Maxillary Premolars

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- Premolars are so named because they are anterior to molars in permanent dentition.
- They succeed the deciduous molars.
- Also called bicuspid teeth.
- They develop from the same number of lobes as anteriors i.e., four.
- The primary difference is the well-formed lingual cusp developed from the lingual lobe.
- The lingual lobe is represented by cingulum in anterior teeth.

- The buccal cusp of maxillary first premolar is long and sharp assisting the canine as a prehensile or tearing teeth.
- The second premolars have cusps less sharp and function as grinding teeth like molars.
- The crown and root of maxillary premolar are shorter than those of maxillary canines.
- The crowns are little longer and roots equal to those of molars.

- As the cusps develop buccally and lingually, the marginal ridges are a little part of the occlusal surface of the crown.

Maxillary second premolar

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Maxillary First Premolar

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- The maxillary first premolar has two cusps, buccal and lingual.
- The buccal cusp is about 1mm longer than the lingual cusp.
- The crown is angular and buccal line angles are more prominent.
- The crown is shorter than the canine by 1.5 to 2mm on an average.
- The premolar resembles a canine from buccal aspect.

- It differs from canine because the contact area mesially and distally are at the same level, the root is shorter.
- The mesial slope of premolar is longer than distal which is reverse in case of canine.
- The premolar is not as wide as canine in the mesiodistal span.
- Most of maxillary first premolars have 2 roots and 2 root canals. If only one root is present, 2 canals are found anyway.

- Features common to posterior teeth are:

Greater relative faciolingual measurement as compared with the mesiodistal measurement.

Broader contact areas.

Contact areas nearly at the same level.

Less curvature of cervical line mesially and distally.

Shorter crown, cervico-occlusally when compared with anterior teeth.

