

# PEDIATRIC DENTISTRY EARLY DEVELOPMENT AND CALCIFICATION OF THE ANTERIOR PRIMARY TEETH

Lec. 4

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# Early development and calcification of the anterior primary teeth

- Researches have found that the first macroscopic indication of morphologic development occurs at approximately **11** weeks in utero. The maxillary and mandibular central incisor crowns appear identical at this early stage as tiny, hemispheric, mound like structures.

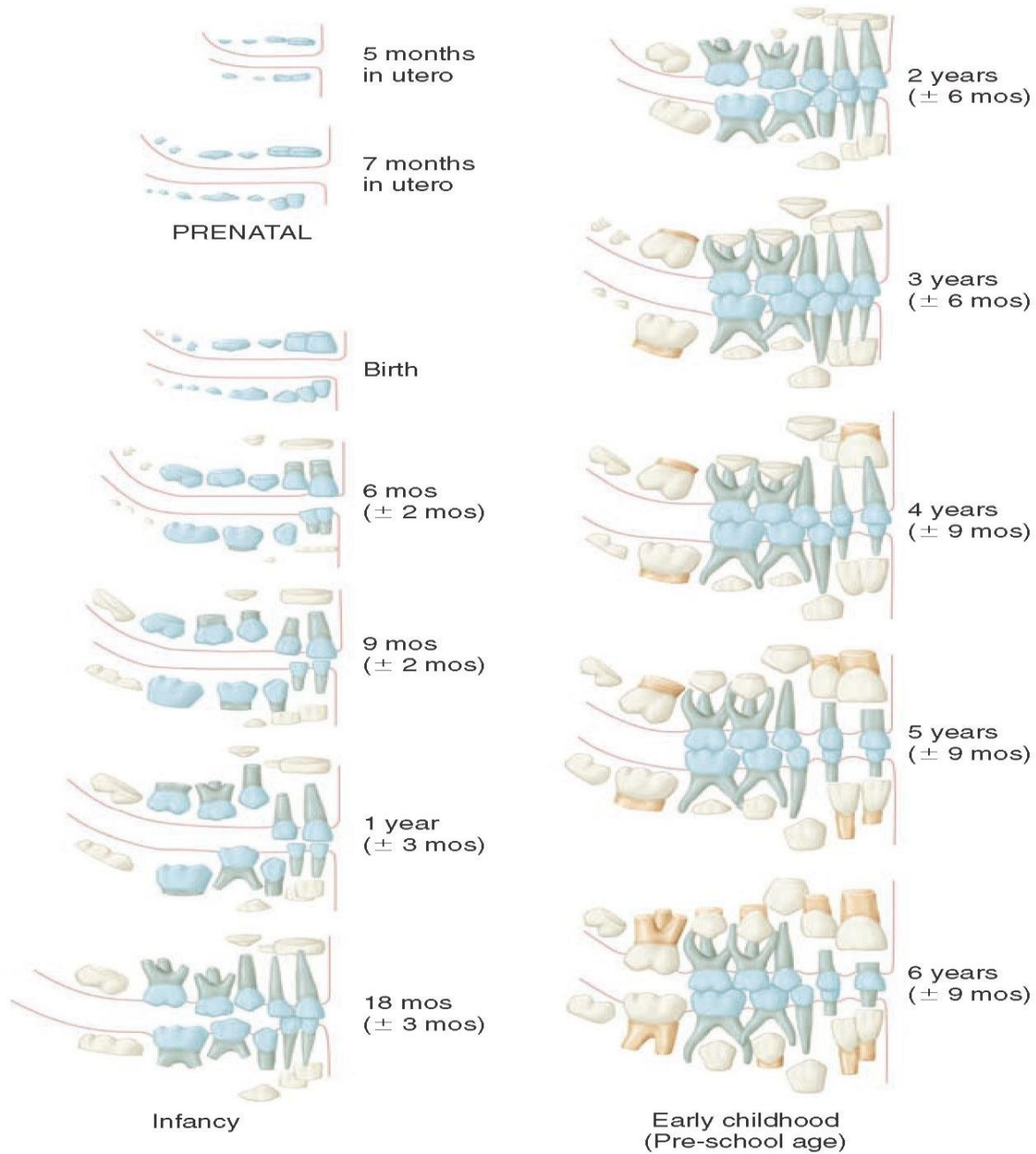
- The lateral incisors begin to develop morphologic characteristics between 13 and 14 weeks. There is evidence of the developing canines between 14 and 16 weeks. Calcification of the central incisor begins at approximately 14 weeks in utero, with the maxillary central incisor slightly preceding the lower central. The initial calcification of the lateral incisor occurs at 16 weeks and of the canine at 17 weeks.

