

Chapter 1

Embryology and Developmental Disorders

ABSTRACT

This chapter describes the embryological development and congenital anomalies of salivary glands. Development of the major salivary glands consists of three main stages. The first stage is marked by the presence of a primordial anlage and the formation of branched duct buds. The second stage is marked by the early appearance of lobules and duct canalization and the third stage by maturation of acini and ducts. The primordial parotid gland is the first to appear, during the sixth gestational week. In addition to heterotopic glands, congenital anomalies include aplasia, gland duplication and congenitally atretic, imperforate, ectatic, and duplicated ducts.

EMBRYOLOGICAL DEVELOPMENT

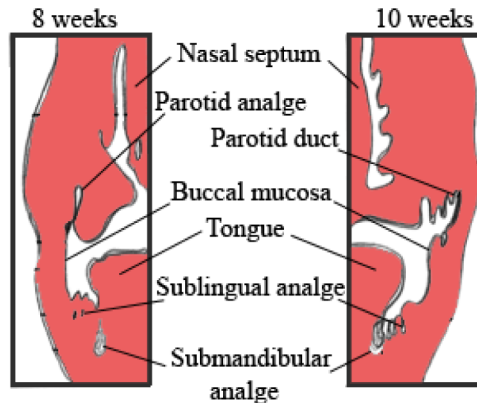
Development of the major salivary glands is thought to consist of three main stages (Arey, 1974; Gibson, 1983). The *first stage* is marked by the presence of a primordial anlage (from the German verb *anlagen*, to set a foundation) and the formation of branched duct buds resulting from repeated epithelial cleft and bud development (Figure 1). Ciliated epithelial cells form the luminal lining, while the external surfaces are lined by ectodermal myoepithelial cells (Bernfield, Banerjee, & Cohn, 1972).

During the *second stage*, early appearance of lobules and duct canalization take place resulting in the appearance of primitive acini and distal duct regions.

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The *third stage* of major salivary gland development is marked by maturation of acini and intercalated ducts, and reduced prominence of interstitial connective tissue.

Figure 1. Embryo-logical development of the salivary glands



The primordial *parotid gland* is the first to appear, during the sixth gestational week, when oral ectodermal out-pouchings extend into the adjacent mesoderm and serve as the site of origin for growth of glands. After a short journey of dorsal and lateral migration, the parotid gland resides in the pre-auricular region. The facial nerve arbitrarily divides the gland into superficial and deep lobes by the 10th week of gestation. A fully developed capsule from the nearby mesenchyme surrounds the gland by the 12th week (Arey, 1974).

During the sixth week of embryonic life, small buds appear in the floor of the mouth lateral to the tongue and extend posteriorly around the mylohyoid muscle into the submandibular triangle. These buds eventually develop into the *submandibular glands*. A capsule from the surrounding mesenchyme is fully formed around the gland by the third gestational month (Gibson, 1983).

During the ninth embryonic month, the *sublingual gland* anlage is formed from multiple endodermal epithelial buds in the paralingual sulcus of the floor of the mouth. Absence of a capsule is due to infiltration of the glands by sublingual connective tissue. Intra-glandular lymph nodes (LNs) and major ducts also do not generally develop within sublingual glands. Upper respiratory ectoderm gives rise to simple tubuloacinar units. They develop into the *minor salivary glands* during the 12th intrauterine week (Kontis & Johns, 2014).

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