

The permanent mandibular molars

The mandibular molars are the largest & strongest mandibular teeth because of their bulk & their anchorage. They perform the major portion of the work of the lower jaw in mastication & grinding of food. They resemble each other in functional form, although comparison of one with another shows variations in the number of cusps & some variation in size, occlusal design, & relative length & positions of the roots.

The crowns of these molars are wider mesiodistally than buccolingually, & they are shorter cervico-occlusally than those of teeth anterior to them.

Usually the sum of the mesiodistal measurements of mandibular molars is equal or greater than the combined mesiodistal measurements of all teeth anterior to the first molar & up to the median line.

Each mandibular molar has two roots, one mesial & one distal. Third molars & some second molars may show a fusion of these roots.

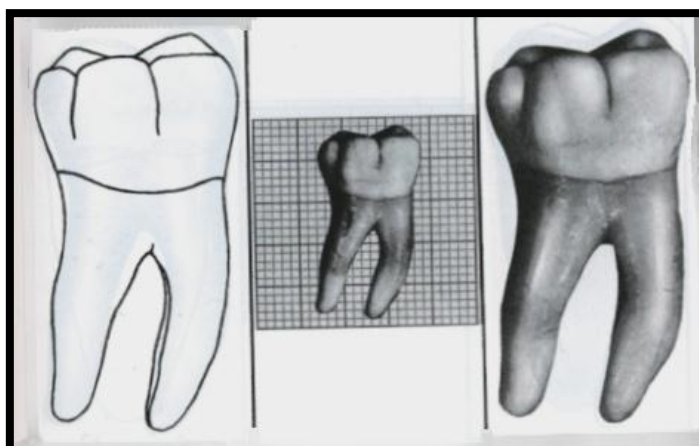
Mandibular First Molar

- It is the largest tooth in the mandibular arch.
- It has five well-developed cusps: two buccal, two lingual & a distal cusp.
- It has two well-developed roots, one mesial & one distal, which are very broad buccolingually. These roots are widely separated at the apices.
- The mesiodistal dimension of the crown is greater than the buccolingual dimension.
- The crown is relatively short cervico-occlusally.
- The buccal surface has two developmental grooves.
- The occlusal outline is rectangular in shape.

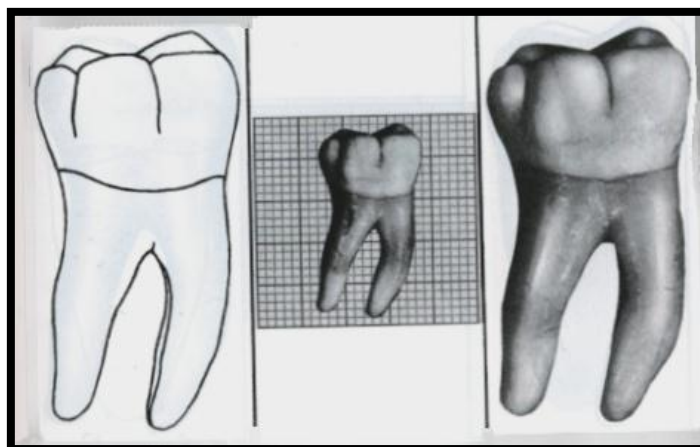
Buccal aspect

- The crown is roughly trapezoidal, with the longest uneven side toward occlusal surface.
- The cervical line is regular curving apically toward the root bifurcation.
- The mesial outline is somewhat concave (nearly straight) from the cervix to the contact area, which is approximately at the junction of the occlusal & the middle third of the crown.
- The distal outline of the crown is straight from the cervix to the contact area, which is little cervical to the level of the mesial contact area.
- The two buccal cusps, the distal cusp, & the tips of the lingual cusps can be seen from this aspect.
- Two developmental grooves appear on the crown portion. These grooves called the mesiobuccal developmental groove & the distobuccal developmental groove. The mesiobuccal is shorter than the distobuccal one. It starts on the buccal surface at a point slightly more than two fifth the distance from mesial to distal outline, having its terminus centrally located cervico-occlusally. This groove is situated a little mesial to the root bifurcation; it acts as a line of demarcation between the mesiobuccal cusp & distobuccal cusps.

