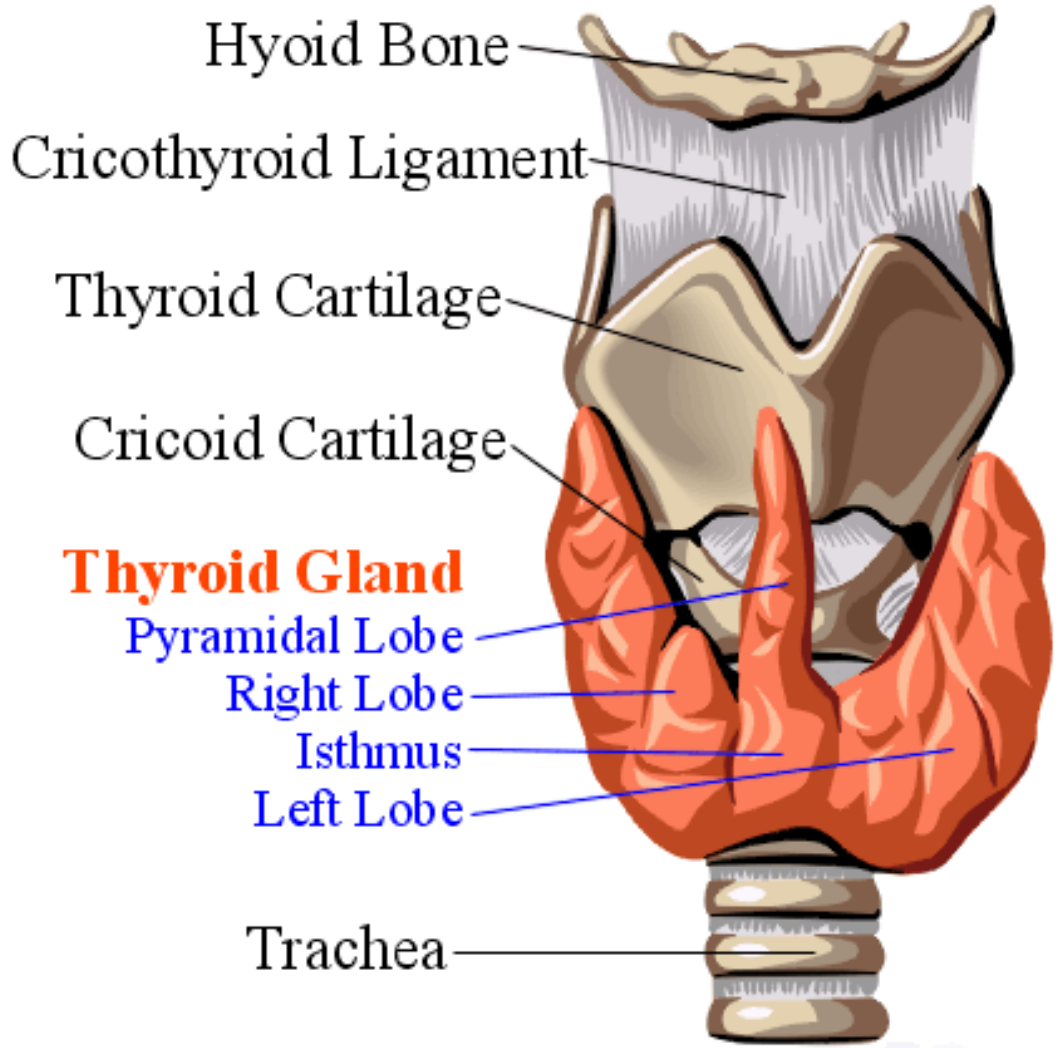
Thyroid and Parathyroid

- The thyroid gland, is one of the largest endocrine glands and consists of two connected lobes.
- The thyroid gland is found in the neck, below the thyroid cartilage (which forms the laryngeal prominence, or "Adam's apple").
- The thyroid gland controls how quickly the body uses energy, makes proteins, and controls how sensitive the body is to other hormones.
- Triiodothyronine (T3) and thyroxine(T4)).
- The thyroid also produces calcitonin, which plays a role in calcium homeostasis.
- Hormonal output from the thyroid is regulated by thyroid-stimulating hormone (TSH) produced by the anterior pituitary, which itself is regulated by thyrotropin-releasing hormone (TRH) produced by the hypothalamus


Layrnx
(voice box)
Thyroid gland
Parathyroid glands
Trachea
(windpipe)

- The thyroid gland is a butterfly-shaped organ and is composed of two cone-like lobes , connected via the isthmus.
- Each lobe is about 5 cm long, 3 cm wide and 2 cm thick.
- The organ is situated on the anterior side of the neck, lying against and around the larynx and trachea, reaching posteriorly the oesophagus and carotid sheath.
- It starts cranially at the oblique line on the thyroid cartilage (just below the laryngeal prominence, or 'Adam's Apple'), and extends inferiorly to approximately the fifth or sixth tracheal ring.
- The third lobe present called the pyramidal lobe of the thyroid gland.

- Between the two layers of the capsule and on the posterior side of the lobes, there are on each side two parathyroid glands.