# Early development and calcification of the posterior primary teeth and first permanent molar

- The maxillary first primary molar appears macroscopically at **12 1/2** weeks in utero. At **approximately 34** weeks the entire occlusal surface is covered by calcified tissue. At birth, calcification includes roughly **three fourths of the occlusal** gingival height of the crown.
- The maxillary second primary molar also appears macroscopically at about **12 1/2** weeks in utero. At birth calcification extends occlusogingivally to include approximately **one fourth** of the height of the crown.
- The mandibular first primary molar initially becomes evident macroscopically at about **12** weeks in utero. At birth, a completely calcified cap covers the occlusal surface.
- The mandibular second primary molar also becomes evident macroscopically **at 12 1/2** weeks in utero. At the time of birth, the five centers have coalesced and only a small area of uncalcified tissue remains in the middle of the occlusal surface.

- There are sharp conical cusps, angular ridges, and a smooth occlusal surface, all of which indicate that calcification of these areas is incomplete at birth. Thus there is a calcification **sequence** of central incisor, first molar, lateral incisor, canine, and second molar.
- Research was indicated that the adjacent second primary and the first permanent molars undergo identical patterns of morphodifferentiation but at different times and the initial development of the first permanent molar occurs slightly later. The first permanent molars are uncalcified before **28** weeks of age; at any time thereafter calcification may begin. Some degree of calcification is always present at birth.

# DECIDUOUS DENTITION



MIXED DENTITION



Late childhood  
(school age)

PERMANENT DENTITION



Adolescence  
and adulthood

# Morphology of individual primary teeth.

## Maxillary central incisor:

1. The mesiodistal width of the crown of the maxillary central incisor is greater than the cervicoincisal length.
2. Developmental lines are usually not evident in the crown, thus the labial surface is smooth.
3. The incisal edge is nearly straight even before abrasion become evident.
4. There are well-developed marginal ridges on the lingual surface and a distinctly developed cingulum.
5. The root of the incisor is cone shaped with tapered sides.





C



B



A



F



E



D

# Maxillary lateral incisor

- The outline of the maxillary lateral incisor is similar to that of the central incisor, but the crown is **smaller** in **all dimensions**. The length of the crown from the cervical to the incisal edge is greater than the dimension width.
- The root outline is similar to that of the central incisor but is longer in proportion to the crown.



