Dental anatomy

Lecture (8)

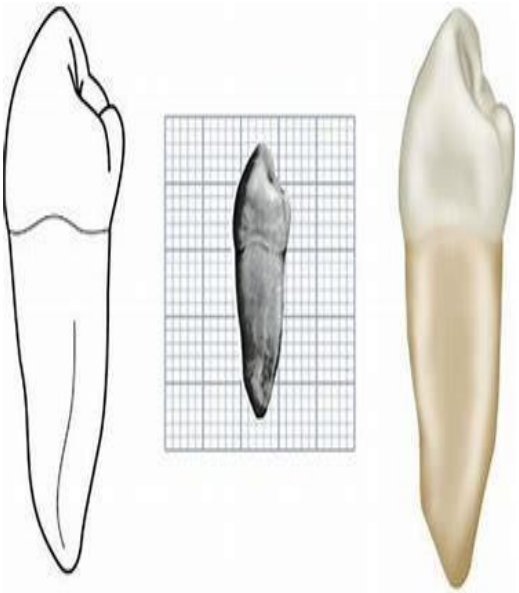
Dr. Sajad Athab Shwaiel

Permanent Mandibular first Premolar

It is the smallest premolar in the human dentition. It resembles both the mandibular canine and the mandibular second premolar in function and has some of the characteristics of each of them.

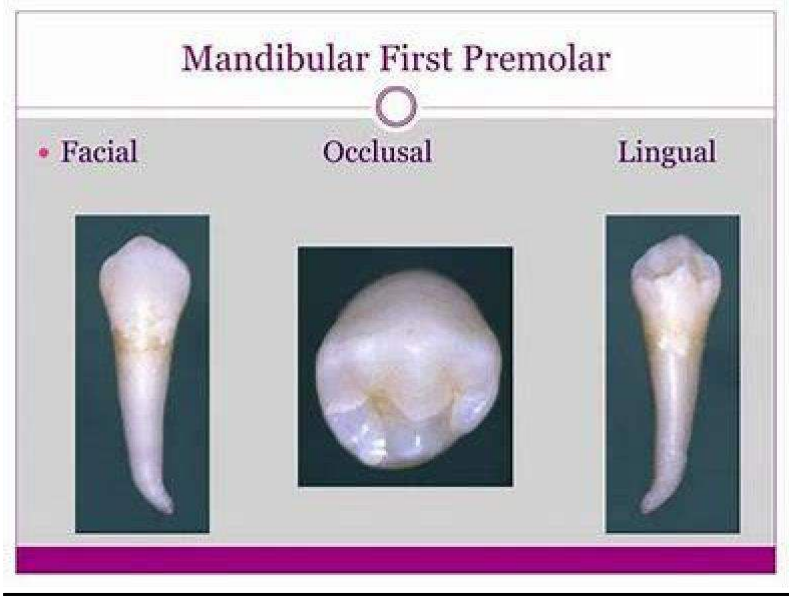
A. Characteristics that resemble those of the mandibular canine:

1. The buccal cusp is long, and is the only occluding cusp.
2. The Bucco-lingual measurement is similar to that of the mandibular canine.
3. The occlusal surface slopes sharply lingually in a cervical direction.
4. The mesio-buccal cusp ridge is shorter than the disto-buccal cusp ridge.
5. The outline form from the occlusal aspect resembles the incisal aspect of the mandibular canine.



B. <u>Characteristics that resemble those of the mandibular second premolar:</u>

1. The mesial and distal contact areas are located at nearly the same level.
2. The curvature of the cervical line mesially and distally is similar.
3. The tooth has more than one cusp.
4. The length of the root of the mandibular first premolar is closer to the length of the root of the mandibular second premolar.





Principal Identifying Features

1. Marked lingual inclination of the crown.
2. Two cusps: buccal and lingual; the buccal cusp is larger, and the lingual cusp is like a more developed cingulum.
3. Circular occlusal outline.
4. Single rounded root.

The Buccal Aspect

1. The crown is roughly trapezoid with a prominent middle buccal ridge, which continues from the cusp tip to the cervical line.
2. The mesial slope of the buccal cusp is shorter than the distal slop.
3. The contact areas mesially and distally are broad and at the same level.
4. The mesial and distal outlines from the cervical line to the crest of curvature are slightly concave.
5. The tip of the buccal cusp is sharp and located mesial to the long axis of the crown.



