Pediatric Dentistry

Eruption of teeth

Lec. 1

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1 Phases of tooth eruption

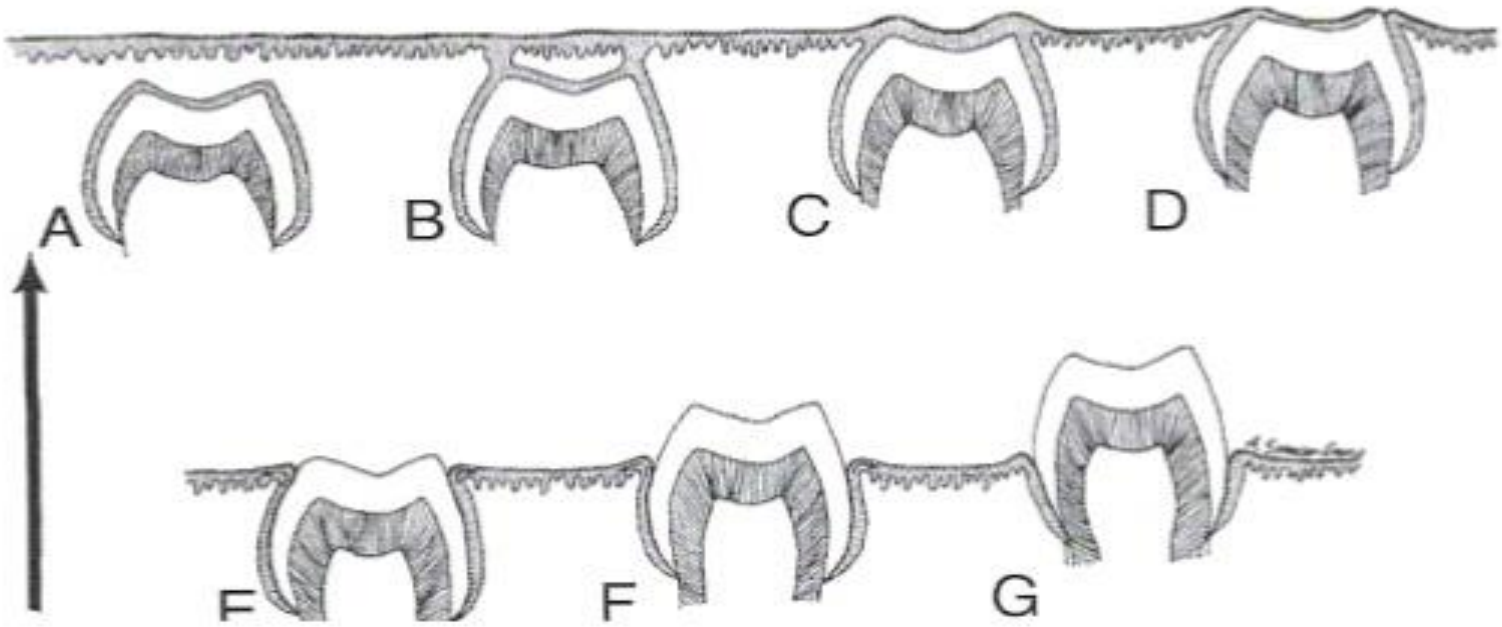
Eruption is the movement of the developing teeth through the bone and the overlying mucosa of the jaws to appear in the oral cavity and reach the occlusal plane

➢Movements of teeth leading to eruption take place in three phases

1.Preeruptive phase

2.Eruptive phase

3.Functional phase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1.Preeruptive phase

- The movements in preeruptive phase are the movements of the developing tooth before the root begins to form.

- It consists of movements of the developing tooth within the alveolar process.

- The tooth germs move outward and upward/downward with the increasing length, width and height of the jaws.

- Preeruptive movements involve bodily movement and eccentric movement of the developing tooth germ.
- Bodily movement is the shift of the entire tooth germ.
- Eccentric movement is the relative growth in one part of the tooth, leading to a change in the centre of the tooth germ.