C



B



A



F



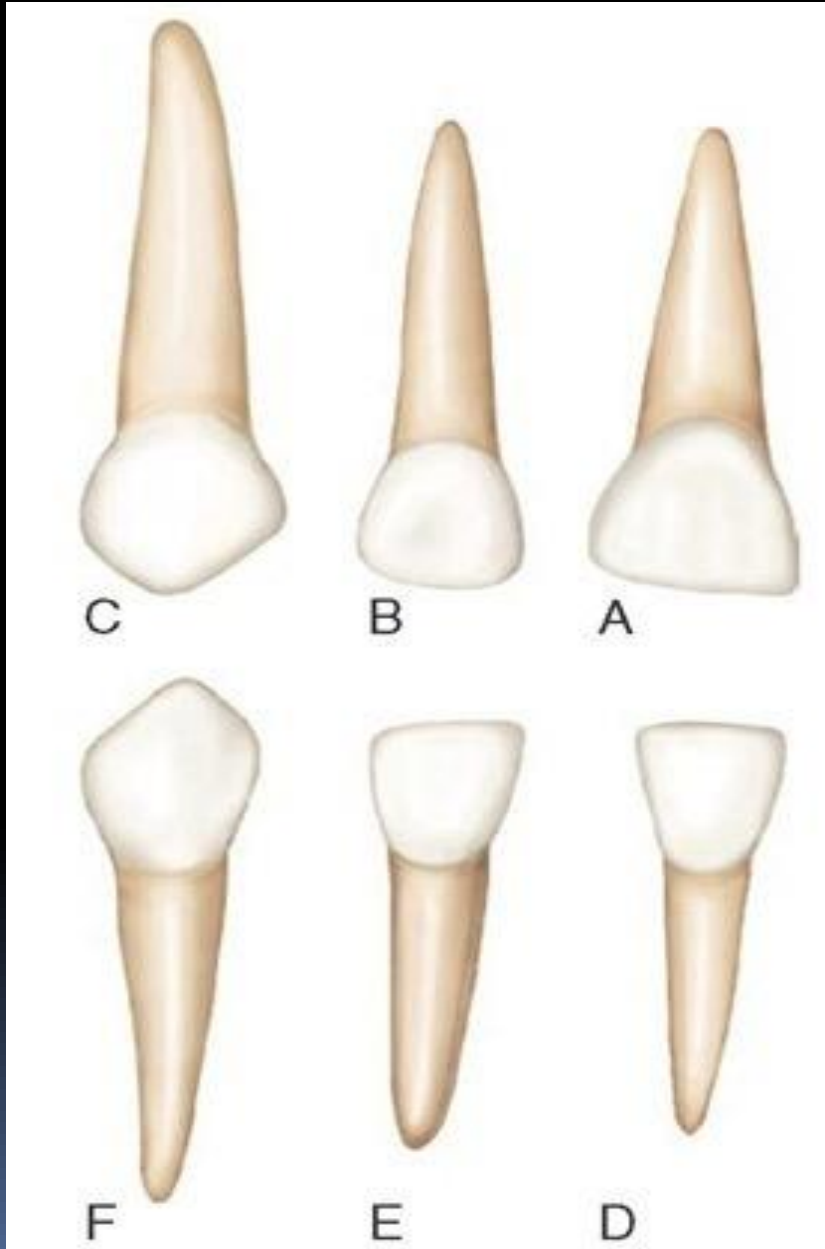
E



D

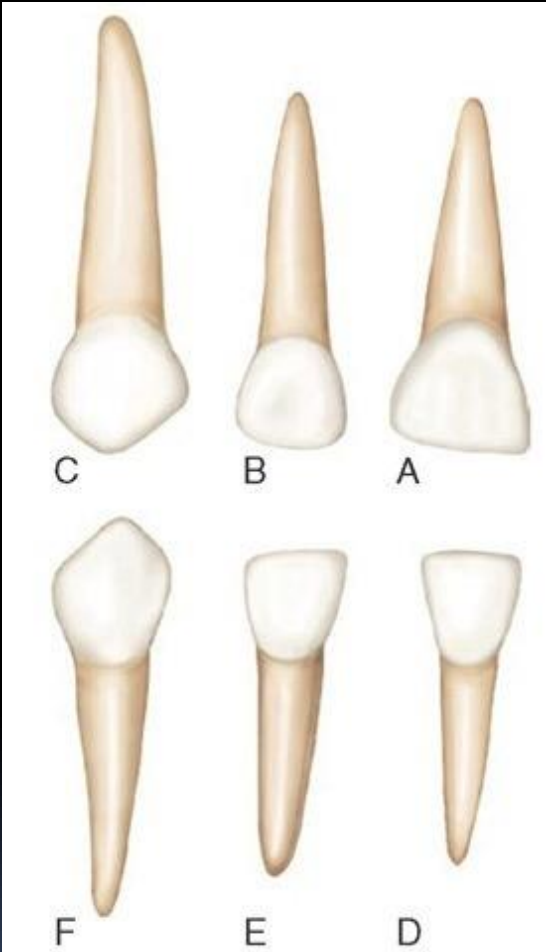
# Maxillary canine

1. The crown of the maxillary canine is more constricted at the cervical region than are the incisors.
2. The incisal and distal surfaces are more convex.
3. There is a well-developed sharp cusp rather than a relatively straight incisal edge.
4. The canine has long, slender, tapering root that is more than twice the length of the crown.
5. The root is usually inclined distally, apical to the middle third.



# Mandibular central incisor

1. Is smaller than the maxillary central, but is labiolingual measurement is usually only 1 mm less.
2. The labial aspect presents a flat surface without developmental grooves.
3. The lingual surface presents marginal ridges and a cingulum.
4. The middle third and the incisal third on the lingual surface may have flattened surface level with the marginal ridges, or there may be slight concavity.
5. The incisal edge is straight, and it bisect the crown labiolingually.
6. The root is approximately twice the length of the crown.



# Mandibular lateral incisor

- The outline of the mandibular lateral incisor is similar to that of the central incisor but is somewhat larger in a dimensions except labiolingually. The lingual surface may have greater concavity between the marginal ridges. The incisal edge slopes toward the distal aspect of the tooth.