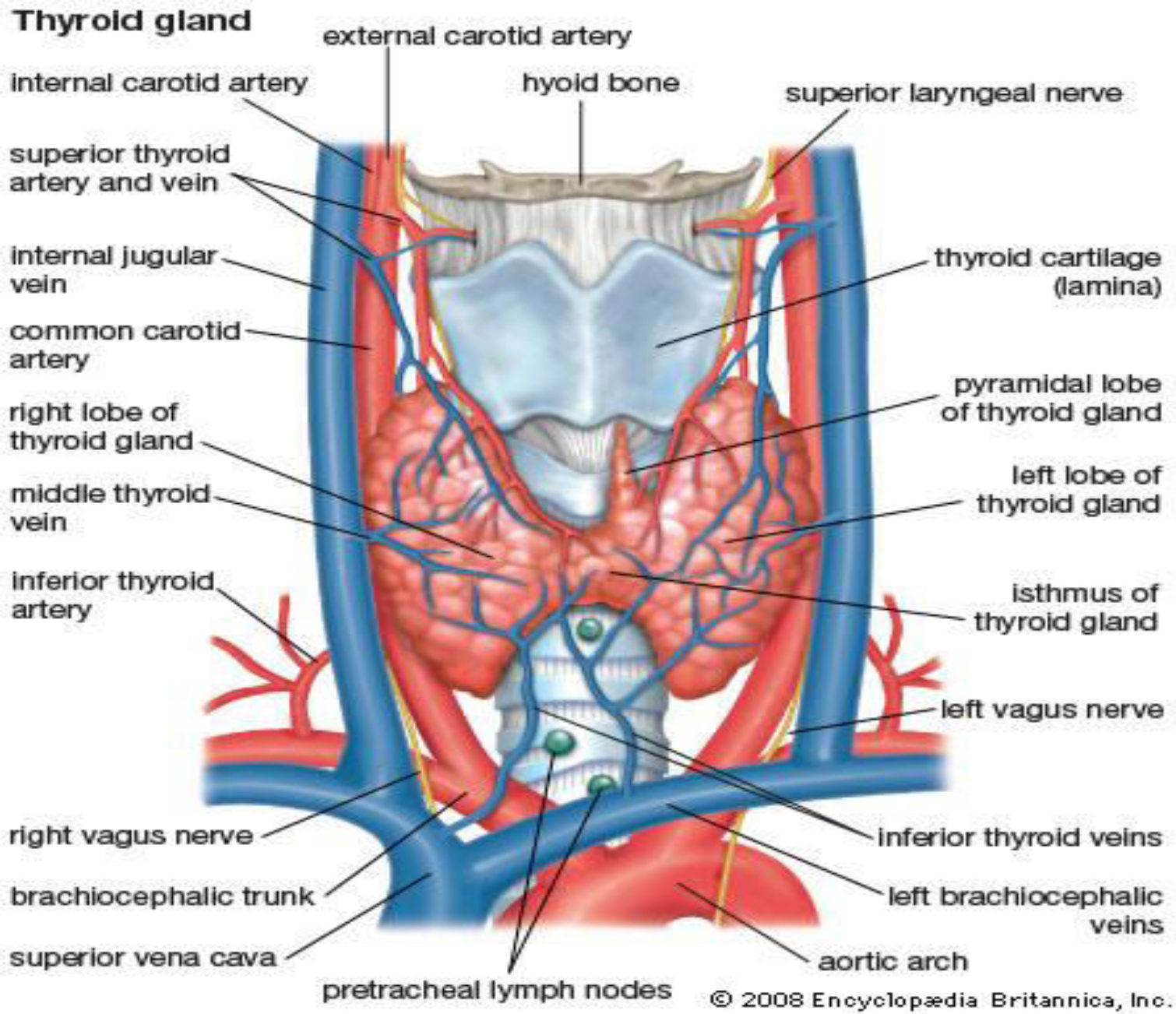


Adapted from Corel Draw 9

- The thyroid gland is covered by a thin fibrous sheath, composed of an internal and external layer. The external layer is anteriorly continuous with the pretracheal fascia and posteriorolaterally continuous with the carotid sheath
- The gland is covered anteriorly with infrahyoid muscles and laterally with the sternocleidomastoid muscle also known as sternomastoid muscle.
- On the posterior side, the gland is fixed to the cricoid and tracheal cartilage and cricopharyngeus muscle by a thickening of the fascia to form the posterior suspensory ligament of thyroid gland also known as Berry's ligament.
- The thyroid gland's firm attachment to the underlying trachea is the reason behind its movement with swallowing.

- The thyroid is supplied with arterial blood from the superior thyroid artery, a branch of the external carotid artery, and the inferior thyroid artery, a branch of the thyrocervical trunk, and sometimes by the thyroid ima artery, branching directly from the subclavian artery.

- The venous blood is drained via superior thyroid veins, draining in the internal jugular vein, and via inferior thyroid veins, draining via the plexus thyreoideus impar in the left brachiocephalic vein.