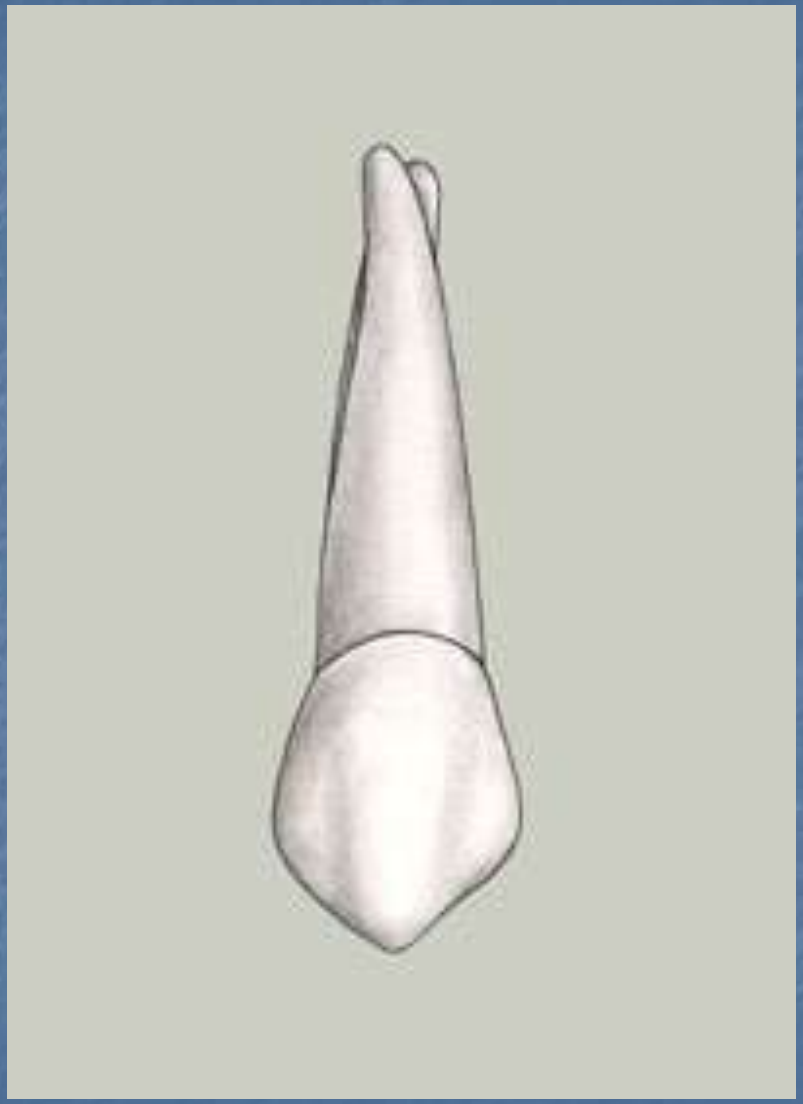
Buccal Aspect

The crown is roughly trapezoidal from this aspect.

The crown exhibits little curvature at the cervical line.

The crest of curvature of cervical line buccally is towards the center of the root buccally.

The mesial outline is slightly concave from the cervical line to the mesial contact area.



The contact area is represented by a broad curvature, the crest of which lies immediately occlusal to the halfway point from cervical line to the tip of buccal cusp.

The mesial slope of buccal cusp is rather straight and longer than the distal slope which is shorter and more curved.

This arrangement places the tip of buccal cusp distal to a line bisecting the buccal surface of the crown.

The distal outline below the cervical line is straighter than the mesial, although it may be concave too.

The distal contact area is represented by a broader curvature than mesially.

The width of the crown mesiodistally is 2mm less at the cervix.

The buccal cusp is long with a pointed tip resembling a canine.

The buccal surface is convex showing strong development of the middle buccal lobe.

Buccal ridge can be seen extending from cusp tip to cervical margin.

Development depressions can be seen on either side of the middle lobe, between mesial and distobuccal lobes, extending from occlusal surface up to the middle third.

The mesial and distobuccal lobes are less prominent, but they serve to emphasize strong mesiobuccal and distobuccal line angles on the crown.

The roots are 3-4 mm shorter than that of canine.

The buccal root outline bears a close resemblance to that of canine.