The distobuccal developmental groove starts on the buccal surface at a point four fifth the distance from mesial to distal outline, & has its terminus near the distobuccal line angle at the cervical third. It travels cervically & distally parallel with axis of the distal root. It acts as line of demarcation between the distobuccal & distal cusps.

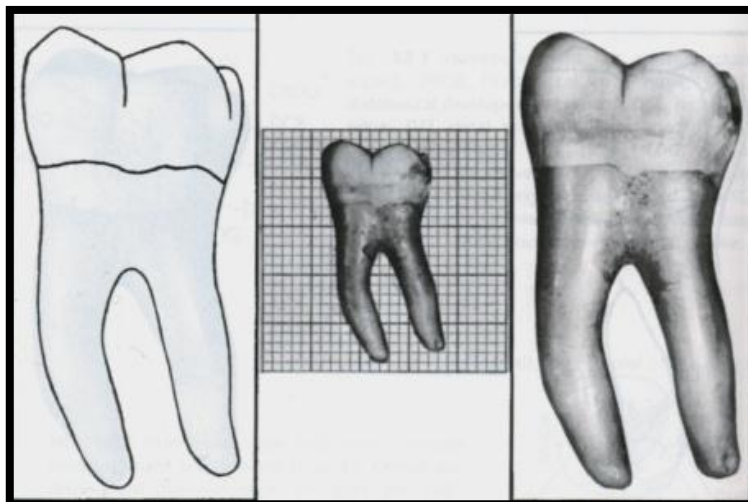


- The width of the two buccal cusps are almost the same (the mesiobuccal is slightly wider), making together almost (80%) of the total mesiodistal width of the buccal surface of the crown. The distal cusp is much smaller, making up the remainder or about (20%) of the mesiodistal width.
- The buccal cusps are relatively flat, the mesiobuccal has some curvature, the distobuccal has a cusp ridge of somewhat greater curvature, the distal cusp is more rounded (pointed) than either of the two buccal cusps. **(Flattened buccal cusps are typical for all mandibular molars).**
- A developmental depression is noticeable on the buccal surface nearly at the level of the ends of the developmental grooves; it runs in a mesiodistal direction just above the cervical ridge of the buccal surface.
- The cervical ridge may show a smooth depression in it which progresses cervically, joining with the developmental depression just below the cervical line, which congruent with the root bifurcation buccally.
- Both roots are visible from this aspect, & the point of bifurcation is located approximately 3mm below the cervical line.



