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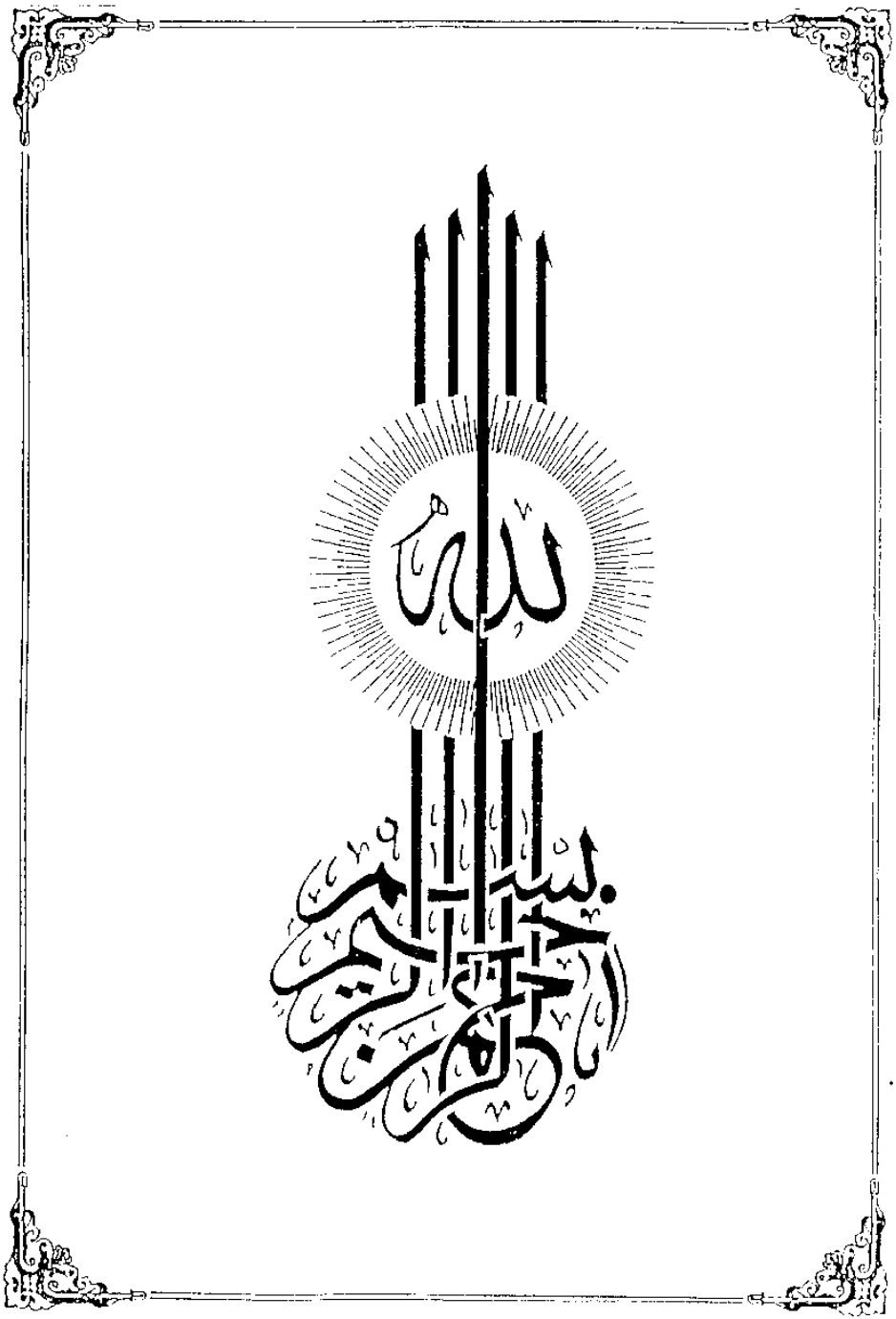

C O N T E N T S

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Introduction And Aim of The work

INTRODUCTION AND AIM OF THE WORK

The relation between diseases of the maxillary sinuses and the teeth is intimate, and in many cases the combined work of both th dental surgeon and the otolaryngologist is needed .

The otolaryngologist has to be aware of many things concerning the dental surgeon originally, but knowing them, he will be able to diagnose and treat his cases on better and more correct basis . Our study will include:-

- Embryology, development and growth of the teeth, maxilla and maxillary sinuses .
- Inflammatory lesions of the teeth and their possible effects on the maxillary sinus .
- Cysts and tumours of odontogenic origin in relation to the maxillary sinus .
- Diseases of the maxillary sinus and their possible effects on teeth .
- Inflammatory lesions of the maxillary sinus and their possible effects on teeth .

Embryology, Development And Growth Of Teeth

EMBRYOLOGY, DEVELOPMENT AND GROWTH OF TEETH

-DEVELOPMENTAL STAGES BUD, CAP AND BELL STAGES

-DEVELOPMENT OF ENAMEL

-DENTINOGENESIS

-CEMENTOGENESIS

-DEVELOPMENT OF PERIODONTAL LIGAMENT

-TOOTH ERUPTION

-SHEDDING OF DECIDUOUS TEETH

DEVELOPMENT OF TEETH

The primitive oral cavity is lined by ectoderm that consists of a basale layer of columnar cells and a surface layer of flattened cells . Each tooth develops from a tooth bud, that forms from the lining of the oral cavity (Bhaskar,1976) .