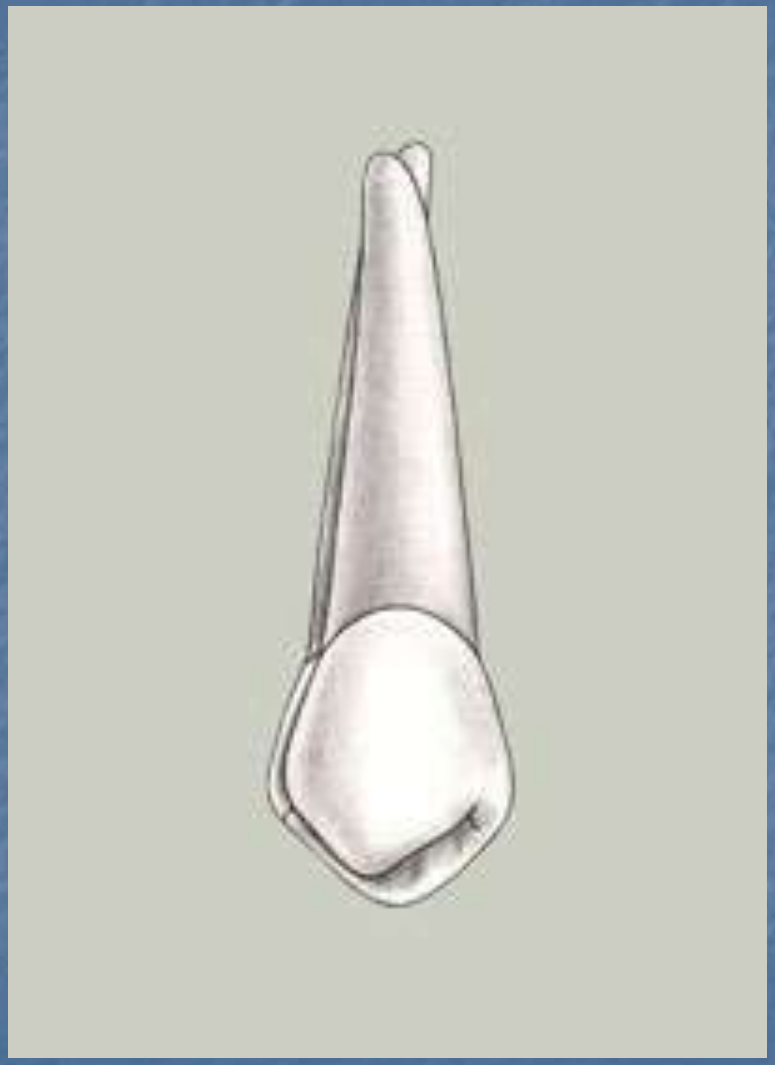
Lingual Aspect

The gross outline on the lingual aspect is just the reverse to that on buccal.

The crown tapers towards the lingual as the lingual cusp is narrower mesiodistally.

The lingual cusp is smooth and spheroidal from cervix to the cusp tip.

The cusp tip is pointed with mesial and distal slopes meeting at right angles.



The crest of lingual surface may sometimes be called lingual ridge.

The mesial and distal outlines of the lingual portion of crown are convex.

Lingually, the cervical line is regular with slight curvature towards the root and crest of curvature centered on the root.

Mesial and distal portion of the crown can be seen from lingual aspect because the lingual portion is narrower than buccal.

As the lingual cusp is shorter than buccal, the tips of both the cusps with their mesial and distal slopes may be seen from the lingual aspect.

The lingual portion of the root is smooth and convex at all points.

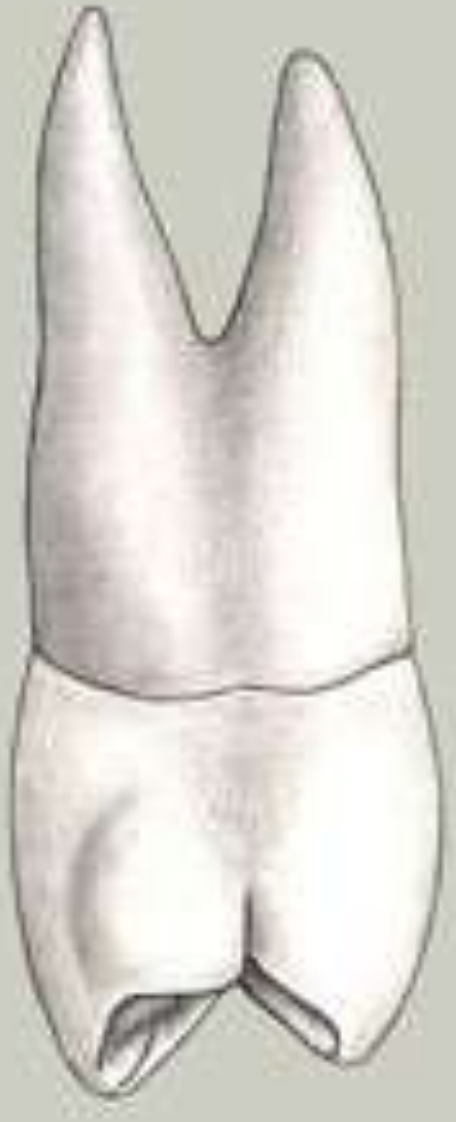
The apex of lingual root of a two-root specimen tends to be more blunt than the buccal root apex.

Mesial Aspect

The mesial aspect of the crown is roughly trapezoidal.

However, the longest of the uneven sides is towards the cervical portion and the shortest towards the occlusal portion.

Tips are well within the confines of the root trunk i.e., the measurement from tip of buccal cusp to the tip of lingual cusp is less than the bucco-lingual measurement at the cervix.



From the mesial aspect, the two roots one buccal and one lingual can be clearly seen.

The cervical line may be regular or irregular in outline.

The curvature of cervical line mesially is constant within a fraction of a mm.

The buccal outline from the mesial aspect can be seen to curve outward below the cervical line.

The crest of curvature is located approx. at the junction of cervical and middle thirds or within the cervical third.