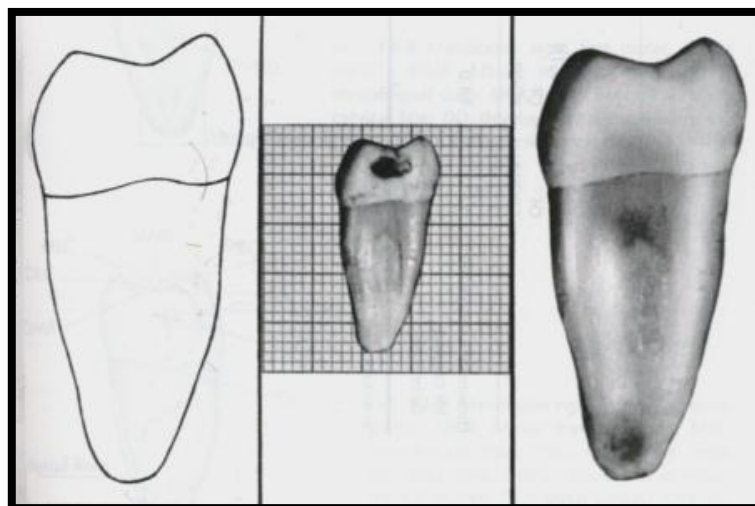
Lingual aspect

- The cervical line lingually is irregular, waving line & tends to point sharply toward the root bifurcation & immediately above it.
- Two lingual cusps & the lingual portion of the distal cusp may be seen.
- The two lingual cusps are pointed, & the cusp ridges are high enough to hide the two buccal cusps from view. Part of the two buccal cusps may be seen just beyond the sulcus between the two lingual cusps.
- The mesiolingual cusp is the widest mesiodistally, with its cusp tip somewhat higher than the distolingual cusp.
- The cusp ridges of the two lingual cusps form obtuse angles at the cusp tips.
- The angle formed by the distolingual cusp ridge of the mesiolingual cusp & the mesiolingual cusp ridge of the distolingual cusp is more obtuse than the angulation of the cusp ridges at the tips of the lingual cusps.
- The lingual developmental groove acts as a line of demarcation between the lingual cusps, extending downward on the lingual surface of the crown for a short distance only, sometimes there is no groove but a depression lingual to the cusp ridges may be seen.
- Part of the mesial & distal surfaces of the crown & root trunk may be seen from this aspect because the mesial & distal sides converge lingually.
- The root bifurcation lingually starts at a point approximately 4mm below the cervical line.



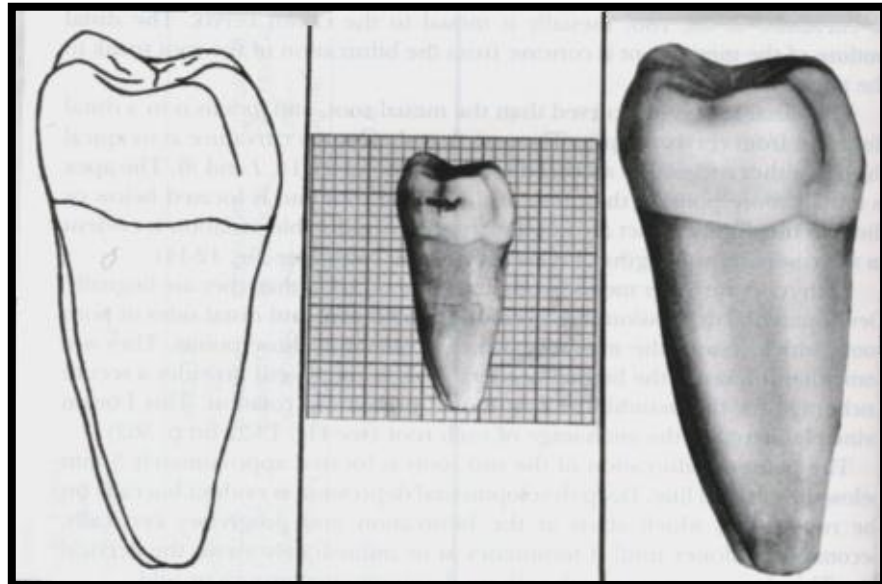
Mesial aspect

- The crown is roughly rhomboidal, & the crown has a lingual tilt in relation to the long axis of the root.
- Two cusps & one root only can be seen, since the buccolingual measurements of the mesial portion of the crown & of the mesial root are greater than that of the distal portion & the distal root as well as the mesial cusps are higher than distal cusps.
- The cervical line is irregular & at higher level lingually than buccally.
- The buccal outline of the crown is convex immediately above the cervical line outlining the buccal cervical ridge, the crest of curvature at the junction of cervical third & middle third. Above the cervical ridge, the buccal outline becomes straighter (less convex); it continues occlusally outlining the mesiobuccal cusp. The mesiobuccal cusp is located directly above the buccal third of the mesial root.
- The lingual outline start as straight line from the cervical line & joining the lingual curvature at the middle third, the lingual curvature being pronounced between this point & the tip of the mesiolingual cusp. The crest of curvature lingually is located at the center of the middle third of the crown. The tip of the mesiolingual cusp is located directly above the lingual third of the mesial root.
- The buccal cusp is rather flat, & the lingual cusp is sharp, with greater cusp height.
- The mesial marginal ridge is confluent with the mesial ridges of the mesiobuccal & mesiolingual cusps, it is placed 1mm below the level of the cusp tips.



