# LANDMARKS OF TOOTH

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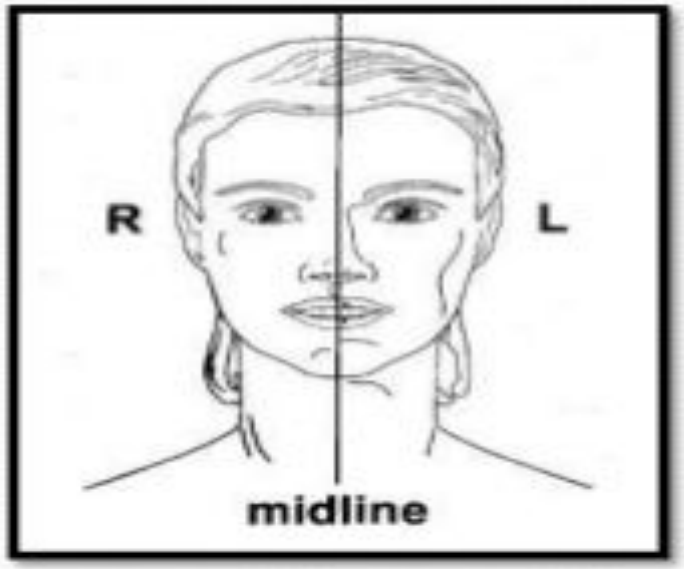
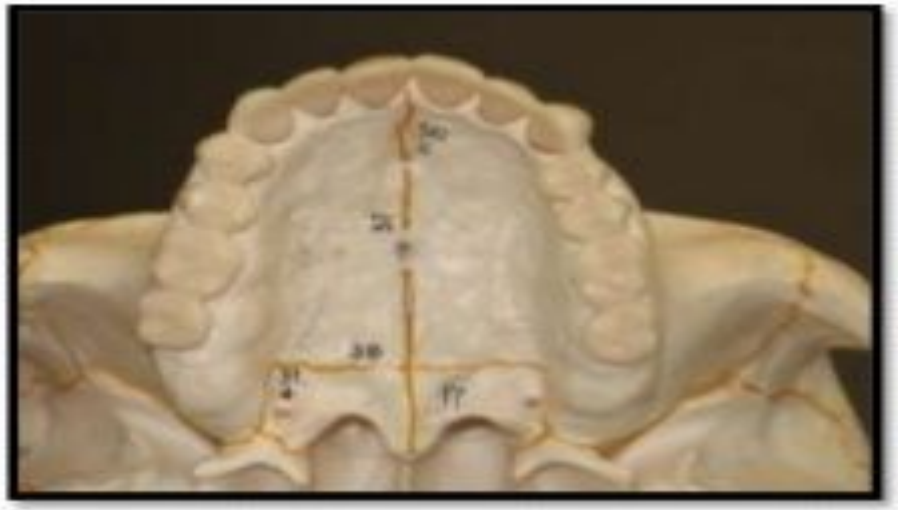
# Introduction

- Midline: imaginary vertical line which divides each arch as well as body into approx. equal halves
- Maxillary teeth: teeth arranged in upper arch
- Mandibular teeth: teeth arranged in lower arch



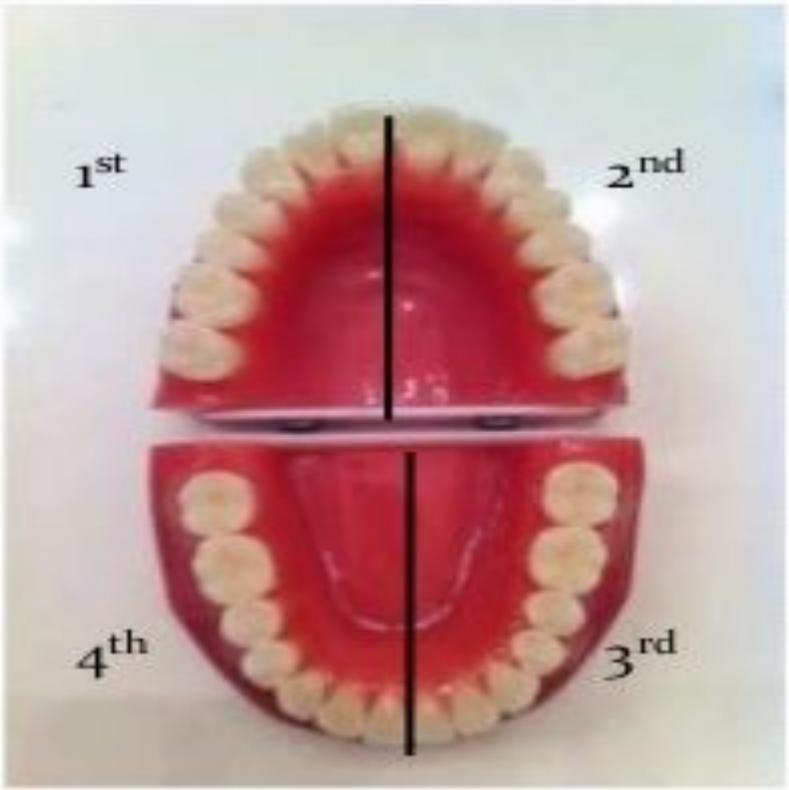
MAXILLARY TEETH



MANDIBULAR TEETH

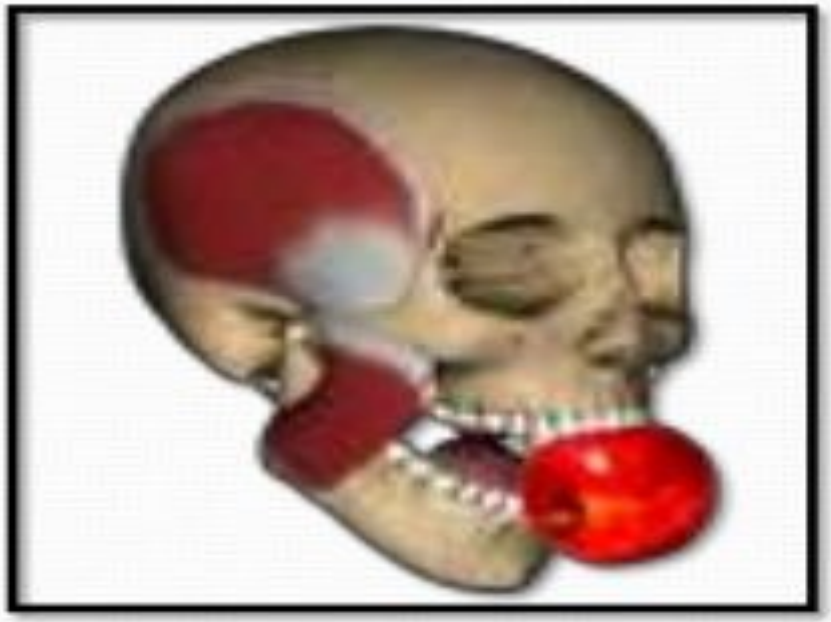
- **Quadrants:** two approximately equal portions of each arch divided by midline

- Four in entire mouth & termed as:
  1. maxillary (upper) right
  2. maxillary (upper) left
  3. mandibular (lower) left
  4. mandibular (lower) right



- **Occlusion:** manner in which mandibular teeth contact maxillary teeth

- **Mastication:** term for process of biting or chewing of food



# Important terminologies

Mid line: An imaginary line dividing the upper and lower arches into two equal halves

Anterior: Pertaining to or towards the front plane of the body

Posterior: Pertaining to or towards the back plane of the body

Superior: Situated above another or towards the head

Inferior: Situated beneath another or towards the feet


**Canine to canine**

**Premolars & molars**

# DENTITION

- In human two dentitions are present:

1. Deciduous (Primary)
2. Permanent (Secondary)

- Transitional phase when both deciduous & permanent teeth are present is called Mixed dentition period

# Deciduous Teeth

- so named because they are shed like the leaves of deciduous trees in autumn
- Erupts from 6 months to 2 years
- 20 total deciduous teeth

- Other non-scientific names for deciduous teeth include “milk” teeth, “baby” teeth & “temporary” teeth

# Permanent dentition

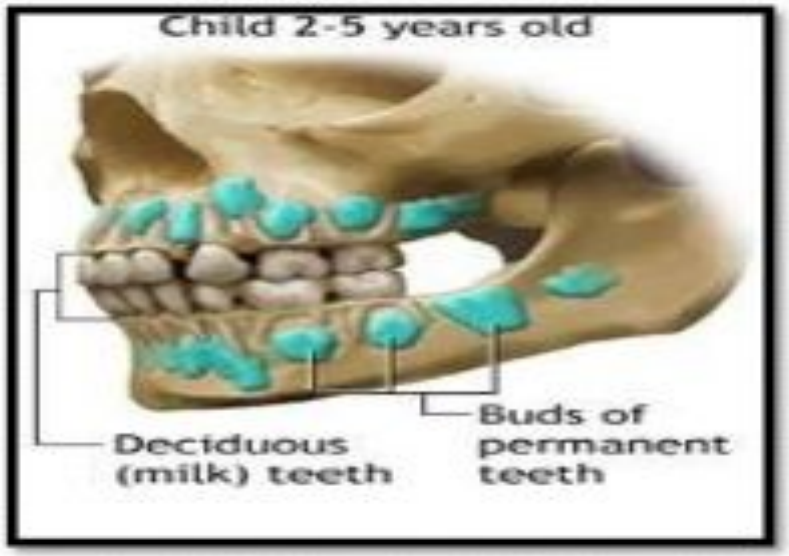
- Teeth of the second, or adult dentition
- There are 32 permanent teeth
- Erupt from 6-21 years of age

# PRIMARY TEETH

# PERMANENT TEETH

# Succedaneous teeth

- Simply means "succeeding" deciduous teeth
- Twenty deciduous teeth to be replaced, there must be twenty succedaneous teeth
- Incisors and canines - replace their deciduous counterparts



- Premolars - which replace deciduous molars
- Molars are not considered as succedaneous teeth

# Dental Formulae

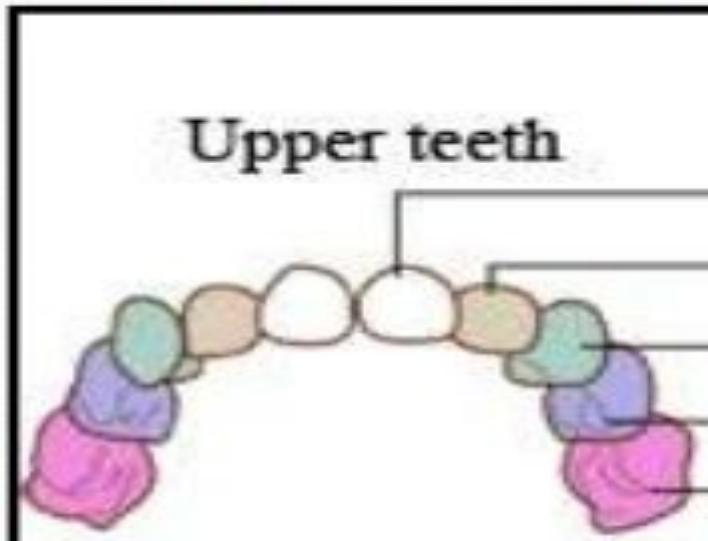
$$I\frac{2}{2}C\frac{1}{1}M\frac{2}{2}=10$$

Primary dentition

$$I\frac{2}{2}C\frac{1}{1}P\frac{2}{2}M\frac{3}{3}=16$$

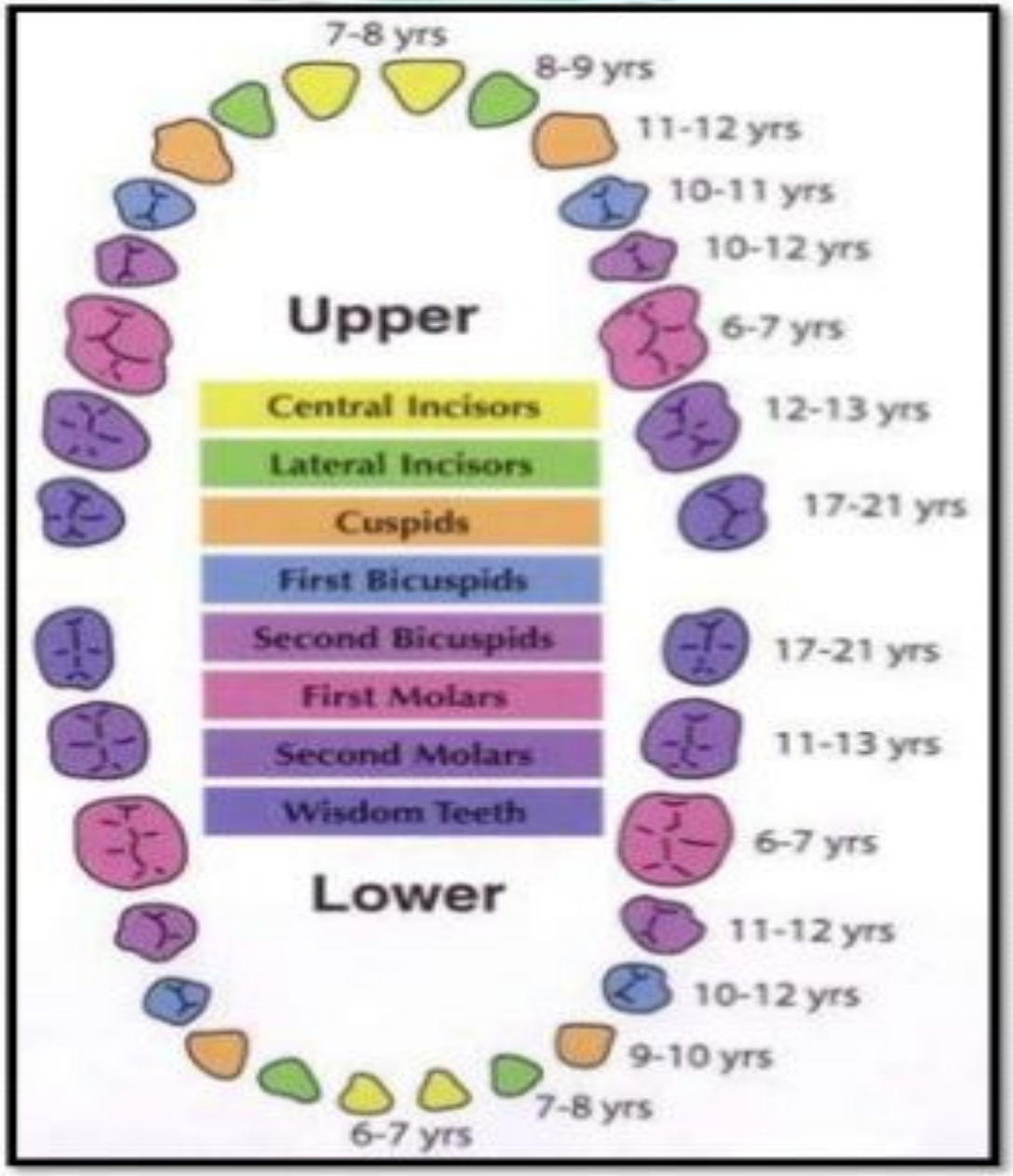
Permanent dentition

# Eruption pattern




| Primary Teeth | Age tooth comes in | Age tooth falls out |
|---|---|---|
| Central incisor | 8-12 mos. | 6-7 yrs. |
| Lateral incisor | 9-13 mos. | 7-8 yrs. |
| Canine (cuspid) | 16-22 mos. | 10-12 yrs. |
| First molar | 13-19 mos. | 9-11 yrs. |
| Second molar | 25-33 mos. | 10-12 yrs. |
| Second molar | 23-31 mos. | 10-12 yrs. |
| First molar | 14-18 mos. | 9-11 yrs. |
| Canine (cuspid) | 17-23 mos. | 9-12 yrs. |
| Lateral incisor | 10-16 mos. | 7-8 yrs. |
| Central incisor | 6-10 mos. | 6-7 yrs. |

# Permanent Teeth



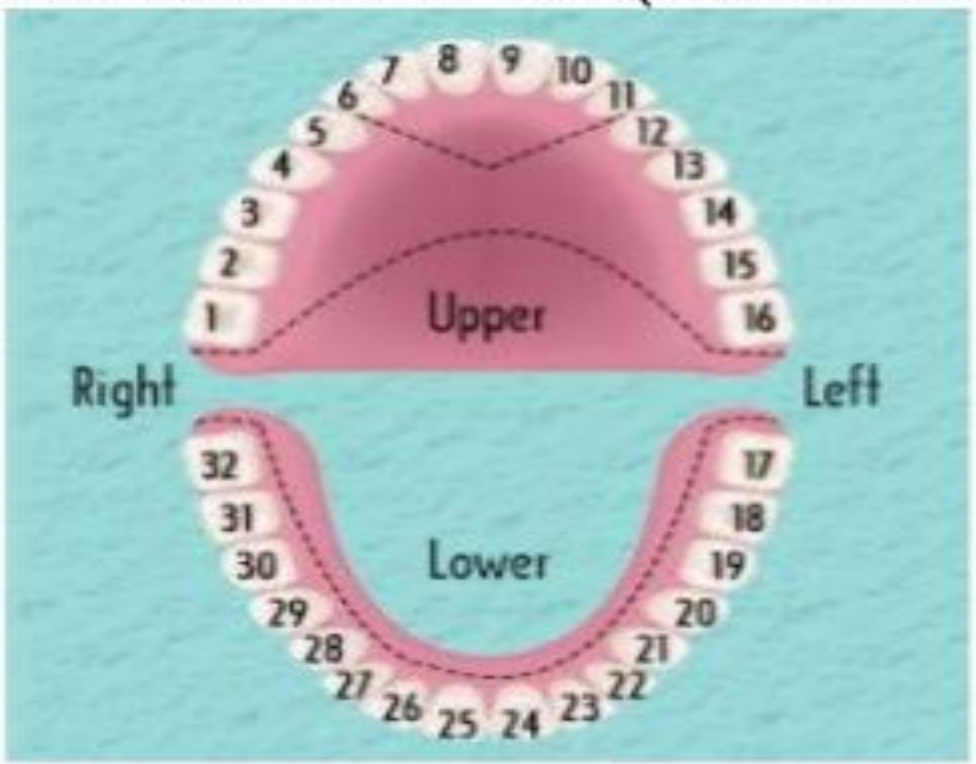
## Zsigmondy Palmer notation system

- 1861 - Adolph Zsigmondy
- Primary teeth- $\frac{EDCBA|ABCDE}{EDCBA|ABCDE}$
- Permanent teeth- $\frac{87654321|12345678}{87654321|12345678}$
- Permanent max. Right canine : $\underline{3}|$

# Universal notation system

- ADA : 1968

- Permanent dentition:
  maxillary teeth - 1 to 16 (starts with right 3rd molar)
  mandibular teeth -17 to 32 (starts with lower left 3rd molar)



- Primary teeth- 1d 2d3d4d5d | 6d7d8d9d10d
  20d19d18d17d16d | 15d14d13d12d11d

- Permanent teeth-

| 1 2 3 4 5 6 7 8 | 9 10 11 12 13 14 15 16 |
|---|---|
| 32 3130 29 28 27 26 25 | 24 23 22 21 20 19 18 17 |

- Primary max. right canine : #3d

- Permanent max. left 1st premolar : #12

## FDI system (Federation Dentaire Internationale)

- Two digit system
- First digit indicates the quadrant and the second digit indicates the tooth within the quadrant.
- 1 to 4 and 5 to 8 as the first digit indicates permanent and primary dentition respectively.
- 1 to 8 and 1 to 5 as the second digit indicates permanent and primary teeth respectively.