From the crest of curvature, the buccal outline continues as a line of less convexity to the tip of buccal cusp which is directly below the center of buccal root.

The lingual outline of the crown may be described as a smoothly curved line starting at cervical line and ending at the tip of lingual cusp.

The crest of curvature is mostly near the center of the middle third.

The tip of lingual cusp is on a line with the lingual border of lingual root.

The cusps are long and sharp with the mesial marginal ridge at about the level of the junction of middle and occlusal thirds.

Mesial developmental depression is present immediately cervical to the mesial contact area, centered on the mesial surface.

This mesial concavity continues apically beyond the cervical line, joins a deep developmental depression between the roots and ends at root bifurcation.

This concavity is not so marked in a single rooted teeth and is absent on second premolars.

Another distinguishing feature is a well defined developmental groove in the enamel of the mesial marginal ridge.

This groove is in alignment with the developmental depression on the mesial surface of root but is not connected with it.

This groove is continuous with the central groove of occlusal surface of the crown, crossing the marginal ridge immediately lingual to mesial contact area and ending a short distance cervical to the mesial marginal ridge.

The buccal outline of buccal root, above the cervical line is with a tendency towards lingual inclination.

On the buccal roots having a buccal inclination above the root bifurcation, the outline is relatively straight up to the apical portion, or it may curve buccally at the middle thirds. Buccal roots may take a buccal or lingual inclination, apical to middle thirds.

The root trunk is long, making up about half of the root length.

The bifurcation on the teeth with two roots begins at a more occlusal point mesially than distally.

Except for the deep developmental groove and depression at or below the bifurcation, the mesial surface of the root portion is smoothly convex buccally and lingually.

In cases of single root also, the developmental depression can be seen for most of the root length.

In such teeth, the roots with buccal and lingual outlines end in a blunt apex above the center of the crown.

Distal Aspect

The differences from the mesial aspect are:

The crown surface is convex at all points except for a small, flattened arc just cervical to the contact area and buccal to the center of distal surface.

The curvature is less on the distal than on the mesial surface.

A deep developmental groove crossing the distal marginal ridge of the crown is not evident.

The root trunk is flattened on the distal surface above the cervical line.

The bifurcation of the roots is abrupt near the apical third, with no developmental groove.

Occlusal Aspect

Occlusal aspect of maxillary first premolar resembles roughly a six-sided or hexagonal figure.

The six sides are made up of mesiobuccal, mesial, mesiolingual, distolingual, distal and distobuccal.

The hexagonal figure is not equilateral, the mesial side is shorter than distal side and mesiolingual is shorter than distolingual side.

The crest of distal contact area is buccal to that of mesial and the crest of buccal ridge is somewhat distal to that of lingual ridge.

The distance from the buccal crest to mesial crest is slightly longer than distance from buccal crest to distal crest.

The distance from mesial crest to lingual crest is much shorter than distal to lingual.

Crown is wider on buccal than on lingual.

Buccolingual dimension of crown is much greater than mesiodistal.

The occlusal surface is circumscribed by cusp ridges and marginal ridges.

The mesiobuccal and distobuccal cusp ridges are in line with each other and their alignment is in distobuccal direction.

The angle formed by convergence of mesiobuccal cusp ridge and mesial marginal ridge is a right angle.

The angle formed by convergence of distobuccal cusp ridge and distal marginal ridge is acute.

The mesiolingual and distolingual cusp ridges are confluent with the mesial and distal marginal ridges. They follow a semicircular outline.

When looking at the occlusal aspect so that the line of vision is in line with the long axis, more of the buccal surface is seen than lingual surface.

When viewing from the mesial aspect, the tip of buccal cusp is nearer the center of root trunk than is the lingual cusp.

The occlusal surface has a well defined *Central developmental groove* that divides the surface buccolingually.

It is located at the bottom of the central sulcus of the occlusal surface, extending from a point just mesial to distal marginal ridge to the mesial marginal ridge, where it joins mesial marginal developmental groove. This groove crosses mesial marginal ridge and ends on the mesial surface of the crown.

