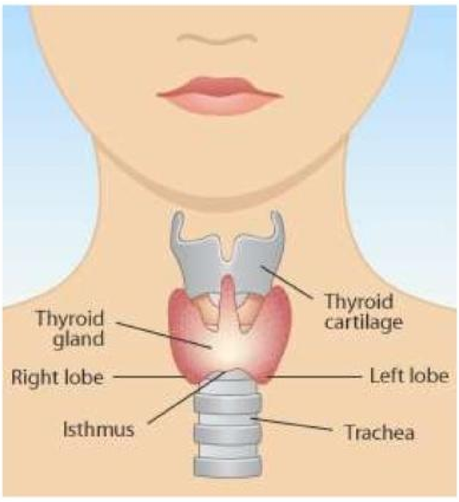


THYROID GLAND DEVELOPMENT

- The thyroid gland is the first of the body's endocrine glands to develop, on approximately the 24th day of gestation

- It begins its development from a median endodermal thickening in the floor of the primitive pharynx just caudal to the future site of the tuberculum impar

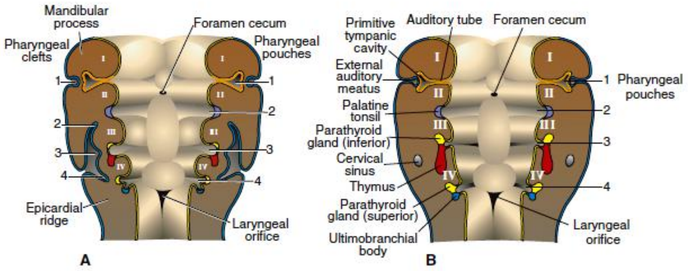


Figure 17.10 **A.** Development of the pharyngeal clefts and pouches. The second arch grows over the third and fourth arches, burying the second, third, and fourth pharyngeal clefts. **B.** Remnants of the second, third, and fourth pharyngeal clefts form the cervical sinus, which is normally obliterated. Note the structures formed by the various pharyngeal pouches.

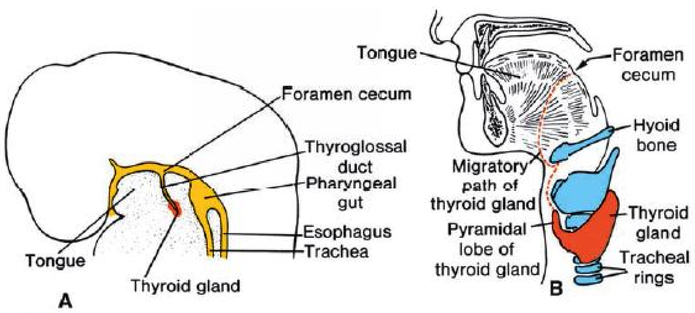


Figure 17.18 **A.** The thyroid primordium arises as an epithelial diverticulum in the midline of the pharynx immediately caudal to the tuberculum impar. **B.** Position of the thyroid gland in the adult. *Broken line*, the path of migration.

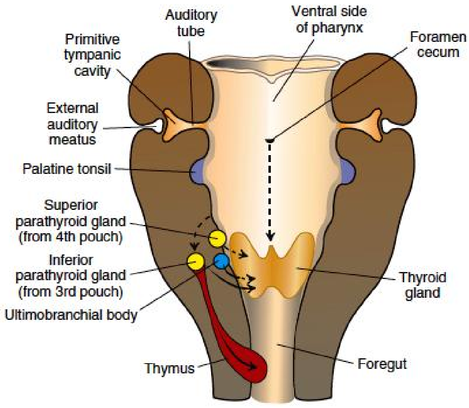


Figure 17.11 Migration of the thymus, parathyroid glands, and ultimobranchial body. The thyroid gland originates in the midline at the level of the foramen cecum and descends to the level of the first tracheal rings.

Descent of the Thyroid Gland

- Thickening forms a downgrowth, *thyroid diverticulum*, which grows into the underlying mesoderm, and as the embryo elongates and the tongue grows, the diverticulum descends in front of the neck and pharyngeal gut
- The diverticulum is connected to the tongue by a narrow canal, the *thyroglossal duct*, which opens in the tongue via the *foramen cecum*, which persists as a vestigial pit on the tongue

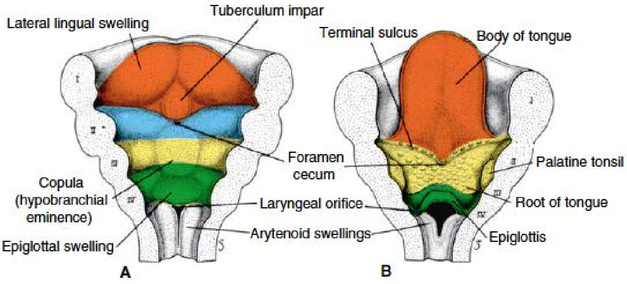


Figure 17.17 Ventral portion of the pharyngeal arches seen from above showing development of the tongue. I to IV, the cut pharyngeal arches. **A.** 5 weeks (~6 mm). **B.** 5 months. Note the foramen cecum, site of origin of the thyroid primordium.

