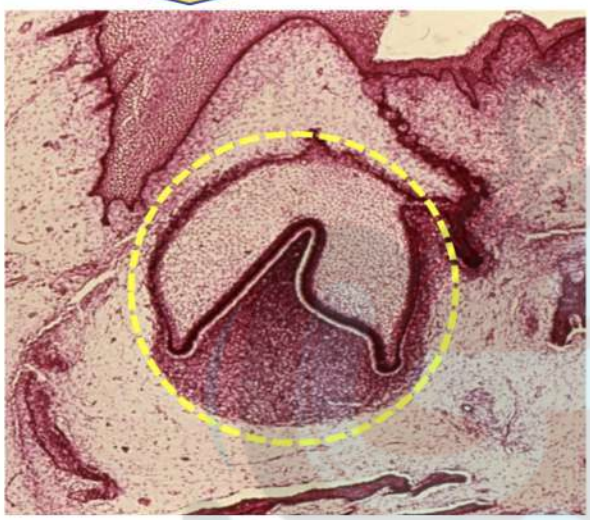
(4) Bell Stage:

- Differential growth of enamel organ will lead to more deepening of the concave surface to give the enamel organ the shape of a bell.
- The bell stage is divided into:

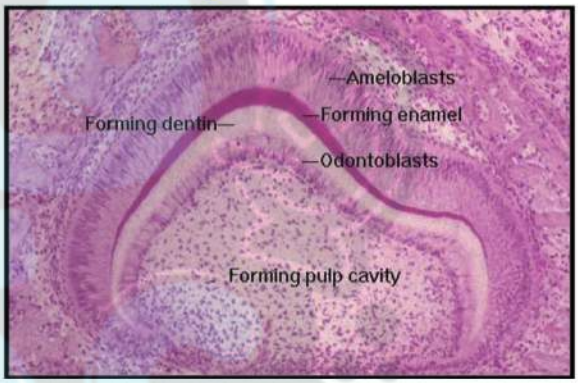
Early bell stage:

- No hard dental tissue



Late bell stage

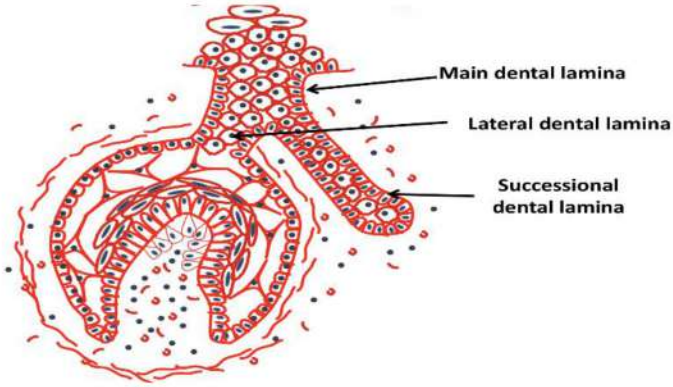
- Advanced bell stage.
- Hard dental tissue is present.
- started by the formation of first layer of dentine



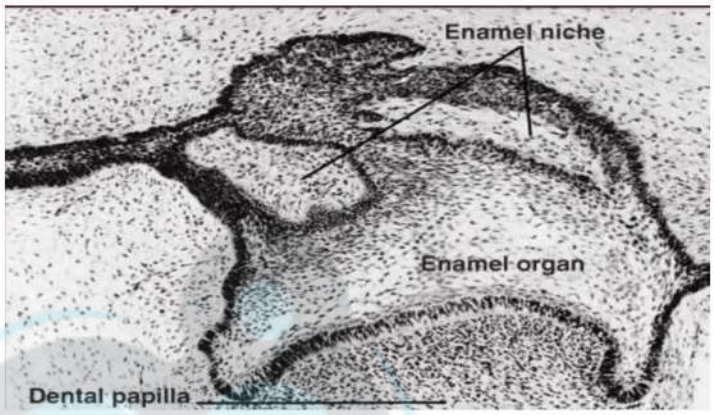
a. Early bell stage:

a) Dental Lamina:

- In the early bell stage:
  1. Main dental lamina will be divided by the invasion of mesenchymal tissue into lateral dental lamina (which is long and narrow epithelial connection) carrying the enamel organ of the deciduous tooth.
  2. The main (proper) dental lamina will grow lingually to the deciduous tooth germ forming a successional dental lamina which will give the tooth germ of the permanent successors.



