

# DEVELOPMENT OF TEETH

Prof. Shaleen Chandra

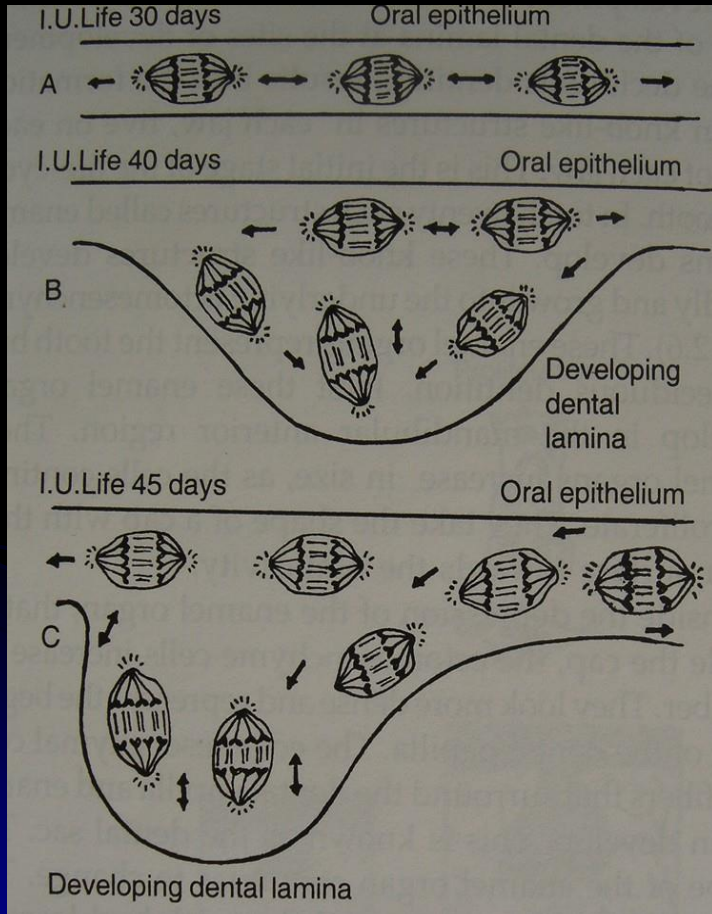


- A complex biological process involving epithelial mesenchymal interactions, morphogenesis and mineralization
- 20 deciduous and 32 permanent teeth

## Formation of Primary Epithelial Band

- At thirty seven days of IU development
- Horseshoe shaped corresponding to future dental arches

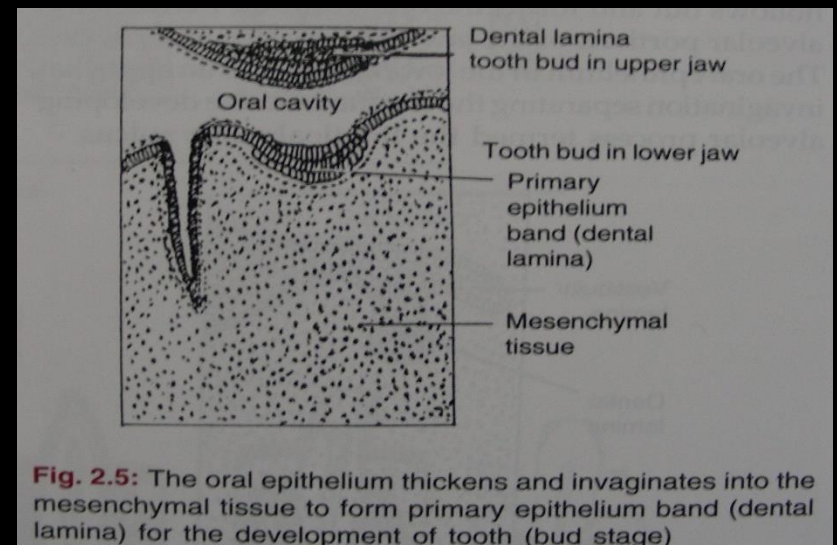
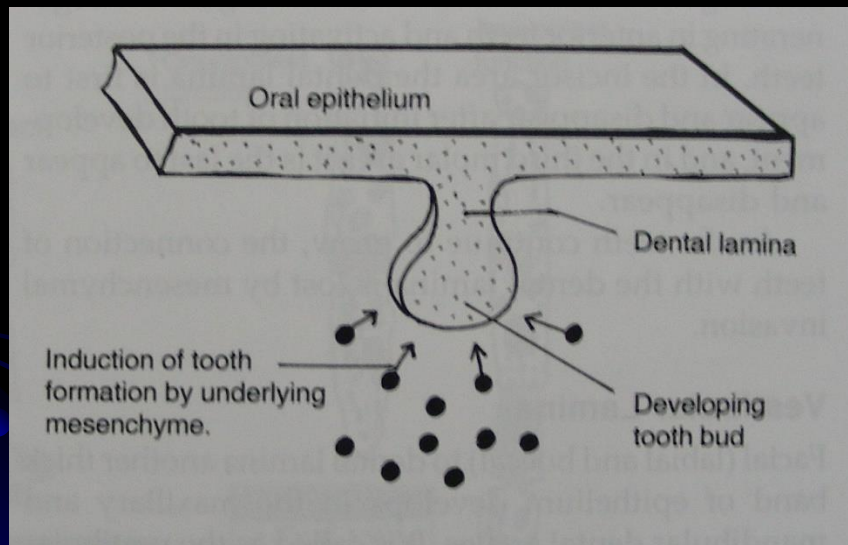
# Primary epithelial Band



Mitosis seen in thickened Oral epithelium at 5<sup>th</sup> week of I.U. life

change in the plane of cleavage of cells

# Dental Lamina



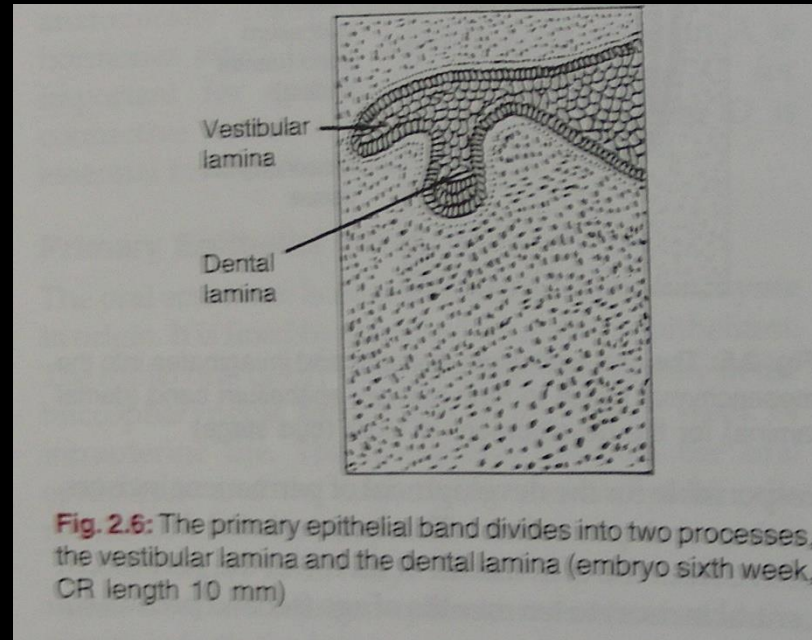
**Fig. 2.5:** The oral epithelium thickens and invaginates into the mesenchymal tissue to form primary epithelium band (dental lamina) for the development of tooth (bud stage)

