Because of its numerous clinical, including endodontic, implications, several fundamental points regarding the embryology of the tooth and its supporting structures will be discussed. For histological aspects, the reader is referred to existing sources.

CROWN FORMATION

The teeth begin to form about the sixth week of intrauterine life. The process is manifested by a thickening in the basal layer of ectodermal cells that cover the primitive oral cavity, or stomodeum. This thickening is called the “dental lamina.” It assumes the shape of a horseshoe, extending the length of the future dental arches. It comprises cells that proliferate at a more rapid rate than do the adjacent epithelial cells. At a certain point, at predetermined sites on the dental lamina, each corresponding to the ten deciduous maxillary and ten mandibular teeth, further cellular proliferation takes place, forming small protuberances (Fig. 2.1).

The protuberances do not form simultaneously throughout the dental lamina, but rather begin anteriorly, first in the mandibular, then in the maxillary regions. The posterior ones then develop, at points which correspond to the future deciduous teeth. As the protuberances proceed to enlarge, they remain associated with the dental lamina, differentiate, and depending on the stage, they assume peculiar forms called “bud,” “cap,” or “bell”. These terms serve descriptive purposes only; they represent three moments of a slow evolution.
lution in which, by means of a continuous and gradual proliferation of cells, the teeth begin their slow, progressive formation.

Very early in the “tooth bud stage”, which represents the primordia of the enamel organ,* two types of epithelial cells differentiate. One covers the internal surface of the bud, the other the external surface; they are the “inner epithelium” and “outer epithelium”, respectively, of the enamel organ (Fig. 2.2). Concurrently, there is marked proliferation of the mesenchymal cells which face the inner epithelium of the enamel organ, from which the “dental papilla” (Fig. 2.3) will derive. This mesenchymal proliferation tends to dip within the epithelial proliferation (Fig. 2.4), which in turn circumscribes it during its growth. In this way, the process proceeds to the “cap stage” (Fig.

(*) A.R. Ten Cate\footnote{13} correctly notes that the term “enamel organ” is imprecise, inasmuch as it is too limiting; he prefers to call this structure the “dental organ”. Indeed, it has several functions, as will be shown in the course of this chapter: apart from forming enamel, it is responsible for determining the shape of the crown, induces the differentiation of the odontoblasts, and thus directly initiates dentin formation and finally establishes the dento-gingival junction. Nonetheless, to avoid confusion, the universally-accepted old terminology will be employed.