Thyroid gland
external carotid artery
internal carotid artery
hyoid bone
superior laryngeal nerve
superior thyroid artery and vein
internal jugular vein
thyroid cartilage (lamina)
common carotid artery
pyramidal lobe of thyroid gland
right lobe of thyroid gland
left lobe of thyroid gland
middle thyroid vein
inferior thyroid artery
isthmus of thyroid gland
left vagus nerve
right vagus nerve
inferior thyroid veins
brachiocephalic trunk
left brachiocephalic veins
superior vena cava
aortic arch
pretracheal lymph nodes
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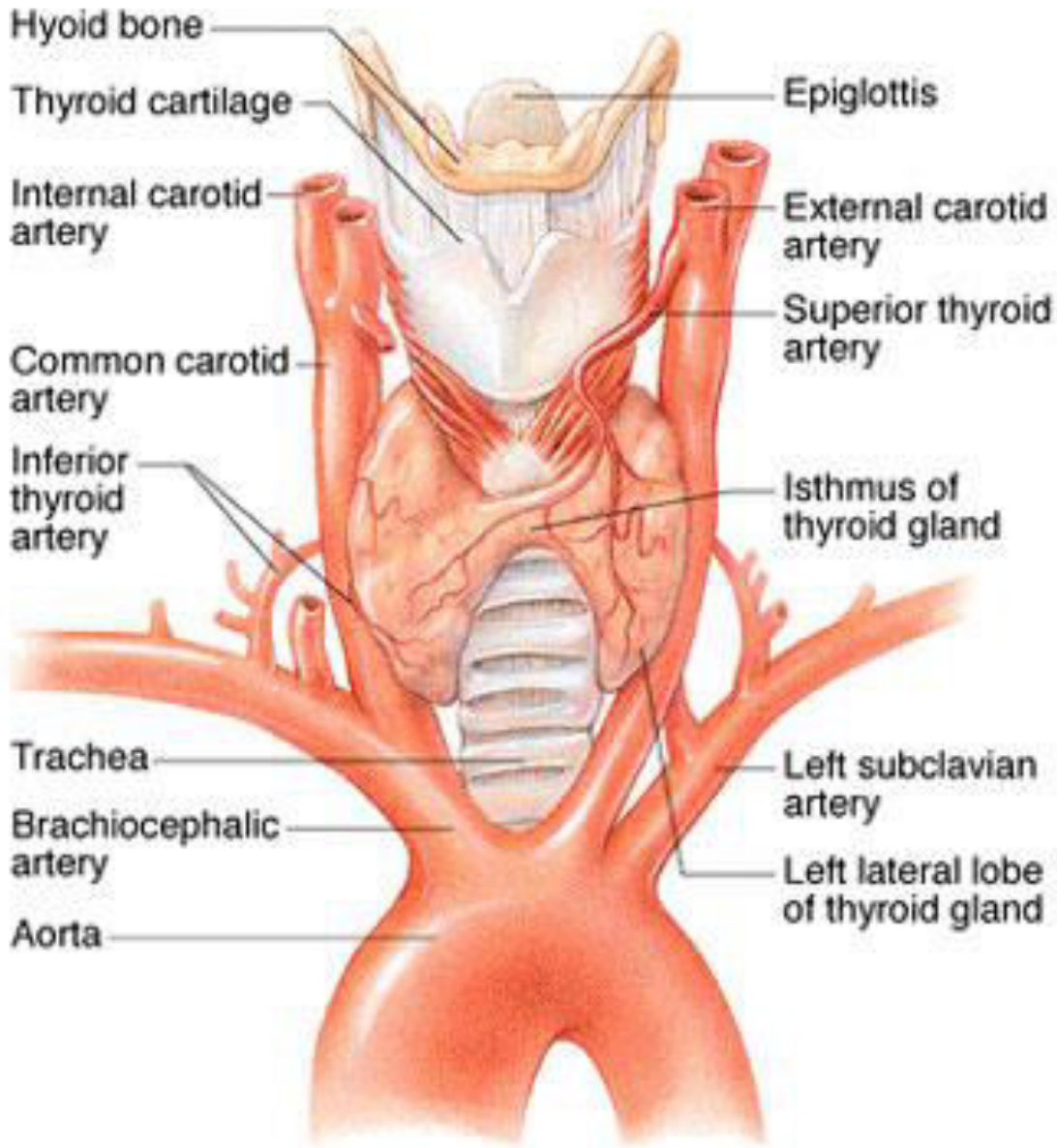
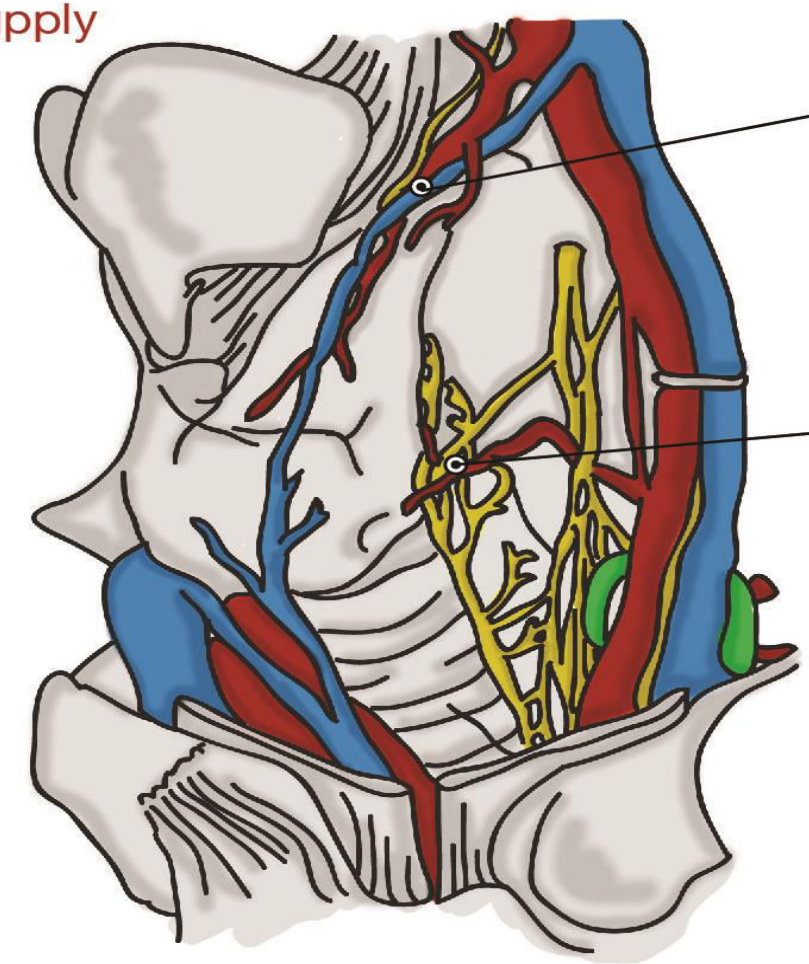


Thyroid Gland - Arterial Supply

Vascular arteries accompanied by nerves

Anastamose profusely



Superior Thyroid Artery

Branch of external carotid accompanied by external (superior) laryngeal nerve

Inferior Thyroid Artery

Accompanied by recurrent laryngeal nerve branch of thyrocervical trunk

Thyroidea ima

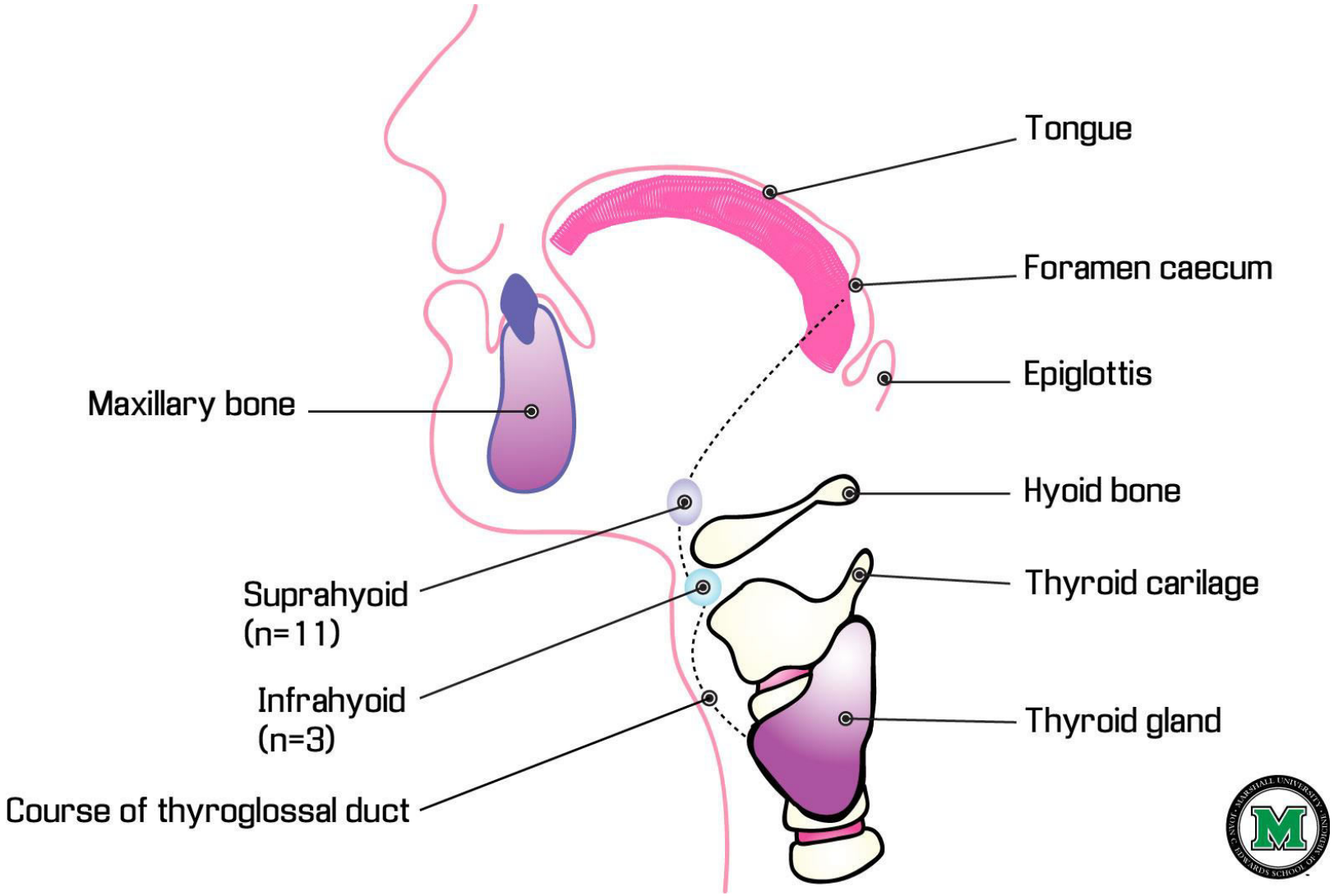
Occasionally seen branch from braciocephalic artery or arch of arotra