- Primary teeth-

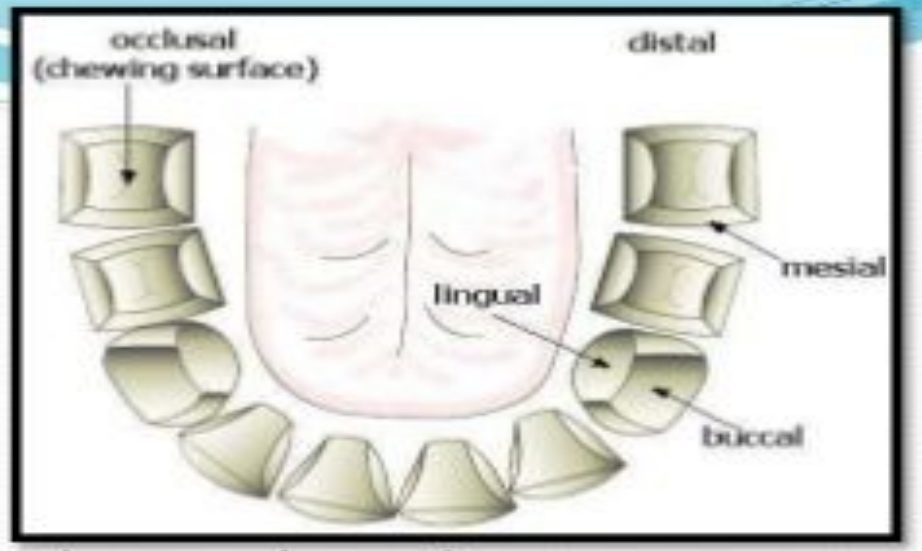
| 55 | 54 | 53 | 52 | 51 | 61 | 62 | 63 | 64 | 65 |
|---|---|---|---|---|---|---|---|---|---|
| 85 | 84 | 83 | 82 | 81 | 71 | 72 | 73 | 74 | 75 |

- Permanent teeth-

| 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 |

# Surfaces of teeth

Crowns of all teeth have 5 surfaces




1. Facial Surface

Facial surface can be labial surface or buccal surface.

a. Labial surface- The surfaces of incisors and canines that are towards lip

b. Buccal surface- The surfaces of premolars & molars that face cheek.

## 2. Lingual Surface (Palatal surface)

Surfaces facing towards tongue.

Mandibular teeth

Maxillary teeth

## 3. Proximal Surfaces

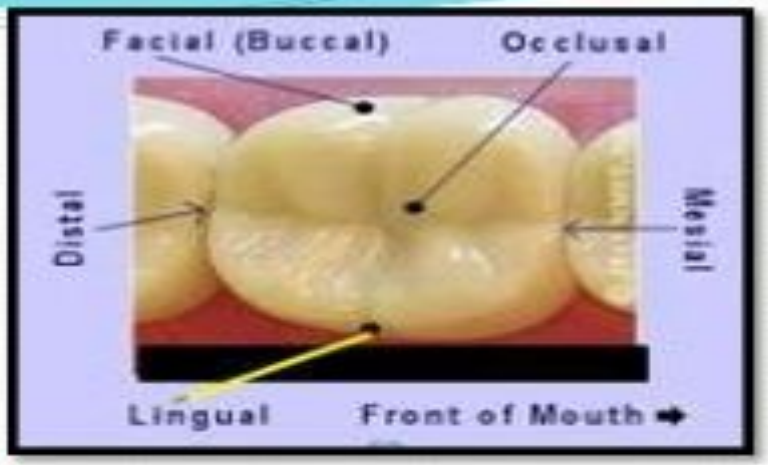
### a. Mesial Surface

Surfaces towards midline.

### b. Distal Surface

Surfaces away from midline.

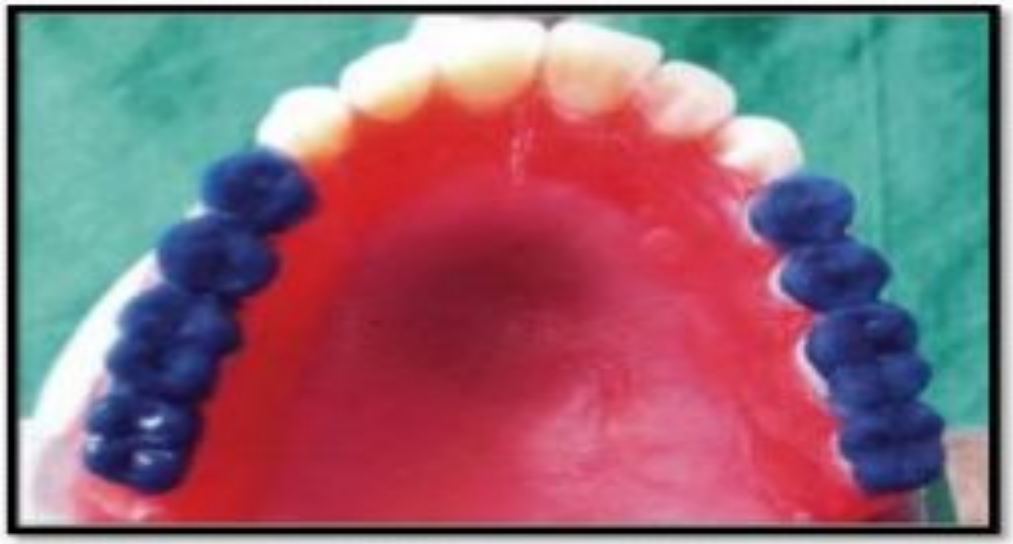
✓ collectively called "**Proximal surface**"




## 4. **Incisal or Occlusal surface**

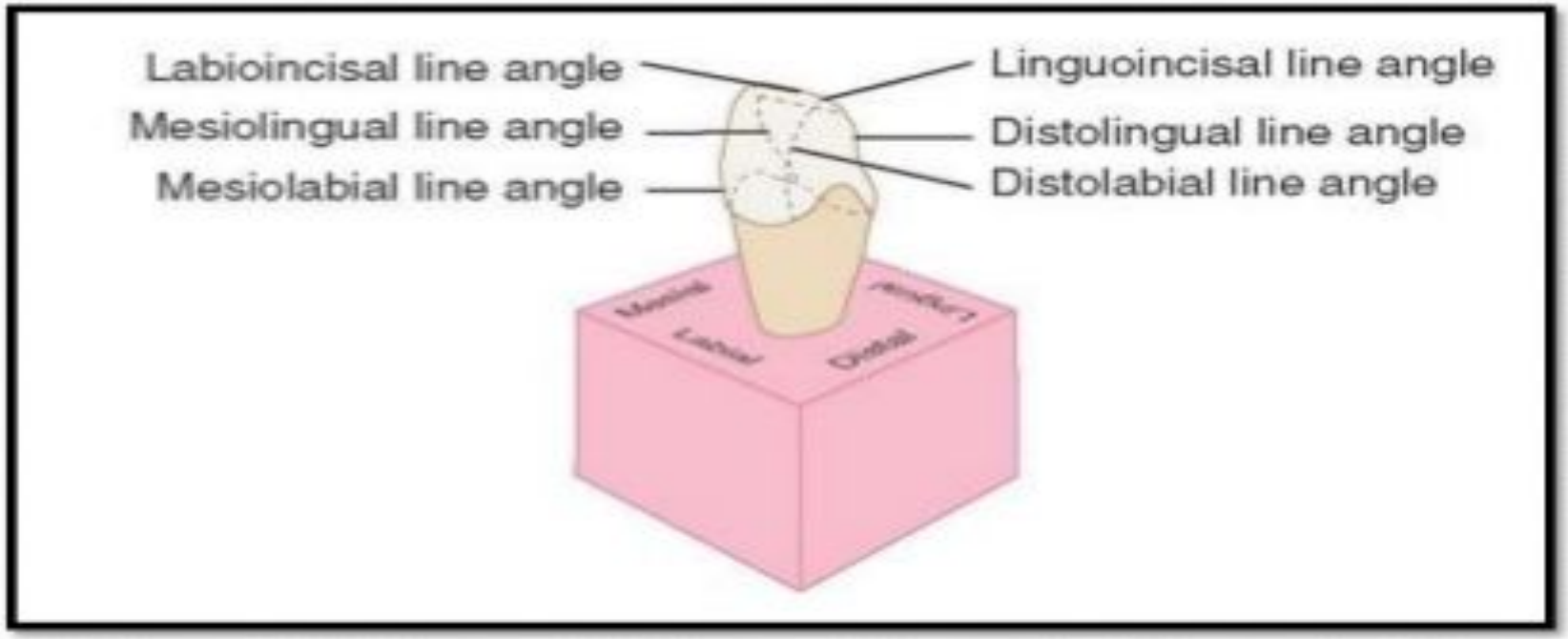
a. Incisal surface: The surface of incisors and canines that come in contact with those in the opposite jaws during the act of closure are called incisal surfaces

b. Occlusal surface: The surface of premolars and molars that come in contact with those in opposite jaws during act of closure are called occlusal surfaces.



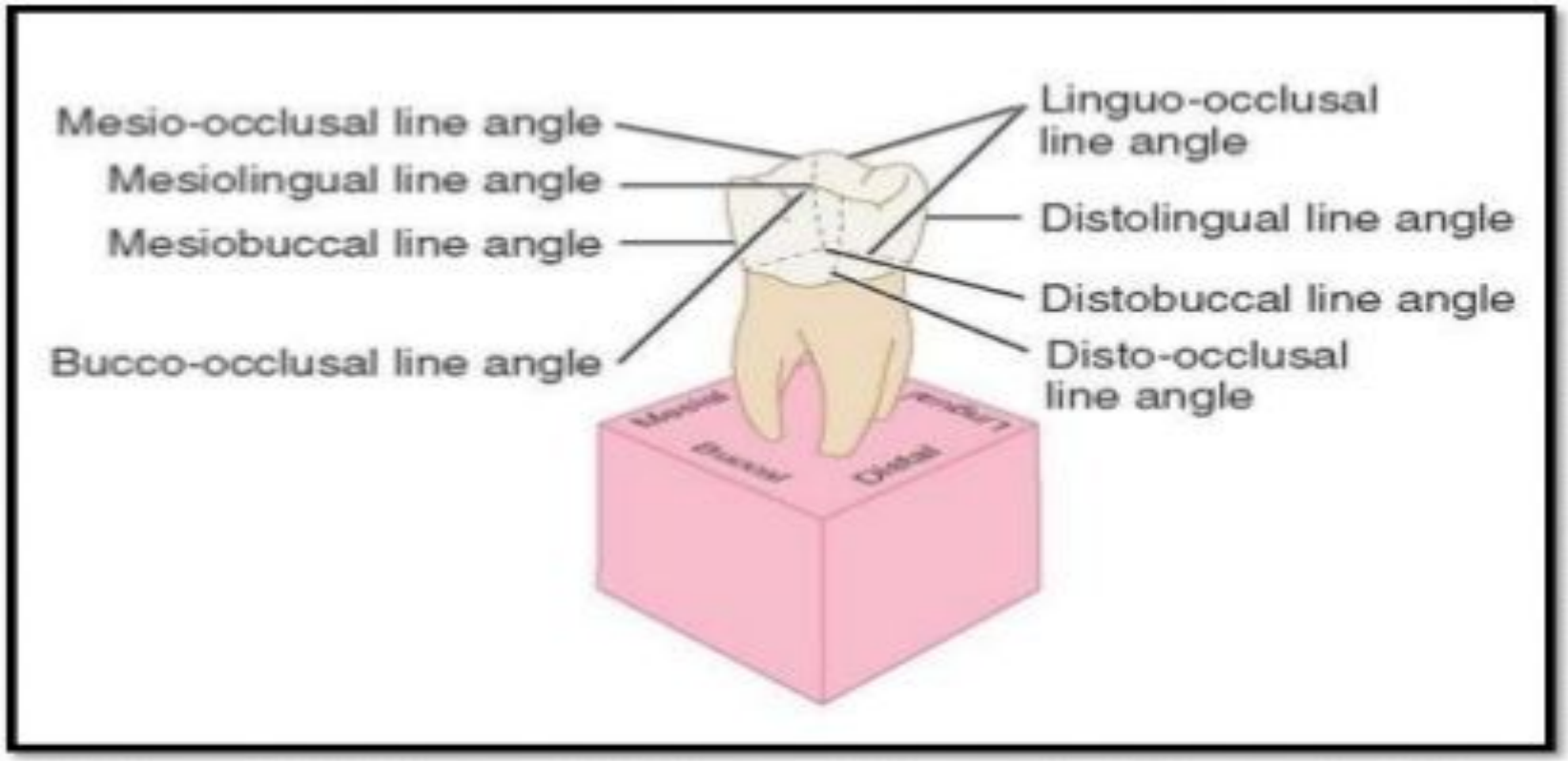
# Line angles of anterior teeth

1. Mesio-labial
2. Disto-labial
3. Mesio-lingual
4. Disto-lingual
5. Labio-incisal
6. Linguo-incisal



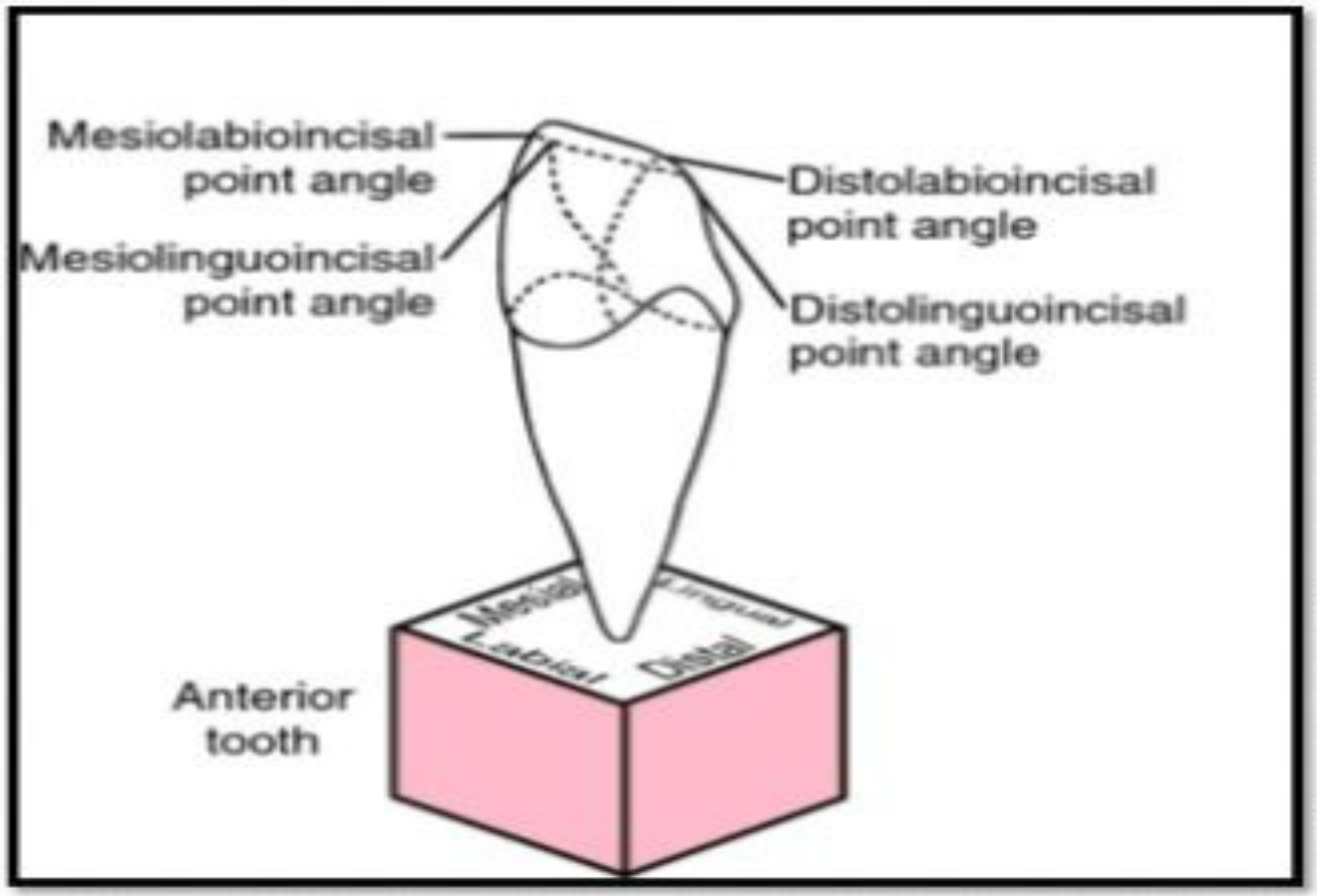
## Line angles of posterior teeth

1. Mesio-buccal
2. Disto-buccal
3. Mesio-lingual
4. Disto-lingual
5. Mesio-occlusal
6. Disto-occlusal
7. Bucco-occlusal
8. Linguo-occlusal



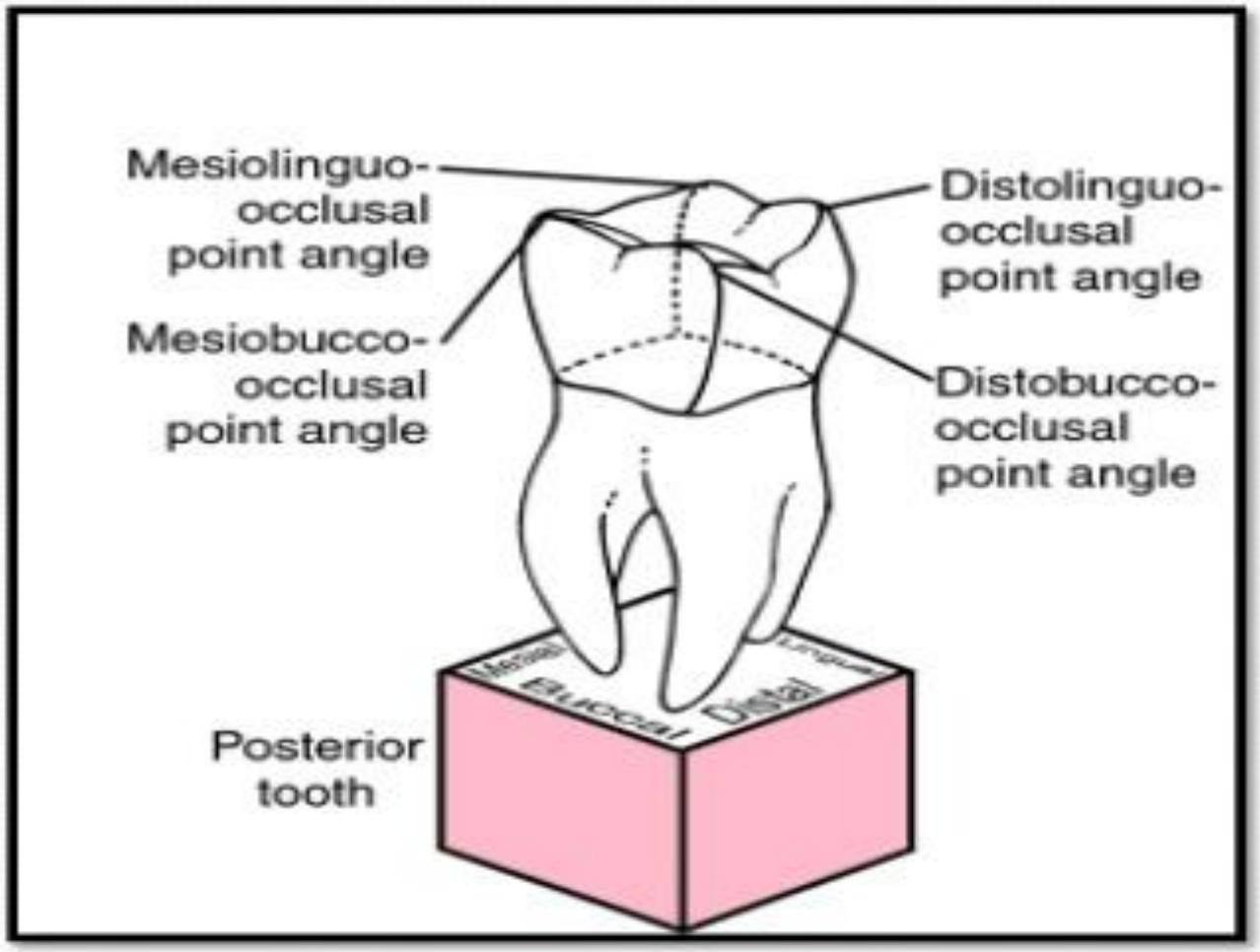
## Point angles of anterior teeth

1. Mesio-labio-incisal
2. Disto-labio-incisal
3. Mesio-linguo-incisal
4. Disto-linguo-incisal



## Point angles of posterior teeth

1. Mesio-bucco-occlusal
2. Disto-bucco-occlusal
3. Mesio-linguo-occlusal
4. Disto-linguo-occlusal

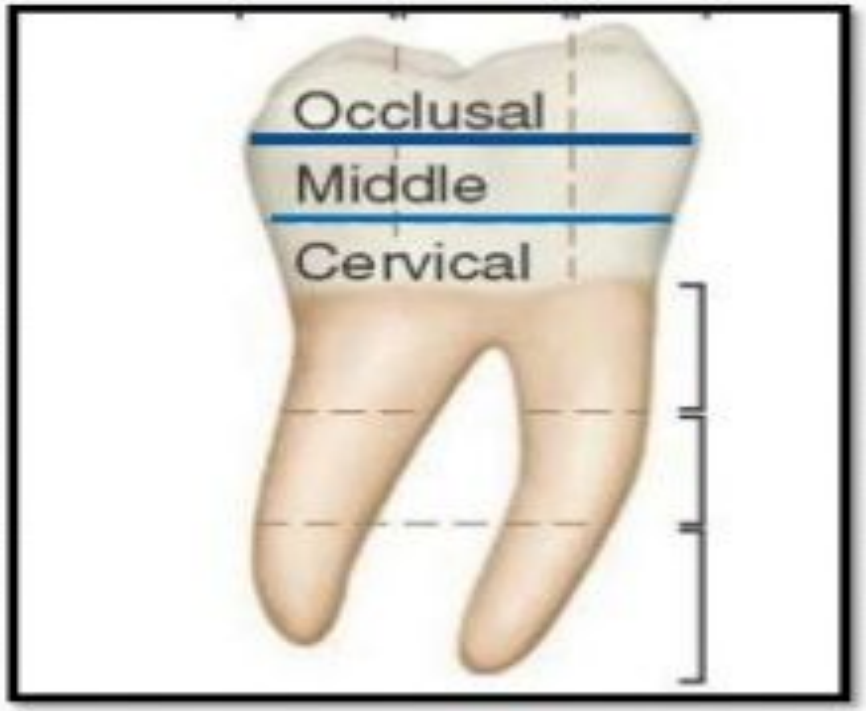


# THIRDS OF TOOTH

- To make study and communication easier the crown and root are divided into three halves