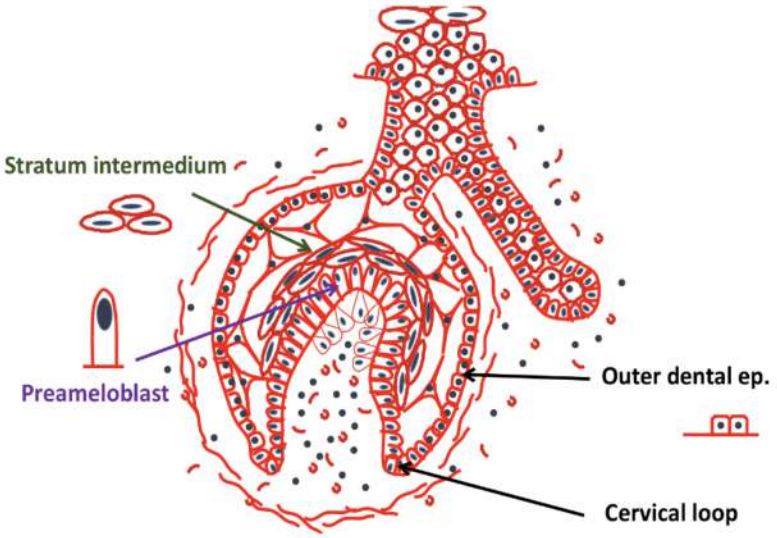
In some histological sections of developing tooth, the dental organ appears to be connected to the oral epithelium by two or more strands of dental lamina This is due to the plane of sectioning in the curved dental lamina and is known as Enamel niche

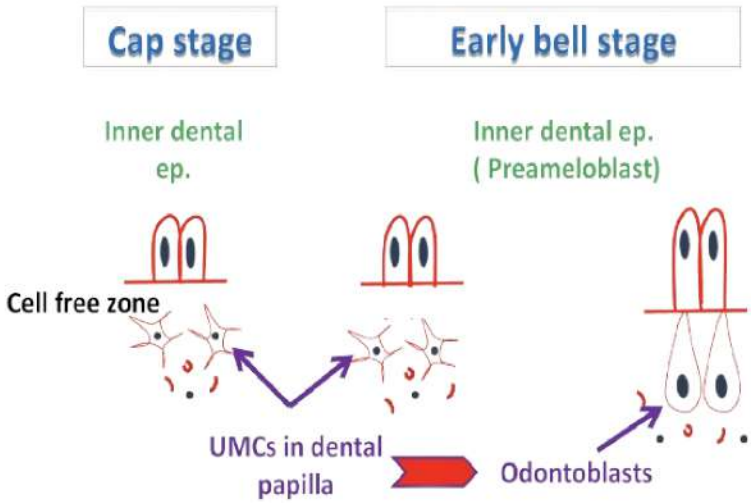


b) Dental (Enamel) Organ:

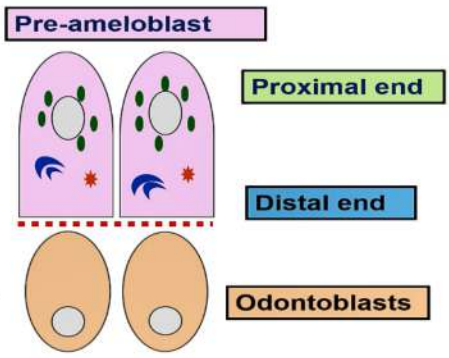
1. Outer enamel epithelium (O.E.E.):
   - It becomes low cuboidal cells.

2. Inner enamel epithelium (I.E.E.):
   - It becomes tall columnar cells (40 microns) (Preameloblast), it elongates more toward the dental papilla leading to disappearance of cell free zone and the (I.E.E.) will come in contact with the superficial layer of dental papilla exerting an organizing influence so, the U.M.Cs. (Undifferentiated mesenchymal cells) by a process called induction will be differentiated into odontoblasts.