..Cont

- Diverticulum grows rapidly and forms 2 lobes
- By week 7 of embryonic development, it reaches anterior to the trachea, having acquired a small median isthmus and 2 lateral lobes. By then, the thyroglossal duct usually has disappeared
- A pyramidal lobe of the thyroid may be observed in as many as 50% of patients. This lobe represents a persistence of the inferior end of the thyroglossal duct that has failed to obliterate.

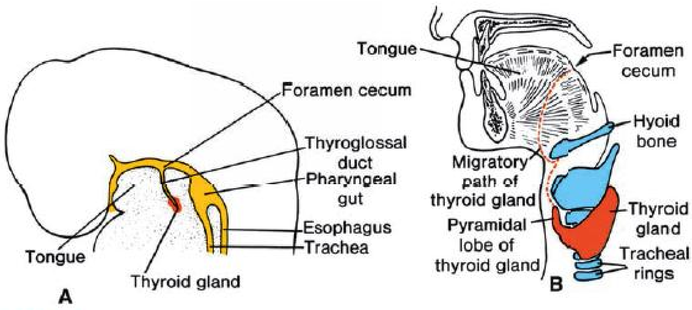
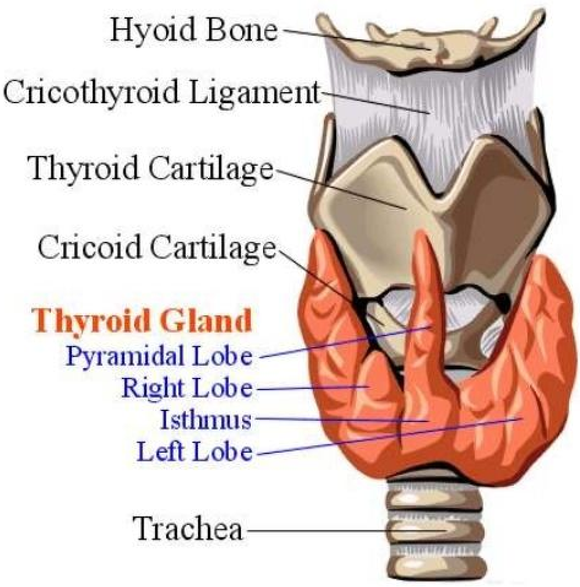
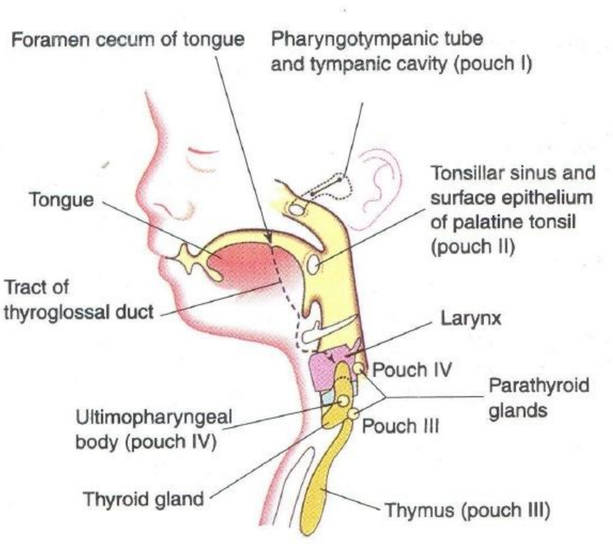


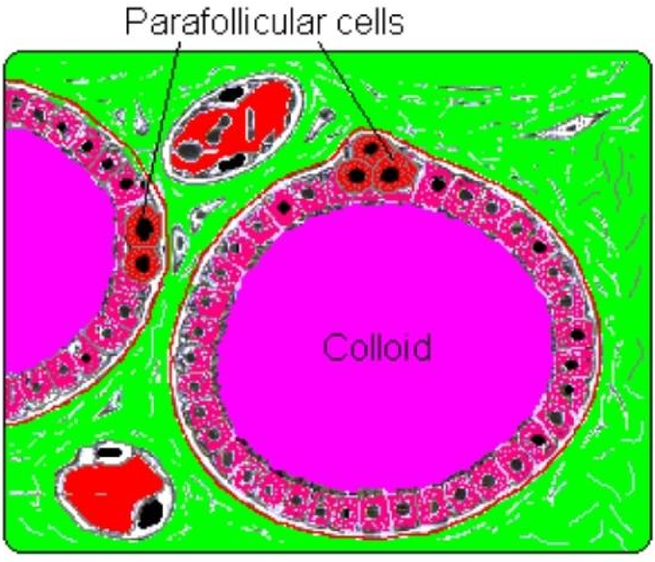
Figure 17.18 **A.** The thyroid primordium arises as an epithelial diverticulum in the midline of the pharynx immediately caudal to the tuberculum impar. **B.** Position of the thyroid gland in the adult. *Broken line*, the path of migration.