## Division in thirds occluso-gingivally (Crown)

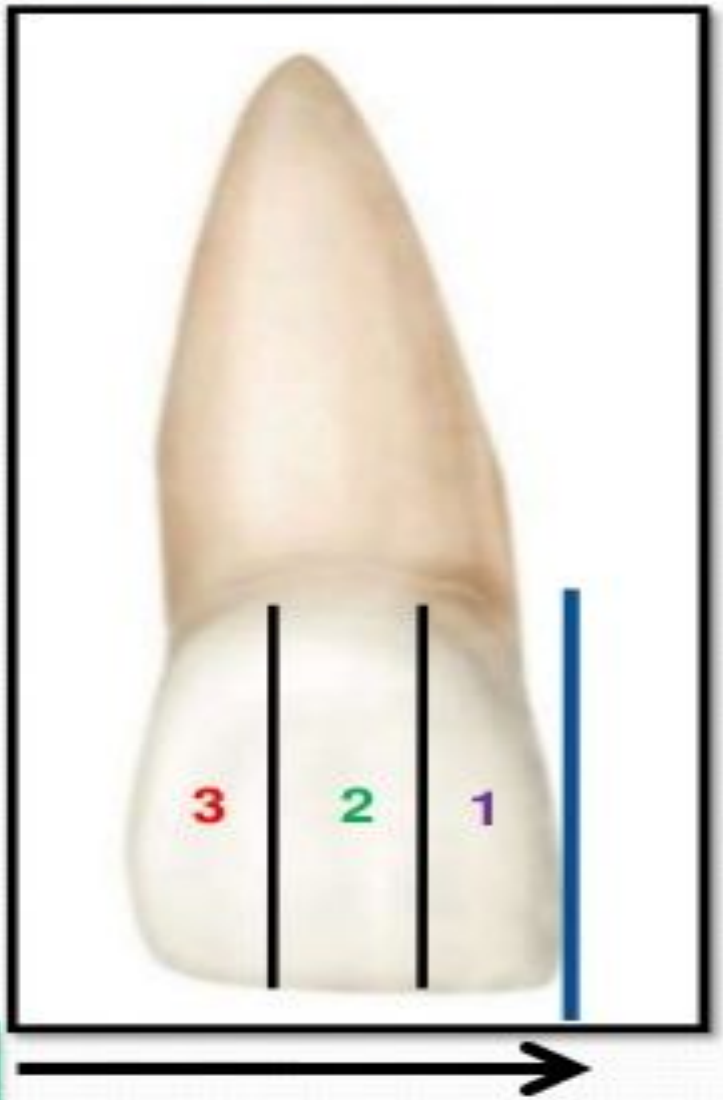
1. Cervical third
2. Middle third
3. Incisal/Occlusal third



# Division in thirds mesio-distaly (Crown)

Crown when viewed from front

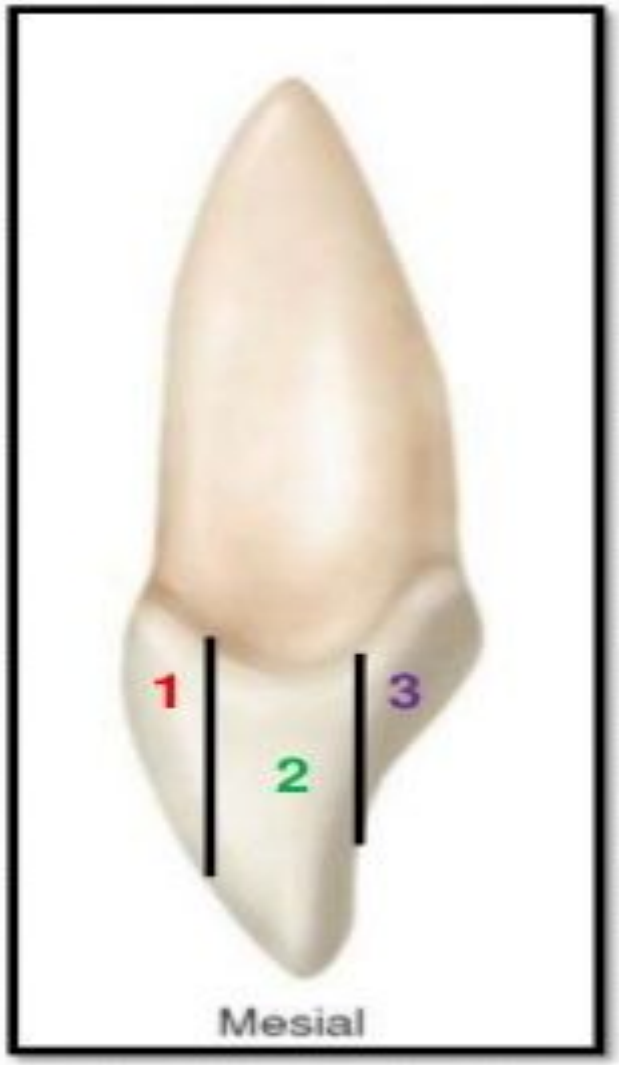
1. Mesial third
2. Middle third
3. Distal third



# Division in thirds facio-lingually (Crown)

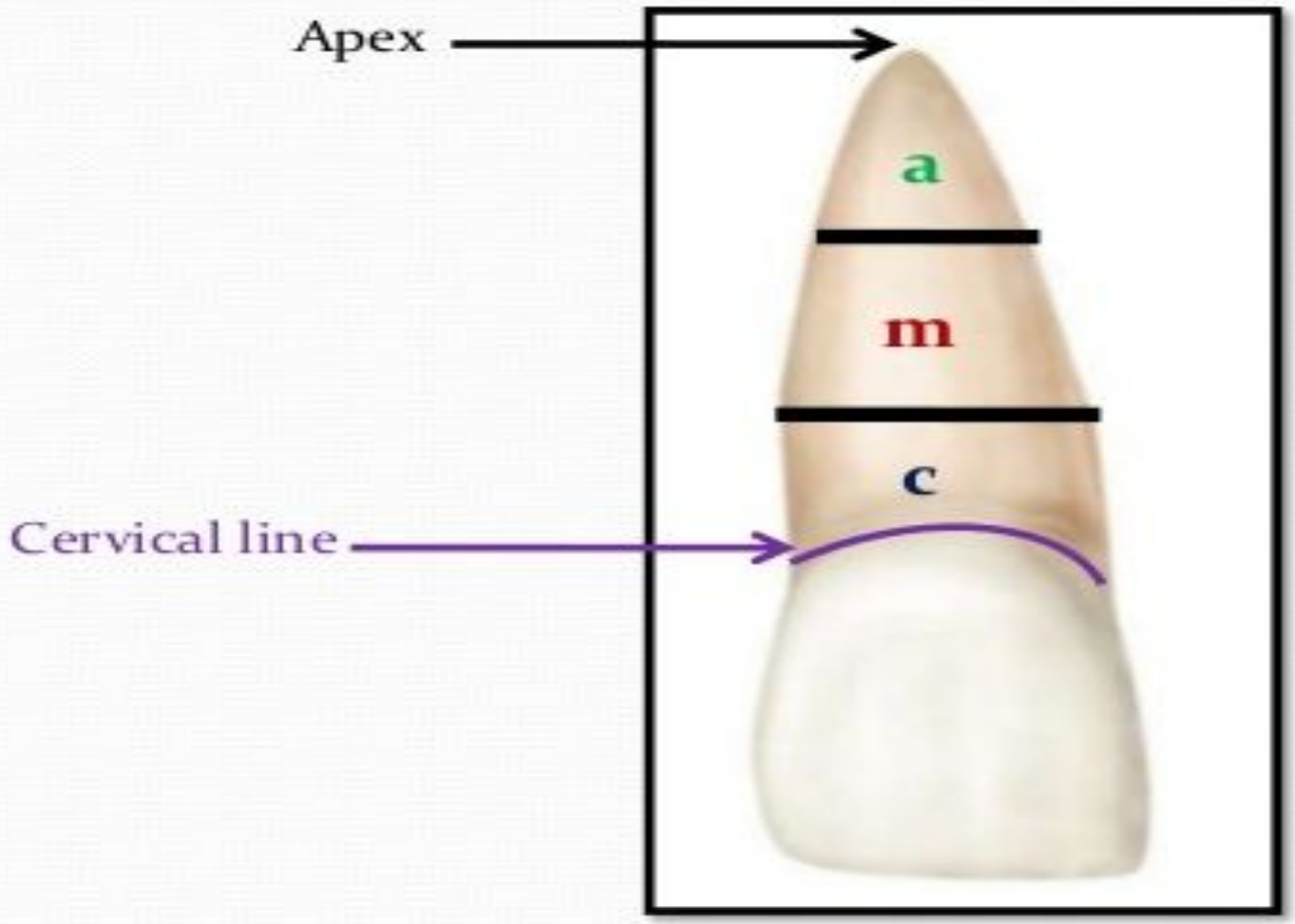
Crown when viewed from the side :

1. Facial third
2. Middle third
3. Lingual third



## Thirds-root

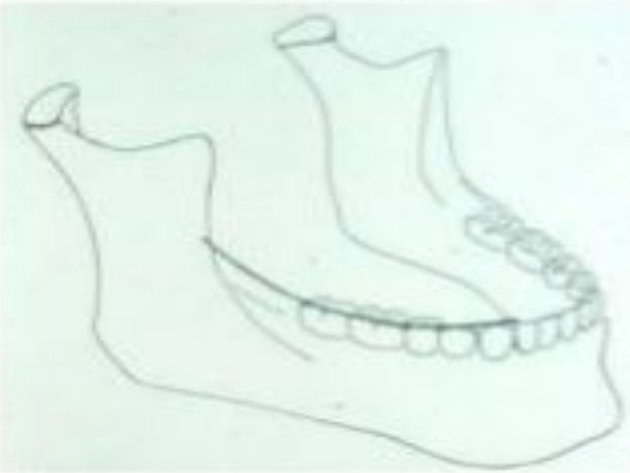
1. Cervical third
2. Middle third
3. Apical third



# OCCLUSAL CURVATURES

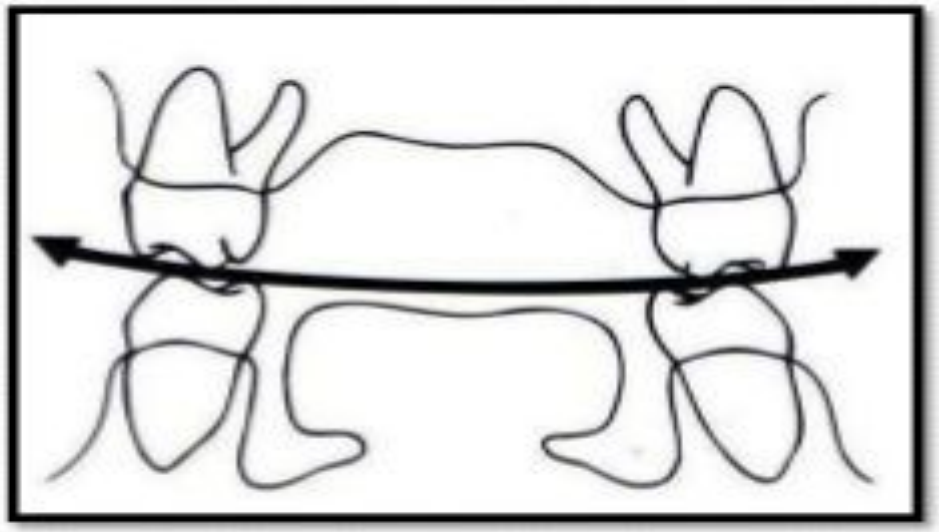
## Curve of Spee

- Curvature which begins at the tip of canines & follows buccal cusp tips of premolars & molars posteriorly, when viewed from their facial aspect
- Two dimensional
- Curves upward from anterior to posterior



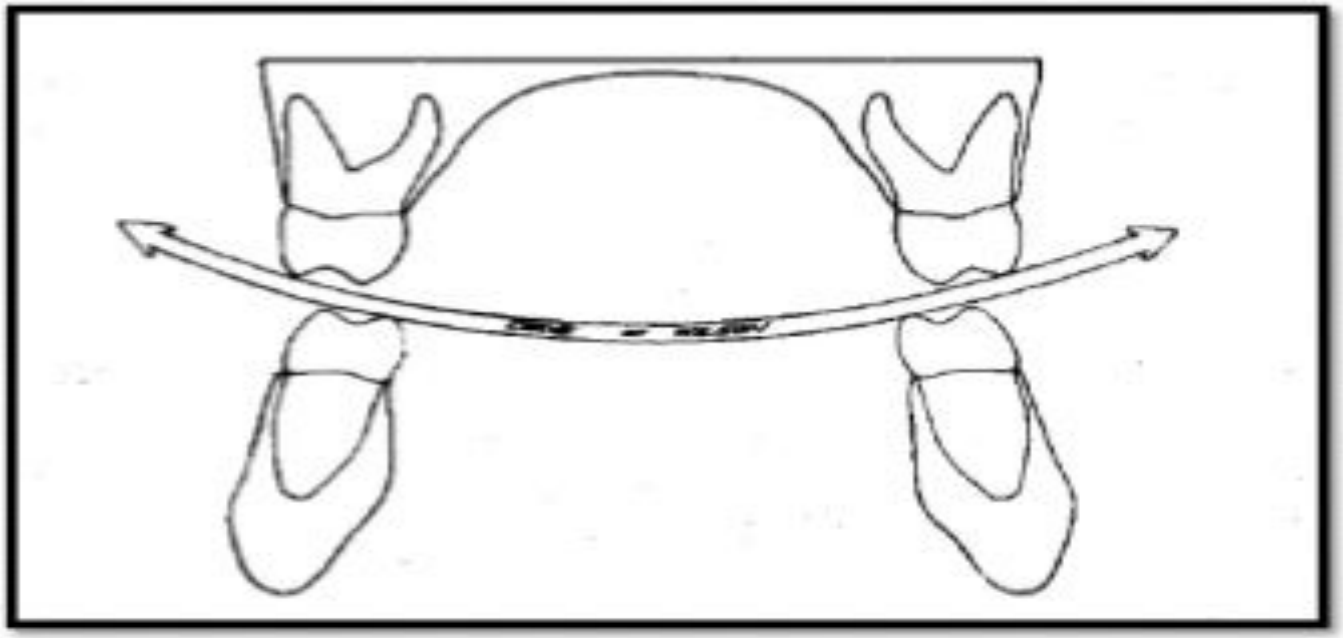
## Curve of Wilson

- The medio-lateral curvature of the occlusal plane of posterior teeth.
- Two dimensional & approax. right angles to that of the Curve of Spee.
- Complement paths of condyles during movements of mandible.

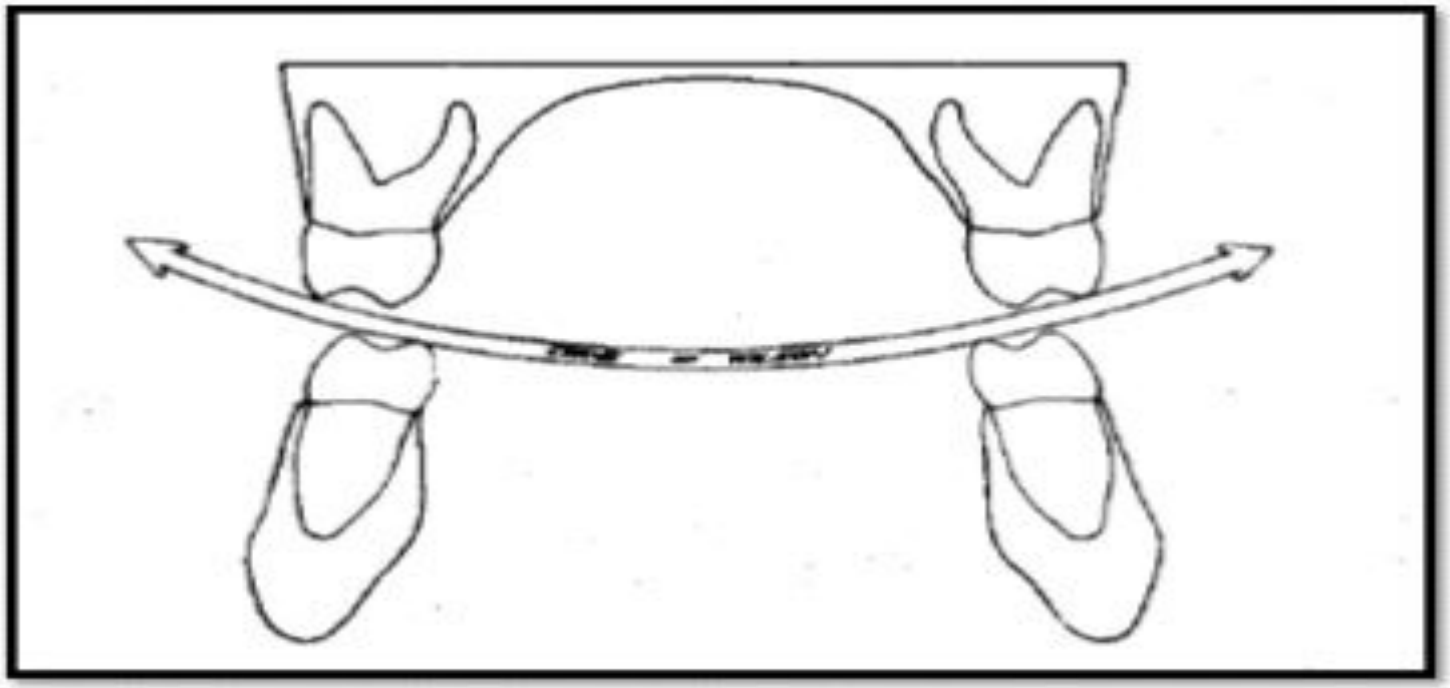


- The crowns of mandibular posterior teeth must incline to lingual, while crowns of maxillary posterior teeth must incline toward buccal

- This curve becomes deeper posteriorly, so that molars inclination is greater than that of premolars



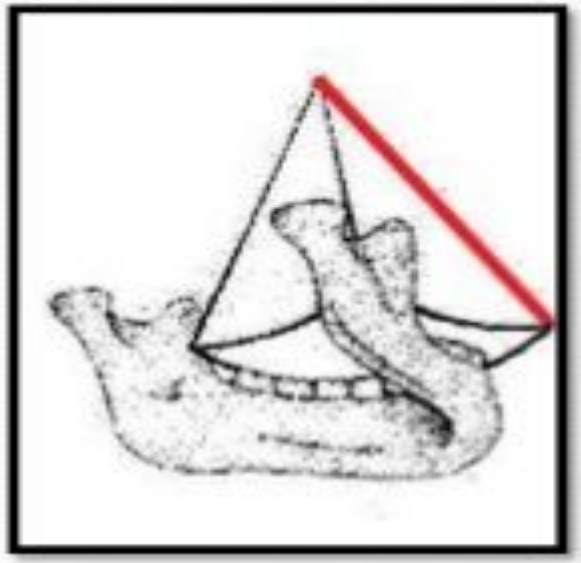
- Because of this curve & associated tooth inclinations, buccal cusps of mandibular molars & lingual cusps of maxillary molars usually appear to be longer



## Sphere of Monson

- The three dimensional curvature of occlusal plane, which is combination of Curve of Spee & Curve of Wilson.