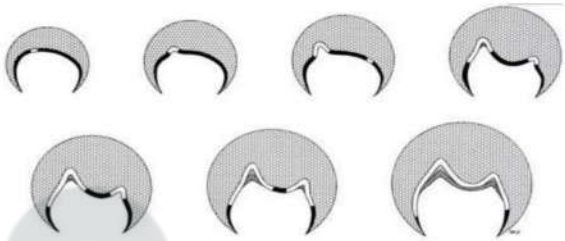




- I.E.E. will change in functional polarity (cellular repolarization):
  - the nucleus and mitochondria are proximal (facing the stratum intermedium)
  - the Golgi apparatus and centriole are distal (facing the dental papilla).

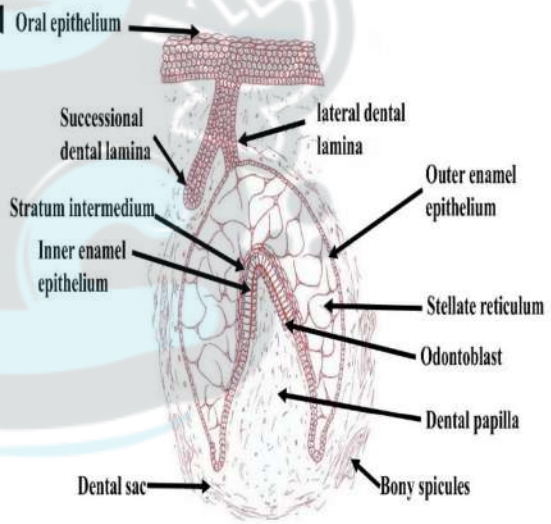


- The pre-ameloblasts release enzymes that degrade the basal lamina separating them from the odontoblast.
- I.E.E. arranged on the basement membrane as the pattern of amelo-dentinal junction and this map the incisal or occlusal shape of the crown.



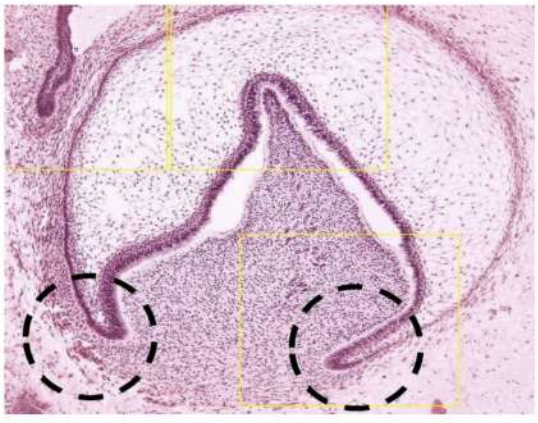
Future crown patterning also occurs in the bell stage, by folding of the inner dental epithelium. Cessation of mitotic activity within the inner dental epithelium determines the shape of a tooth.

3. Stellate Reticulum:
   - The mucoid fluid is increased, and the cells become further apart showing well developed Golgi apparatus and contain phosphatase enzyme.



4. Stratum intermedium:
   - It is formed of 2-3 layers of squamous cells between I.E.E. and stellate reticulum
   - It is derived from the enamel organ (either the I.E.E. or the enamel knot).
   - These cells are rich in alkaline phosphatase which is essential for enamel mineralization.

5. Cervical loop:
   - The I.E.E. and O.E.E. meet each other in the rim of the enamel organ.
   - the I.E.E. covers the O.E.E. for a short distance which is called cervical loop.
   - It is very important for root formation.



c) Dental papilla:

- Differentiation of odontoblasts.
- They attain a cuboidal form, then become columnar in shape, and have the specific potential to produce dentin.
- The central cells of the dental papilla are the primordium of the pulp. (vascular and cellular elements increase during this stage)
- the basement membrane between I.E.E. and odontoblasts called membrana preformativa

d) Dental Sac:

- The fibers in the outer surface show circular arrangement and may merge with the lamina propria of the gingiva (Surrounding C.T).
- The inner surface of it facing the dental papilla and enamel organ resembling a capsular structure is vascular.