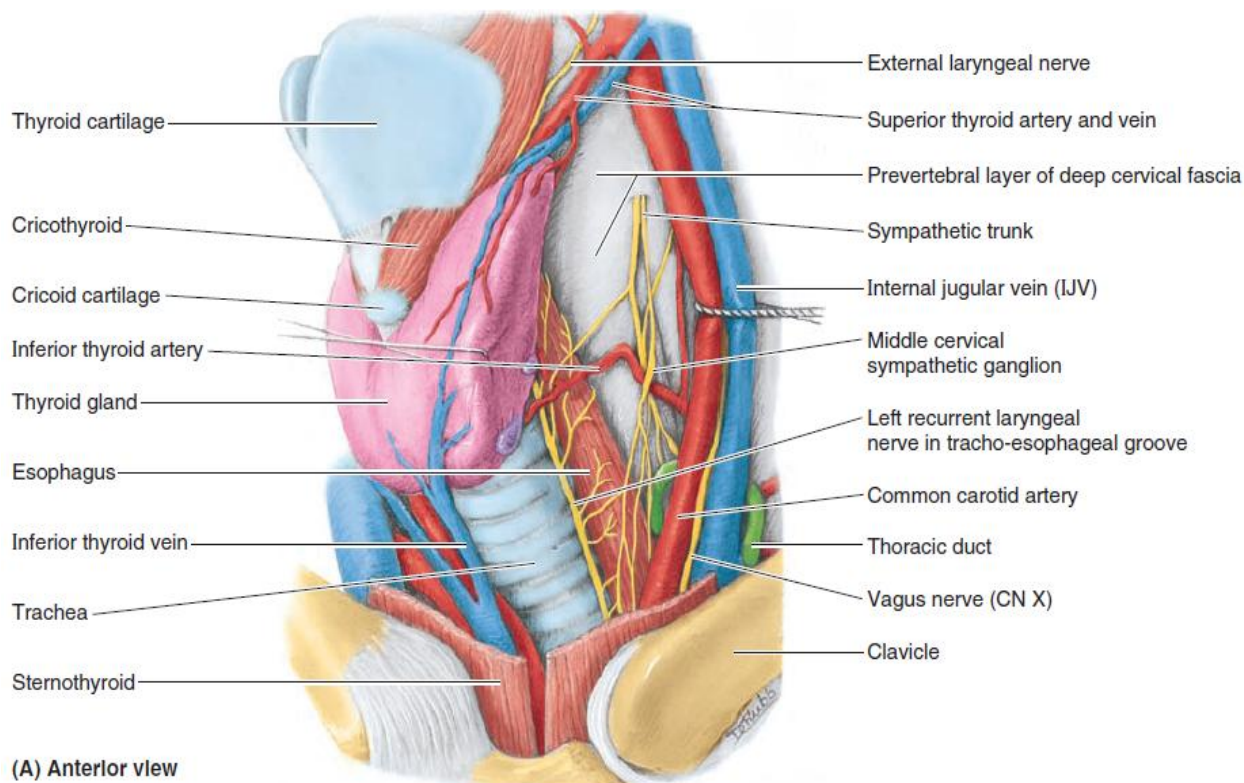




## ANATOMY

- The thyroid gland produces the following hormones (by uptaking iodine from blood and under regulation of thyroid stimulating hormone TSH which is secreted from the anterior pituitary gland):
  - **Thyroxine:** produced from follicular cells.
  - **Calcitonin:** produced from parafollicular cells.
- Structure of the thyroid gland:
  - It is composed of right and left lobes which are connected to each other by isthmus. Notice that the isthmus is crossing the 2<sup>nd</sup> and 3<sup>rd</sup> tracheal rings. In some people, you might find a third lobe known as the pyramidal lobe → this is a remnant of the thyroglossal duct and it is extending superiorly from the isthmus to the left of the midline.
  - The thyroid gland is surrounded by a fibrous capsule and external to this capsule is the pretracheal fascia.
  - **Structural relations to the thyroid gland:**
    - ✓ Medially:
      - ❖ *Upper part:* middle constrictor muscle of the pharynx.
      - ❖ *Lower part:* trachea, esophagus and –between them- recurrent laryngeal nerve.
    - ✓ Anteriorly: infrahyoid muscles (omohyoid, sternohyoid and sternothyroid).
    - ✓ Posteriorly: carotid sheath (consisting of common carotid artery, internal jugular vein and vagus nerve).
  - **Arterial supply:**
    - ✓ Superior thyroid artery: branching from external carotid artery.
    - ✓ Inferior thyroid artery: branching from thyrocervical trunk.