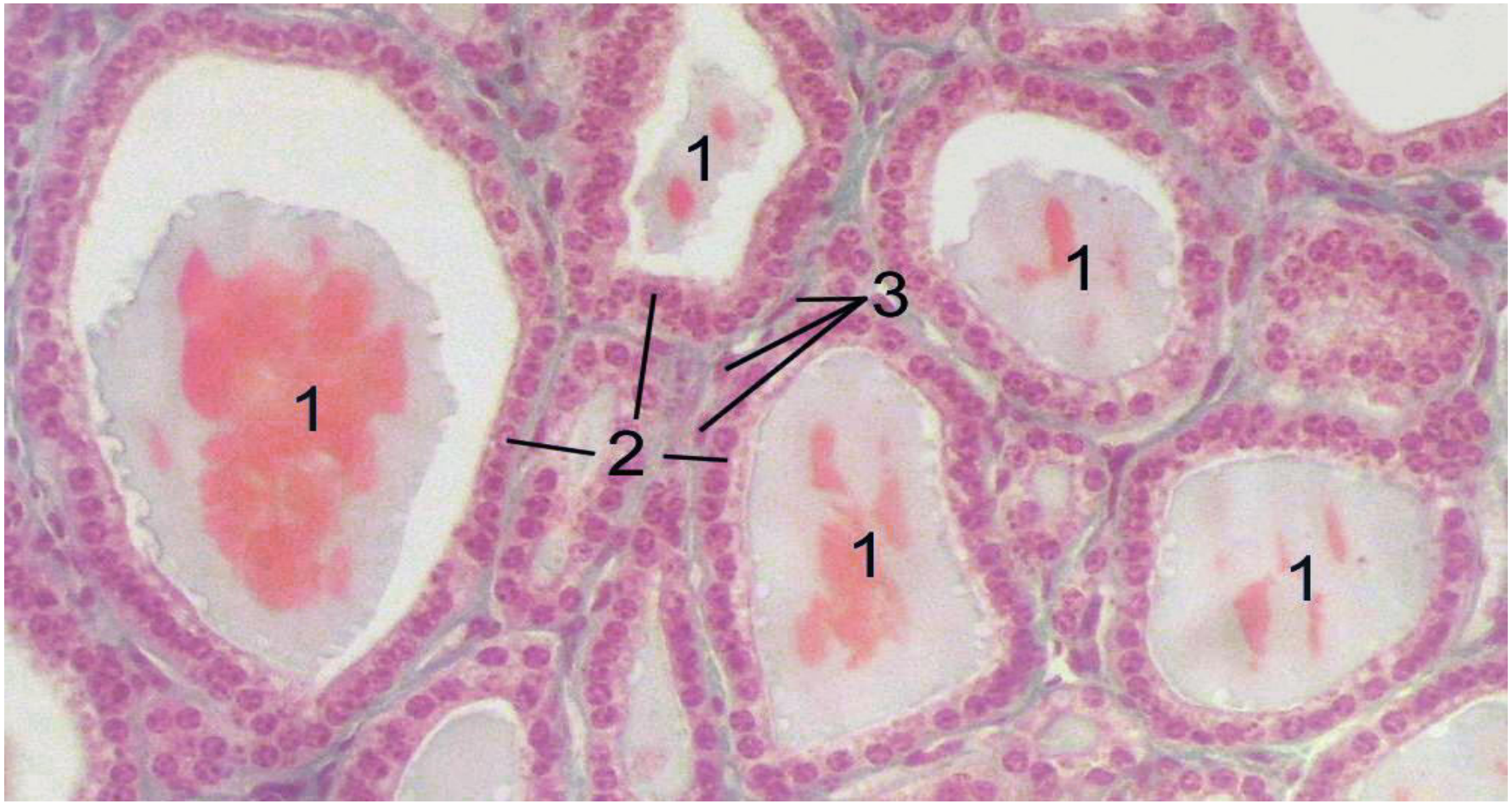
In thyroid surgery care taken not to damage Recurrent Laryngeal Nerve which supplies all muscles acting on vocal cord (except cricothyroid muscle which is supplied by the external larygeal branch of vagus)

- Lymphatic drainage passes frequently the lateral deep cervical lymph nodes and the pre- and paratracheal lymph nodes.

- The gland is supplied by parasympathetic nerve input from the superior laryngeal nerve and the recurrent laryngeal nerve.

- Prenatal development
- Floor of pharynx of embryo between 18 and 21 days
- In the embryo, at 3–4 weeks of gestation, the thyroid gland appears as an epithelial proliferation in the floor of the pharynx at the base of the tongue between the tuberculum impar and the copula linguae at a point later indicated by the foramen cecum.
- The thyroid then descends in front of the pharyngeal gut as a bilobed diverticulum through the thyroglossal duct.
- Over the next few weeks, it migrates to the base of the neck, passing anterior to the hyoid bone. During migration, the thyroid remains connected to the tongue by a narrow canal, the thyroglossal duct.