A
B
C

2.Eruptive phase (Prefunctional phase)

- Eruptive phase begins when the root starts to form and ends when the tooth reaches occlusal plane.

- After initiation of root formation PDL also starts to develop.

- PDL is remodelled continuously to accommodate the eruptive tooth movement.

- The end of secretory phase of amelogenesis also coincides with the start of the eruptive phase.

- During the eruptive stage the crown breaks the double layer epithelium overlying it and enters the oral cavity.
- The eruption causes the tissue around it form the junctional epithelium and the gingiva.
- This phase is also called as prefunctional phase.

3.Functional phase (Post eruptive phase)

- The functional phase begins when the tooth reaches the occlusal plane and continues as long as the tooth remains in the oral cavity.

- Movements in the early stages of this phase accommodates the growth of root and the jaws.

- This phase is also called the post eruptive phase.

2 Mechanism of tooth eruption

There are many theories that explain the mechanism of tooth eruption

Vascularity

- Vascularity plays an important role in tooth eruption
- Sufficient blood supply to the tooth germ has proven to cause eruptive tooth movement
- Localized hyperamia has shown to causes increased vascularity of the periodontal tissue and also increased eruption of adjacent tooth

Pressure

- Decreased pressure overlying a tooth and increased pressure around the tooth are major factors in tooth eruption.

- When the root formation begins an eruption pathway develops overlying the tooth.

- Remodelling of tissue around the developing tooth brings about an increase in pressure tooth which causes the tooth movement.

Root formation

- Root formation causes an overall increase in the length of the tooth.
- It produces enough force that leads to the resorption of bone.
- However, this force in itself does not cause tooth movement.
- Rootless teeth also erupt.

Periodontal ligament

- The remodelling of PDL has also been considered as a factor for tooth eruption.

- The fibroblasts possess traction power that causes tooth movement.

- The PDL helps lift the tooth to its occlusal plane during the supraosseous phase of eruption.

Bone remodelling

- The selective resorption and formation of bone surrounding the tooth cause its movement.

- This theory also explains the tooth movement during preeuptive phase.

Influence of premature loss of primary molars on eruption time of their successors

- Eruption of the premolar teeth is delayed in children who lose primary molar at 4 or 5 years of age and before. If extraction of the primary molars occurs after the age the age of 5 years, there is a decrease in the delay of premolar eruption. At 8,9 and 10 years of age, premolar eruption resulting from premature loss of primary teeth is greatly accelerated. In some cases that premature loss of teeth associated with systemic disease usually results from some change in immune system or connective tissue. The most common of these conditions appears to be hypophosphatasia and early-onset periodontitis.

Life cycle of the tooth

- The tooth as a living functional organ passes through successive periods of development during its life cycle and this development results from an interaction of the oral epithelial cells and the underlying mesenchymal cells, form this interaction , 20 primary, and 32 permanent teeth developed.

The fundamental process are similar for all teeth which involve the following:

1. Growth

a. Initiation-evidence of development of human tooth could be observed as early as the sixth week of embryonic life. Certain cells of the basal layer of the oral epithelium begin to proliferate more rapid than adjacent cells this represent the formation of tooth bud.

b. Proliferation- proliferate growth is the result of cellular division and therefor multiplication of the cell it constitutes the most rapid phase of growth and characterized by marked alteration in the form of growing organ.

c. Histodifferentiation- specialization of cells, the cells of inner epithelia of enamel organ become ameloblast and the peripheral cells of dentine organ become odontoblast.
d. Morphodifferentiation- arrangement of the formative cell along the future dento-enamel and dento- cemental junction so as to out lines the size and shape of the future crown and root.
e. Apposition- apposition growth result from a layer like deposition of non vital extracellular secretion in form of a tissue matrix. This matrix, deposit by the formative cells, ameloblast and odontoblast, their deposition were according to definite pattern and at a definite rate.

2. Calcification (mineralization)
3. Eruption
4. attrition

THANK YOU