- This curvature is in form of a portion of a ball, or sphere. This curvature is concave for mandibular arch & convex for maxillary arch

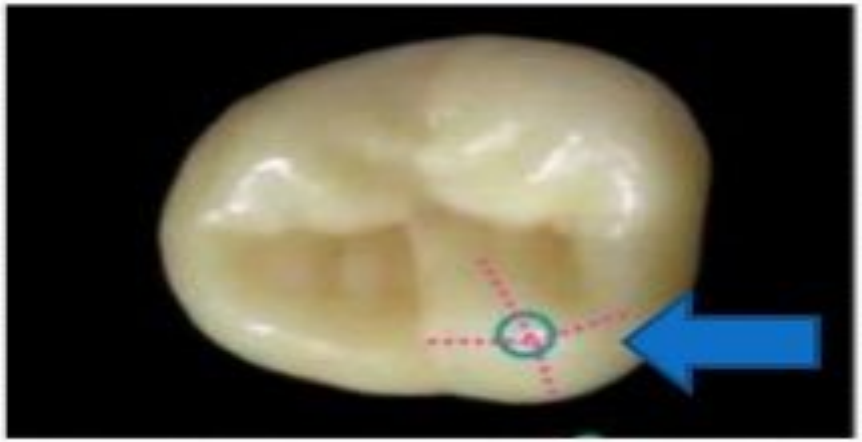


# CUSP

- A cusp is a pointed, projecting, or elevated feature.
- These are conical or pyramidal projections on the crown portion of the tooth.
- It is an elevation or mound on the crown portion of a tooth making up a divisional part of the occlusal surface
- It contributes to a significant portion of the tooth's surface.

## Cusp ridges:

- Each cusp has four cusp ridges extending in different directions (mesial, distal, facial, lingual) from its tip
- Normally, the cusp ridge which extends toward central portion of occlusal surface is also a triangular ridge
- Named by the direction they extend from the cusp tip



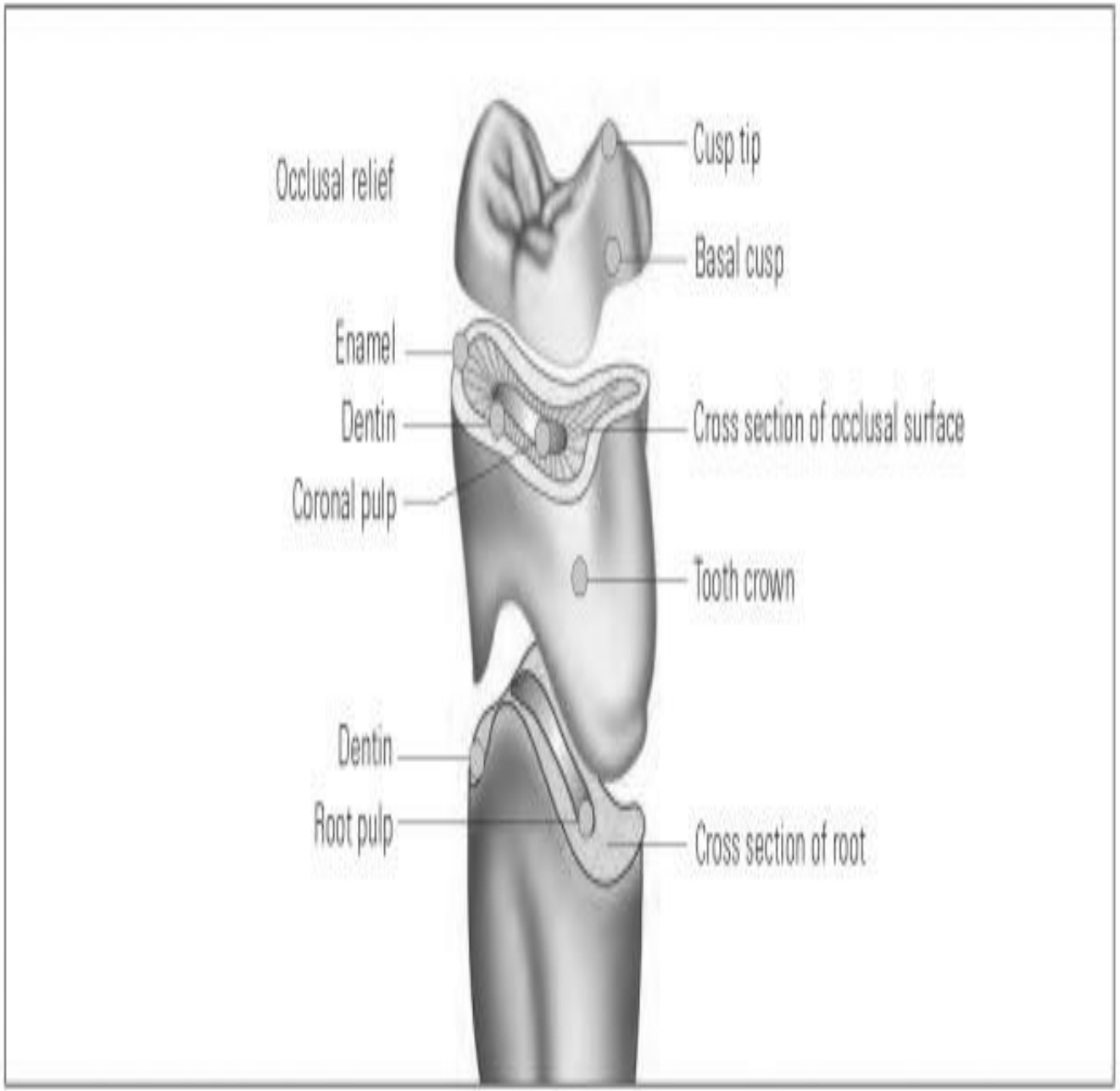
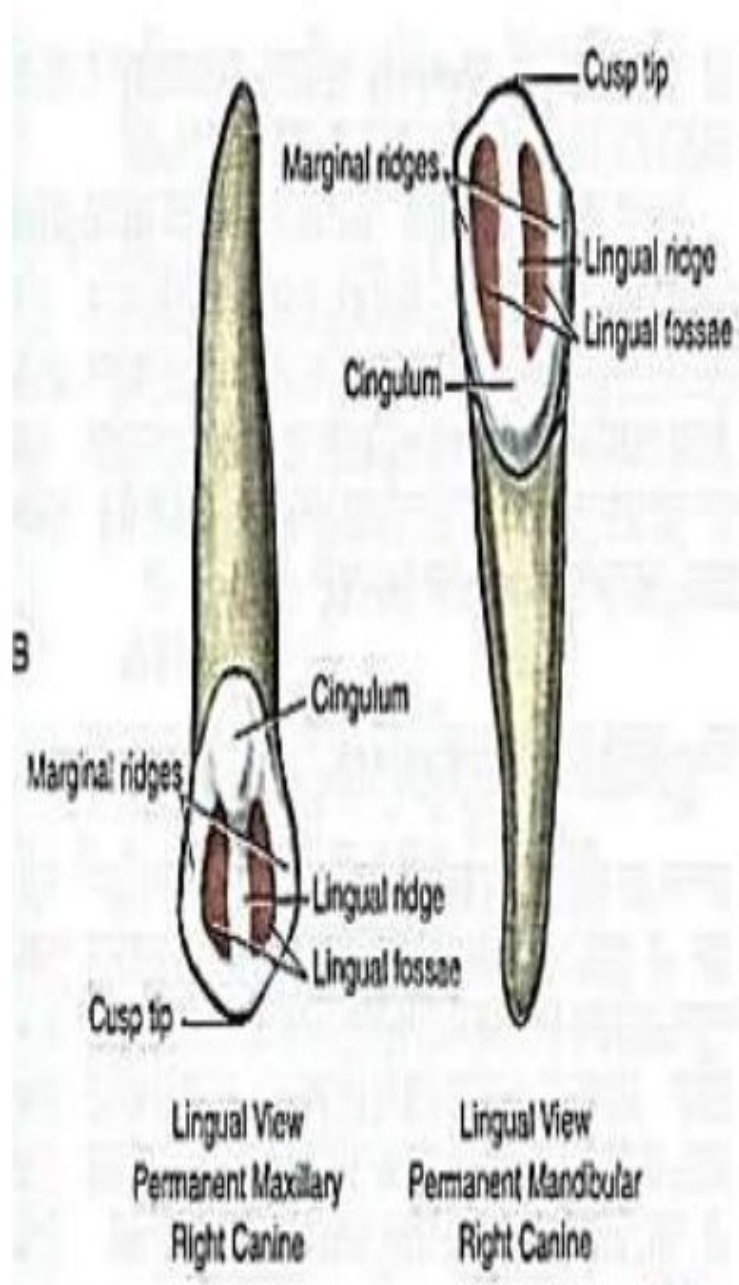



Fig 4-41 Schematic diagram of a premolar divided into horizontal layers.

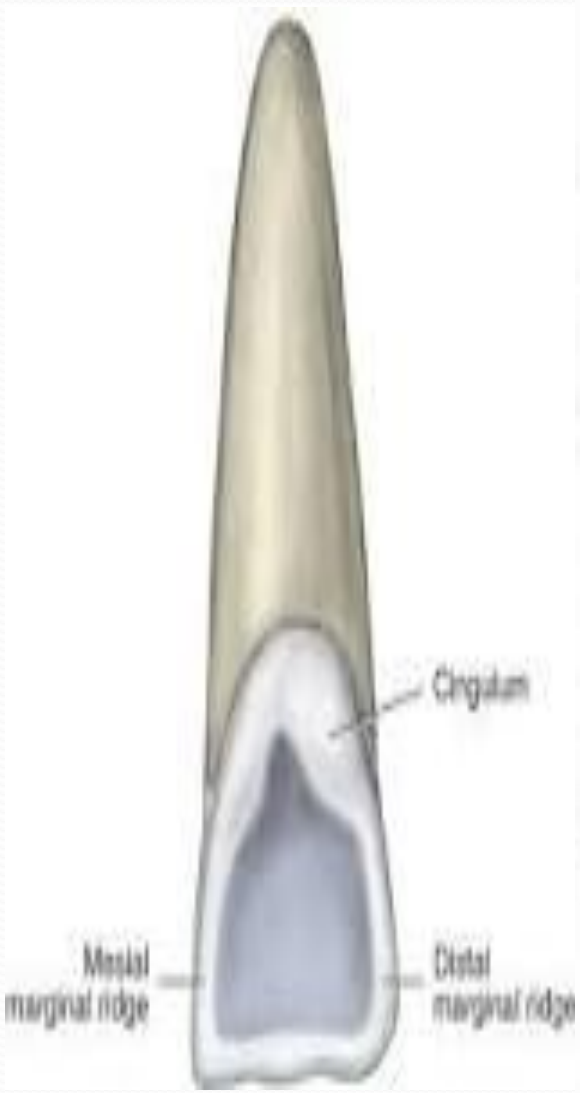


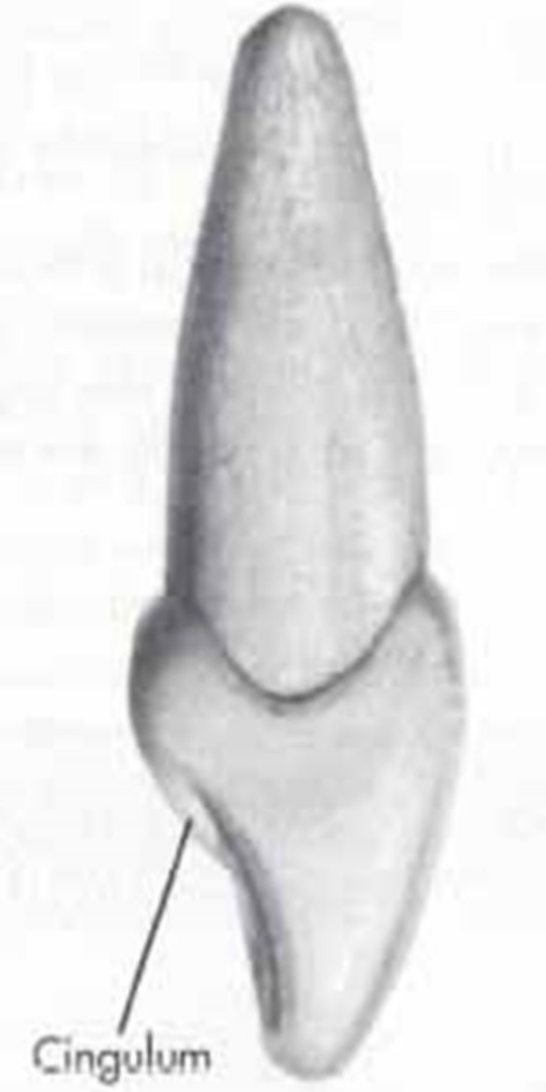

LINGUAL ASPECT

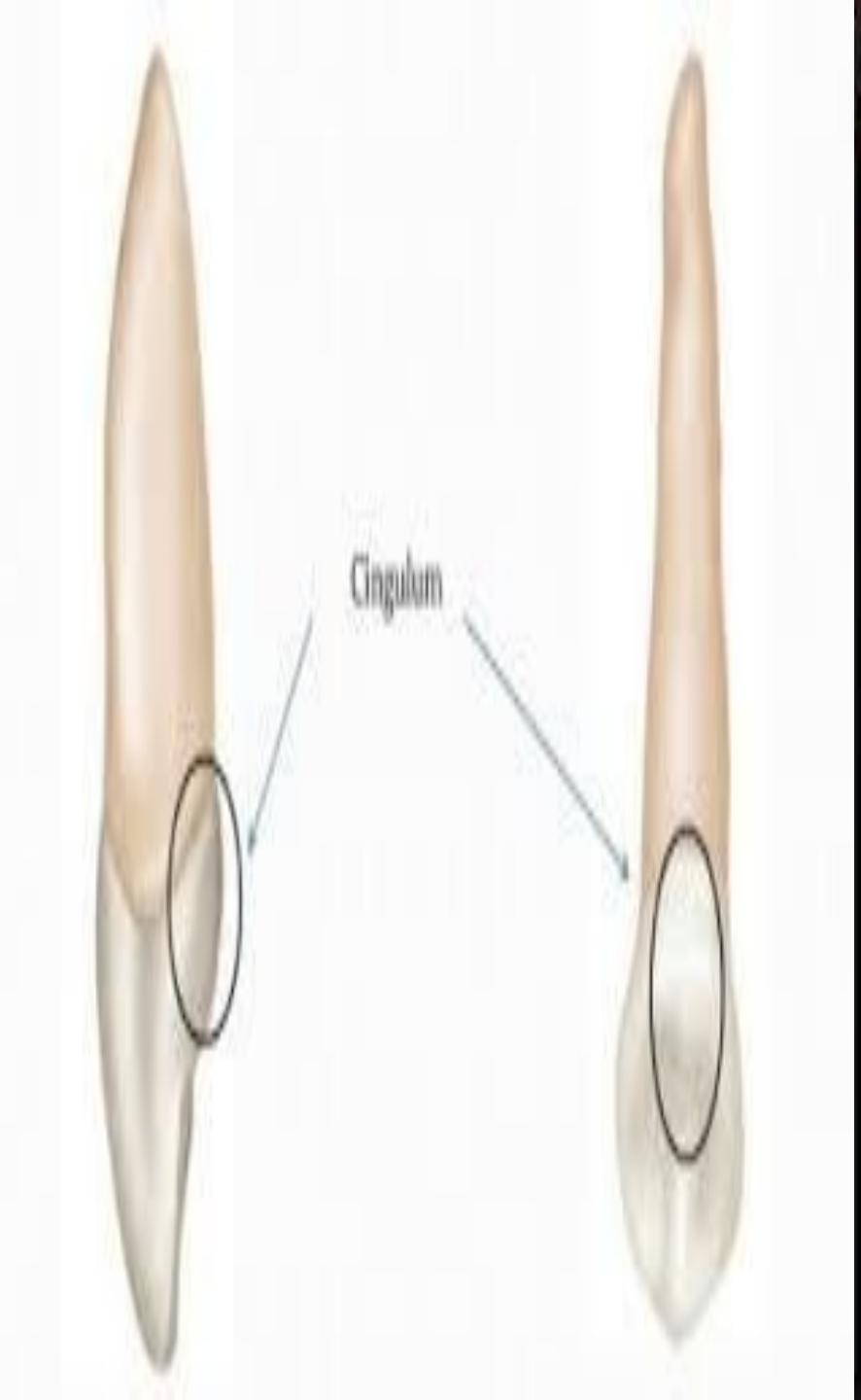
# CINGULUM

- Latin word is **Girdle**
- It is the lingual lobe of an anterior tooth.
- It makes up the bulk of the cervical third of the lingual surface (a prominence of enamel).
- Its convexity mesio distally resembles a girdle encircling the lingual surface at the cervical third.