Tongue
Foramen caecum
Epiglottis
Maxillary bone
Hyoid bone
Suprahyoid
(n=11)
Thyroid carilage
Infrahyoid
(n=3)
Thyroid gland
Course of thyroglossal duct


1
1
1
3
1
2
1
1

- Clinical significance

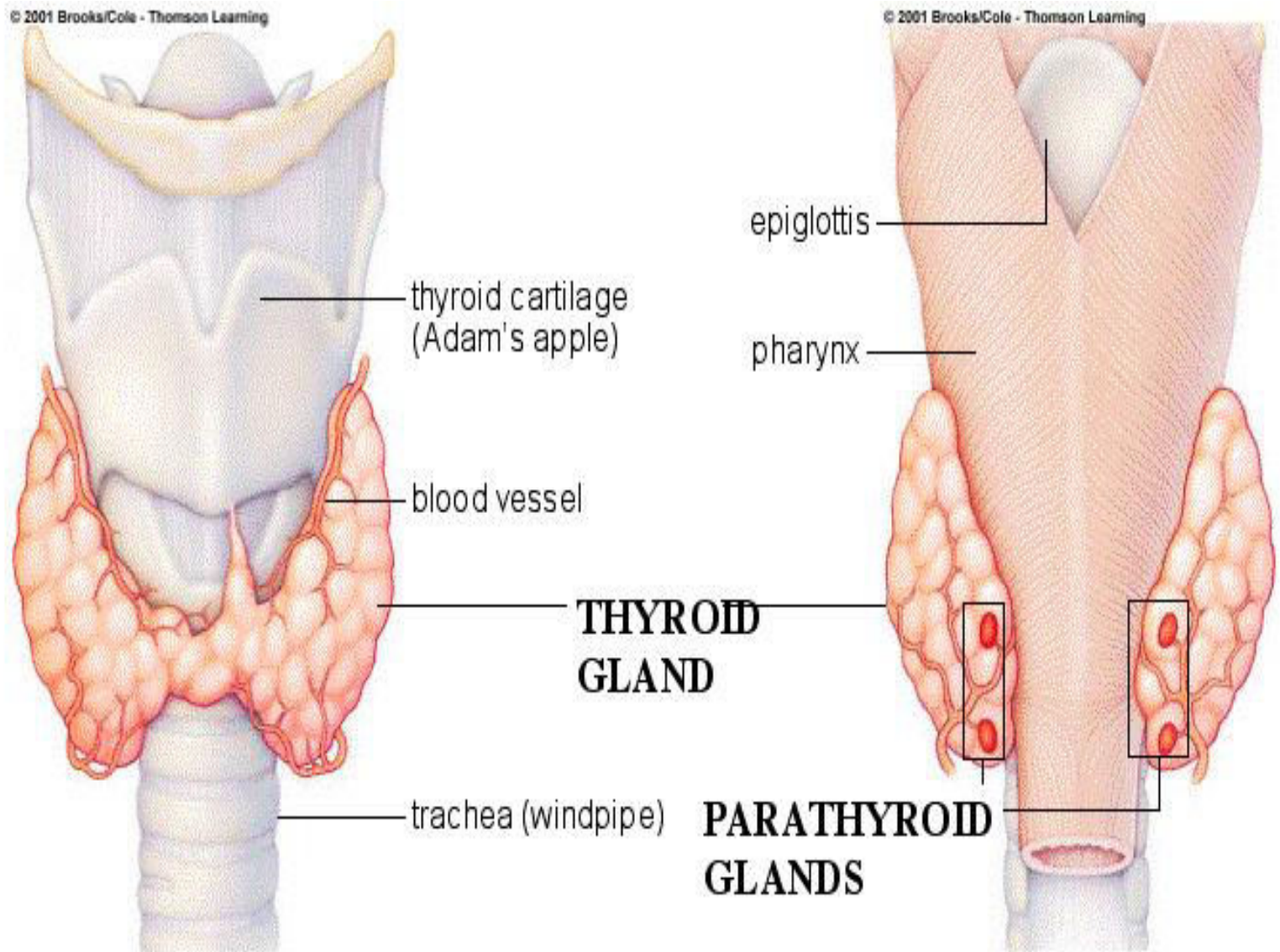
- hyperthyroidism (abnormally increased activity),
- hypothyroidism (abnormally decreased activity)
- thyroiditis, inflammation of the thyroid
- thyroid nodules, which are generally benign thyroid neoplasms (tumours), but may be thyroid cancers.