Supplemental grooves are absent which makes the surface evenly smooth

Two collateral developmental grooves join the central groove just inside the mesial and distal marginal ridges. These grooves are called *Mesiobuccal and Distobuccal developmental grooves*.

The junctions of the grooves are deeply pointed and named *Mesial and Distal developmental pits.*

Just distal to mesial marginal ridge, the triangular depression having mesiobuccal developmental groove is called *Mesial triangular fossa.*

Smooth developmental depressions may be visible radiating from the central groove and giving the occlusal surface an uneven appearance.

Buccal triangular ridge of the buccal cusp is prominent, arising near the central groove and converging with the tip of buccal cusp. Lingual ridge is less prominent.

Lingual cusp is pointed more sharply than the buccal cusp.

MAXILLARY SECOND PREMOLARS

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The maxillary second premolar is less angular, giving a more rounded effect to the crown from all aspects.

Has a single root.

The maxillary second premolar varies considerably in size as it does not appear true to form.

It may have a crown that is noticeably smaller cervico-occlusally and mesio-distally.

The maxillary second premolar and first premolar have about same dimensions on average, except for a tendency of lengthier second premolar root.

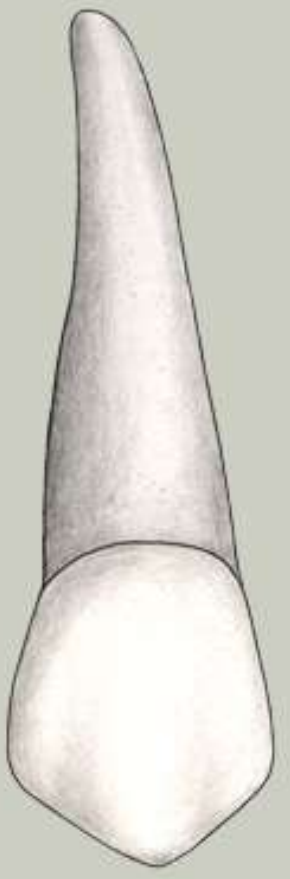
Buccal Aspect

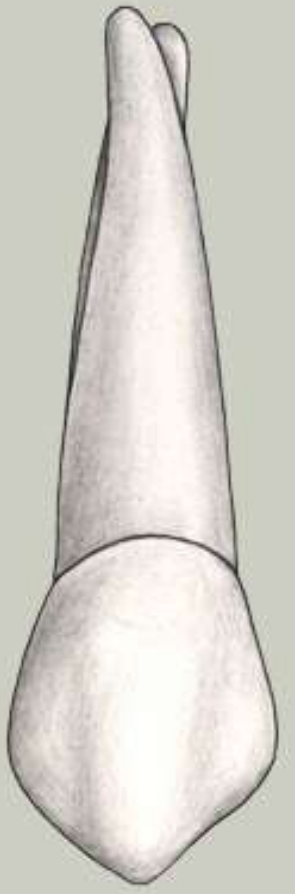
The buccal cusp of second premolar is not as long as that of first premolar and appears less pointed.

The mesial slope of buccal ridge is usually shorter than the distal slope.

The crown and root may be thicker at cervical portions.

The buccal ridge of the crown may not be so prominent when compared to first premolar.