The Lingual Aspect:

1. The crown and the root taper lingually, and the occlusal surface inclines greatly cervically.
2. The lingual cusp is poorly developed, but is pointed.
3. There is a developmental groove named " mesio-lingual developmental groove", which divides the lingual cusp into the mesio-buccal and lingual lobes.

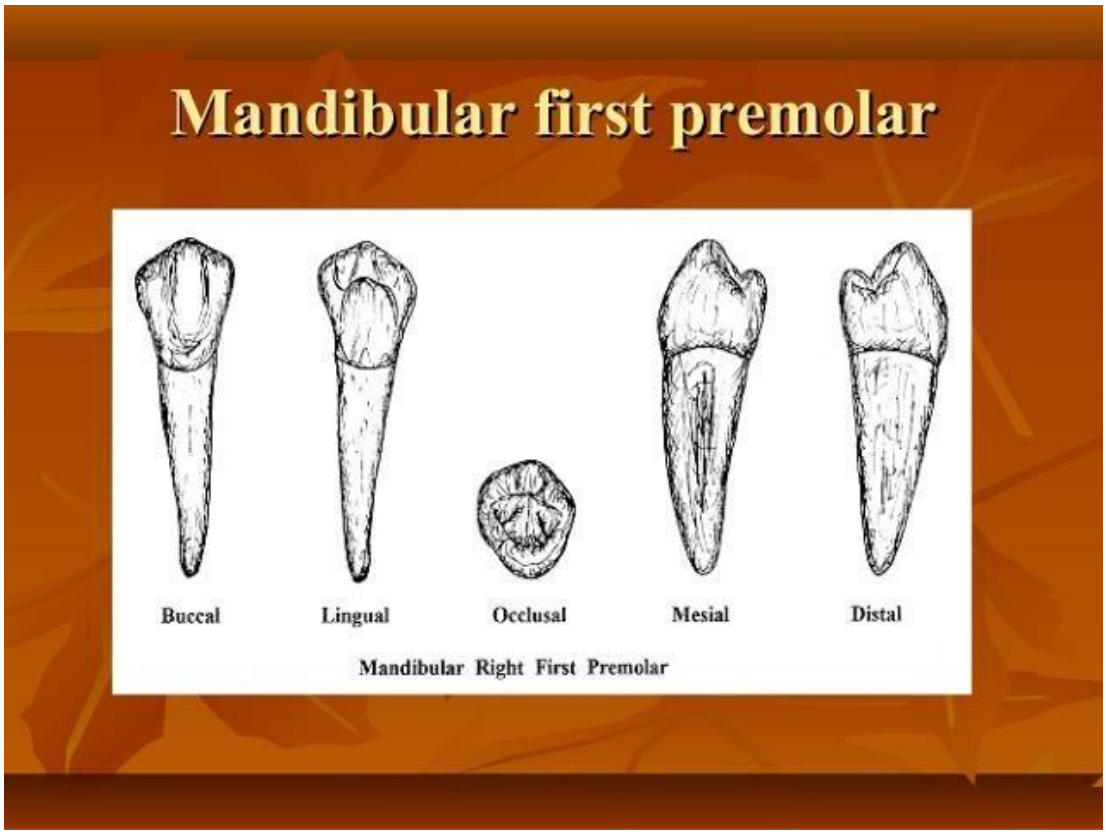
The Mesial Aspect:

1. The tip of the buccal cusp nearly reaches the center of the root, and the convexity of the lingual outline of the cusp will be lingual to the lingual outline of the root.
2. The buccal outline is very curved, and the crest of curvature is near the middle third of the crown.
3. The lingual outline is less curved than the buccal outline, with the crest of curvature at the center of the middle third.
4. The height of the lingual cusp is two-thirds the height of the buccal cusp from the cervical line to the tip of the cusp.
5. The surface of the crown mesially is smooth except for the presence of the mesio-lingual developmental groove.