- All these disorders may give rise to a goiter, that is, an enlarged thyroid

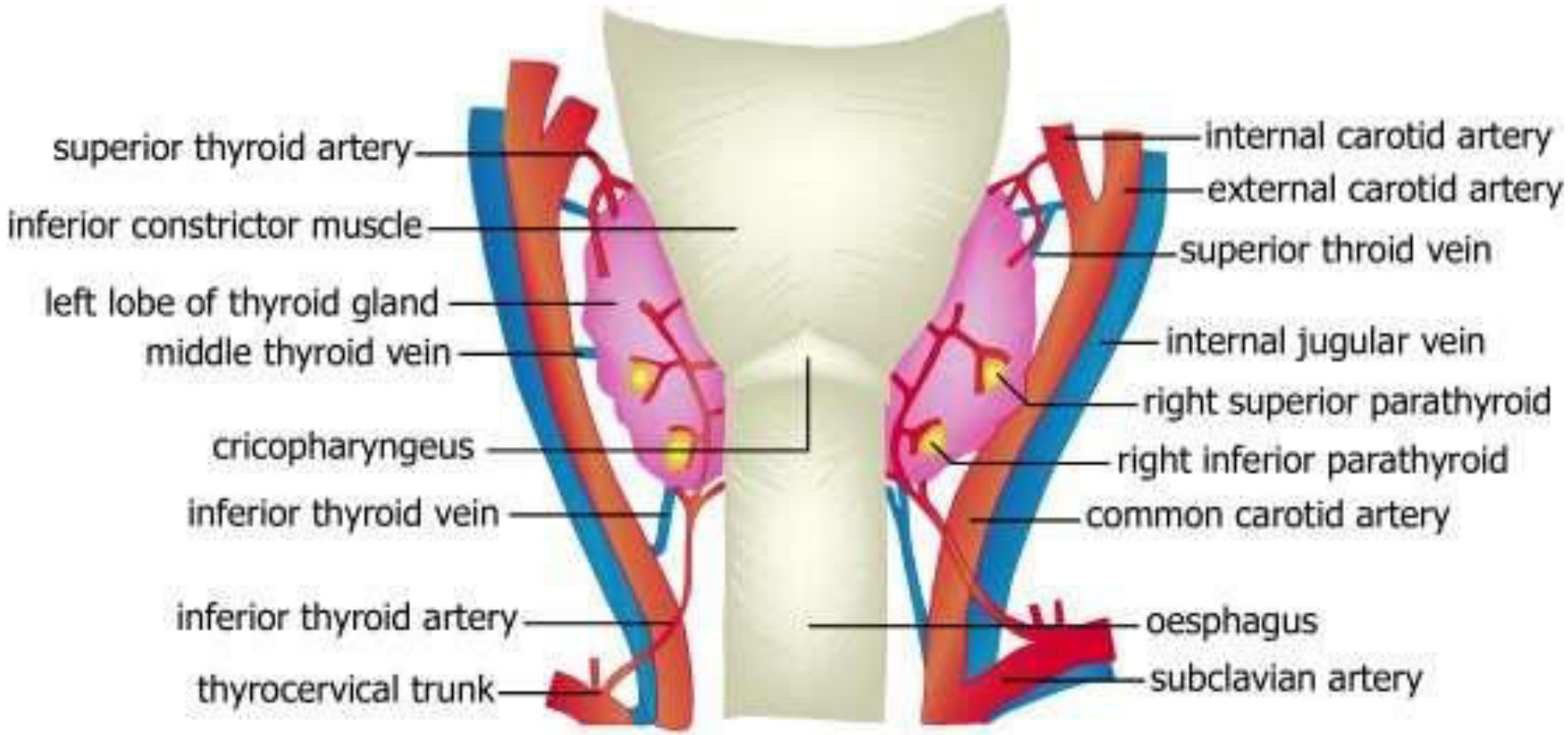
Parathyroids

- The parathyroid glands are small endocrine glands in the neck of Four parathyroid glands, variably located on the back of the thyroid gland, although considerable variation exists.

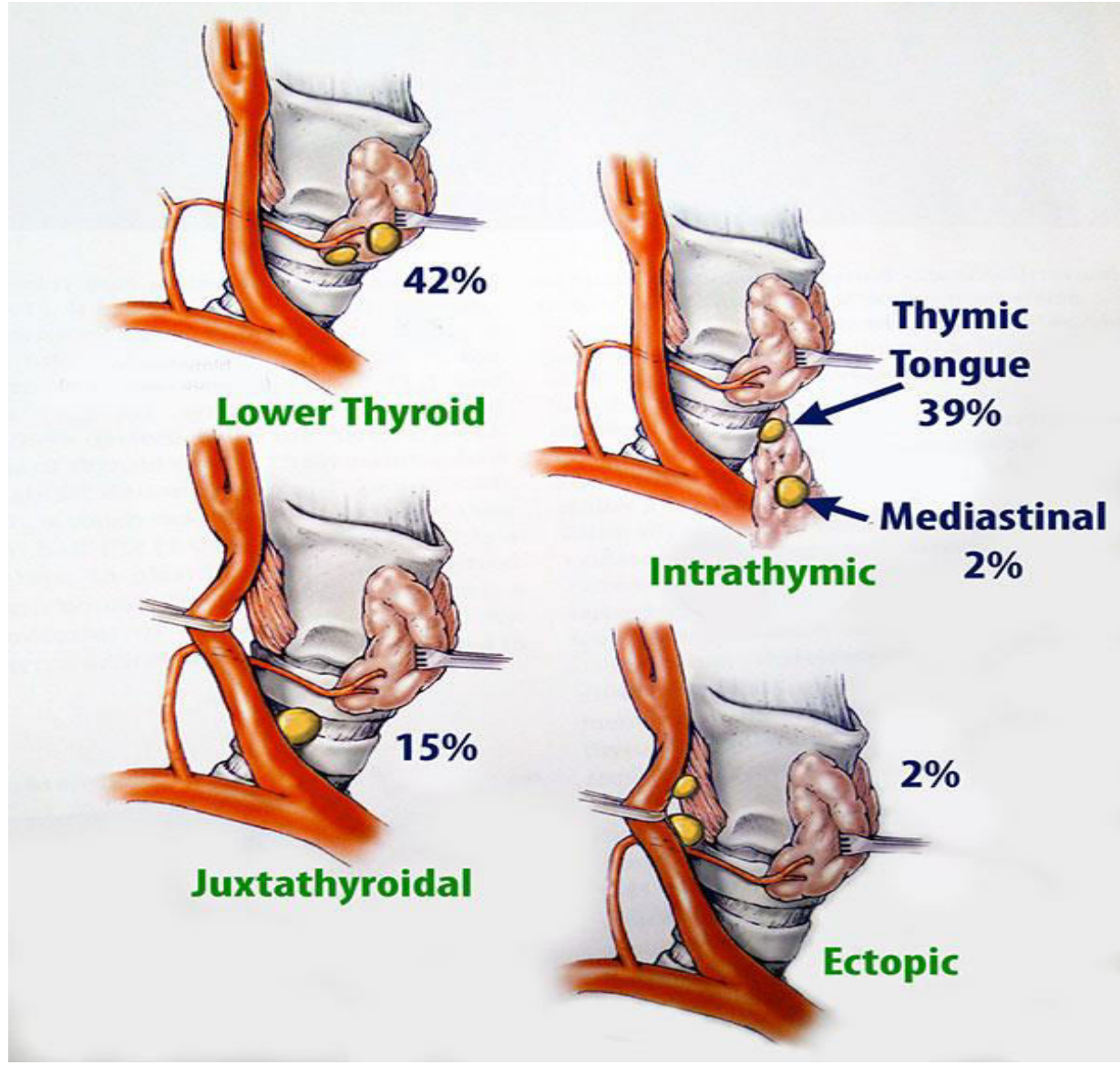
- The parathyroid glands share a similar blood supply, venous drainage, and lymphatic drainage to the thyroid glands.
- The parathyroid glands are derived from the epithelial lining of the third and fourth branchial pouches, with the superior glands arising from the fourth pouch, and the inferior glands arising from the higher third pouch.