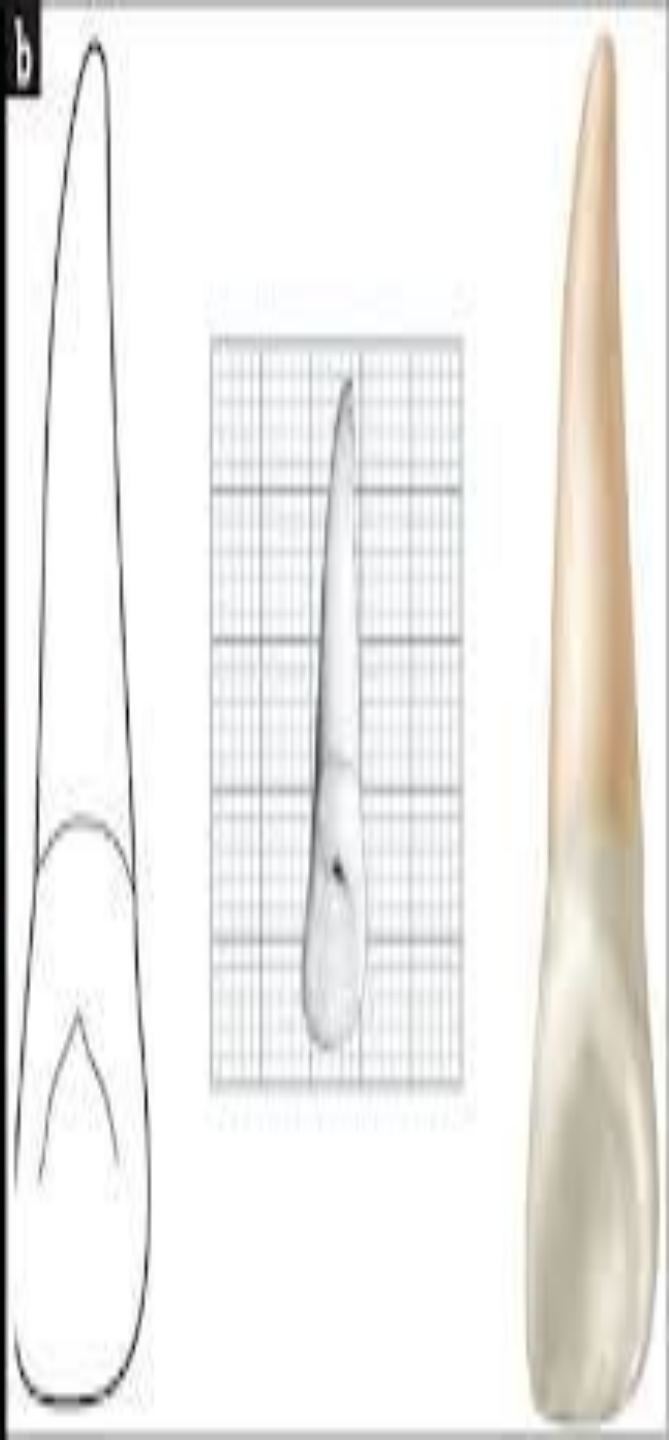
It is frequently identifiable as an inverted V-shaped ridge.



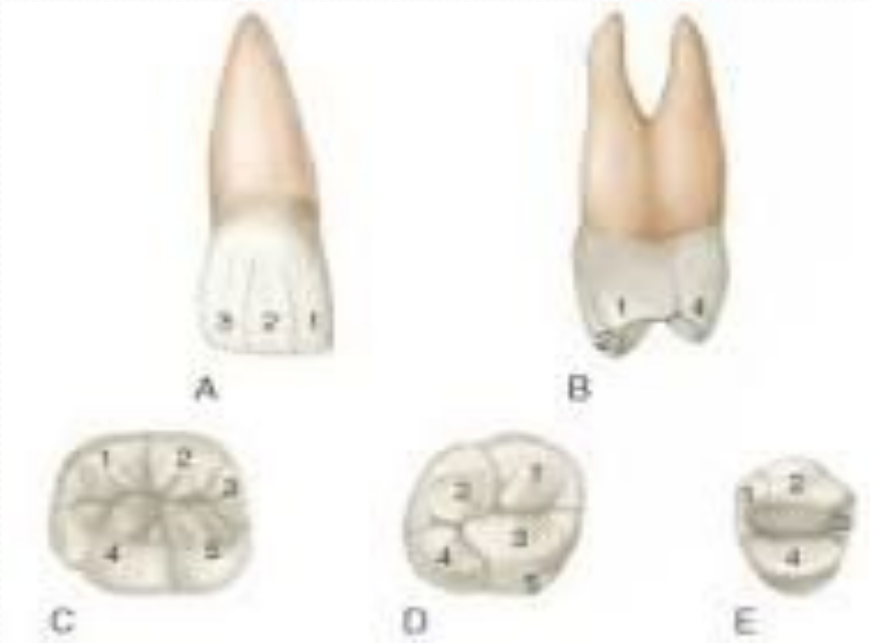

Cingulum


a

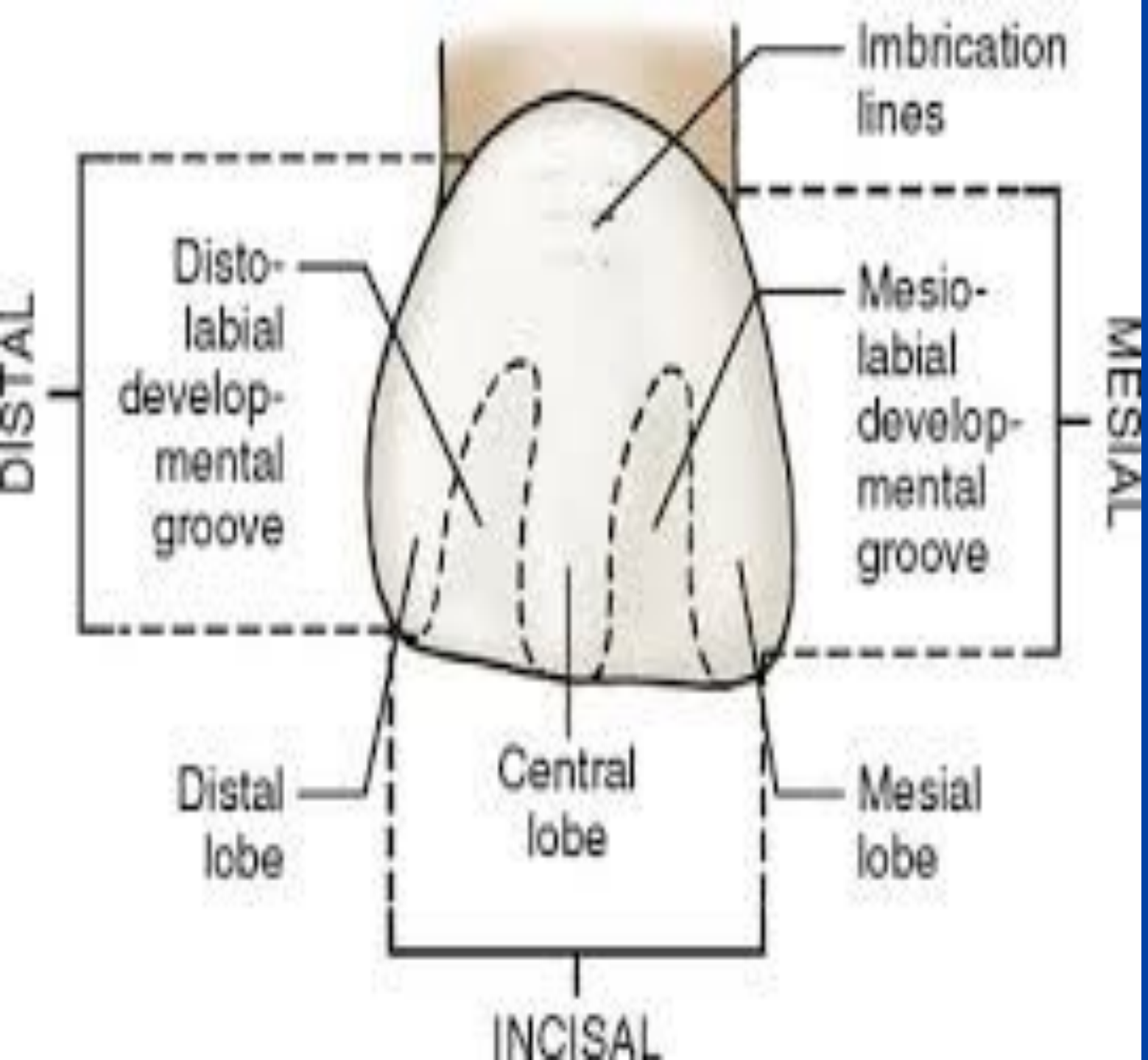

b

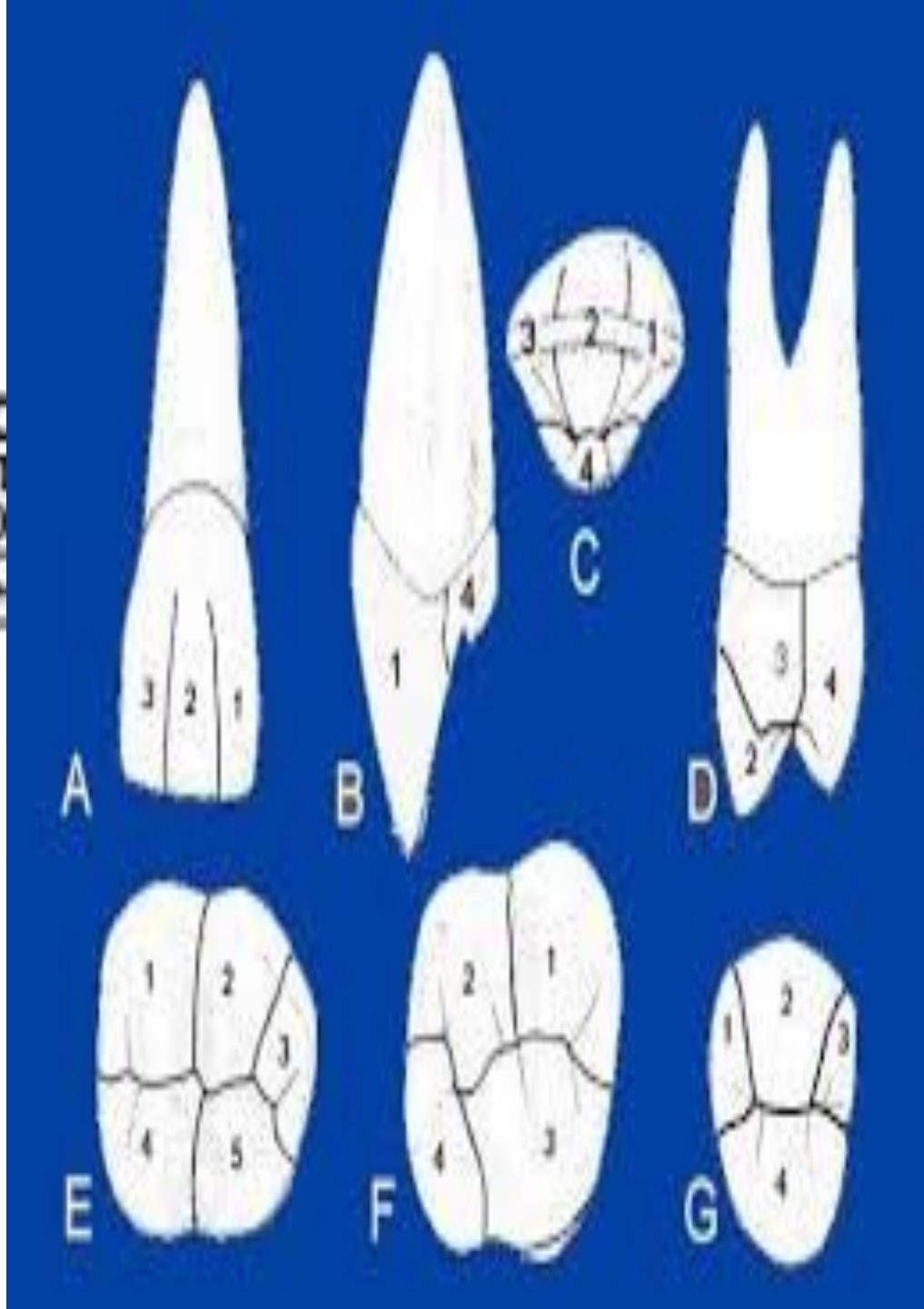
# LOBE

- A **lobe** is one of the primary anatomical divisions of a crown.
- **A lobe is one of the primary center of growth and calcification present during the crown development**
- All **teeth** develop from either four or five **lobes** (for example, a central incisor forms from four **lobes** while first molars develop from five **lobes**.)
- **Lobes** are usually separated by readily identifiable developmental grooves.



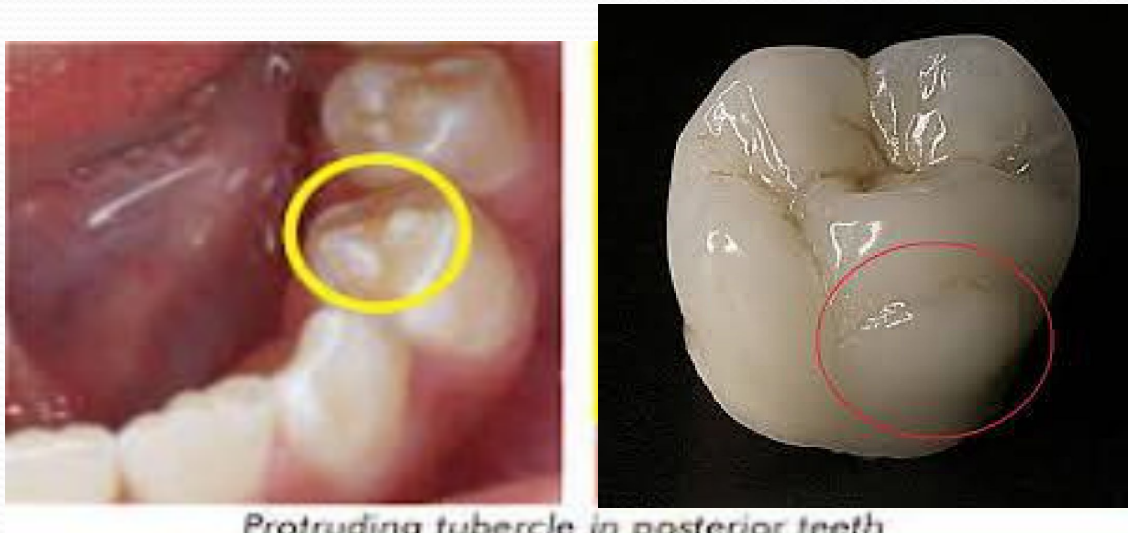
- Each tooth begins it development from four or more growth center which are known as “Developmental Lobes”.
- The anterior teeth, the maxillary premolars and the mandibular first premolar develop from four developmental lobes, three labial and one lingual.


Imbrication lines
Disto-labial develop-mental groove
Mesio-labial develop-mental groove
DISTAL
MESIAL
Distal lobe
Central lobe
Mesial lobe
INCISAL


A
B
C
D
E
F
G

# TUBERCLE

- **It is a small elevation of enamel on some portion of the crown of the tooth.**
- It is produced by an extra formation of enamel and dose not represents a lobe. These are deviations from the typical form.
- It is found on the palatal surface (mesio-palatal cusp) of the upper first molar and called tubercle cusp or Carabelli.

