Lec.8

Embryology

DR. HULAL SALEH SAHIB

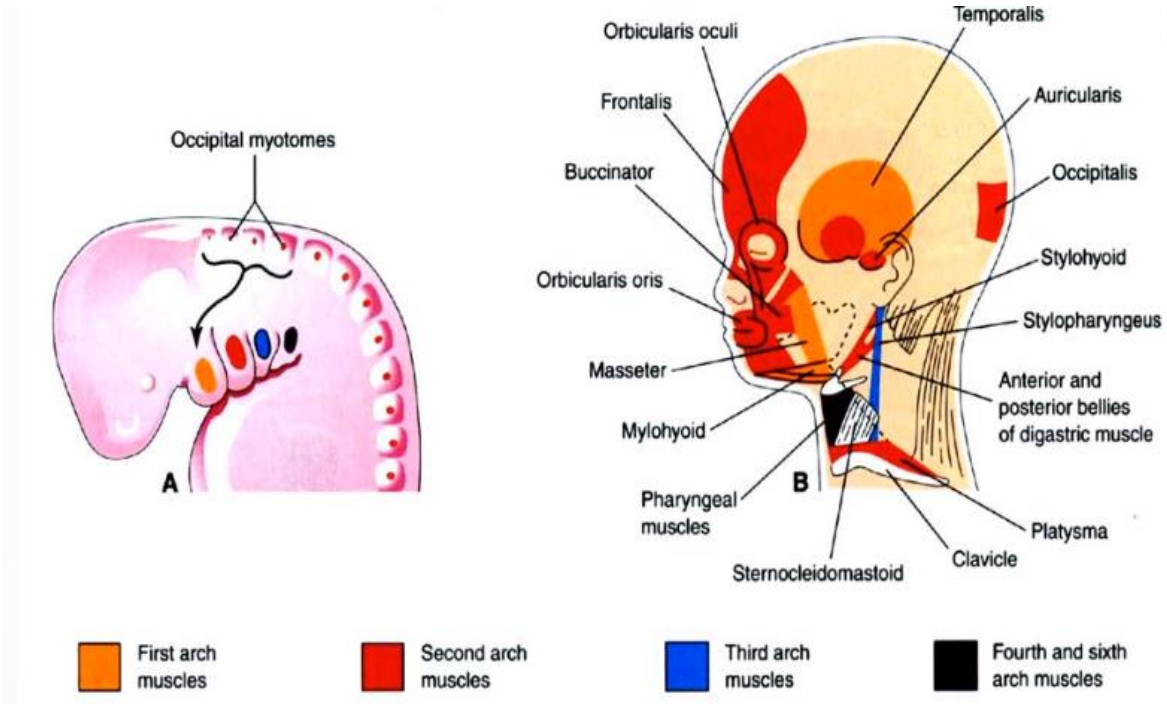
Third pharyngeal arch

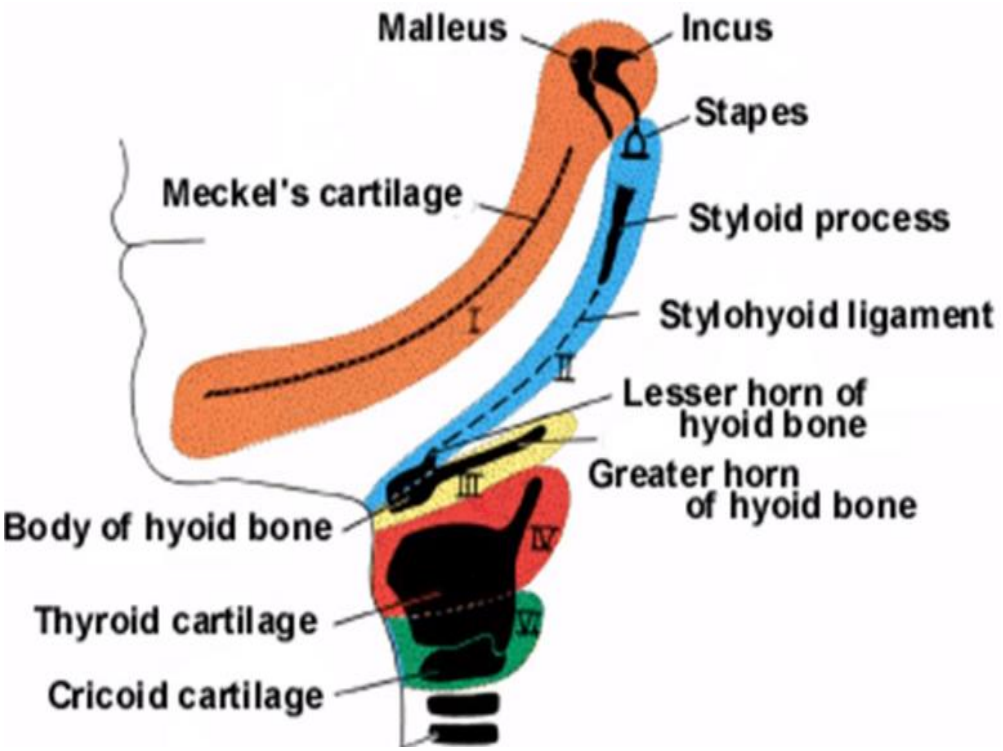
The **cartilage** of the third pharyngeal arch produces the **rest of the hyoid bone**. The **musculature** is limited to the **stylopharyngeus muscles.** These muscles are innervated by the **glossopharyngeal nerve,** the nerve of the third arch.