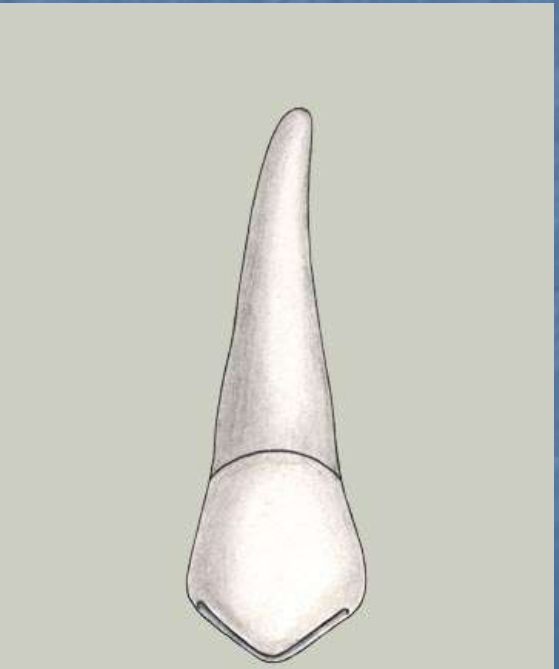


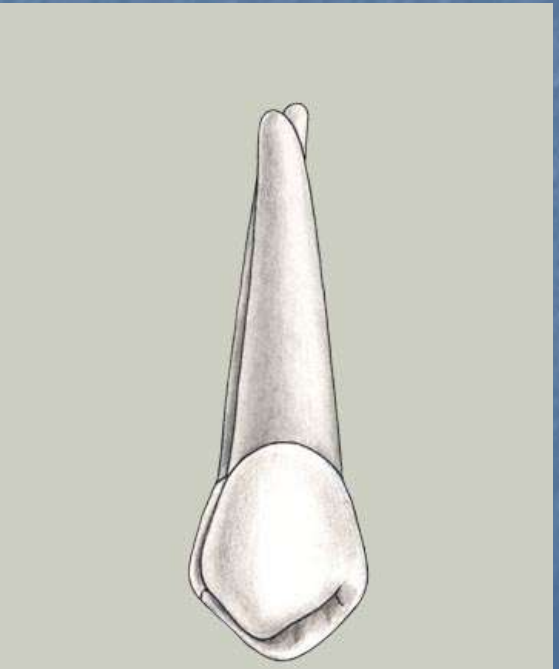


Lingual Aspect

Little variation.

Lingual cusp is longer which makes the crown longer on the lingual side.





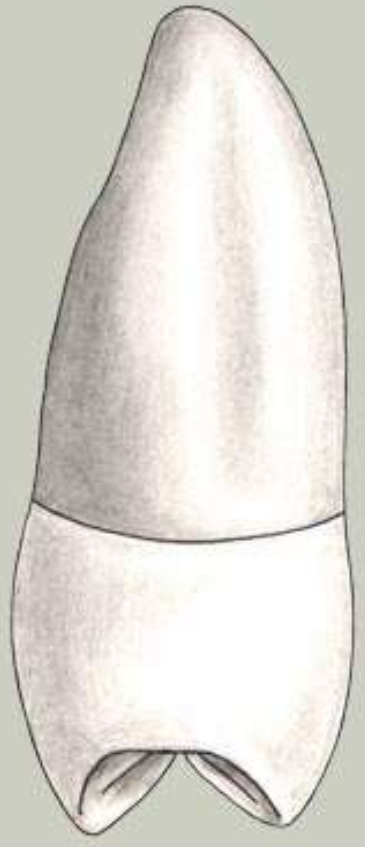
Mesial Aspect

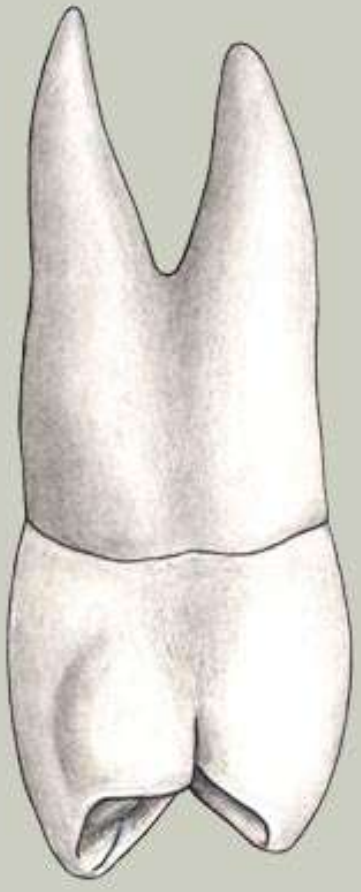
This aspect shows the difference in cusp length between first and second premolar.