## Fate of Dental Lamina:

- Teeth loose their connection with DL
- Later on it gets invaded by mesenchyme
- Remnants of DL may persist as Epithelial pearls or islands within the jaw &/or gingiva

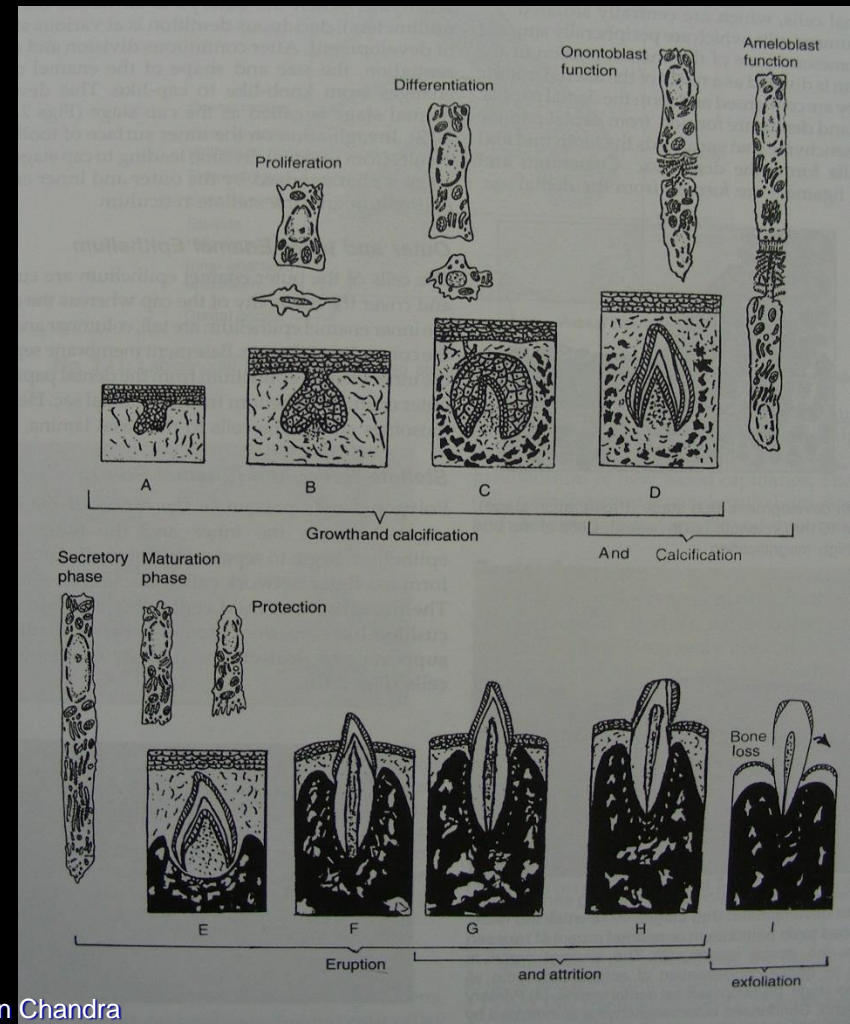


# Vestibular Lamina



# STAGES OF TOOTH DEVELOPMENT

- Bud Stage
- Cap Stage
- Bell Stage
- Advanced Bell Stage

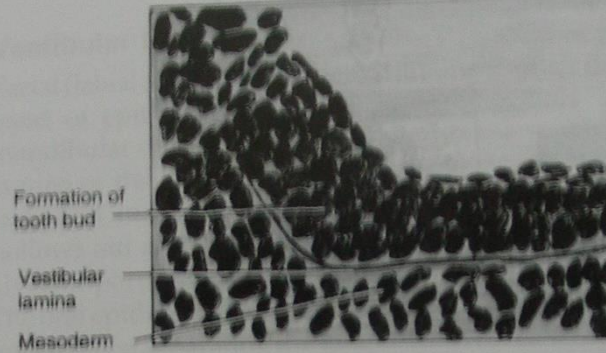


# STAGES OF TOOTH DEVELOPMENT

- Bud Stage : Initiation
- Cap Stage : Proliferation
- Early Bell Stage : Histo-differentiation
- Advanced Bell Stage : Morpho-differentiation