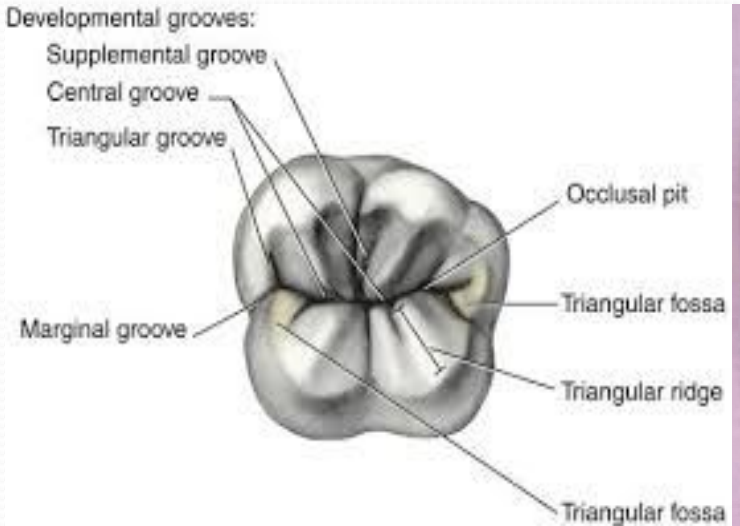


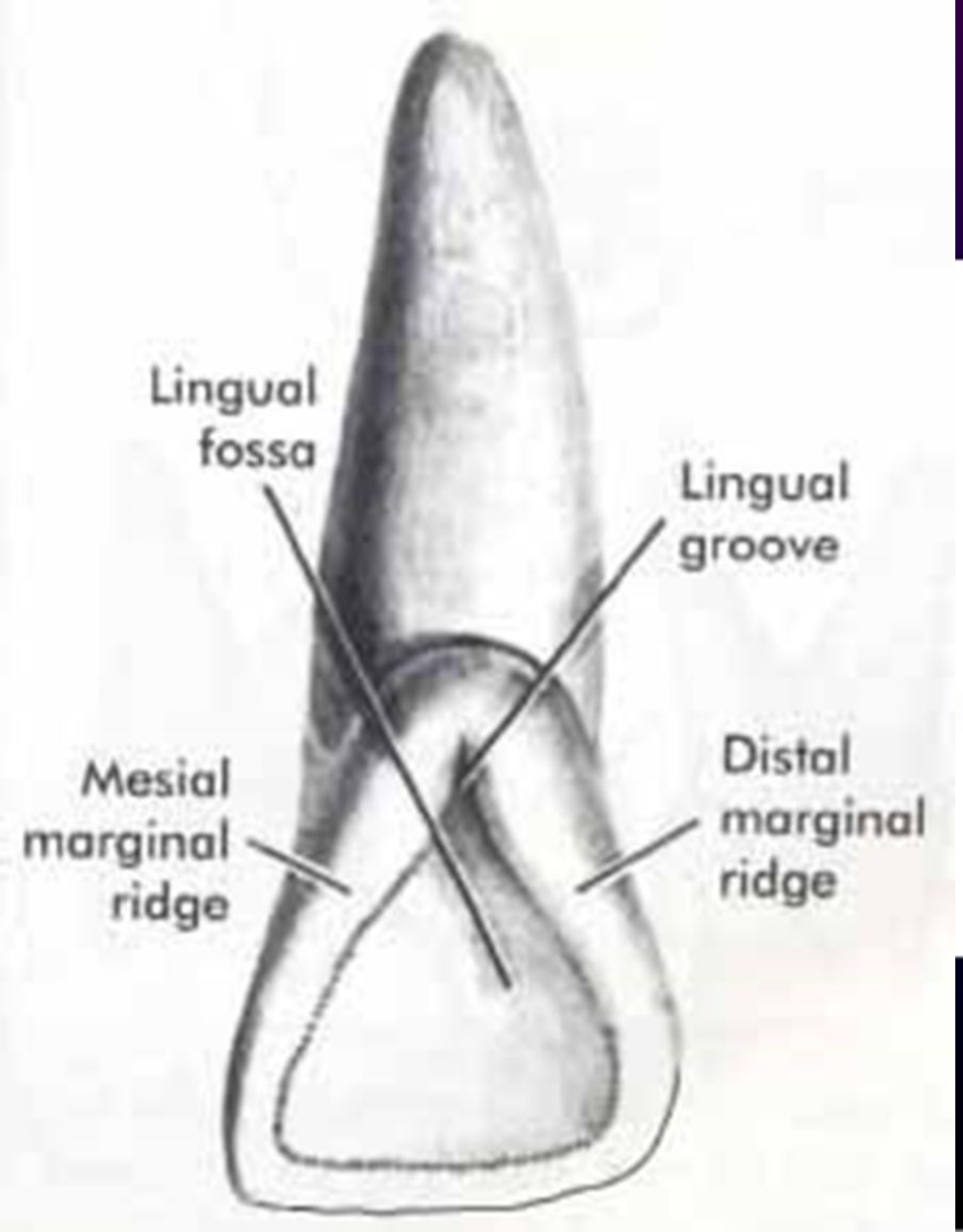
Protruding tubercle in posterior teeth

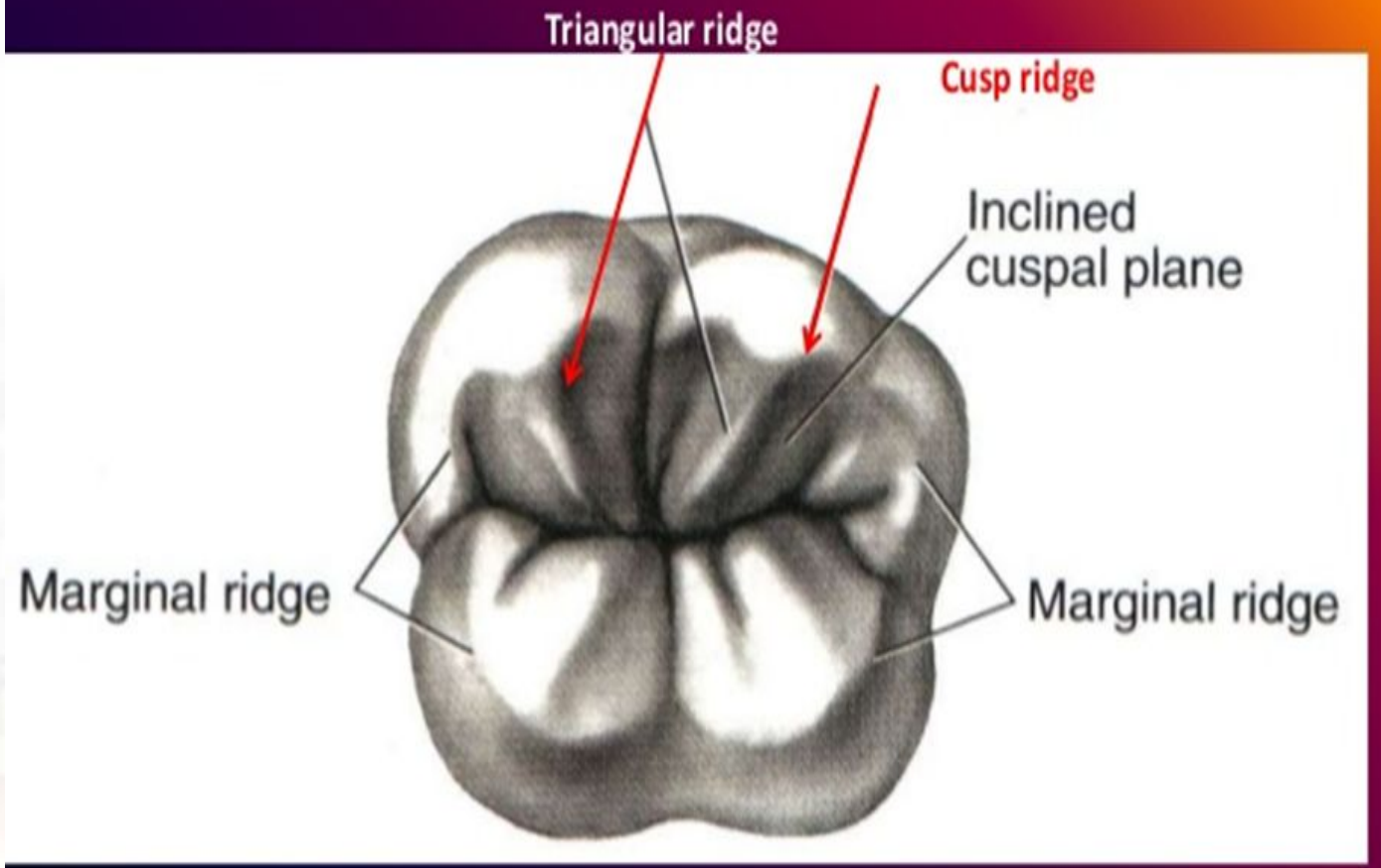
# RIDGE

- **A ridge is any linear elevation on the surface of a tooth and is named according to its location (e.g., buccal ridge, incisal ridge. marginal ridge).**
- **Marginal ridge*:*** these are rounded borders of enamel that formed the mesial and distal margins of the occlusal surfaces of premolars and molars and the mesial and distal margins of the lingual surfaces of the incisors and canines.

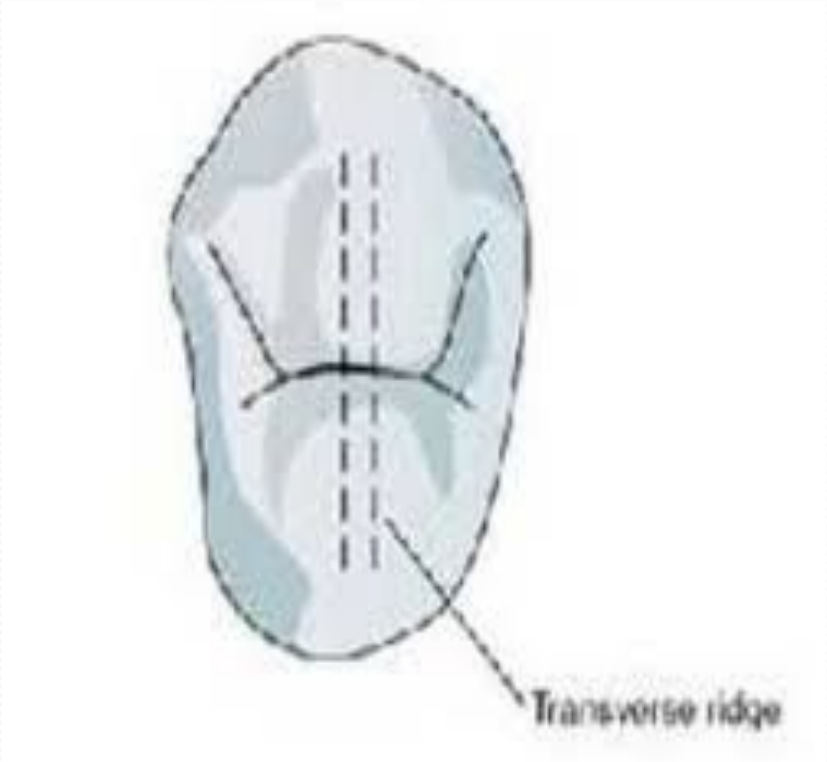
- **TRIANGULAR RIDGES** descend from the tips of the cusps of molars and premolars toward the central part of the occlusal surfaces.
- They are so named because the slopes of each side of the ridge are inclined to resemble two sides of a triangle.
- They are named after the cusps to which they belong. e.g., the triangular ridge of the buccal cusp of the maxillary first premolar.

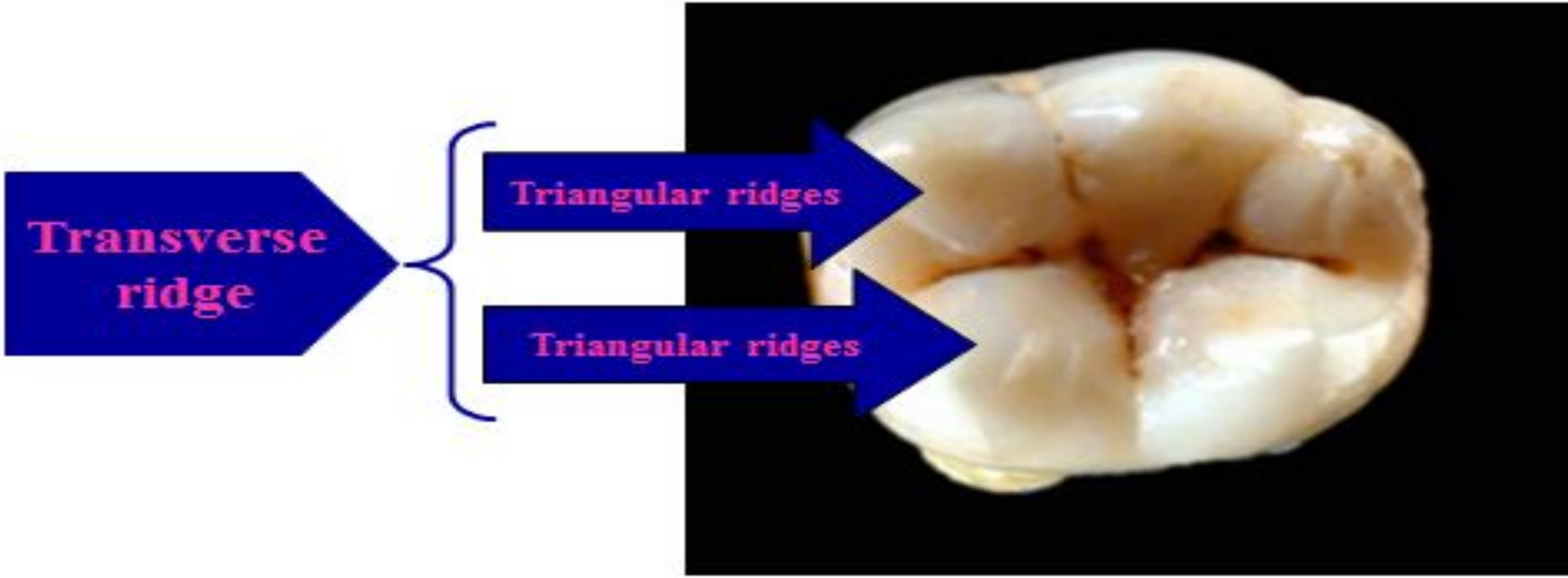




Lingual fossa
Lingual groove
Mesial marginal ridge
Distal marginal ridge


Triangular ridge
Cusp ridge
Inclined cuspal plane
Marginal ridge
Marginal ridge

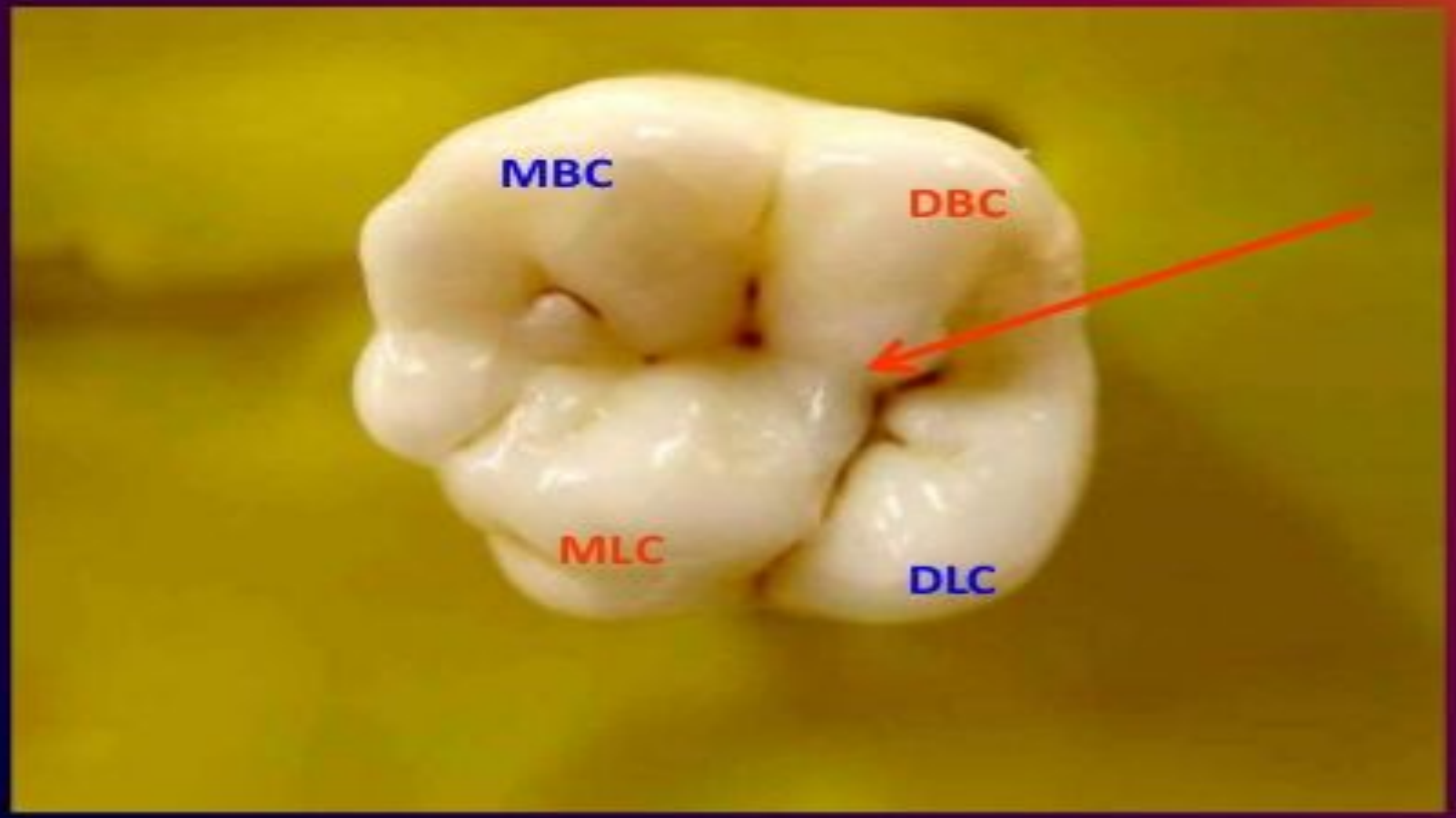
- When a buccal and a lingual triangular ridge join, they form a transverse ridge.
- **A TRANSVERSE RIDGE** is the union of two triangular ridges crossing transversely the surface of a posterior tooth.



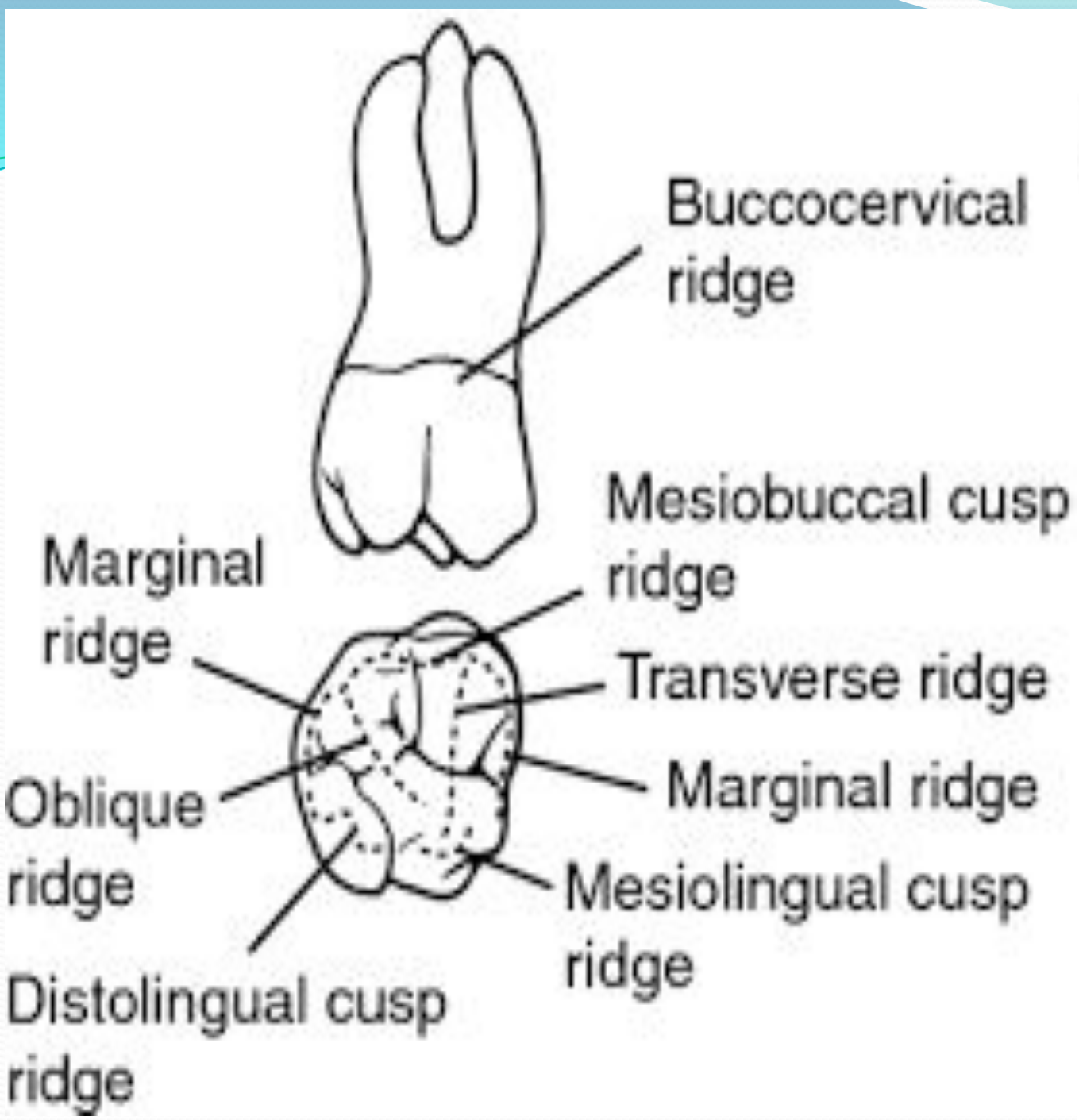

Transverse ridge
Triangular ridges
Triangular ridges

**OBLIQUE RIDGE** is a ridge crossing obliquely the occlusal surfaces of maxillary molars. It is formed by the union of the triangular ridges of the distobuccal cusp and the mesiopalatal cusp.

