

Dental Anatomy

Lecture -11-

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Permanent Maxillary Molars

Permanent maxillary molars are the largest and strongest maxillary teeth. They have three roots: two buccal and one lingual (palatal). They are not succedaneous teeth as they erupt behind the deciduous molars. Their main function is grinding the food and supporting the muscles of mastication and vertical dimension.

Maxillary First Molar

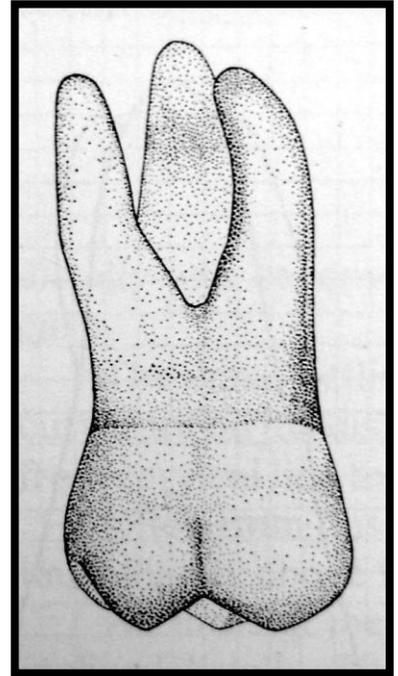
It is the largest tooth in the maxillary arch.

Principal Identifying Features

1. Rhomboidal occlusal outline.
2. The presence of a fifth cusp named (the cusp of Carabelli)-a non-functional cusp- on the lingual surface of the mesio-lingual cusp.
3. The presence of an oblique ridge extending from the mesiolingual cusp to the disto-buccal cusp.
4. The presence of three well-separated and well-developed roots: two buccal and one lingual. The lingual root is the longest.

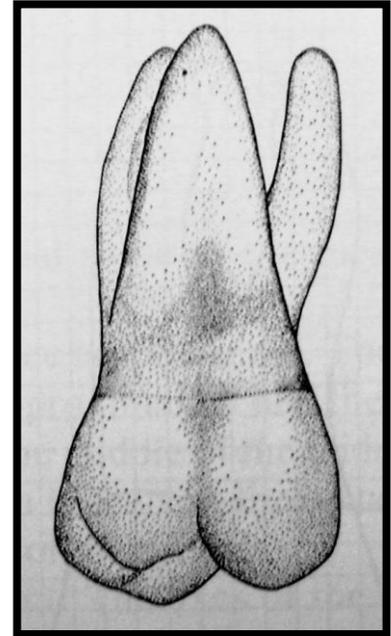
Buccal Aspect

1. The crown is roughly trapezoidal and the cervical line shows very little convexity, which is directed toward the root.
2. The mesial outline of the crown is straight, curving occlusally as it reaches the contact area, which is located at the junction between the occlusal and middle thirds.
3. The distal outline of the crown is convex, with the contact area located at the center of the middle third.
4. The mesio-buccal cusp is broader than the disto-buccal cusp, and its mesial and distal slopes meet at an obtuse angle, while the mesial and distal slopes of the disto-buccal cusp meet at a right angle (which is sharper), and we may see the lingual cusps.
5. The buccal developmental groove divides the two buccal cusps in equal distance and it terminates apically.
6. The three roots are visible and inclined distally, with the lingual root is the longest.



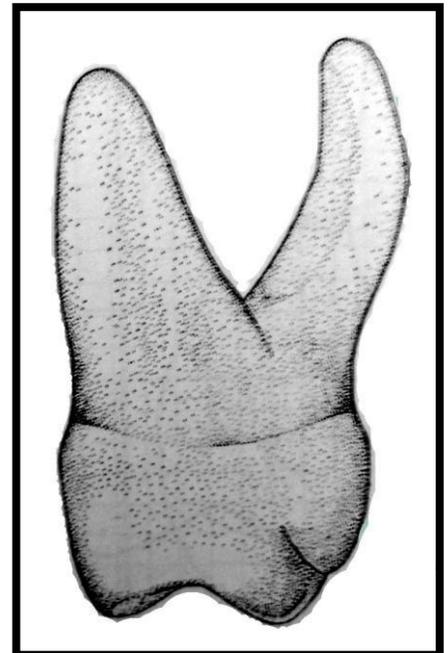
Lingual Aspect

1. The lingual cusps only can be seen, with the mesio-lingual cusp is the largest cusp and accounts for $\frac{3}{5}$ of the mesio-distal width of the crown, while the disto-lingual cusp accounts for $\frac{2}{5}$ of the mesio-distal dimension.
2. The lingual developmental groove starts approximately at the center mesio-distally and curves sharply distally, then continues on the occlusal surface.
3. The fifth cusp (the cusp of Carabelli) is 1.5 mm cervical to the mesio-lingual cusp tip, and an irregular developmental groove separates this cusp from the mesio-lingual cusp.
4. There are three roots visible, with the lingual root making most of the aspect.