© 2001 Brooks/Cole - Thomson Learning
thyroid cartilage
(Adam's apple)
blood vessel
THYROID
GLAND
trachea (windpipe)
© 2001 Brooks/Cole - Thomson Learning
epiglottis
pharynx
PARATHYROID
GLANDS

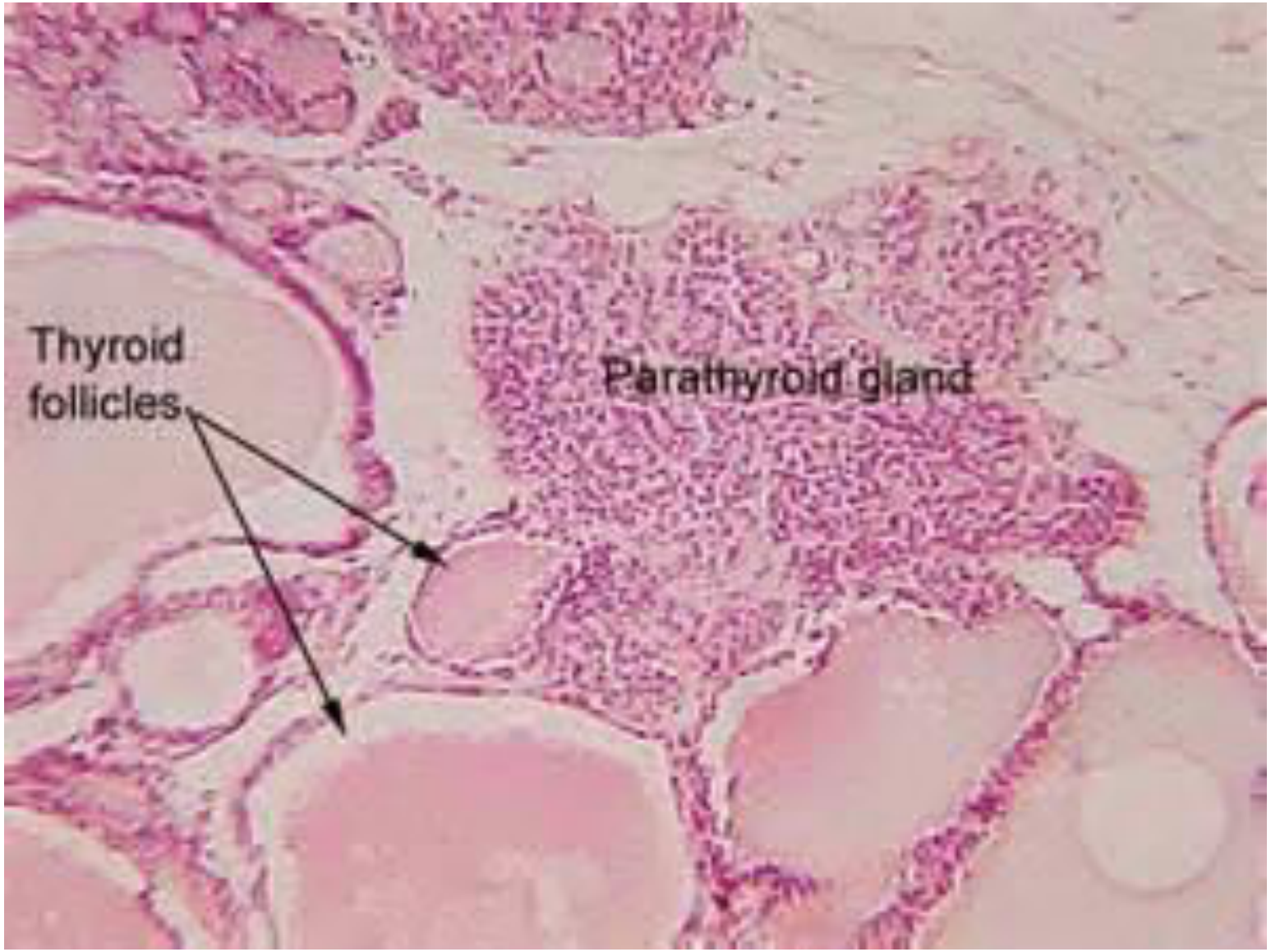
- Blood supply: The superior parathyroid glands receive their blood from the inferior thyroid arteries. The inferior parathyroid glands receive a variable blood supply, from either the ascending branch of the inferior thyroid arteries or the thyroid ima artery.
- Each parathyroid vein drains into the superior and, middle and inferior thyroid veins. The superior and middle thyroid veins drain into the jugular vein, and the inferior thyroid vein drains into the brachiocephalic vein.
- Lymphatic vessels from the parathyroid glands drain into deep cervical lymph nodes and paratracheal lymph nodes.