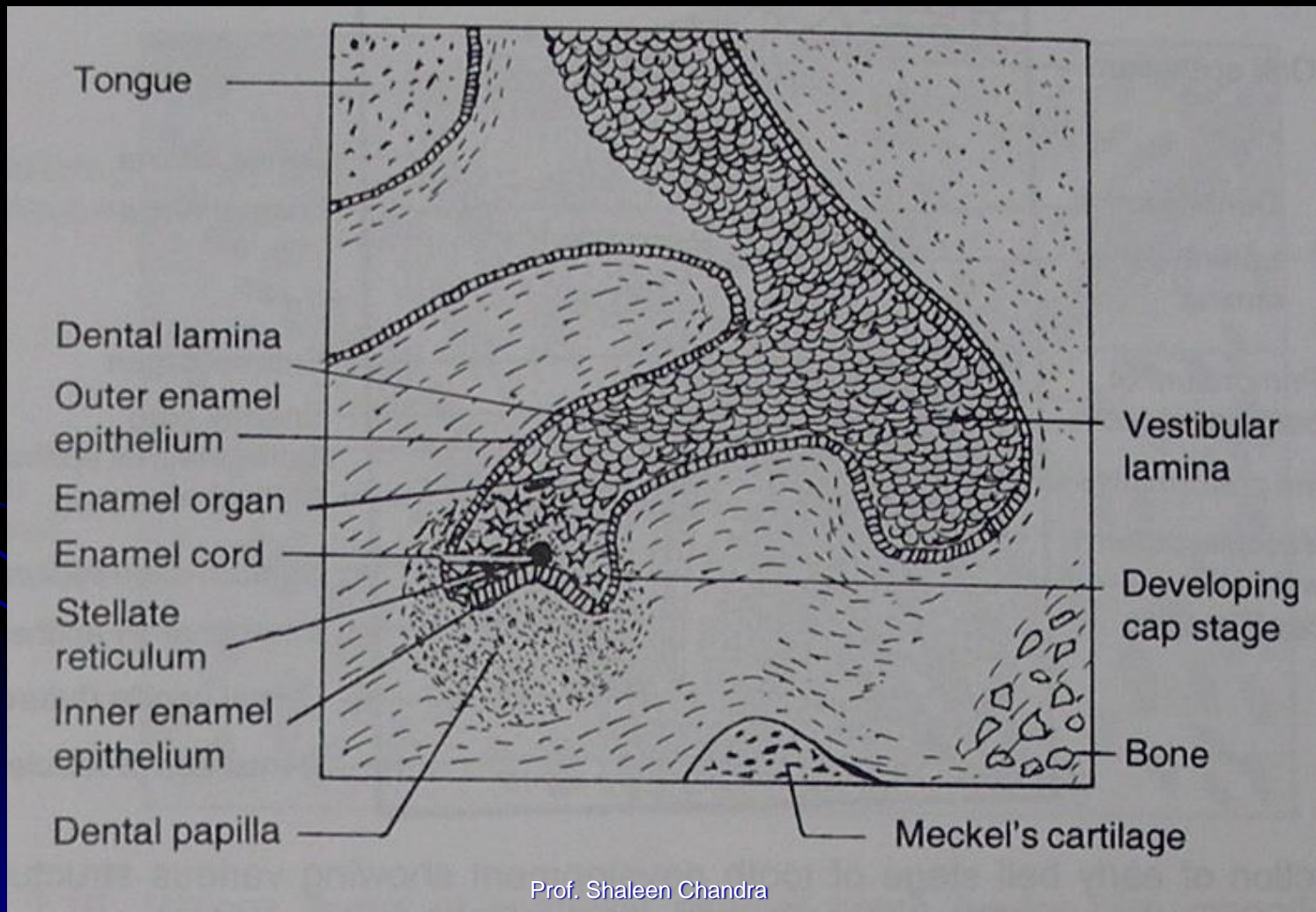
# Bud Stage



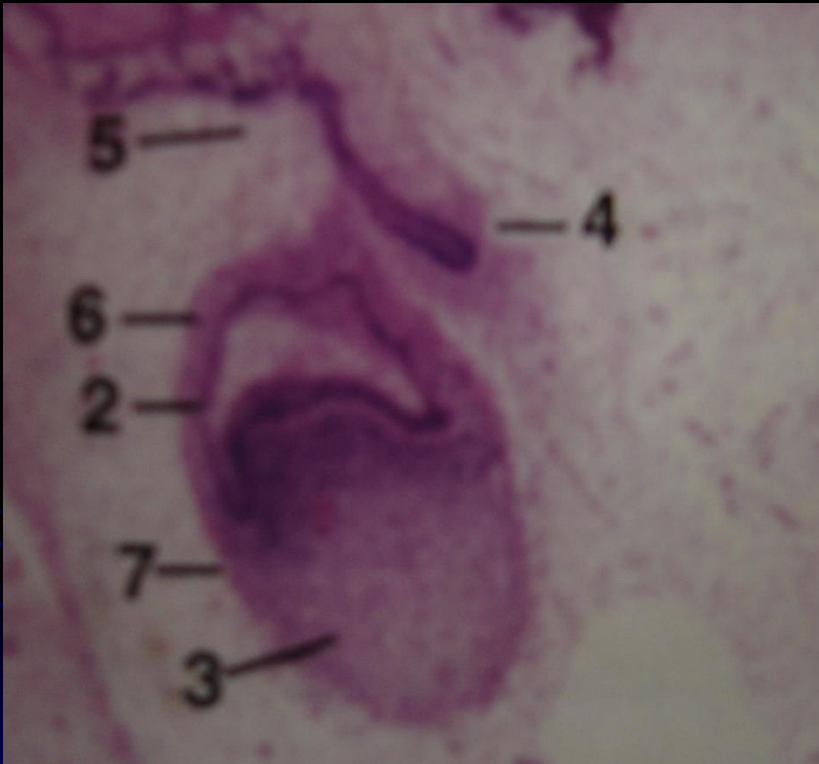
**Fig. 2.8:** Tooth development: Bud stage (Proliferation stage). Embryo about 15 mm in length (sixth week). Cells of the bud stage under high magnification