The Distal Aspect:

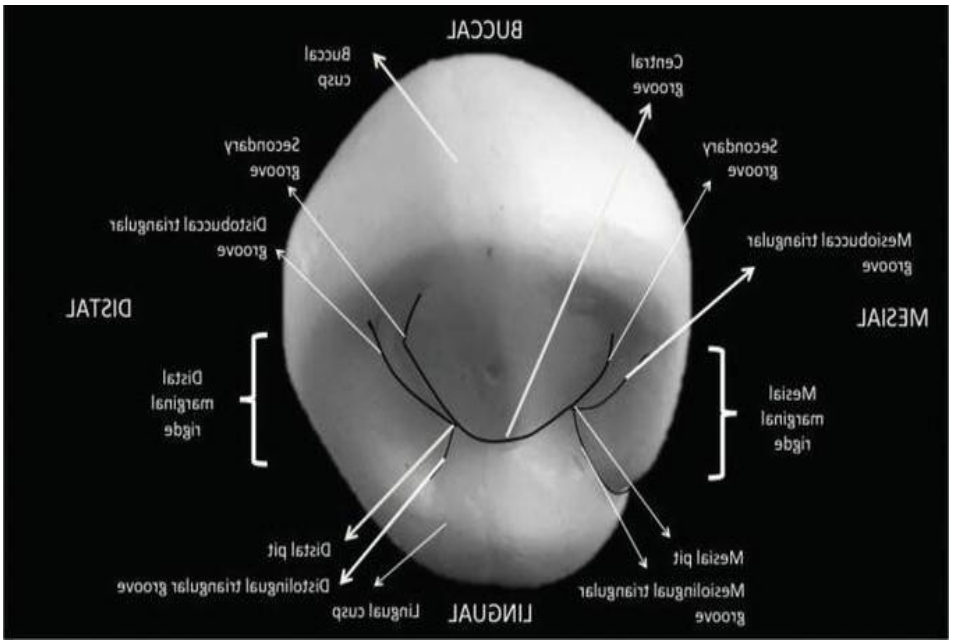
The distal aspect of the mandibular first premolar differs from the mesial aspect in the following points:

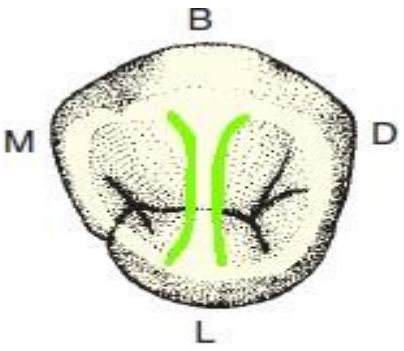
1. There is no developmental groove in the distal aspect.
2. The distal marginal ridge is higher than the mesial marginal ridge, with less inclination lingually.
3. The curvature of the cervical line distally is nill.



The Occlusal Aspect

1. The buccal ridge is prominent.
2. The mesio-buccal and disto-buccal line angles are rounded and prominent.
3. The crown converges sharply to the center of the lingual surface.
4. The marginal ridges are well developed.
5. The lingual cusp is small.
6. The triangular ridge of the buccal cusp is large, while the triangular ridge of the lingual cusp is small.
7. There are two fossae: mesial and distal fossae.
8. The mesial contact area is smaller than the distal contact area because it is constricted by the mesio-lingual developmental groove.