**C. Oblique ridge :** is the union of the non-opposing buccal and lingual triangular ridges obliquely crossing the occlusal surface of maxillary molars from the mesiolingual cusp to the distobuccal cusp




# OBLIQUE RIDGE



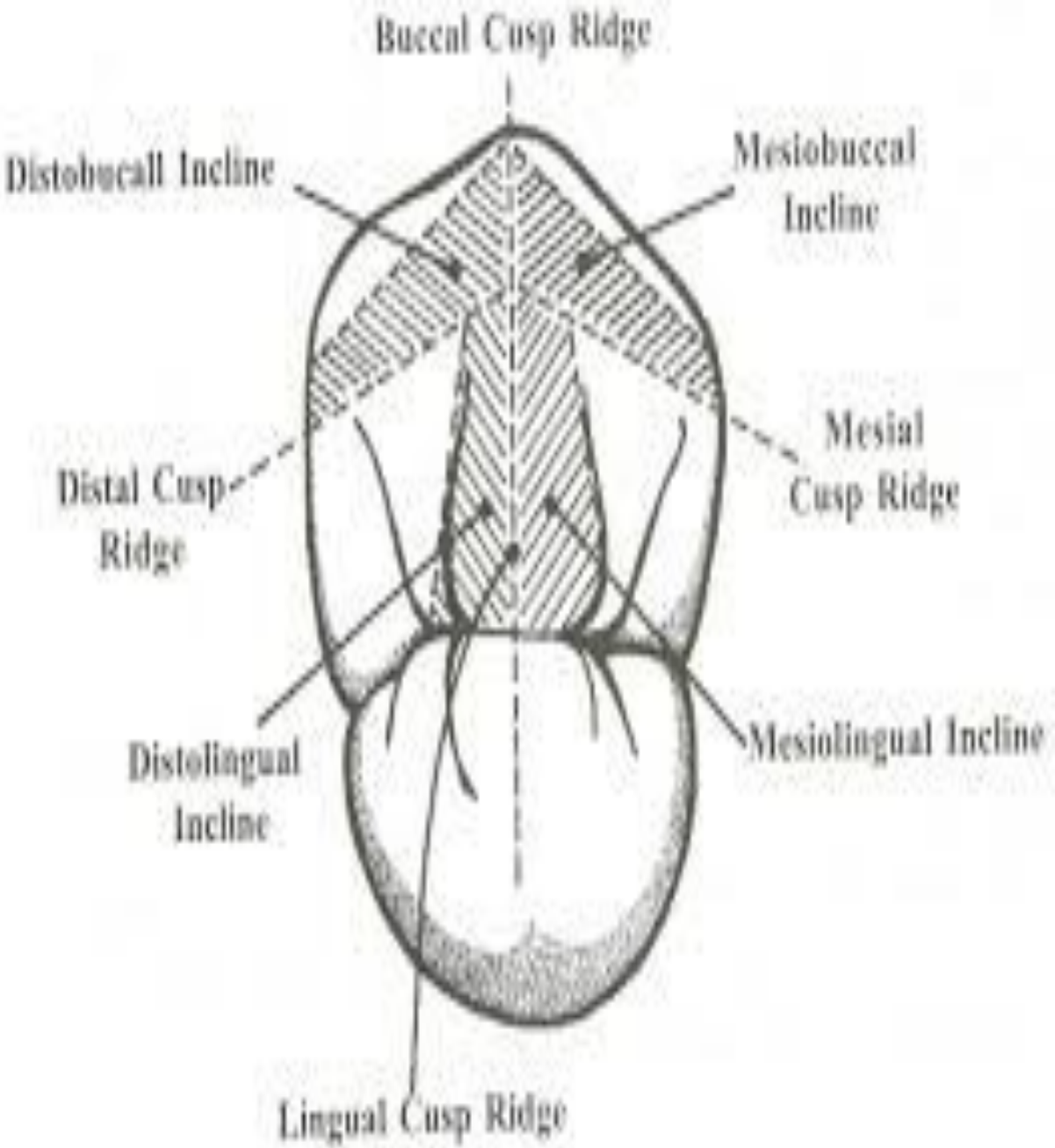
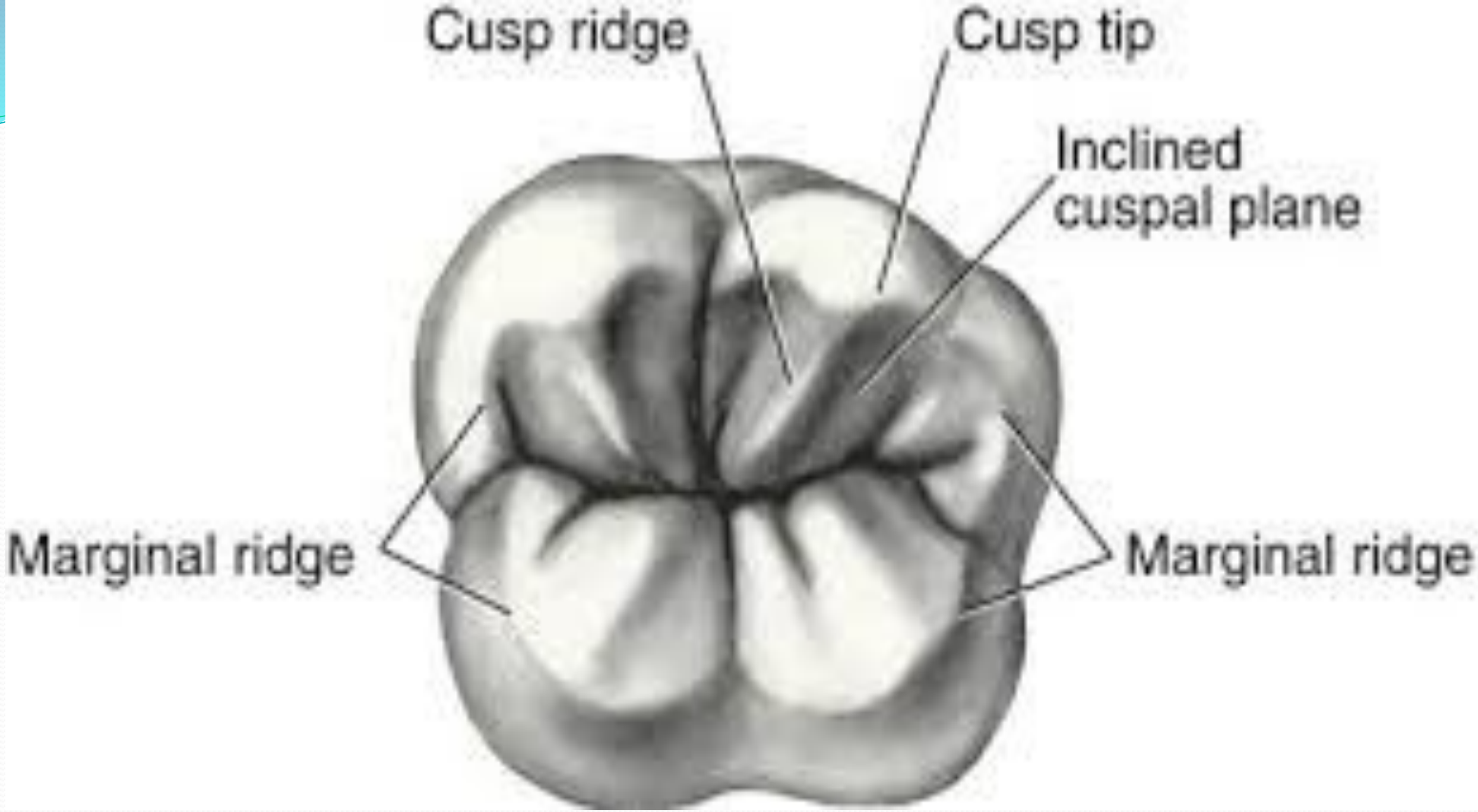
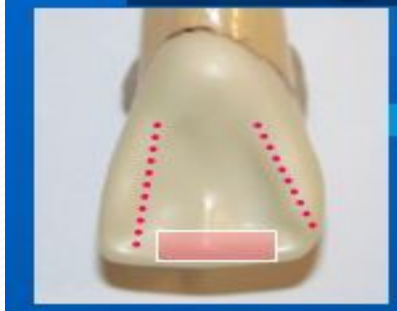




Figure 2-16. Cusp Ridges


Cusp ridge
Cusp tip
Inclined
cuspal plane
Marginal ridge
Marginal ridge

# 5-Ridges

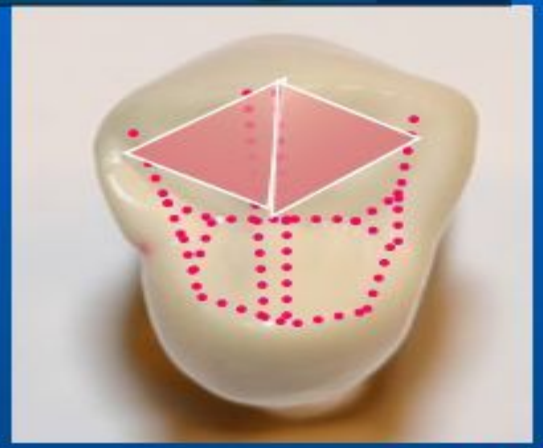
## Marginal



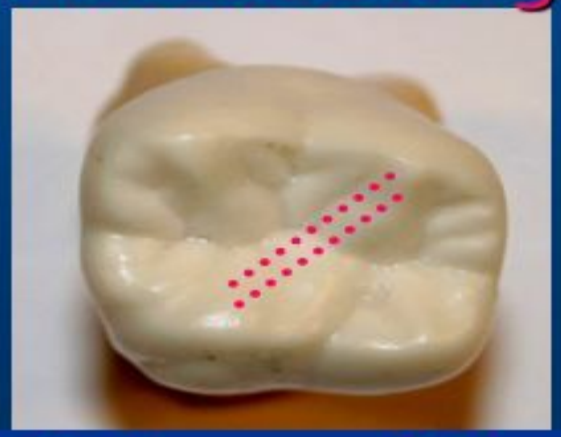
Ridge or elevation of enamel forming the margin of the surface of a tooth;

- on mesial /distal **margins of lingual** surfaces anterior teeth.
- mesial & distal **margins of occlusal** surfaces posterior teeth

## Triangular



Transverse Ridge



Oblique Ridge

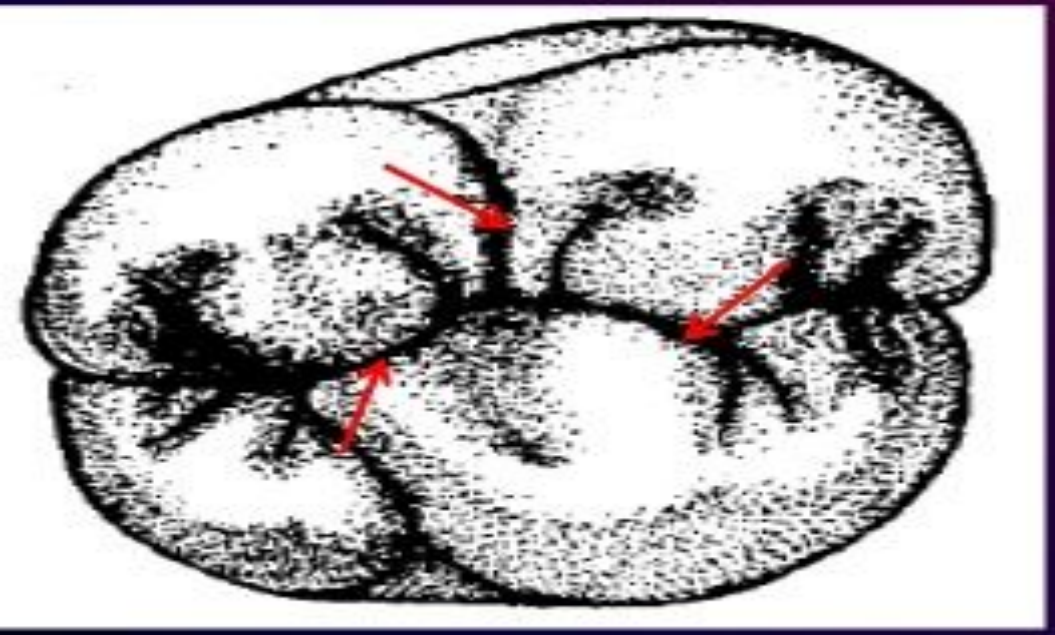
## Linear

- Linear ridges: Elevated portions of tooth run in a line named for their location
  - Cervical
  - Incisal
  - Labial
  - Buccal
  - Lingual

- ***A developmental groove*** is a shallow groove or line between the primary parts or lobes of the crown or root.
- ***A supplemental groove,*** less distinct, is also a shallow linear depression on the surface of a tooth, but it is supplemental to a developmental groove and does not mark the junction of primary parts.
- ***Buccal and lingual grooves*** are developmental groove found on the buccal and lingual surfaces of posterior teeth.

# B) Depressed landmarks :

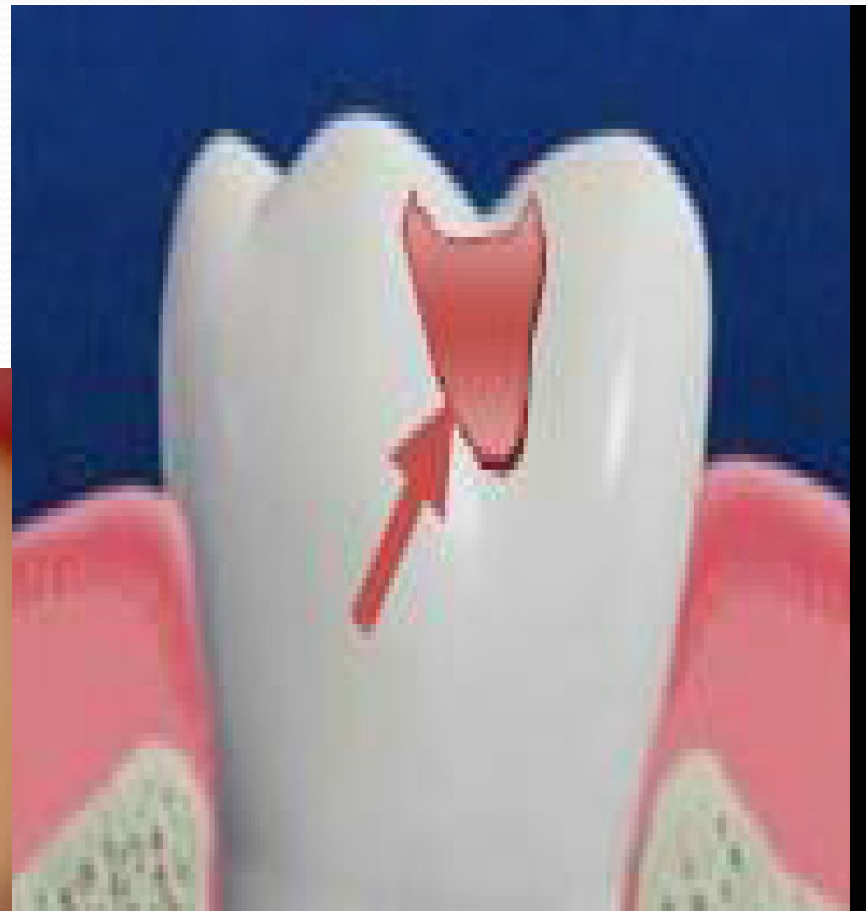
**1. Developmental groove :** is a deep linear depression in the occlusal surface and may extend buccally , lingually or mesially . It denote the line of fusion of primary lobes .



**2. Supplemental groove :** is a shallow linear depression in the occlusal surface , which does not demarcate the line of lobes fusion , but represents a branch from the developmental groove .

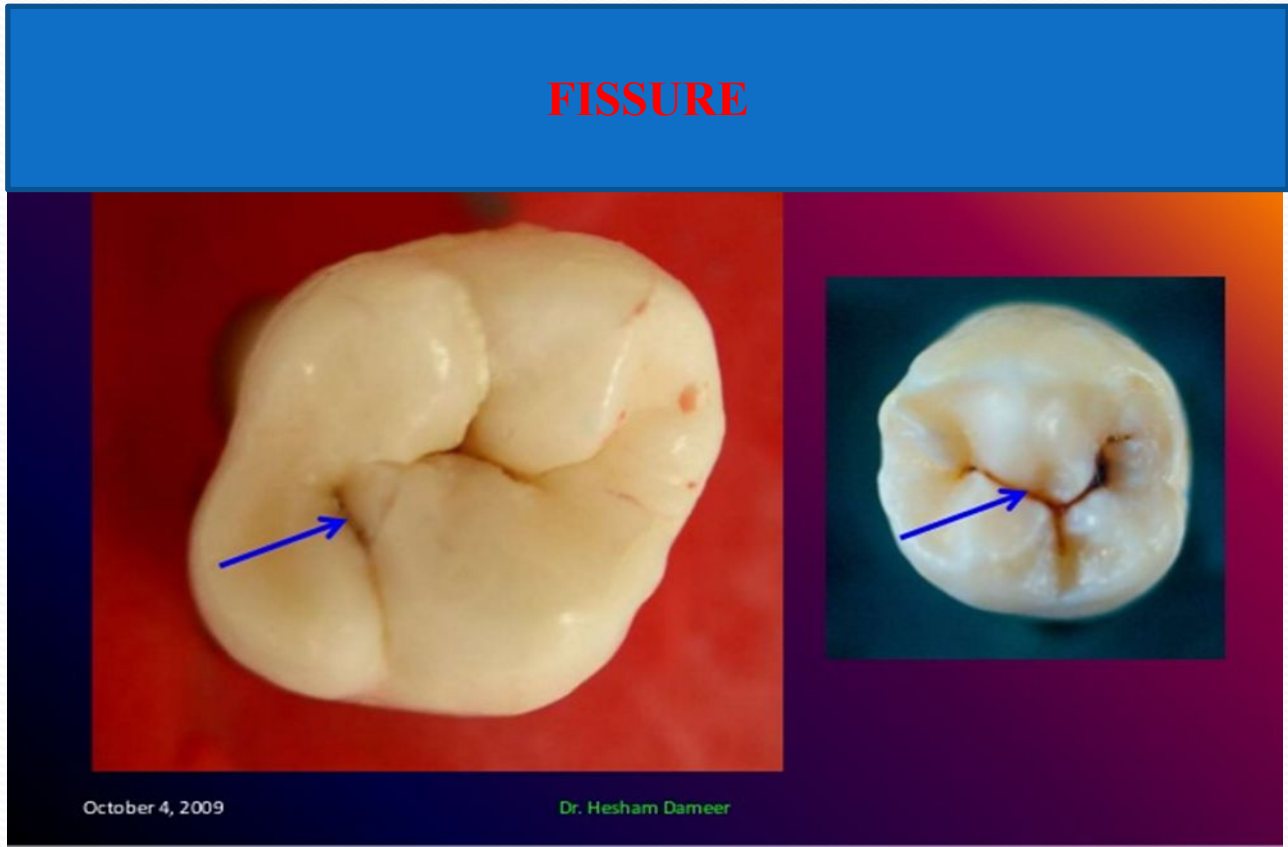
# SULCUS

- A sulcus is a long depression or valley in the surface of a tooth between ridges and cusps, the inclines of which meet at an angle.
- A sulcus has a developmental groove at the junction of its inclines.

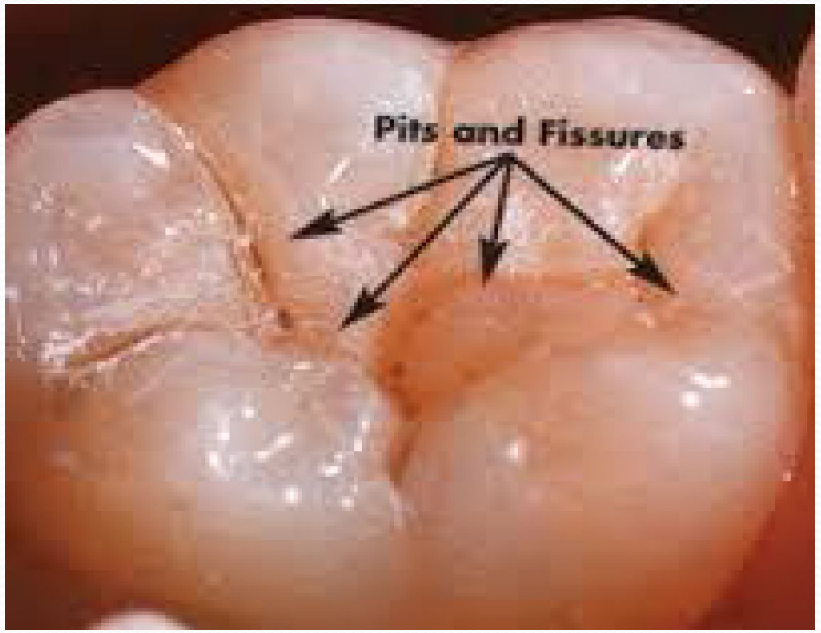


**FISSURE:** It is a narrow channel or cleft which is formed at the depth of a developmental groove and result from the incomplete union of the primary lobes. It is considered as a fault or abnormalities in enamel.

Decay (caries) often begins in a deep fissure.



**PITS:-** are small pin point depressions located at the junction of developmental grooves or at terminals of those grooves. For instance, central pit is a term used to describe a landmark in the central fossa of molars where developmental grooves join.