    - ✓ Thyroid ima artery (not present in all people): branching from brachiocephalic trunk.
  - **Venous drainage:**
    - ✓ Superior and middle thyroid veins: draining to internal jugular vein (IJV).
    - ✓ Inferior thyroid vein: draining into brachiocephalic vein.
- Clinical correlations:
  - **Goiter (enlargement of the thyroid gland):**
    - ✓ Causes: iodine deficiency, hyperthyroidism, hypothyroidism (in which the gland swells in an attempt to produce more hormones).
    - ✓ Enlargement of the thyroid gland will cause compression on: trachea (dyspnea), esophagus (dysphagia), larynx and recurrent laryngeal nerve (causing hoarseness of voice).
    - ✓ Treatment: Radioactive iodine or thyroidectomy.
  - **Grave's disease:**
    - ✓ It is an autoimmune disease in which the thyroid gland is stimulated by thyroid stimulating immunoglobulins (TSIs) → resulting in hyperthyroidism, goiter and exophthalmos (جحوظ العينين).
    - ✓ Clinical manifestations: insomnia (inability to sleep), irritability, weight loss, sweating and palpitations.
  - **Hashimoto thyroiditis:**
    - ✓ It is an autoimmune disease resulting in destruction of the thyroid gland. This will lead to hypothyroidism and goiter.
  - **Papillary carcinoma of the thyroid gland (70% of cases: most common):**
    - ✓ More in females.
    - ✓ Manifestations: lump on the side of the neck, hoarseness and difficulty in swallowing.

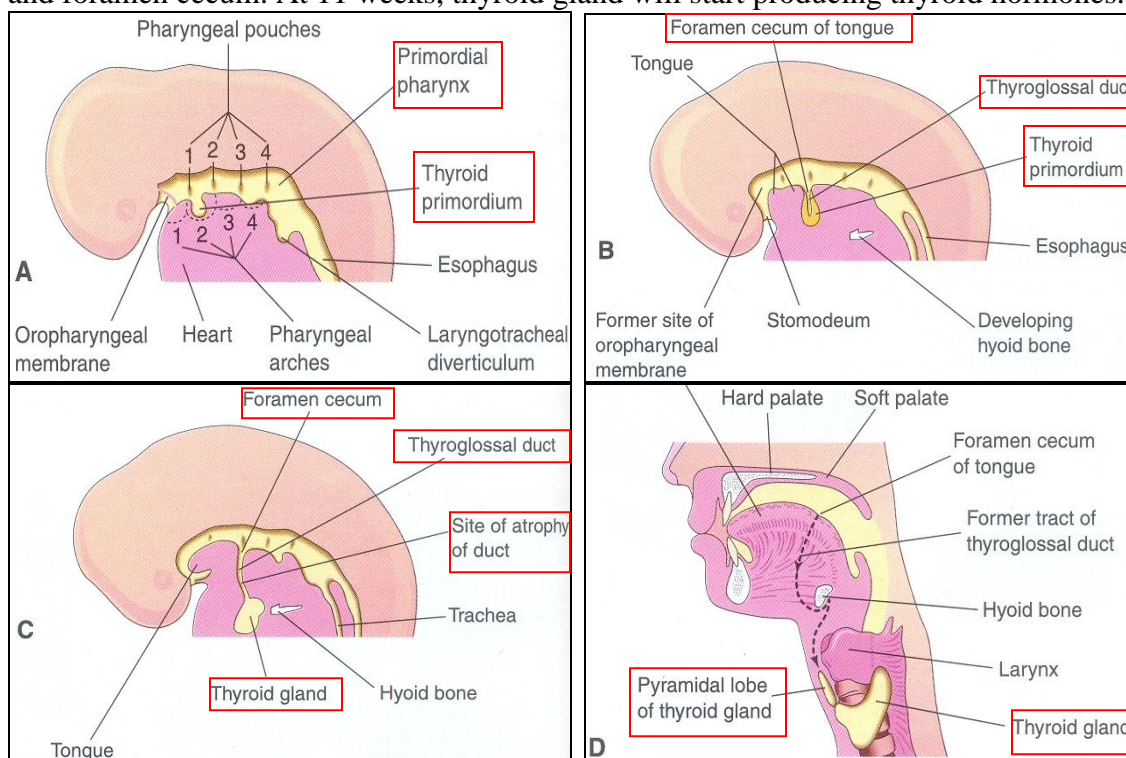
- ✓ Treatment: surgical removal, post-operative radioactive iodine and thyroid hormone (for life!).