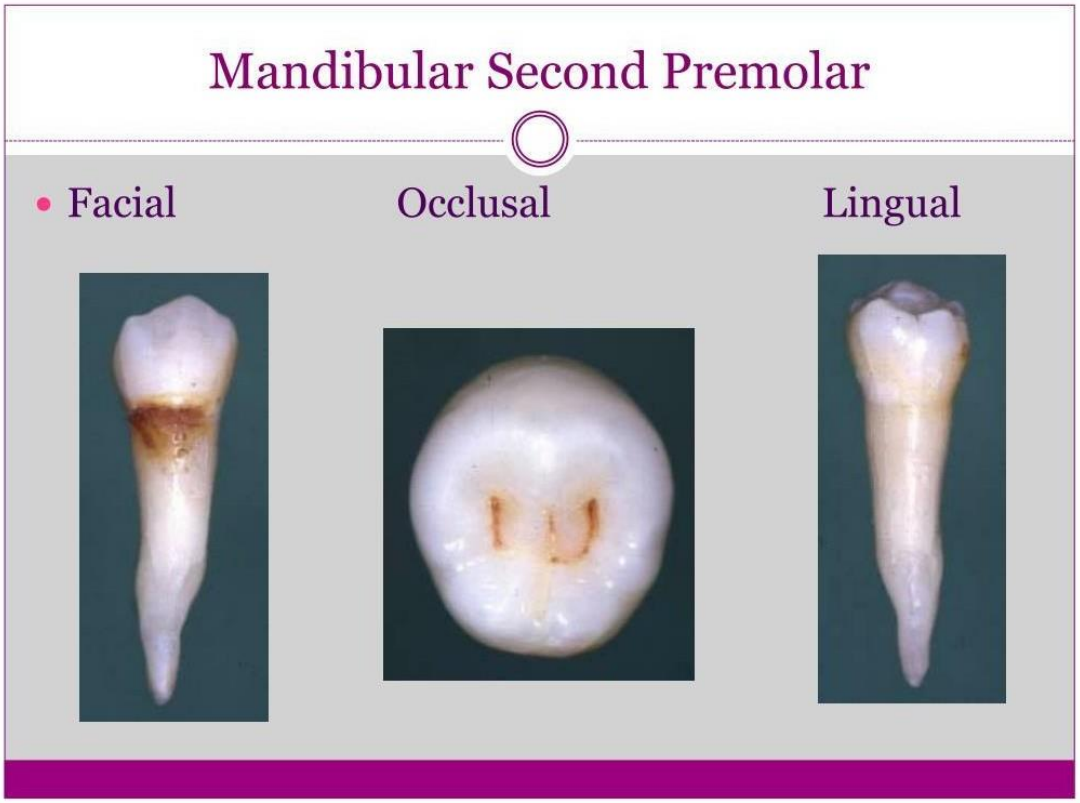


Mandibular right first premolar

Permanent Mandibular Second Premolar Principal

Identifying Features:

1. It is larger than the mandibular first premolar.
2. The cusps are more equal in size with less pointed tips. Usually this tooth has three cusps, one buccal and two lingual; or may have only two cusps, one buccal, and one lingual.
3. The occlusal outline is almost square in appearance with no mesio-lingual developmental groove.



Buccal Aspect:

1. The buccal cusp is shorter and less pointed than that of mandibular first premolar.
2. The contact areas are broad and high (appear to be higher because of the shorter buccal cusp).
3. The root is broader mesio-distally than that of mandibular first premolar ending with a blunter apex.

Lingual Aspect:

The lingual surface of the crown is smooth and spheroidal. From this aspect, this tooth differs from the mandibular first premolar in:

1. The lingual cusps are more developed (larger cusps).
2. Less occlusal surface may be seen. However, because the lingual cusps are slightly shorter than the buccal cusp, we can see part of the lingual incline of the buccal cusp from this aspect.
3. **A. In the three cusps type:** there are two lingual cusps, the mesio-lingual is larger than the disto-lingual cusp and are divided by the lingual developmental groove.

B. In the two cusps type: there is a large cusp of the same height as in the three cusps type. There is a developmental depression disto-lingually where the lingual cusp ridge joins the distal marginal ridge.



Mesial Aspect

From this aspect, this tooth differs from the mandibular first premolar in:

1. The crown and the root are wider Bucco-lingually.
2. The buccal cusp is not nearly centered over the root trunk, and it is shorter.
3. The marginal ridge is at a right angle to the long axis of the tooth with less occlusal surface may be seen.
4. There is no mesio-lingual developmental groove on the crown.
5. The root is longer with blunter apex.

Distal Aspect

1. All the three cusps may be seen.
2. The distal marginal ridge is lower than that mesially, reveling more of the occlusal surface.