# Cap Stage

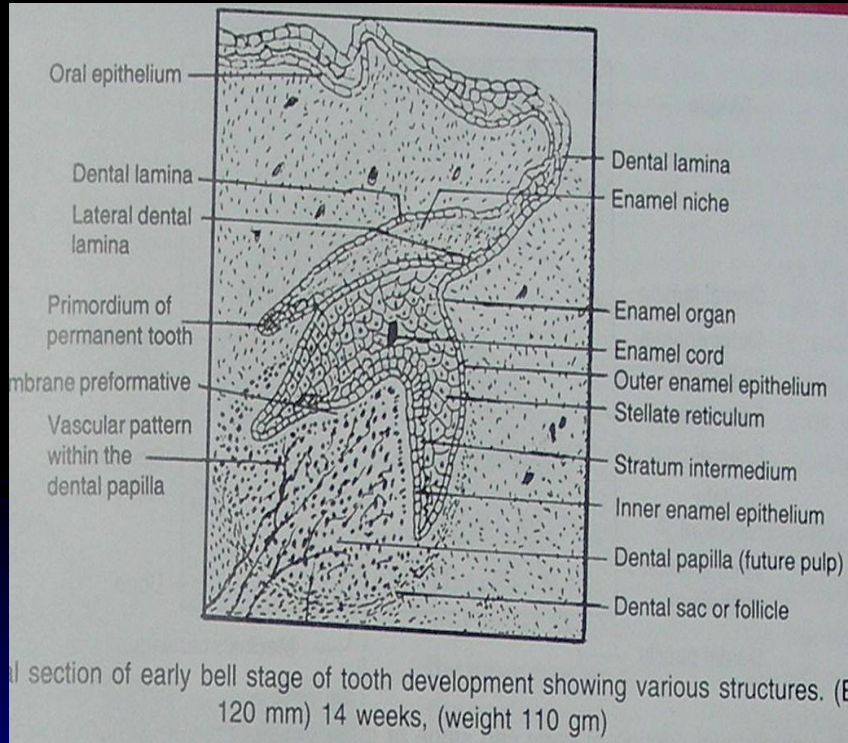


# Cap Stage



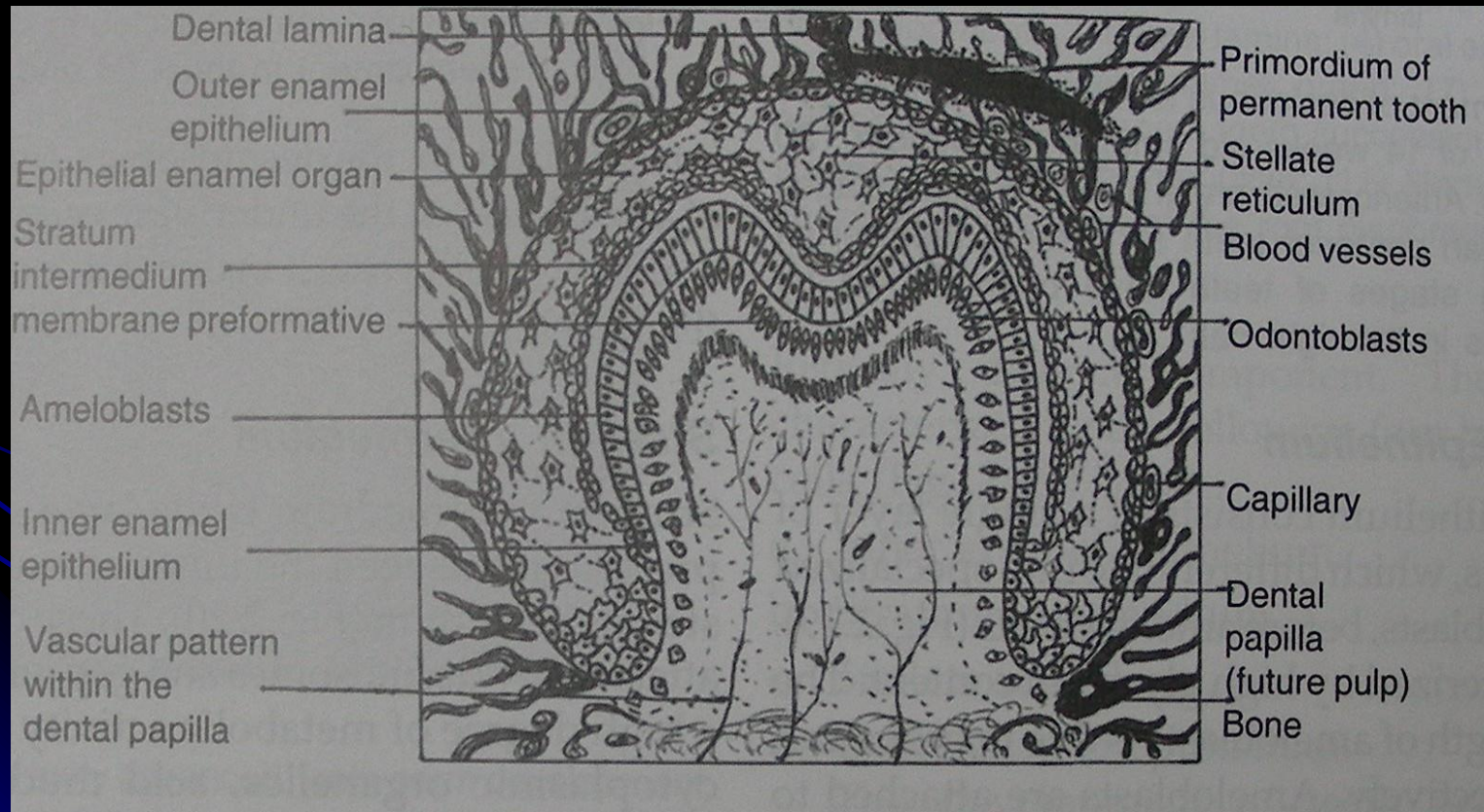
- 2 – Enamel Organ
- 3 – Dental Papilla
- 4 – Successional Lamina
- 5 – Dental Lamina
- 6 – Dental Sac
- 7 – Dental Follicle

# Bell Stage





# Bell Stage





# Bell Stage

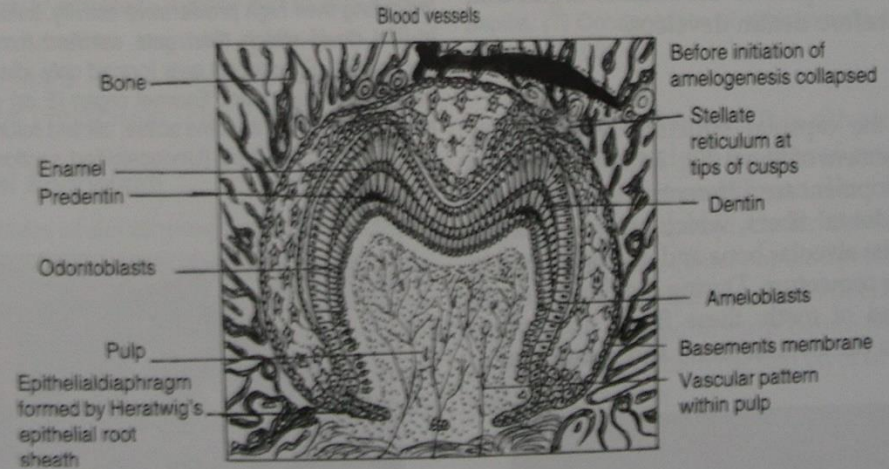


Prof. Shaleen Chandra

# Advanced Bell Stage



**Fig. 2.24:** Advanced bell stage: Dentinogenesis (Appositional stage). Labiolingual section through deciduous mandibular first molar. Embryo about 190 mm in length (20 weeks, fetal weight 460 gm) showing dentin formation



**Fig. 2.25:** Very advanced bell stage: (Dentinogenesis-amelogenesis stage). Labiolingual section through deciduous mandibular first molar. Embryo about 210 mm CR length (22 weeks), fetal weight 630 gm showing vitreous formation of enamel, dentin and epithelial diaphragm. Outer enamel epithelium is laid in folds in which vascularity increases to provide nutrition to ameloblasts to form enamel