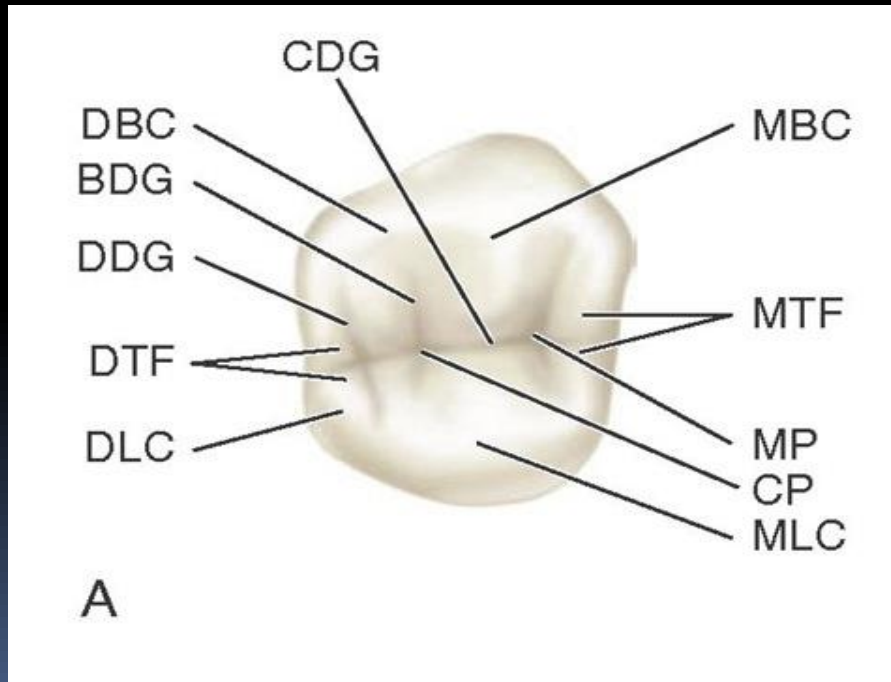


# Mandibular canine

- The form of the mandibular canine is similar to that of the maxillary canine, with a few exceptions.
  - The crown is slightly shorter, and the root may be as much as 2 mm shorter than that of the maxillary canine.
  - The mandibular canine is not as large labiolingually as its maxillary canine.


# Maxillary first molar

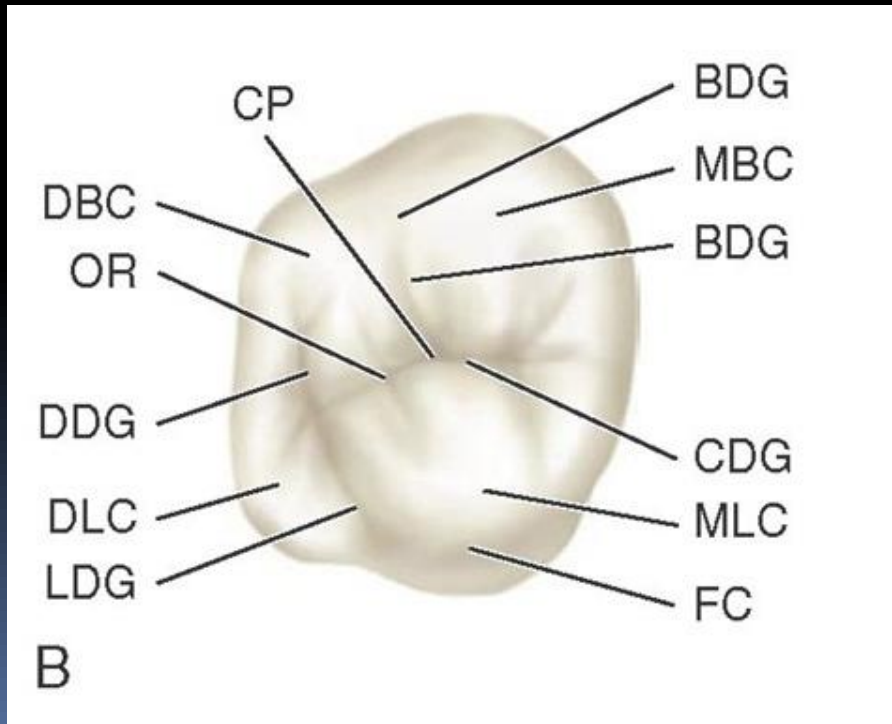
1. The greatest dimension of the crown of the maxillary first molar is at the mesiodistal contact areas, and from these areas the crown converges toward the cervical region.
2. The mesiolingual cusp is the largest and sharpest.
3. The distolingual cusp is poorly defined, small and rounded.
4. The buccal surface is smooth, with little evidence of developmental grooves.
5. The three roots are long, slender and widely spread.