The cusps of second premolar are shorter with both the cusps nearing the same length.

Greater distance between cusp tips widens the occlusal surface bucco-lingually.

Development depression is absent on the mesial surface, the crown surface is convex instead.



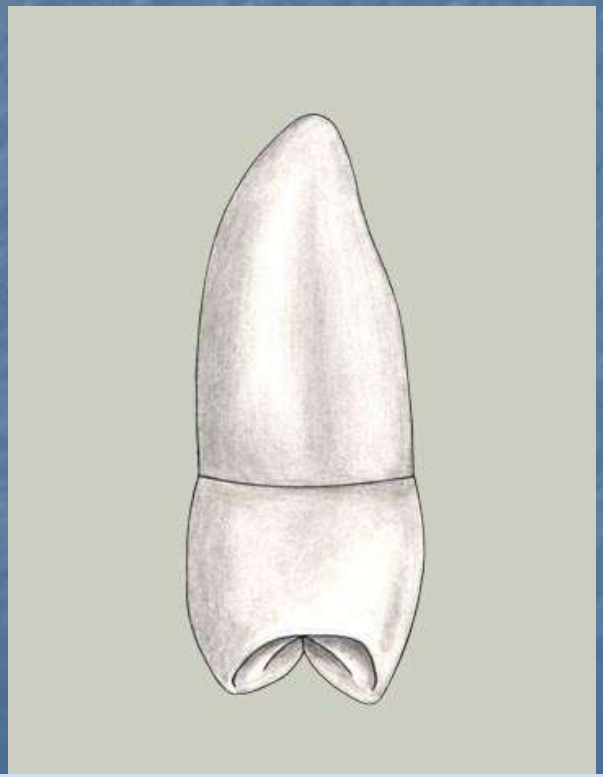


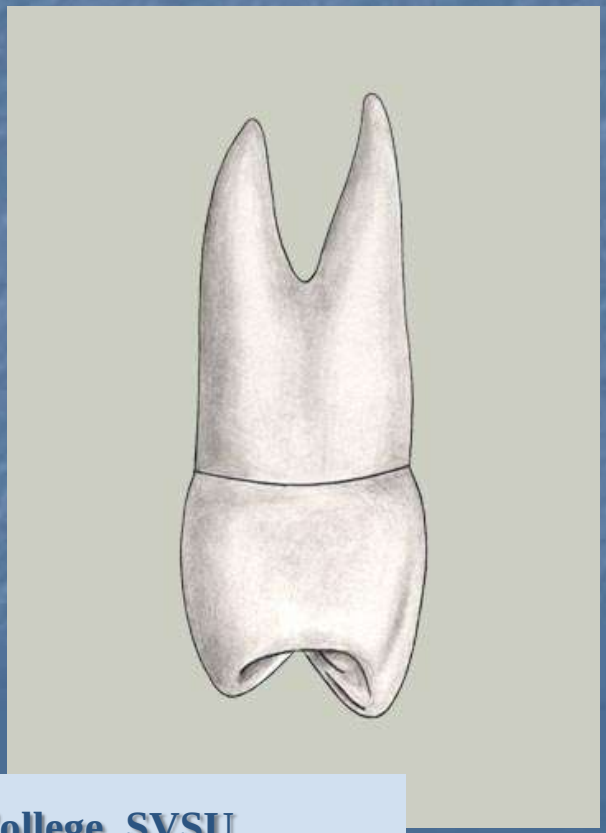
A shallow developmental groove appears on the single tapered root.

No developmental groove crossing the mesial marginal ridge is evident.

Distal Aspect

The maxillary second premolar has the distal root depression deeper than mesial. This characteristic is just opposite to that of first premolar.