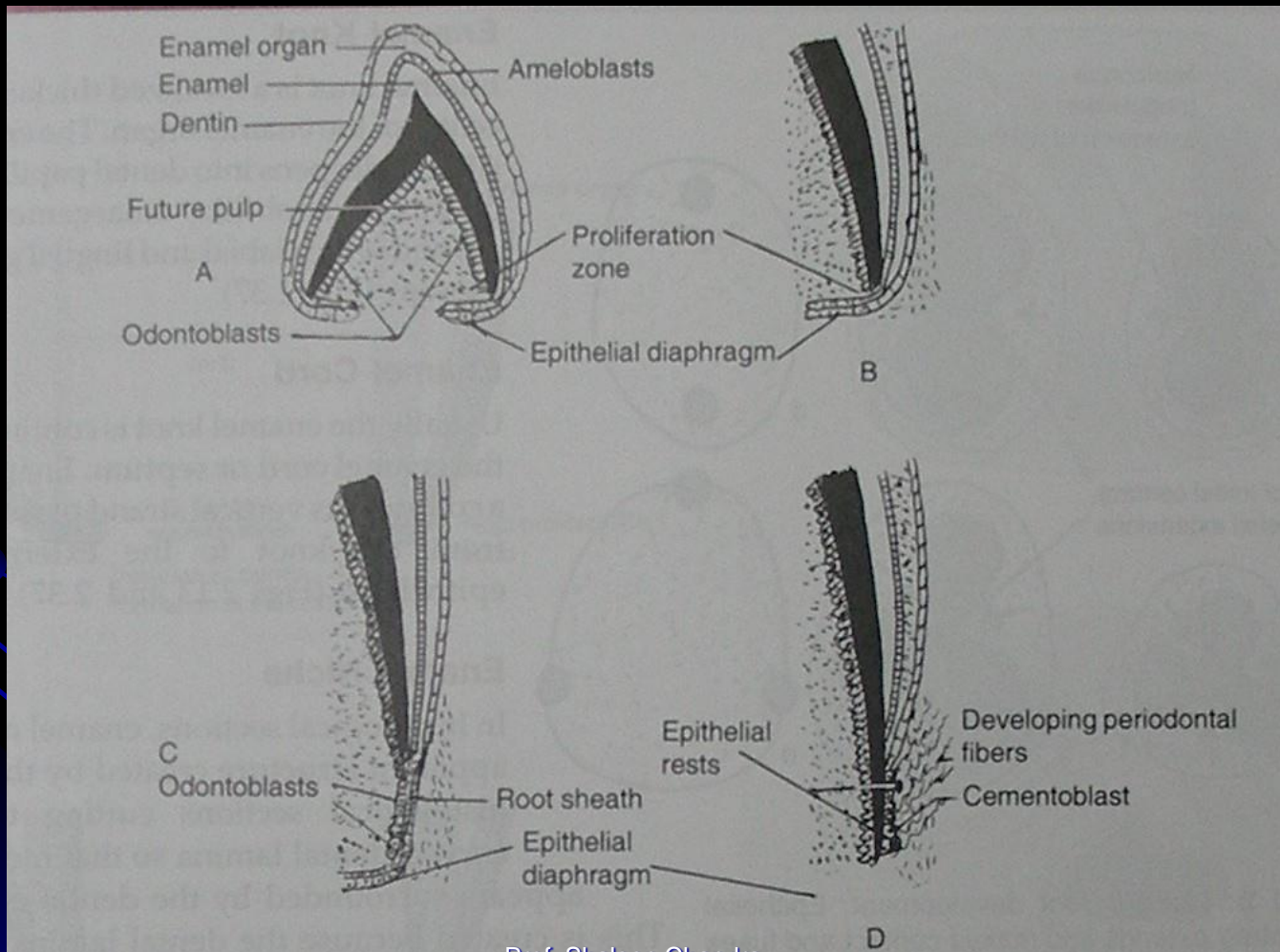


# Advanced Bell Stage



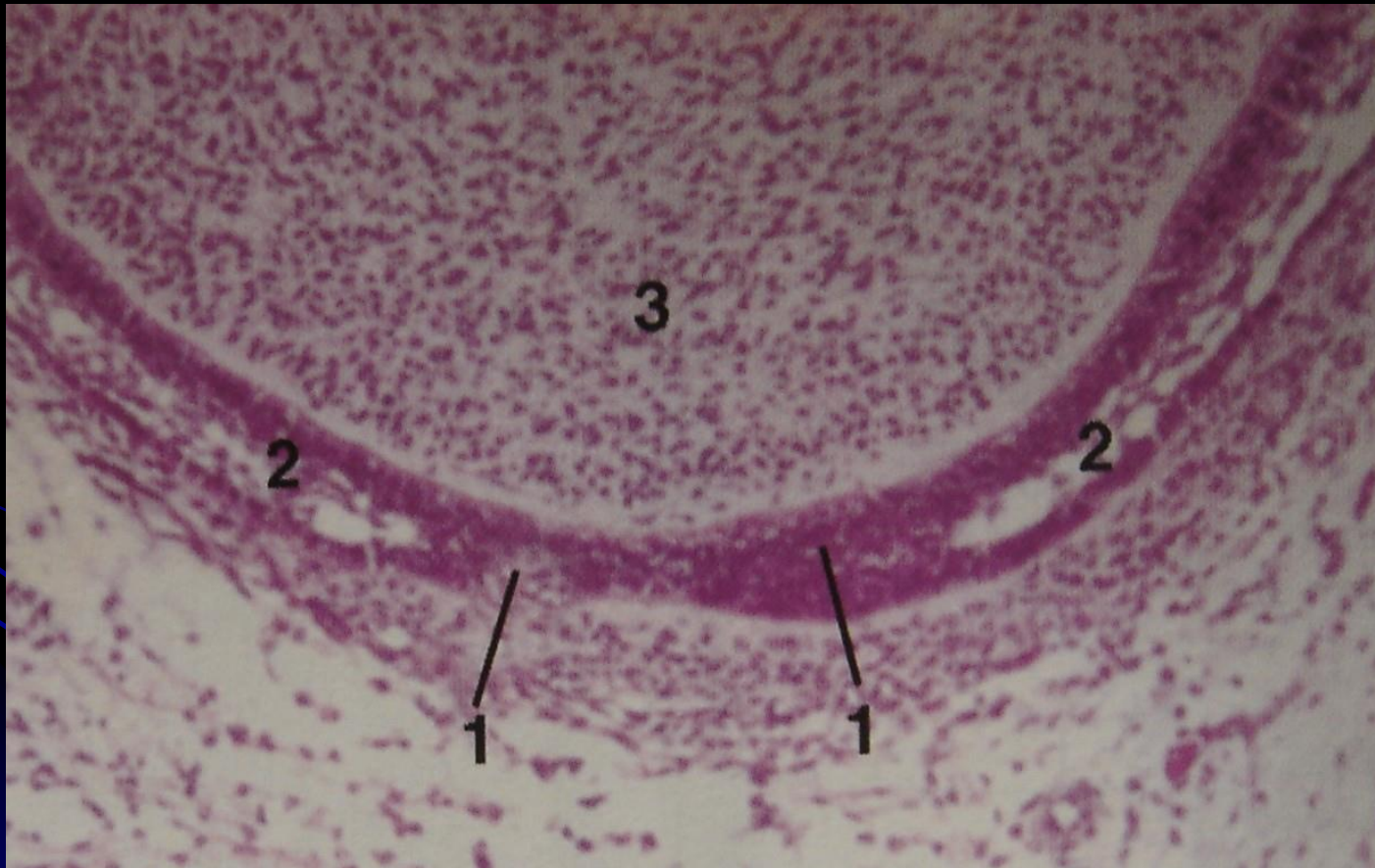
Showing Formation of Pre-dentin and Enamel