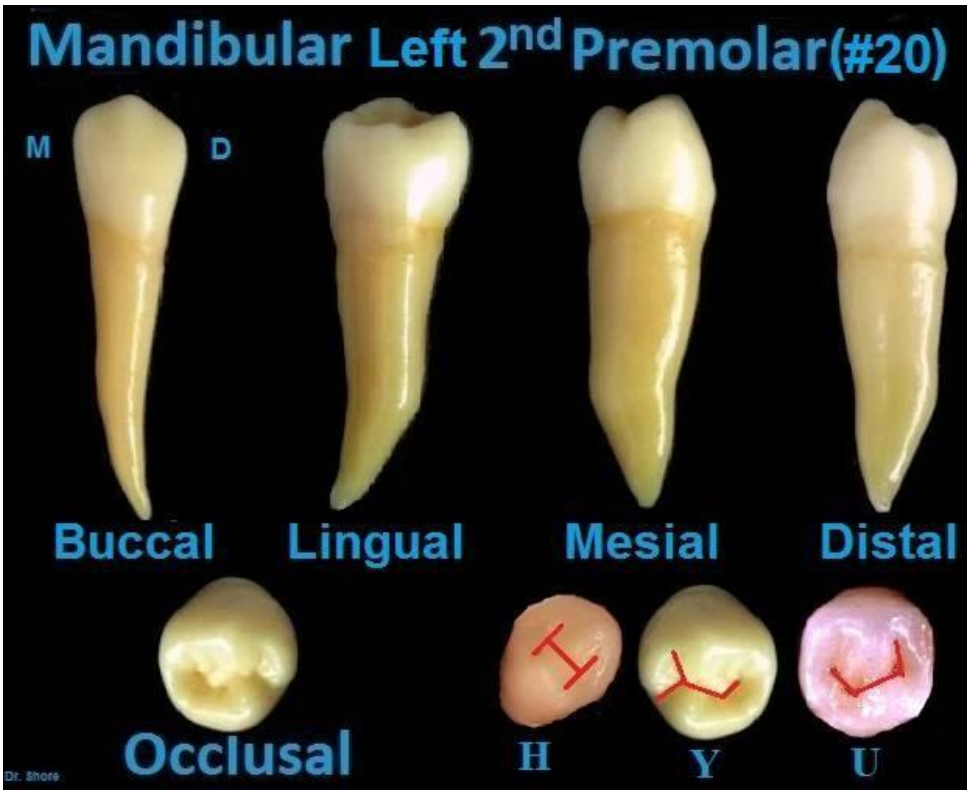
Occlusal Aspect

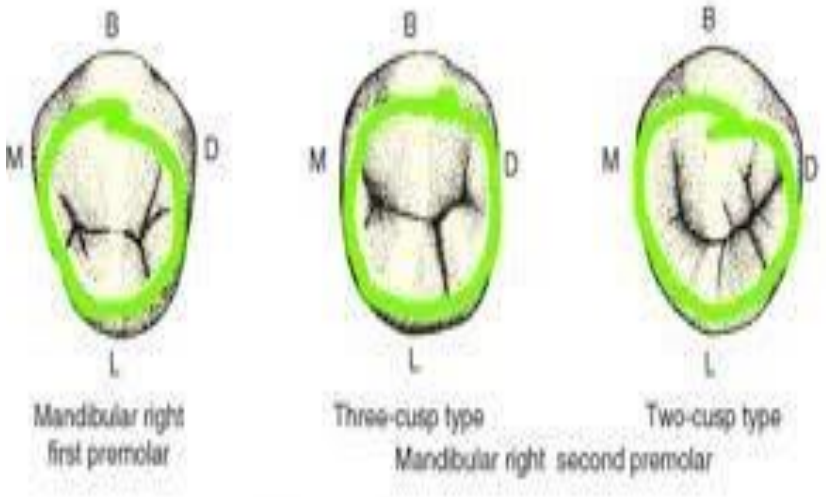
A. Three cusps type:

1. The occlusal aspect is square in shape.
2. Three cusps: the buccal is the largest, followed by the mesio-lingual cusp, and then the disto-lingual cusp.
3. Each cusp has a well-formed triangular ridge separated by deep developmental grooves which form a Y-shape on the occlusal surface.
4. There are three developmental grooves:
    A. Mesial developmental groove ending in the mesial triangular fossa.
    B. Distal developmental groove ending in the distal triangular fossa.
    C. Lingual developmental groove separating the two lingual cusps.
5. These grooves converge in a central pit, which is placed slightly toward the distal side.
6. Supplemental grooves are often seen.

B. <u>Two cusps type:</u>

1. Appear more rounded than the more angular three cusps type.
2. There is one well-developed lingual cusp which is larger and opposite the buccal cusp.
3. A central developmental groove travels in a mesio-distal direction with its terminals centered in the mesial and distal triangular fossae. Sometimes mesial and distal developmental pits in the centers of these fossae may be seen.





MANDIBULAR PREMOLARS (occlusal)