# Maxillary second molar


1. There is considerable resemblance between the maxillary primary second molar and the maxillary first permanent molar.
2. There are two well-defined buccal cusps with a developmental groove between them.
3. The crown of the second molar is considerably larger than that of the first molar.
4. The bifurcation between the buccal roots is closed to the cervical region.
5. The roots are longer and heavier than those of the first primary molar, and the lingual root is large and thick compared with other roots.

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6. The lingual surface has three cusps: a mesiolingual cusp that is large and well developed, a distolingual cusp, and a third smaller supplemental cusp (cusp of Carabelli)
  7. A well defined groove separates the mesiolingual cusp from the distolingual cusp.
  8. On the occlusal surface a prominent oblique ridge connects the mesiolingual cusp with the distobuccal cusp.




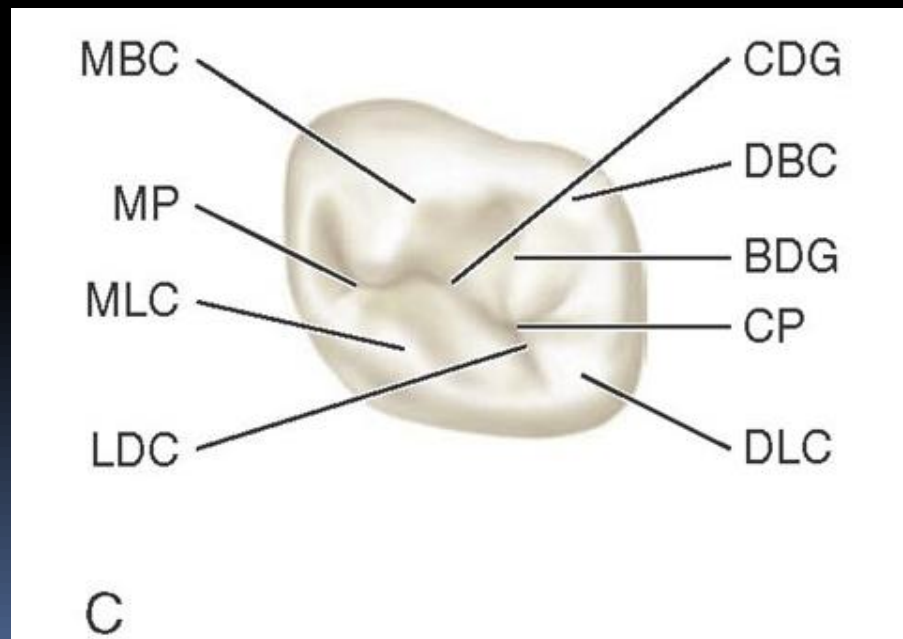
# Mandibular first molar

1. Unlike the other primary teeth, the first primary molar does not resemble any of the permanent teeth.
2. The mesial outline of the tooth, when viewed from the buccal aspect, is almost straight from the contact area to the cervical region.
3. The distal area of the tooth is shorter than the mesial area.
4. The two distinct buccal cusps have no evidence of a distinct developmental groove between them: the mesial cusp is the larger of the two.
5. There is a pronounced lingual convergences of the crown on the mesial aspect, with a rhomboid outline present on the distal aspect.

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6. The mesiolingual cusp is long and sharp at tip; a developmental groove separates this cusp from the distolingual cusp, which rounded and well developed.
  7. The mesial marginal ridge is well developed, to extent that it appear as another small cusp lingually.
  8. When the tooth is viewed from the mesial aspect, there is an extreme curvature buccally at the cervical third.
  9. The crown length is greater in the mesiobuccal area than in the mesiolingual area; thus the cervical line slants upward from the buccal to the lingual surface.