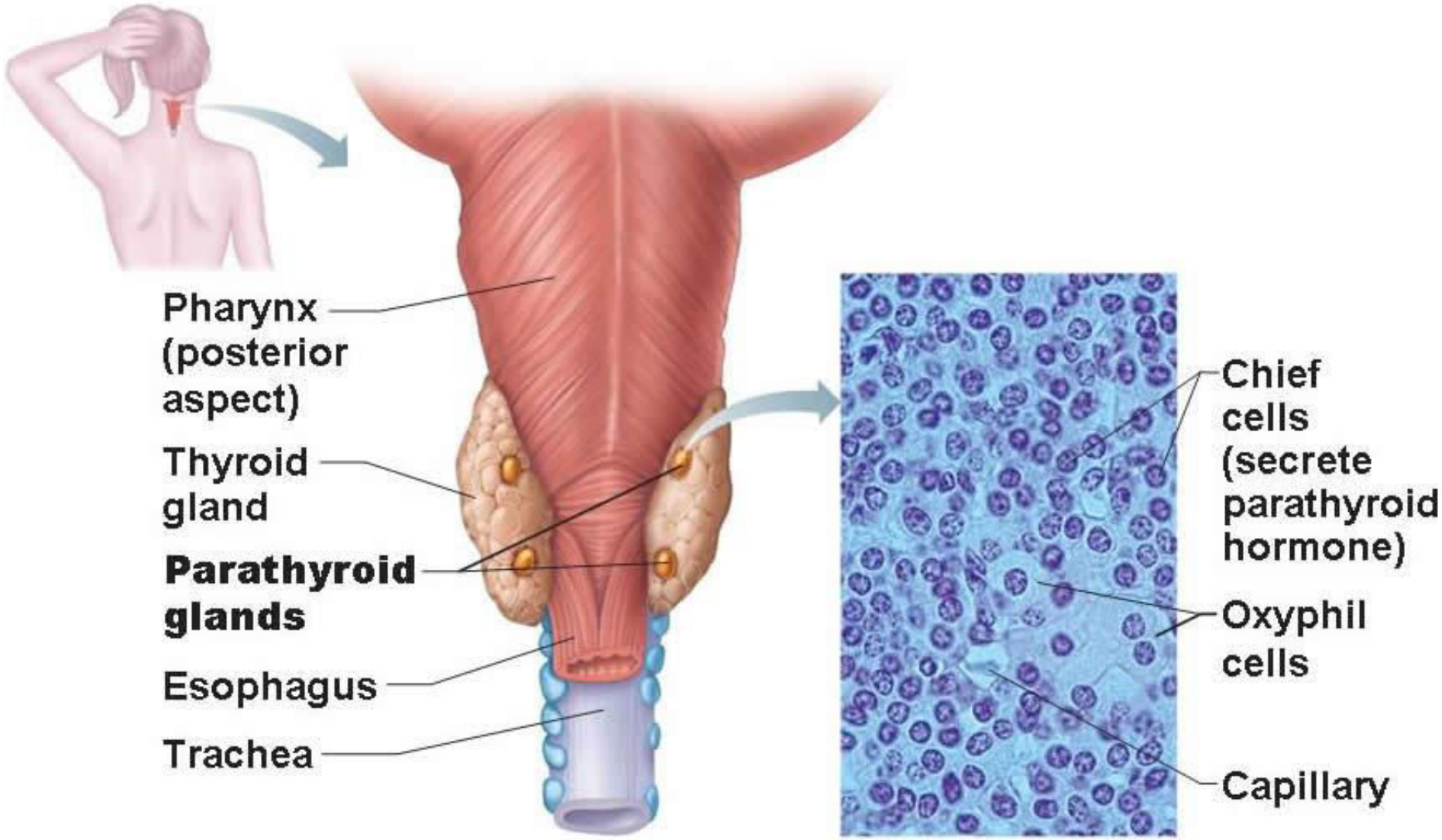


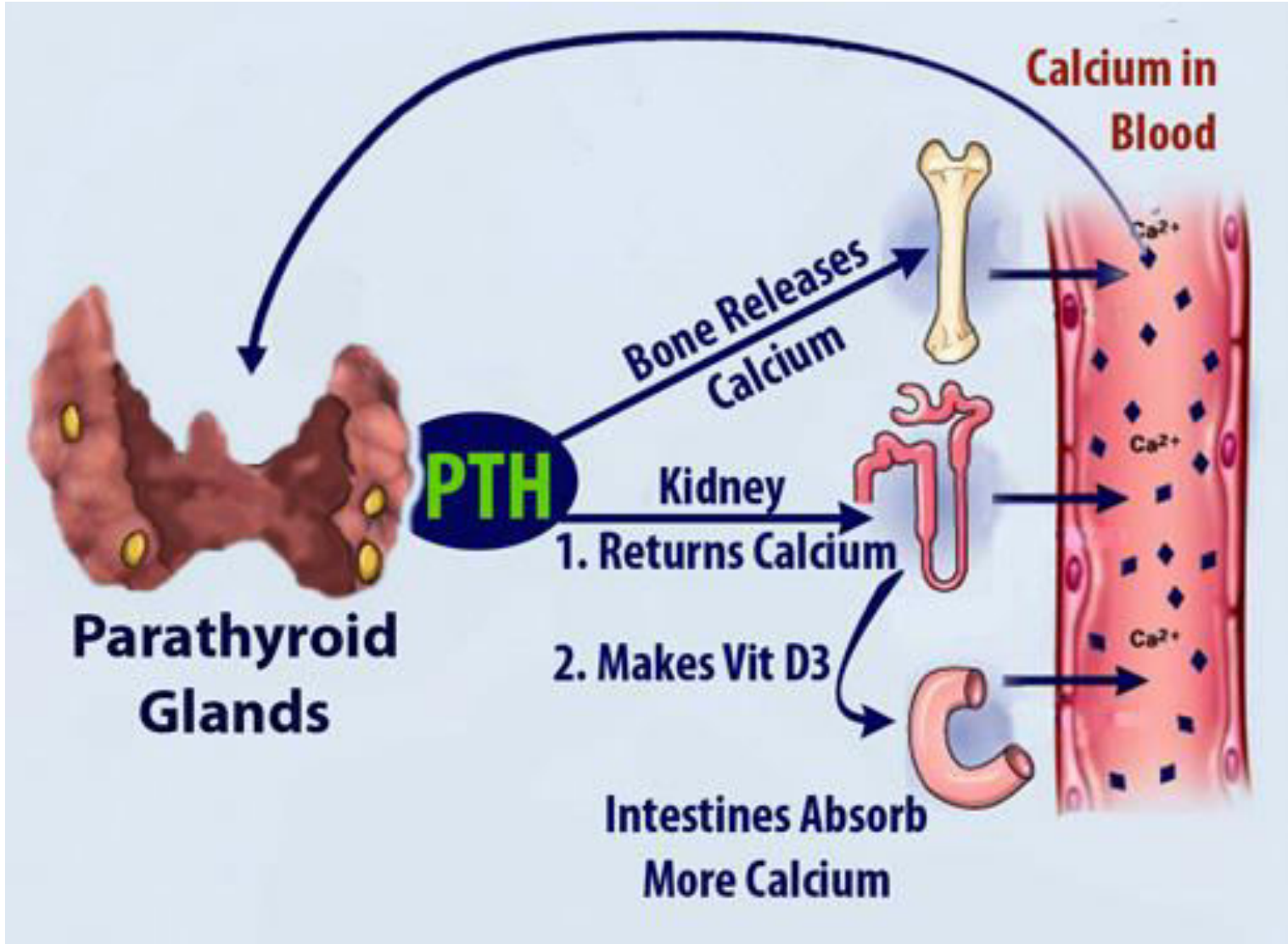
Schematic diagram of the posterior view of the thyroid showing the parathyroid glands and their blood supply


42%
Lower Thyroid
Thymic
Tongue
39%
Mediastinal
2%
Intrathymic
15%
Juxtathyroidal
2%
Ectopic


Auditory tube
Primitive tympanic cavity
External auditory meatus
Palatine tonsil
Superior parathyroid gland (from 4th pouch)
Inferior parathyroid gland (from 3rd pouch)
Ultimobranchial body
Thymus
Ventral side of pharynx
Foramen cecum
Thyroid gland
3
Foregut


Thyroid
follicles
Parathyroid gland




Calcium in Blood
Bone Releases Calcium
PTH
Kidney
1. Returns Calcium
2. Makes Vit D3
Parathyroid Glands
Intestines Absorb More Calcium
Ca2+
Ca2+
Ca2+

Clinicals