Fourth and sixth pharyngeal arches

Cartilaginous components of the fourth and sixth pharyngeal arches fuse to form the **thyroid, cricoid, arytenoid, corniculate, and cuneiform cartilages**

Muscles of the fourth arch (**cricothyroid, levator palatini,** and **constrictors of the pharynx**) are innervated by the **superior laryngeal branch of the vagus,** the nerve of the fourth arch. Intrinsic muscles of the larynx are supplied by the **recurrent laryngeal branch of the vagus,** the nerve of the sixth arch.





Molecular Regulation of Facial Development

As indicated, much of the face is derived from neural crest cells that migrate into the pharyngeal arches. In the hindbrain, crest cells originate from segmented regions known as **rhombomeres.**

There are eight of these segments in the hindbrain (R1 to R8). Crest cells from R1 and R2 migrate to the first arch, cells from R4 go to the second arch, those from R6 and 7 to the third arch, and those from R8 to the fourth and sixth arches. In addition, the first arch receives crest cells originating in the midbrain.
Few if any crest cells form from R3 and R5. Most of the cells from these rhombomeres undergo cell death by **apoptosis.**

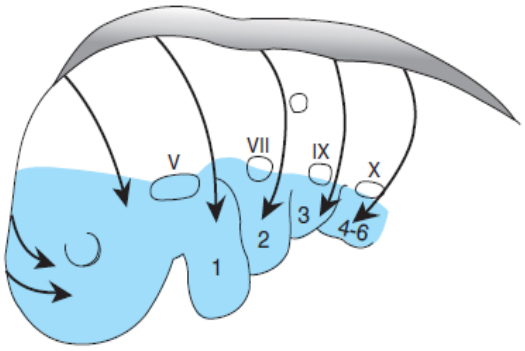


Figure 17.2 Migration pathways of neural crest cells from forebrain, midbrain, and hindbrain regions into their final locations (*shaded areas*) in the pharyngeal arches and face. Regions of ectodermal thickenings (placodes), which will assist crest cells in formation of the fifth (*V*), seventh (*VII*), ninth (*IX*), and tenth (*X*) cranial sensory ganglia, are also illustrated.

CLINICAL CONSIDERATIONS

A. First arch syndrome results from abnormal development of **pharyngeal arch 1** and produces various facial anomalies. It is caused by a lack of migration of neural crest cells into pharyngeal arch 1. Two well described first arch syndromes are **Treacher Collins syndrome** and **Pierre Robin syndrome**.

Treacher Collins syndrome is an autosomal dominant genetic disorder.

Clinical features include hypoplasia of the zygomatic bones and mandible, resulting in midface hypoplasia, micrognathia, and retrognathia; external ear abnormalities (small, absent, malformed, or rotated ears) and lower eyelid abnormalities, including coloboma. The photograph 12.5 shows a young boy with Treacher Collins syndrome. Note the hearing aid cord.

Pierre Robin syndrome: It is an autosomal recessive disorder. The affected infant usually presents triad of anomalies: (a) micrognathia (small mandible), (b) cleft palate, and (c) glossoptosis (posteriorly placed tongue). The primary defect is small mandible. A& B show a child with Pierre robin syndrome

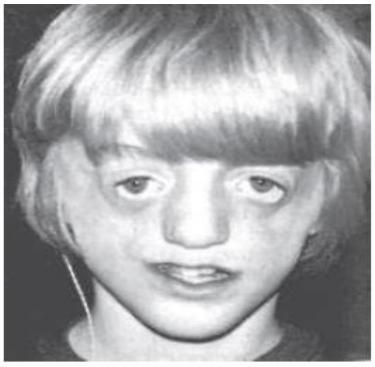


FIGURE 12.5. Treacher Collins syndrome