Mesial Aspect

1. The buccal outline has a crest of curvature within the cervical third, then it continues with a convex outline to the tip of the cusp.
2. The lingual outline has a crest of curvature within the middle third, and it shows a convex

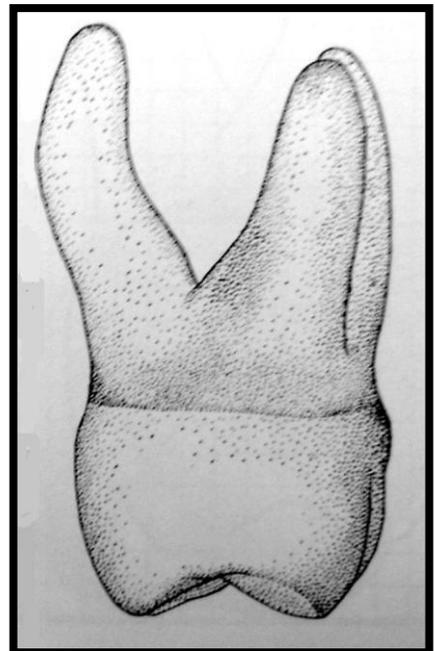


pattern until it reaches the cusp of Carabelli, at which it shows another convexity.

3. The mesial marginal ridge is located at a level $\frac{1}{5}$ the height of the crown.
4. The cervical line curves occlusally about 1 mm.
5. The intercusp distance of the two mesial cusps is a little more than half the bucco-lingual dimension of the crown.
6. The mesial contact area is buccal to the bucco-lingual center of the crown.
7. The lingual and mesio-buccal roots can be seen.

Distal Aspect

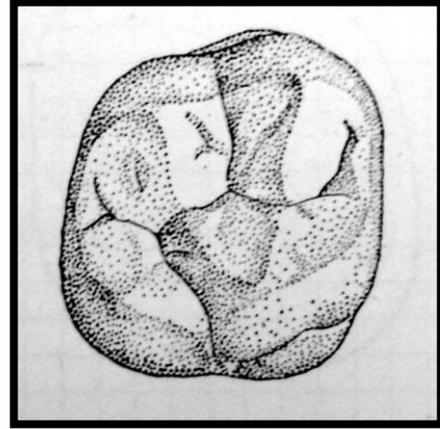
1. The general outline is similar to that of the mesial aspect, but the bucco-lingual measurement is more mesially than distally.
2. The distal marginal ridge is located more cervically, so we can see part of the occlusal surface.
3. The curvature of the cervical line is zero.
4. All the three roots are visible, and the distobuccal root is the smallest one.



Occlusal Aspect

1. The occlusal outline is rhomboidal with greater bucco-lingual measurement mesially than distally, and greater mesio-distal measurement lingually than buccally.

2. Four well-developed cusps can be seen: the mesio-lingual cusp is the largest, then the mesio-buccal, then the distolingual, then the disto-buccal, then the cusp of Carabelli.



3. The mesio-buccal and disto-lingual line angles are acute, and the mesio-lingual and disto-buccal line angles are obtuse.

4. There is an oblique ridge formed by the union of the triangular ridge of the disto-buccal cusp and the distal ridge of the mesiolingual cusp, crossing the occlusal surface obliquely.

5. There are four fossae:

(A) Major fossae:

(i) Central fossa: roughly triangular in shape, located mesial to the oblique ridge.

(ii) Distal fossa: located distal to the oblique ridge.

(B) Minor fossae:

(i) Mesial triangular fossa: located distal to the mesial marginal ridge.

(ii) Distal triangular fossa: located mesial to the distal marginal ridge.

6. There are six developmental grooves:

- (A) Central developmental groove: from the central pit to the mesial triangular fossa.
- (B) Buccal developmental groove: from the central pit to the buccal surface between the mesio-buccal and disto-buccal cusps.
- (C) Distal oblique groove: from the distal triangular fossa going obliquely.
- (D) Lingual developmental groove: this groove joins with the distal oblique groove going between the mesio-lingual and distolingual cusps in a cervical direction.
- (E) Transverse groove of the oblique ridge: this groove crosses the oblique ridge.
- (F) Fifth cusp groove: this groove passes between the fifth cusp and the mesio-lingual cusp.

7. There are three pits:

- (A) Central pit: it is located at the deepest part of the central fossa, at the junction between the central groove and the buccal developmental groove.
- (B) Mesial pit: it is located at the deepest part of the mesial triangular fossa.
- (C) Distal pit: it is located where the distal fossa and distal triangular fossa join.