# Hertwig's Epithelial Root Sheath and Root Formation



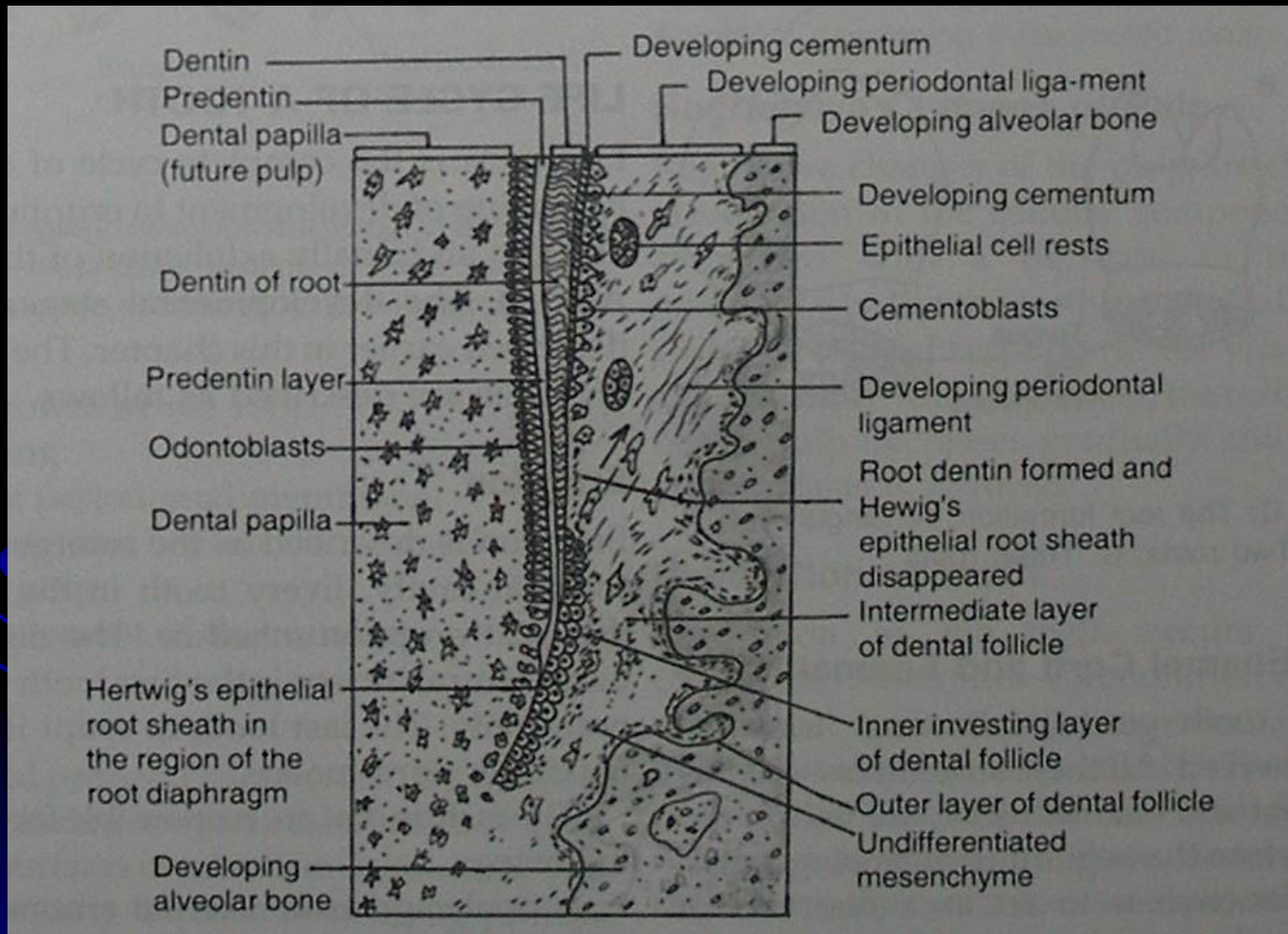


# Hertwig's Epithelial root sheath and Root Formation

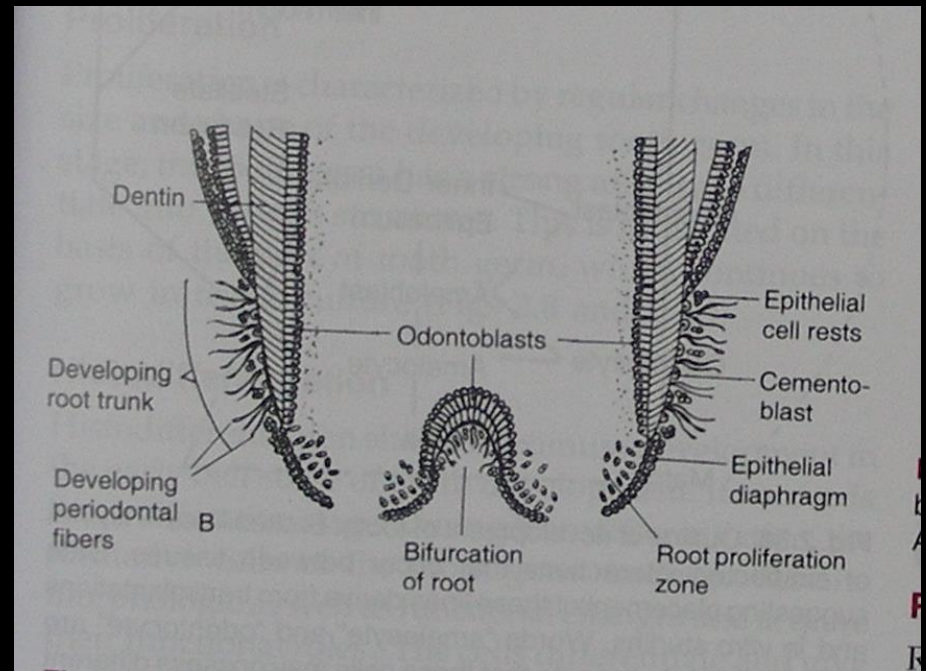
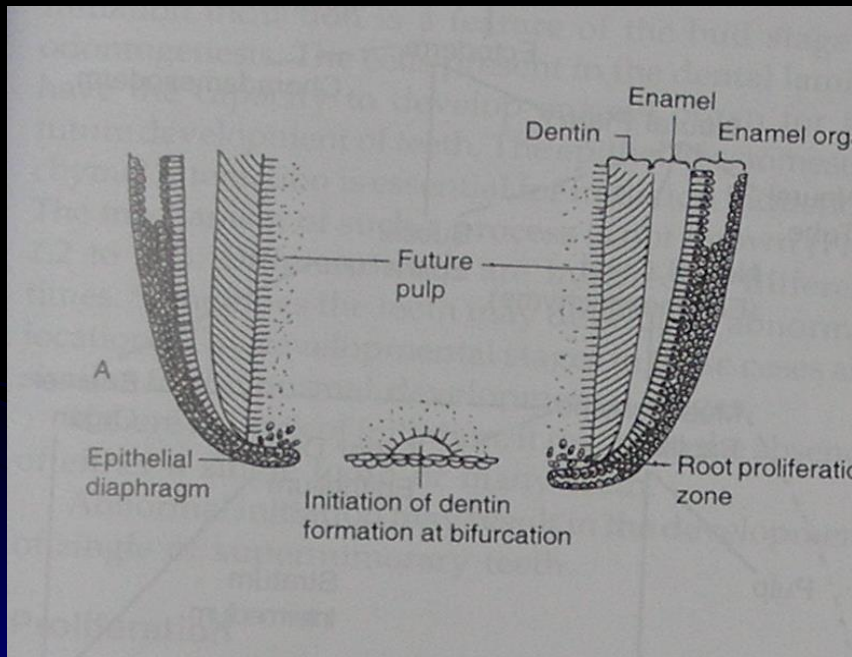