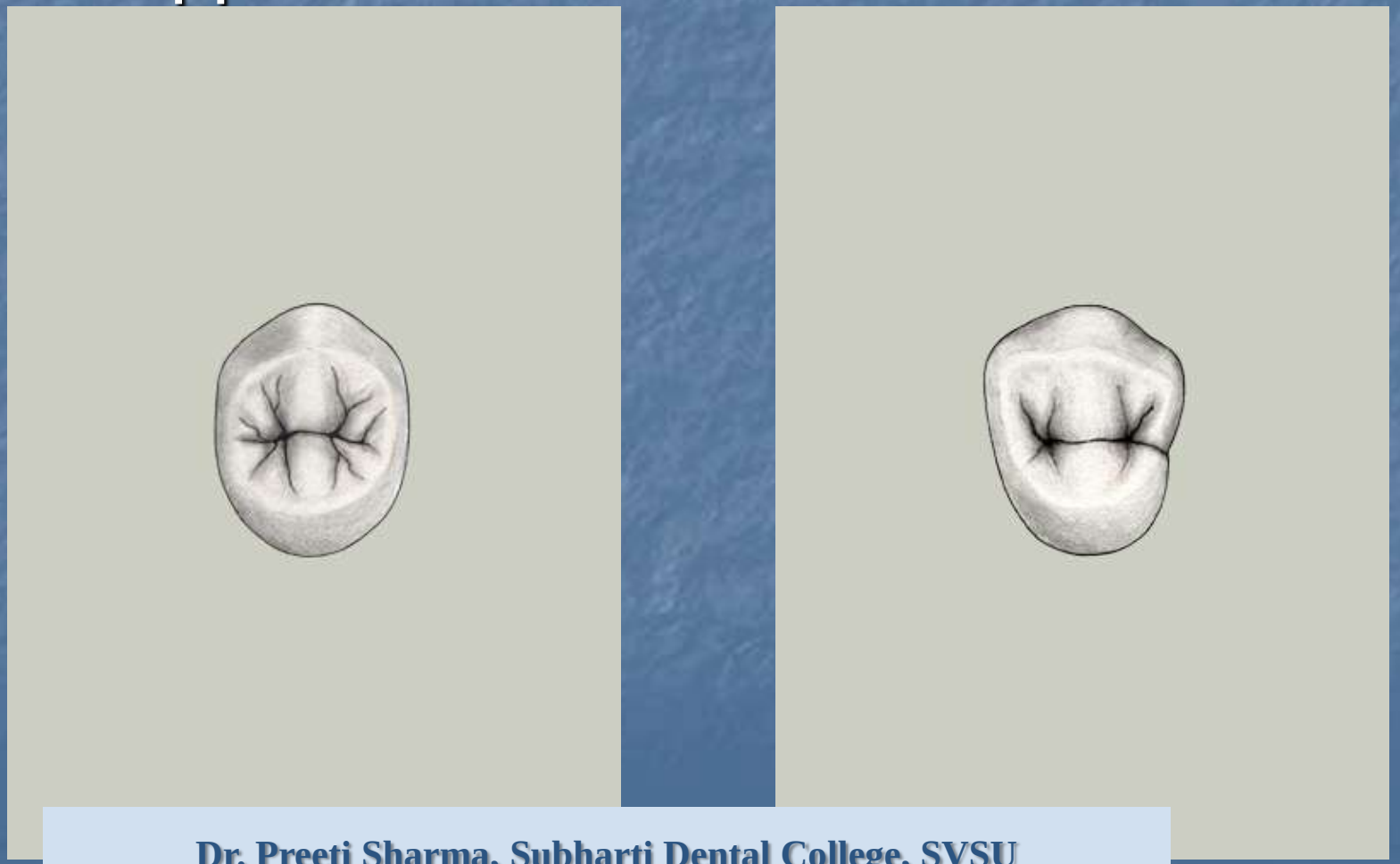
Occlusal Aspect

The outline of the crown is more oval or rounded rather than angular.

The central development groove is shorter and more irregular with a tendency towards multiple supplementary grooves radiating from the central groove.

These grooves terminate in shallow depressions in the enamel that may extend up to the cusp ridges.

This arrangement makes for an irregular occlusal surface and gives the surface a very wrinkled appearance.



REFERENCES

- Wheeler's Dental Anatomy, Physiology and Occlusion. Ninth Edition.