- THE THYROID GLAND begins to function at about the end of month 3, at which time, the first follicles containing colloid can be seen
- AT FIRST, THE THYROID PRIMORDIUM is made up of a solid mass of entodermal cells

- It later breaks up into a network of epithelial cords or plates by invasion of the surrounding mesenchyme
- By week 10, the cords have divided into small cellular groups, and a lumen forms in each cellular cluster. The cells then arrange themselves in a single layer around the lumen
- During week 11, colloid is seen in these follicle structures, and even thyroxine can be demonstrated



- Ultimobranchial bodies loose their connections with pharynx and migrate toward thyroid gland.
- Cells of ultimobranchial bodies disseminate within gland.
- These cells are parafollicular or C-cells.

REMNANTS OF THE THYROGLOSSAL DUCT

- The normal remains of the thyroglossal duct are the vestigial foramen cecum (of the tongue) and the functional pyramidal lobe of the thyroid gland

Congenital malformations

- THYROGLOSSAL DUCT CYSTS AND SINUSES

- Cysts can form anywhere along the course of the developing thyroglossal duct during descent of the developing thyroid gland from the tongue
- Remnants of the duct may persist and give rise to cysts in the tongue or in the midline of the neck, usually below the hyoid bone

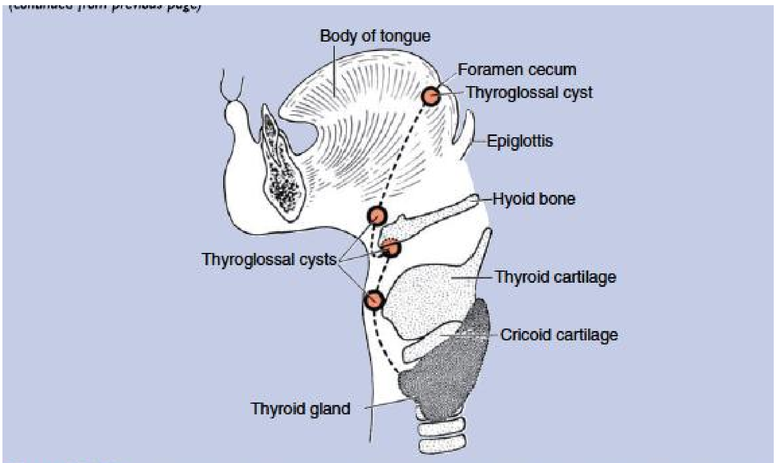


Figure 17.19 Thyroglossal cysts. These cysts, most frequently found in the hyoid region, are always close to the midline.

Thyroglossal Fistula

- Sometimes the cyst is connected to outside by a fistulous canal.
- Then it is called thyroglossal fistula.
- The fistula may be primary when it is present at birth. It may be secondary thyroglossal fistula when a cyst ruptures and communicate outside at later stage.

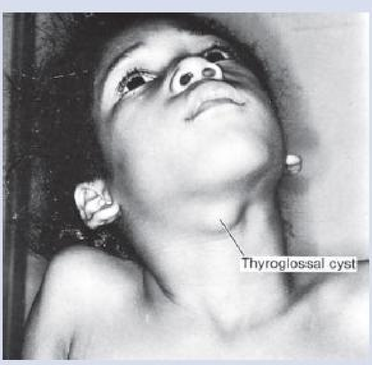


Figure 17.20 Thyroglossal cyst. These cysts, which are remnants of the thyroglossal duct, may be anywhere along the migration pathway of the thyroid gland. They are commonly found behind the arch of the hyoid bone. An important diagnostic characteristic is their midline location.

ACCESSORY THYROID TISSUE

- Very rarely the thyroid fails to descend from the tongue area resulting in a *lingual thyroid*
- Incomplete descent, which is rare, may result in a *cervical thyroid* that is seen in the neck at or just below the hyoid bone
- Accessory thyroid tissue often is fully functional, originates from remnants of the thyroglossal duct, thus can be found anywhere from the level of the tongue to where the thyroid gland comes to rest in the neck

Ectopic Thyroid tissue and Agenesis

- Found in thorax in relation to trachea and bronchi or even oesophagus
- Believed to arise from endodermal cells displaced during formation of laryngotracheal tube.

- **Agenesis of the Thyroid**
- Failure of development of thyroid gland may also occur