A tooth bud consists of three parts:-

1- An enamel organ, which is derived from the oral ectoderm and produces the tooth enamel .

2- A dental papilla, which is derived from the mesenchyme and produces the tooth pulp .

3- A dental sac, which is derived also from the mesenchyme and produces the cementum and the periodontal ligament .

DEVELOPMENTAL STAGES

It is necessary to divide the developmental history of a tooth into several stages . They are named after the shape of the epithelial part of the tooth and they are the bud, cap, and bell stages .

I- DENTAL LAMINA AND BUD STAGE

The first sign of human tooth development is seen during the six week of embryonic life(11mm embryo) . Certain cells in the basale layer of the oral epithelium begin to proliferate at a more rapid rate than do the adjacent cells . An epithelial

thickening arises in the region of the future dental arch and extends along the entire margin of the jaws . It is the primordium of the ectodermal portion of the teeth and is known as the dental lamina .There are ten round or ovoid swellings at ten different points corresponding to the future positions of the deciduous teeth; they are the primordia of the enamel organs or the teeth buds . Thus the development of the tooth germ is initiated and the cells continue to proliferate faster than the adjacent cells do .

2-CAP STAGE

As the tooth bud continue to proliferate, it does not expand uniformly into a large sphere . Unequal growth in the different parts of the bud leads to formation of the cap stage, which is characterised by a shallow invagination on the deep surface of the bud . The peripheral cells of the cap stage are cuboidal, they line the convexity of the cap and are called the outer dental epithelium. The cells on the concavity of the cap are tall and represent the inner dental epithelium . The cells in the center of the epithelial enamel organ, situated between the outer and inner epithelia, begin to separate by an increase of the intercellular fluid and arrange themselves in a network called the stellate reticulum (enamel pulp) . The cells of which assume a branched reticular form . The spaces in this reticular network are filled with a mucoid fluid rich in albumin, giving the stellate reticulum

a cushion like consistency that later supports the delicate enamel forming cells .

Under the organising influence of the proliferating epithelium of the enamel organ, the mesenchyme, partially enclosed by the invaginated portion of the inner enamel epithelium, proliferates . It condenses to form the dental papilla, which is the formative organ of the dentin and the primordium of the pulp . The peripheral cells of the dental papilla, adjacent to the inner dental epithelium, enlarge and later differentiate into odontoblasts .

Concomitant with the development of the enamel organ and the dental papilla, there is a marginal condensation in the mesenchyme surrounding the enamel organ and dental papilla . In this zone, gradually a denser and more fibrous layer develops, which is the primitive dental sac .

3-BELL STAGE

As the invagination of the epithelium deepens and margins continue to grow, the enamel organ assumes the bell stage . The inner dental epithelium consists of a single layer of cells that differentiate into tall columnar cells, (the ameloblasts) . The underlying mesenchymal cells differentiate into odontoblasts .

Several layers of squamous cells, called the stratum

intermedium, appear between the inner enamel epithelium and the stellate reticulum . This layer seems to be essential to enamel formation .

The stellate reticulum(enamel pulp) expands further, mainly by increase of the intercellular fluid . Before enamel formation begins, the stellate reticulum shrinks by loss of the intercellular fluid . Its cells then are hardly distinguishable from those of the stratum intermedium . This change begins at the height of the cusp or the incisal edge and progresses cervically .

The cells of the outer dental epithelium flatten to a low cuboidal form . At the end of the bell stage, preparatory to and during the formation of enamel, the formely smooth surface of the outer dental epithelium is laid in folds . Between the folds the adjacent mesenchyme of the dental sac forms papillae that contain capillary loops and thus provides a rich nutritional supply for the intense metabolic activity of the avascular enamel organ .

ADVANCED BELL STAGE:-

In all teeth, except the permanent molars, the dental lamina proliferates at its deep end to give rise to the enamel organs of the permanent successor . The enamel organ(dental organ) becomes gradually independent and separated from the dental lamina at about

Fig. 2.1. Diagram of life cycle of tooth. (Modified from Schour, I., and Massler, M.: J. Am. Dent. Assoc. 27:1785, 1940.)

the time when the first dentin is formed .

The dental papilla is enclosed in the invaginated portion of the enamel organ . Before the inner enamel epithelium begins to produce enamel, the peripheral cells of the mesenchymal dental papilla differentiate into odontoblasts . They assume a cuboid and later a columnar form and acquire the specific potentiality to produce dentin .

Before the formation of dental tissues, the dental sac shows a circular arrangement of its fibres and resembles a capsular structure . With the development of the root, the fibres of the dental sac differentiate into the periodontal fibres that become embedded in the cementum and the alveolar bone . During the advanced bell stage the junction of the inner and outer dental epithelia at the basale margin of the epithelial organ, in the region of the future cemento-enamel junction, proliferates and gives rise to the epithelial root sheath of Hertwig .

FATE OF THE DENTAL LAMINA :-

During the cap stage the dental lamina maintains a broad connection with the enamel organ, but in the bell stage it begins to break up by mesenchymal invasion, which first penetrates its central portion and divides it into the lateral lamina and the