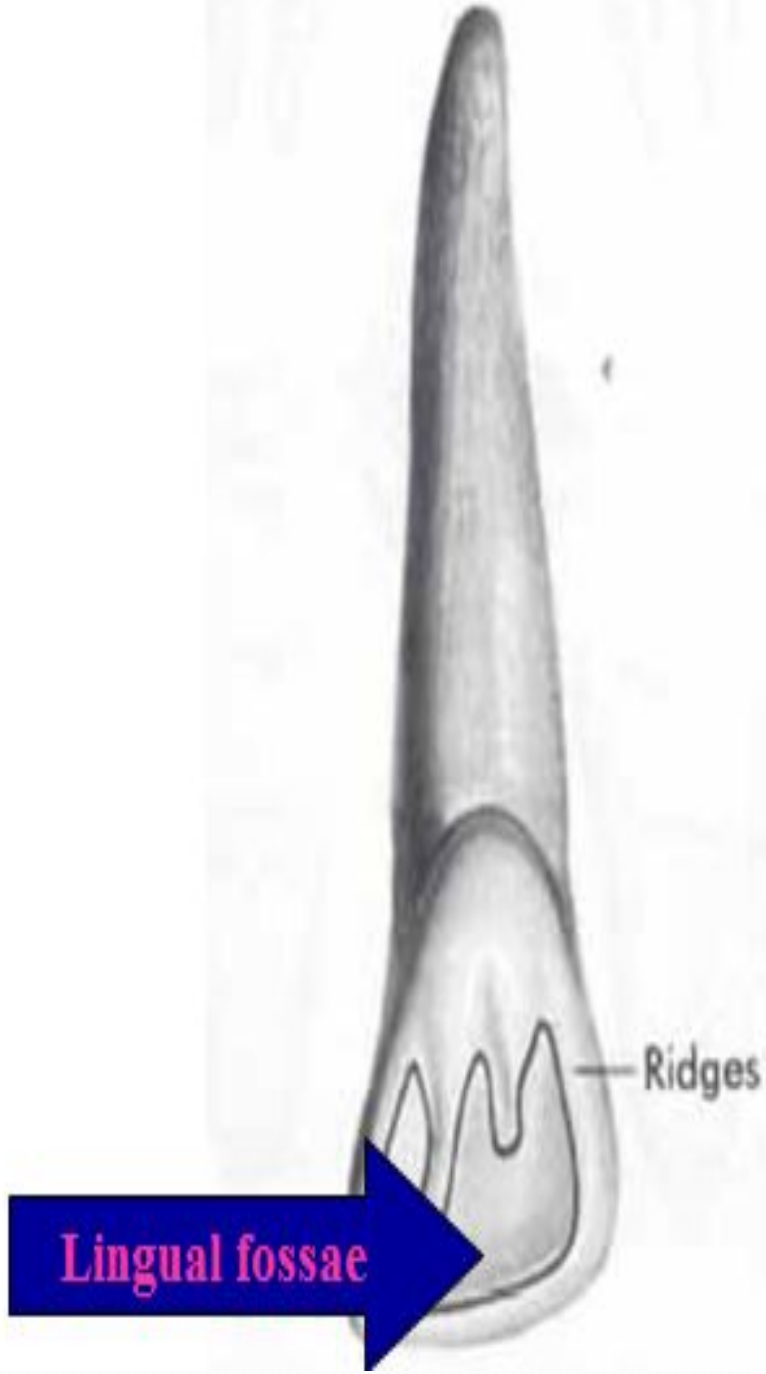
# Crown Depressions

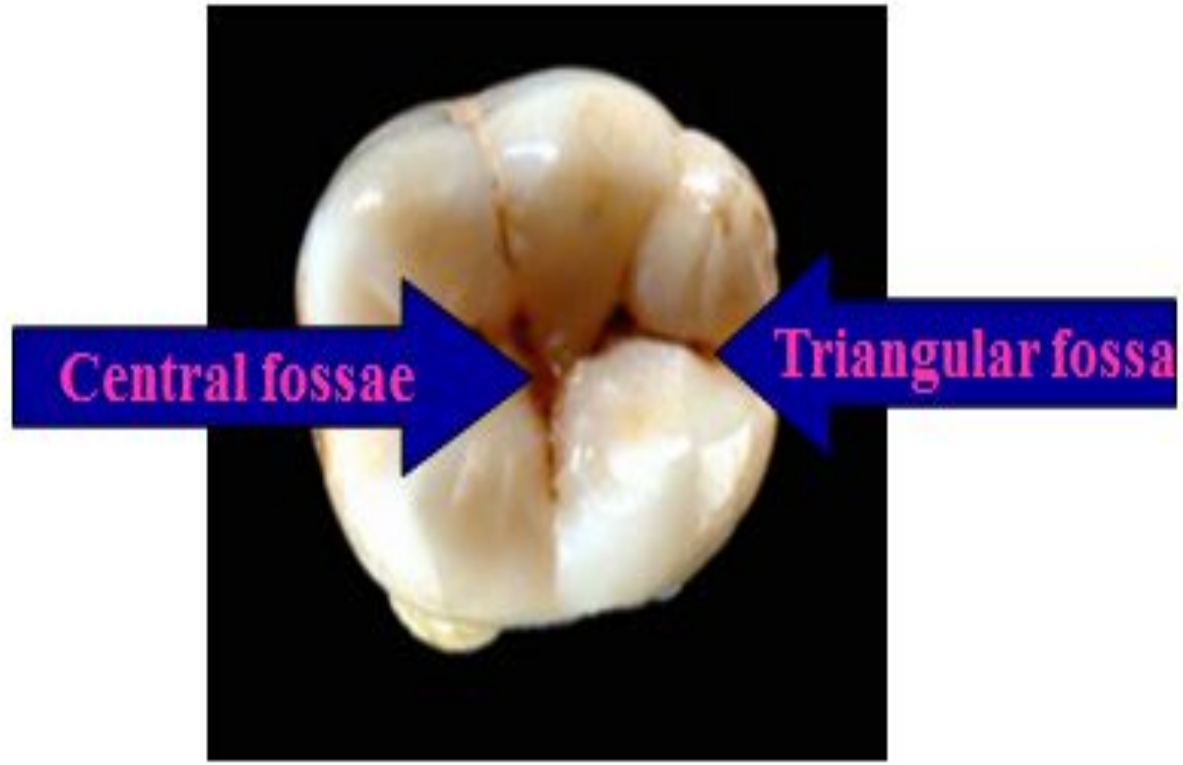
*A fossa* is an irregular depression or concavity, and is named according to its shape and location.

***Lingual fossa*** are on the lingual surface of incisors.

***Central fossa*** are on the occlusal surface of molars. They are formed by the converging of ridges terminating at a central point in the bottom of the depression, where there is a junction of developmental grooves.

***Triangular fossa*** are found on molars and premolars on the occlusal surfaces mesial or distal to marginal ridges. They are sometimes found on the lingual surfaces of maxillary incisors at the edge of the lingual fossae where the marginal ridges and the cingulum meet.


Ridges
Lingual fossae


Central fossae
Triangular fossa

# FOSSA

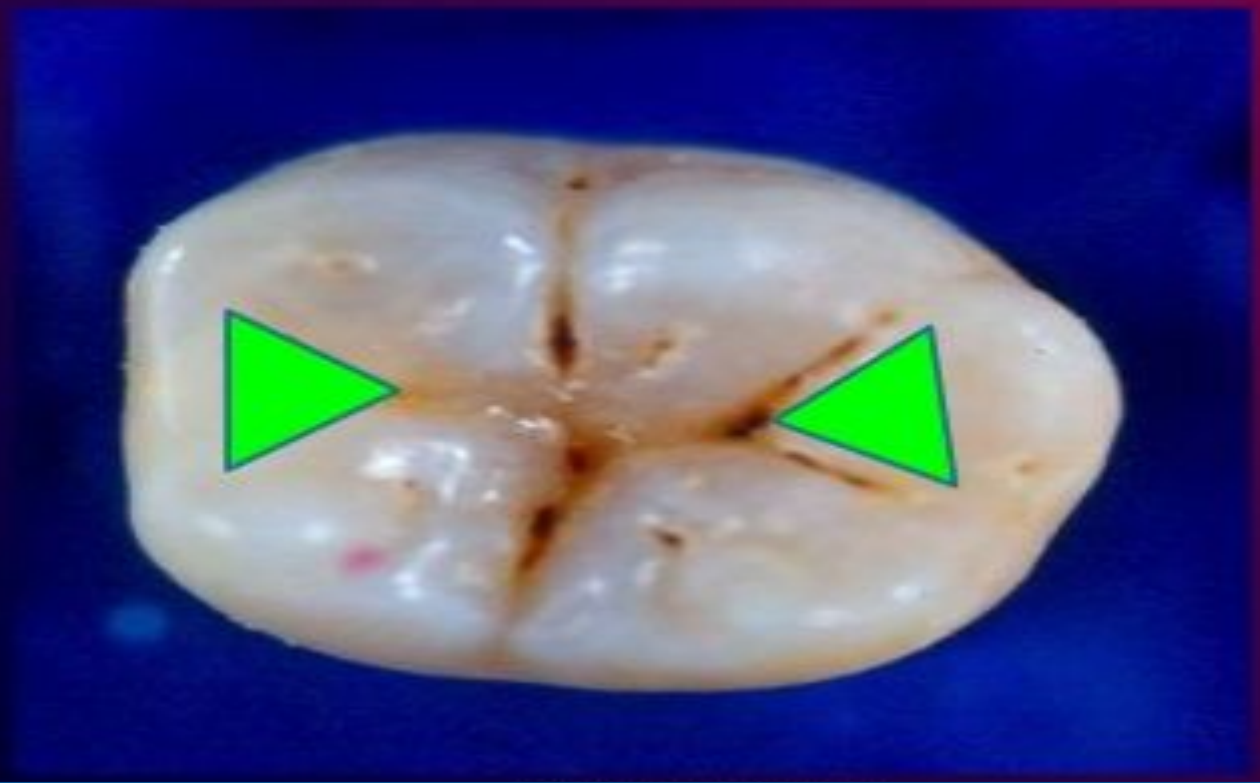
it is an irregular depression or concavity.

- **Lingual fossa:** it is located on the lingual surface of anterior teeth
- **Cenrtal fossa:** it is located on the occlusal surface of molar
- **Triangular fossa**: it is located on the occlusal surfaces of molars and premolars, mesial or distal to marginal ridges

c) Lingual fossa : is located in the lingual surface of incisors .

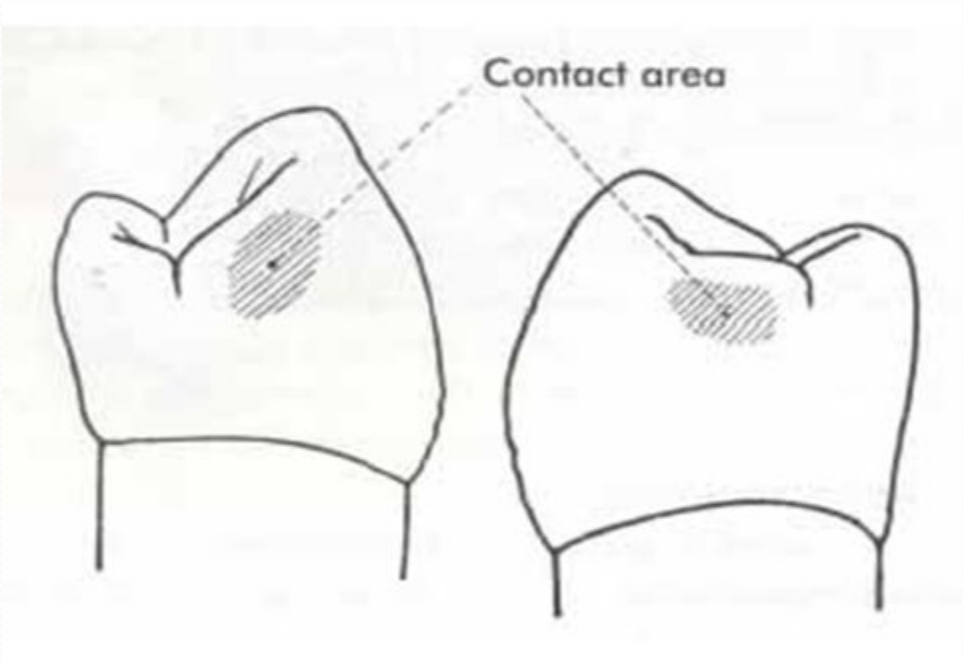
**4. Fossa :** is a small depression or concavity on the occlusal surface of posterior teeth and the lingual surface of anterior teeth . It has different shapes including :

a) Triangular fossa : it present between the branches of the central developmental groove when they terminate before the proximal marginal ridges in molars and premolars .



# CONTACT AREA:

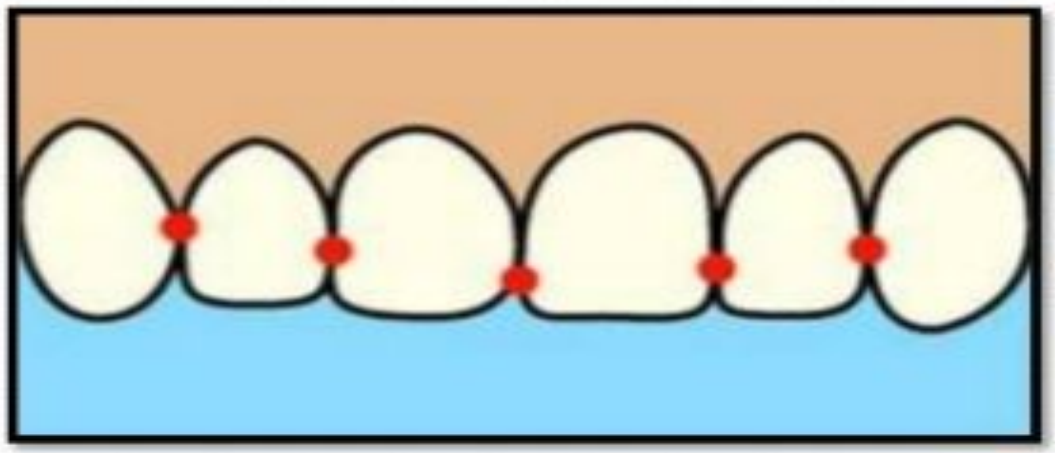
- The area of a tooth that physically touches the abutment tooth; the contact areas occur n the proximal surfaces of teeth.



# Contact Areas:

- In a complete arch, each tooth touches or contacts two adjacent teeth (exception : most posterior tooth)

- These proximal contact areas are normally b/w mesial surface of one tooth & distal surface of tooth just anterior to it ( except central incisors)



# Embrasures

- Embrasures are V-shaped valleys between adjacent teeth. They provide a spill way for food to escape during chewing which essentially aids in the self-cleansing process
- Embrasures are triangular shaped spaces located between the proximal surfaces of adjacent teeth.
- The borders of embrasures are formed by the interdental papilla of the gingiva, the adjacent teeth, and the contact point where the two teeth meet.
- There are four embrasures for every contact area: facial (also called labial or buccal), lingual (or palatal), occlusal or incisal, and cervical or interproximal space.
- The cervical embrasure usually is filled by the interdental papilla from the gingiva

Embrasures have three functions.

- They form spillways between teeth to direct food away from the gingiva.
- They provide a mechanism for teeth to be more self cleansing.
- They protect the gingiva from undue frictional trauma but also providing the proper degree of stimulation to the tissues.

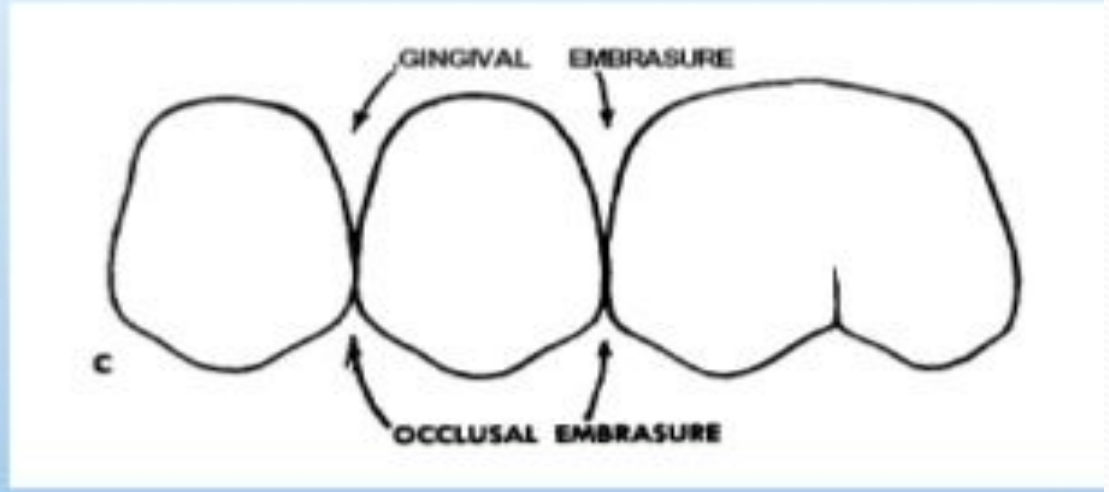
# 3. Embrasures or spillways:

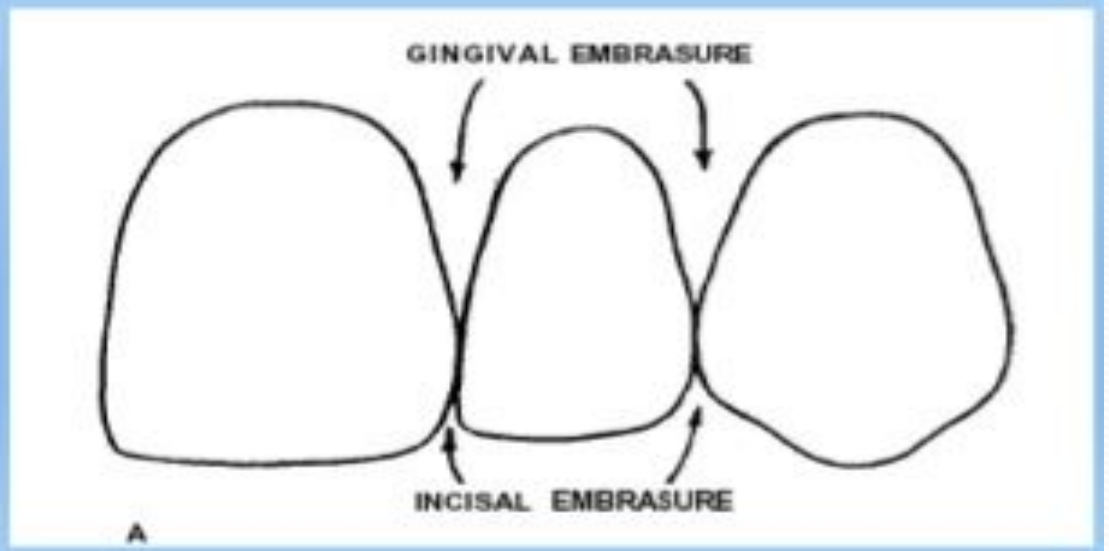
It is an open space between the proximal surfaces of adjacent teeth in the same dental arch. They diverge from the contact area…

- Occlusally.
- Incisally.
- Buccally.
- Labially.
- Lingually.
- Cervically.

Note.

Cervical or gingival E.= Inter proximal space



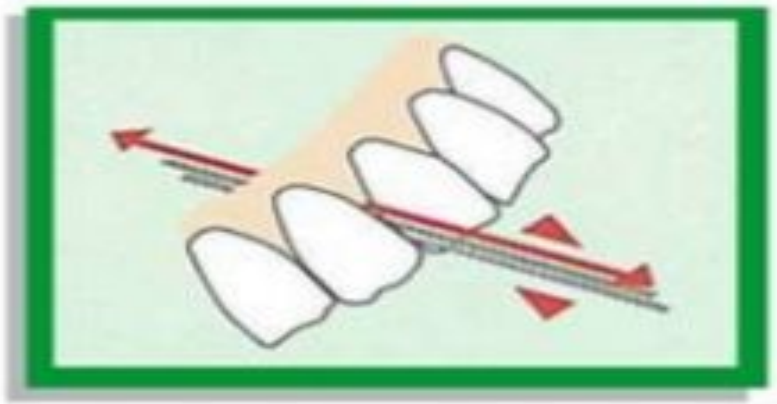
# Mammelons

- Mammelons are the remnants of three lobes of formation of these teeth, the fourth lobe represented by the cingulum.
- Since this surface of the tooth is the first to wear away from attrition, mammelons may not be visible on teeth of older people.
- The best chance to see this characteristic is soon after eruption of the tooth into the mouth.

# Interproximal Spaces:

- Triangular shaped area b/w adjacent teeth in same arch cervical to contact area & which is best observed from facial aspect.

- Interproximal space is covered with the gingival tissue (interdental papilla)




THANK YOU