(A) Anterior view

## EMBRYOLOGY

- The thyroid gland starts to develop at day 24 by endodermal thickening of the floor of the primordial pharynx.
- The gland will start to descend ventral to the hyoid bone and laryngeal cartilages until it reaches its final destination.
- It will be connected with the tongue by the thyroglossal duct (which will obliterate later) and foramen cecum. At 11 weeks, thyroid gland will start producing thyroid hormones.

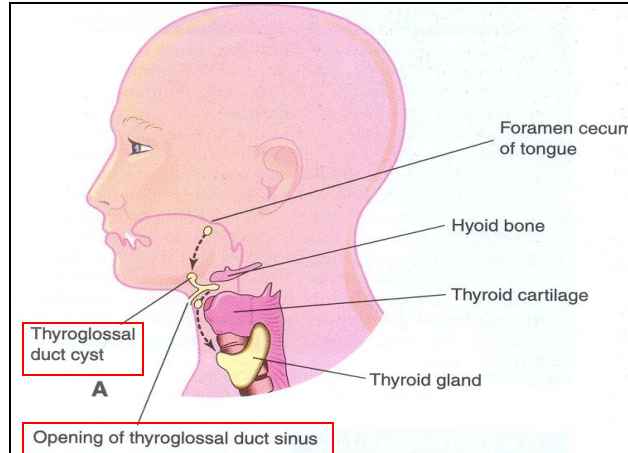




- **Developmental anomalies of the thyroid gland:**

• **Thyroglossal duct cyst:**

- ✓ Can be seen along the course followed by thyroglossal duct.
- ✓ Normally it disappears, but a part of it can form a cyst in the neck.
- ✓ Painless, progressively enlarging and movable mass.
- ✓ It can be lingual or anterior in the neck just inferior to the hyoid bone.
- ✓ When it is infected, perforation of the skin might occur producing a thyroglossal sinus.



• **Ectopic thyroid (lingual thyroid):**

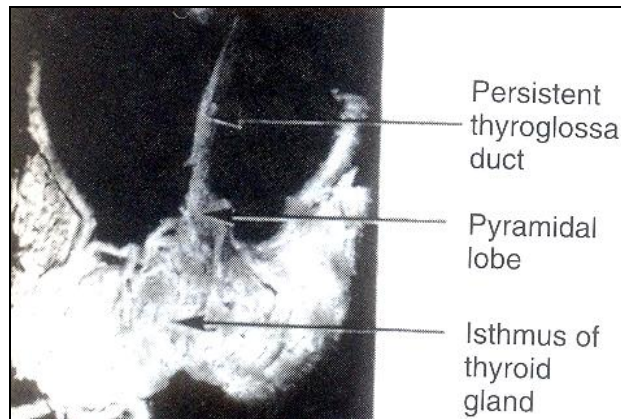
- ✓ Due to arrested caudal growth of thyroglossal duct.

• **Accessory thyroid gland.**

• **Agenesis of thyroid gland (thyroid gland is not formed!):**

- ✓ Complete absence of the thyroid gland (this is rare).
- ✓ Occurs when anti-thyroid antibodies appear within the mother, which might prevent the growth of fetal thyroid tissue after passing through the placental barrier.

• **Pyramidal lobe:** this was mentioned earlier in the note.



**HISTOLOGY**

- The thyroid gland consists of follicles filled with colloid. The precursor of thyroid hormone (thyroglobulin) is stored in the colloid. The colloid is surrounded by follicular cells which are flattened in resting stage and cuboidal or tall-columnar when active.
- Parafollicular cells are found on the periphery of the follicles. They stain lighter than follicular cells and secrete the hormone calcitonin which lowers blood calcium levels in the body.