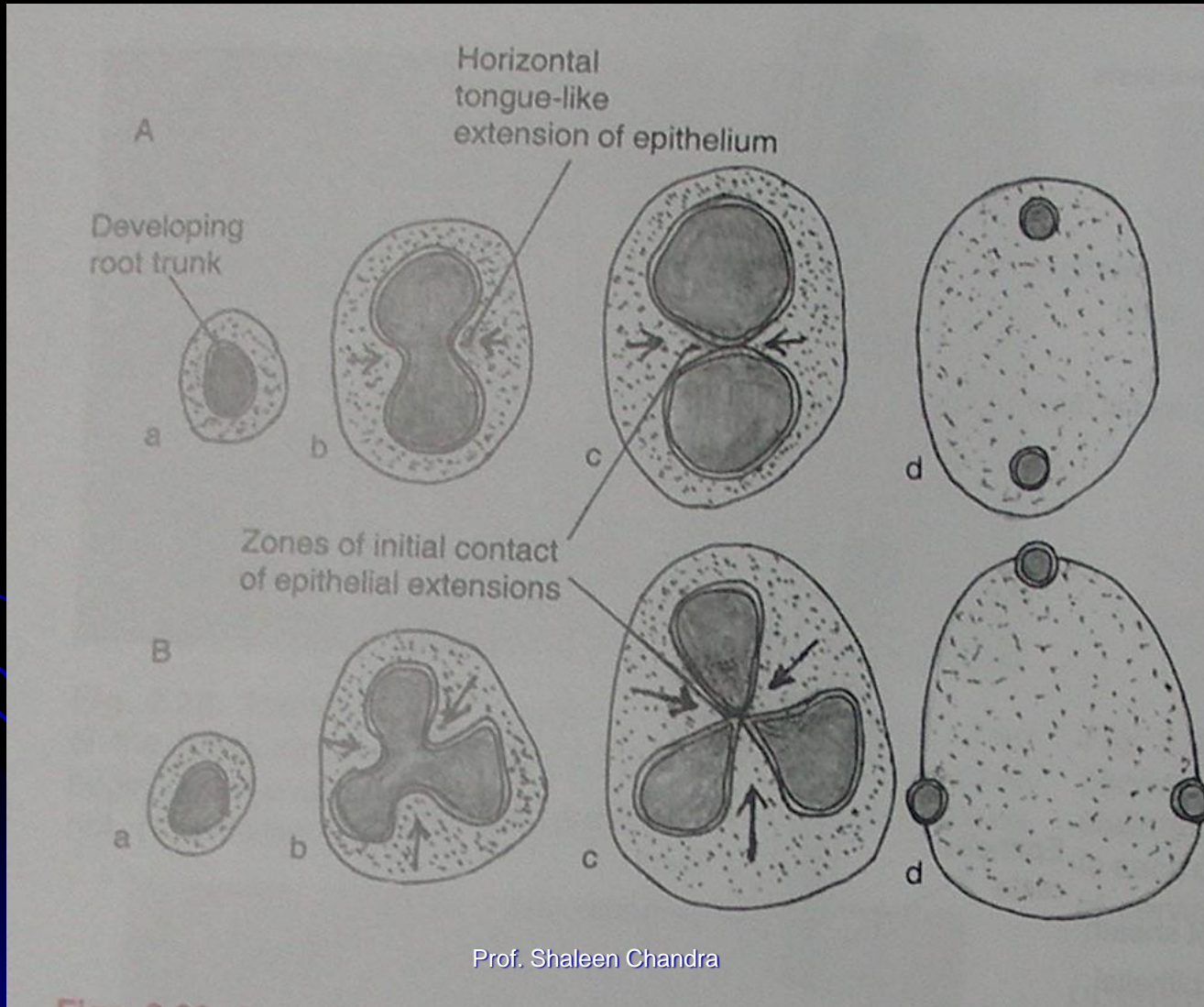
# Formation of Root



# Formation of root – Multi-rooted teeth



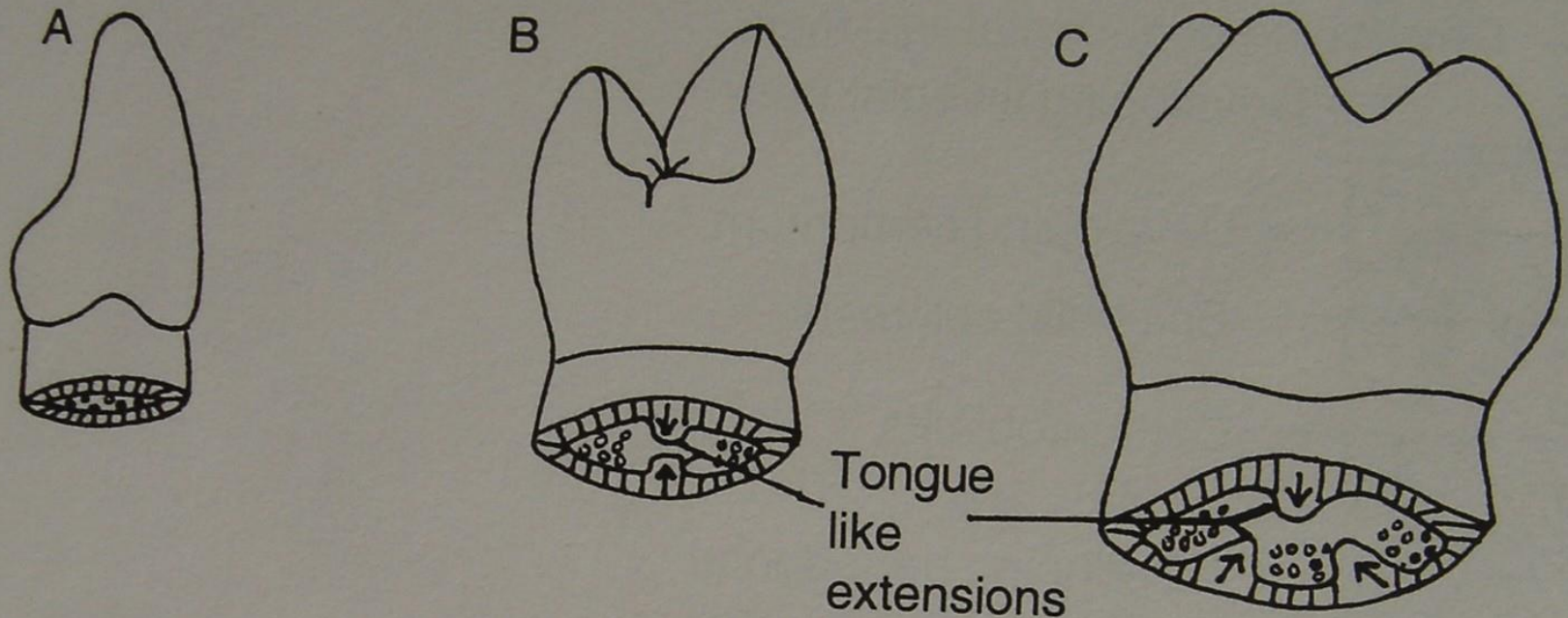
# Formation of root – Multi-rooted teeth

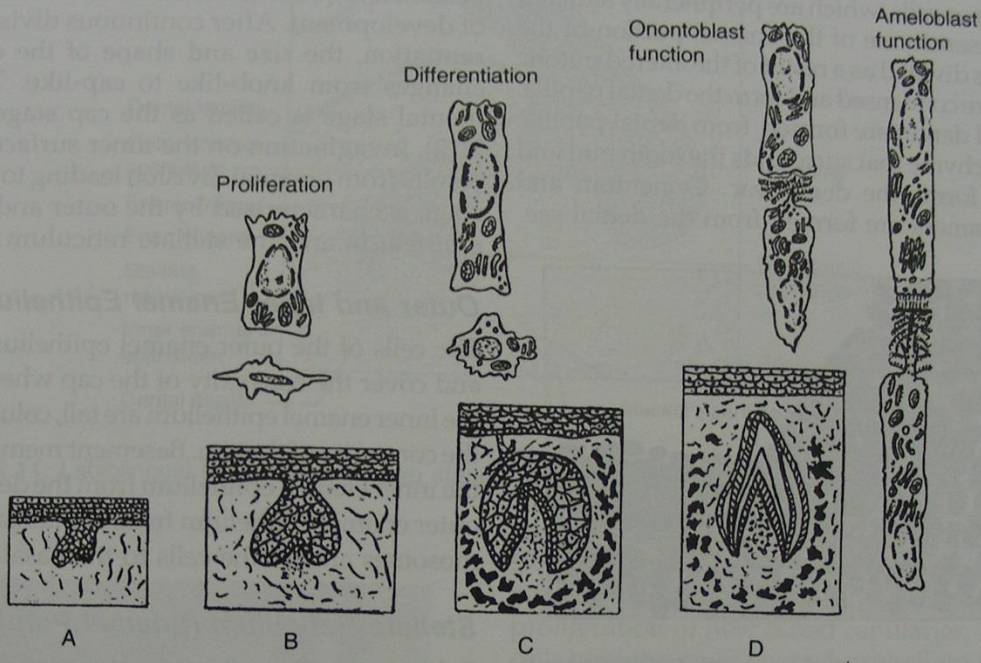


Prof. Shaleen Chandra



# Formation of root – Multi-rooted teeth





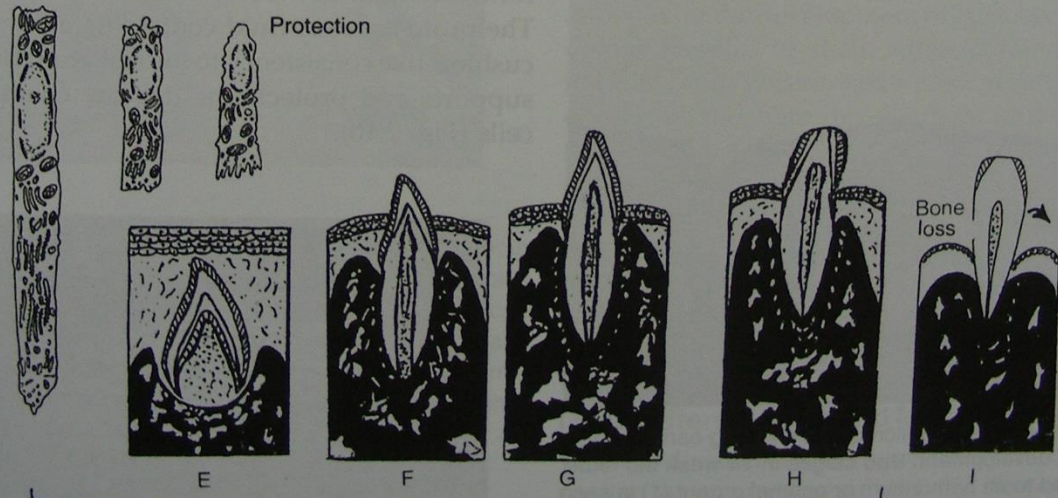
A B C D

Growth and calcification

And Calcification

Secretory phase

Maturation phase



E F G H I

Eruption and attrition

exfoliation

Bone loss



# Clinical Considerations

- Abnormal Location of teeth
- Anodontia – Partial or complete
- Supernumerary teeth
- Osteodentin – Atypical Dentin developing in deficiency of Vit. A

# Clinical Considerations – contd..

- Delayed eruption – Hypopituitarism and Hypothyroidism
- Enamel Hypoplasia- Genetic or Environmental
- Hutchinson incisors and mulberry molars