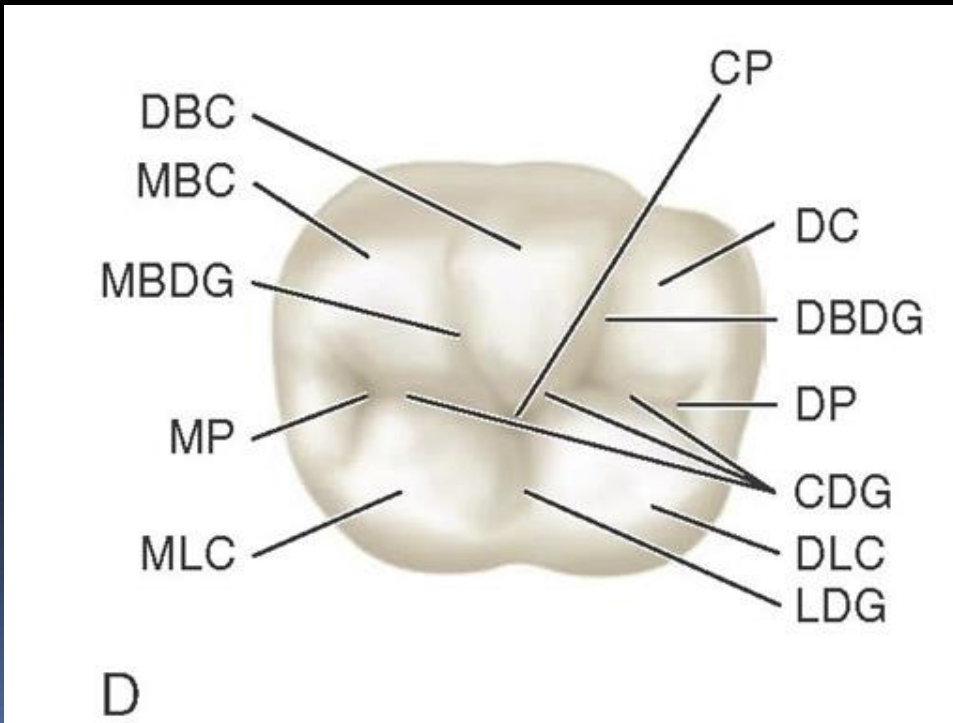
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10. The longer slender roots spread considerably at the apical third, extending beyond the outline of the crown.
  11. The mesial root, when viewed from the mesial aspect, does not resemble any other primary root.
  12. The buccal and lingual outlines of the root drop straight down from the crown, being essentially parallel for over half their length.
  13. The end of the root is flat and almost square.



# Mandibular second molar

1. The mandibular second molar resembles the mandibular first permanent molar, except that the primary tooth is smaller in all its dimensions.
2. The buccal surface is divided into three cusps that are separated by mesiobuccal and distobuccal developmental groove.
3. The cusps are almost equal in size.
4. Two cusps of almost equal size are evident on the lingual surface and are divided by a short lingual groove.
5. The primary second molar, when viewed from the occlusal surface, appears rectangular with a slight distal convergance of the crown.

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6. The mesial marginal ridge is developed to a greater extent than the distal marginal ridge.
  7. One difference between the crown of primary molar and that of first permanent molar is in the distobuccal cusp; the distal cusp of the permanent molar is smaller than the other two buccal cusp.
  8. The roots of the primary second molar are long and slender, with a characteristic flare mesiodistally in the middle and apical thirds.



# Morphological differences between primary and permanent teeth

1. The crowns of the primary teeth are wider mesiodistally in comparison with the crown length than are those of the permanent teeth.
2. The roots of primary anterior teeth are narrow and long compared with crown width and length.
3. The roots of the primary molars are relatively longer and more slender than roots of the permanent teeth. There is also greater extension of the primary roots mesiodistally. This flaring allows more room between the roots for development of the premolar tooth crowns.

4. The cervical ridge of enamel at the cervical third of the anterior crowns is much more prominent labially and lingually in the primary than in the permanent teeth.
5. The crowns and roots of primary molars are more slender mesiodistally at the cervical third than are those of the permanent molars.
6. The cervical ridge on the buccal aspect of the primary molars is much more definite, particularly on the maxillary and mandibular first molars, than that on the permanent molars.
7. The buccal and lingual surfaces of the primary molars are flatter above the cervical curvatures than those of permanent molars, which makes the occlusal surface narrower compared with that of the permanent teeth.
8. The primary teeth are usually lighter in color than the permanent teeth.

# Size and morphology of the primary tooth pulp chamber

- Immediately after eruption the pulp chambers are large and in general follow the outline of the crown.
- The pulp chamber decrease in size as age increase and under the influence of function and of abrasion of the occlusal and incisal surfaces of the teeth.
- No attempt is made here to describe in details each pulp chamber outline. Suggest the dentist to take bite-wing radiographs to the child before doing operative procedures.
- Radiograph will not demonstrate completely the extent of pulp horn into the cuspal area.
- Differences in the calcification time and eruption time lead to differences in the morphology of the crowns and size of pulp chamber.





Thank you