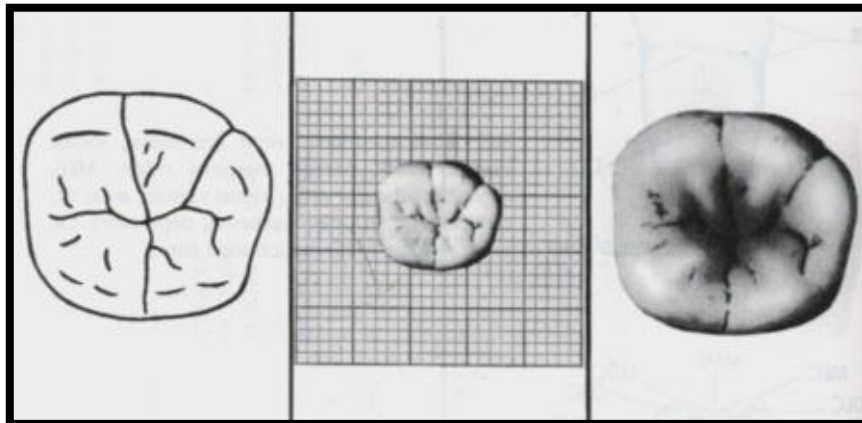
Distal aspect

- More of the tooth can be seen from this aspect because the crown is shorter distally than mesially, & the buccal & lingual surfaces of the crown converge distally, the buccal surface shows more convergence than the lingual surface. The distal root is narrower mesiodistally than the mesial root.
- The distal cusp is located buccal to the center of the crown buccolingually, the distal contact area appearing on its distal contour.
- The distal marginal ridge is short & made up of the distal cusp ridge of the distal cusp & the distolingual cusp ridge of the distolingual cusp. These cusp ridges curves cervically meeting at an obtuse angle.
- A developmental groove or depression crossing the MR at the point of this angle.
- The cervical line is irregular, dipping apically below the center of the crown buccolingually.



Occlusal aspect

- The crown is roughly rectangular; it is wider mesiodistally than buccolingually.
- The buccolingual measurement of the crown is greater on the mesial than on the distal.
- The mesiodistal measurement of the crown buccally is greater than lingually.
- The 5 cusps appear: the mesiobuccal cusp is the largest, the mesiolingual, the distolingual, the distobuccal, & the distal cusp, which is the smallest of all.
- There are 3 fossae, one major & two minor fossae. The major fossa is the central fossa; it is roughly circular & centrally placed on the occlusal surface between buccal & lingual cusp ridges. The two minor fossae are the mesial triangular fossa & distal triangular fossa.



- There are 4 developmental grooves:
 1. Central developmental groove.
 2. Mesiobuccal developmental groove.
 3. Distobuccal developmental groove.
 4. Lingual developmental groove.
- There are three pits: -
 1. Central pit: in the center of the central fossa.
 2. Mesial pit: in the mesial triangular fossa.
 3. Distal pit: in the distal triangular fossa.

TABLE 12-1 Mandibular First Molar

First evidence of calcification	At birth
Enamel completed	2½-3 yr
Eruption	6-7 yr
Root completed	9-10 yr

MEASUREMENT TABLE

	CERVICO- OCCLUSAL LENGTH OF CROWN	LENGTH OF ROOT	MESIODISTAL DIAMETER OF CROWN	MESIODISTAL DIAMETER OF CROWN AT CERVIX	LABIO- OR BUCCOLINGUAL DIAMETER OF CROWN	LABIO- OR BUCCOLINGUAL DIAMETER OF CROWN AT CERVIX	CURVATURE OF CERVICAL LINE—MESIAL	CURVATURE OF CERVICAL LINE—DISTAL
Dimensions* suggested for carving technique	7.5	14.0	11.0	9.0	10.5	9.0	1.0	0.0

*In millimeters.

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