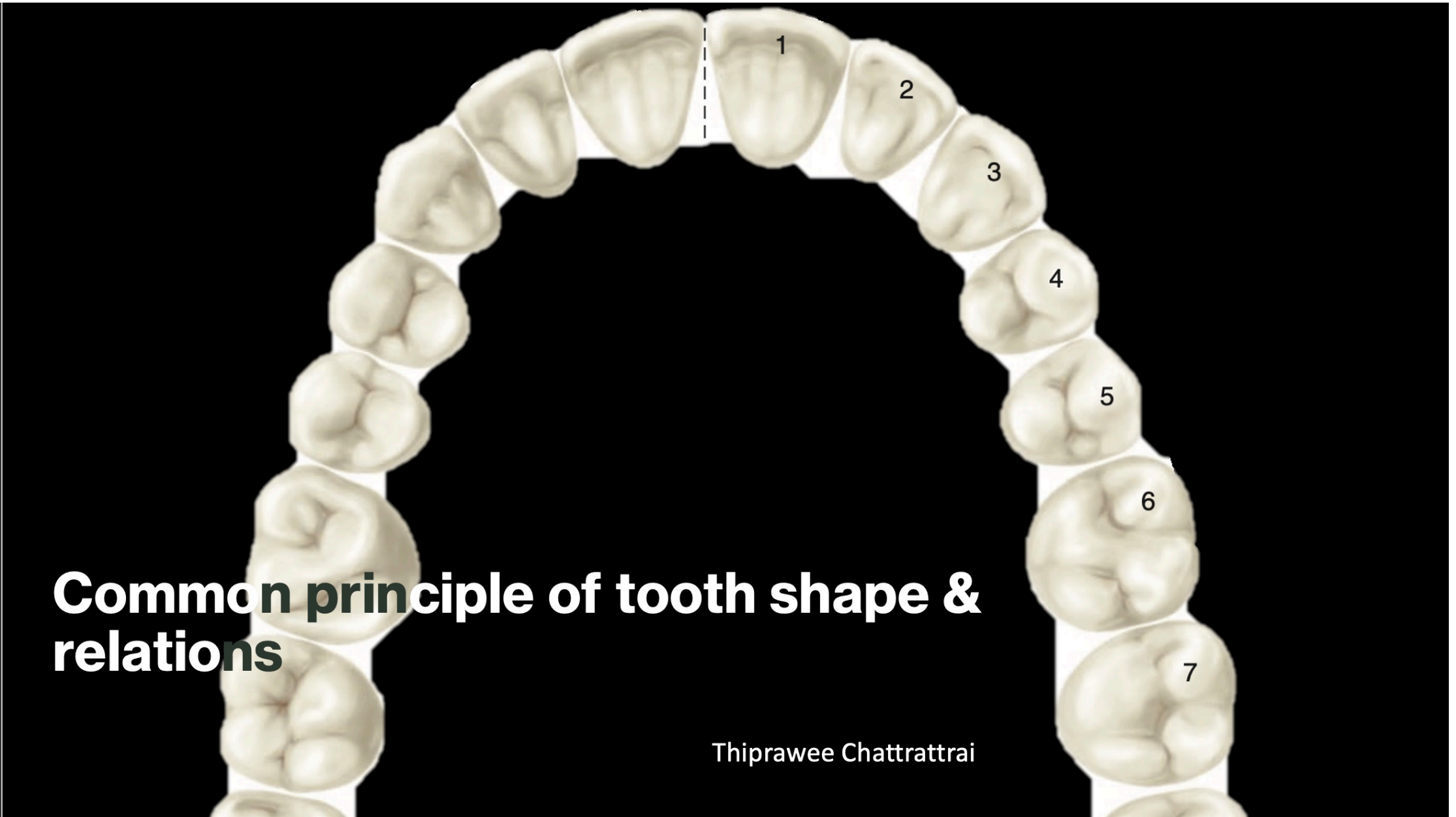
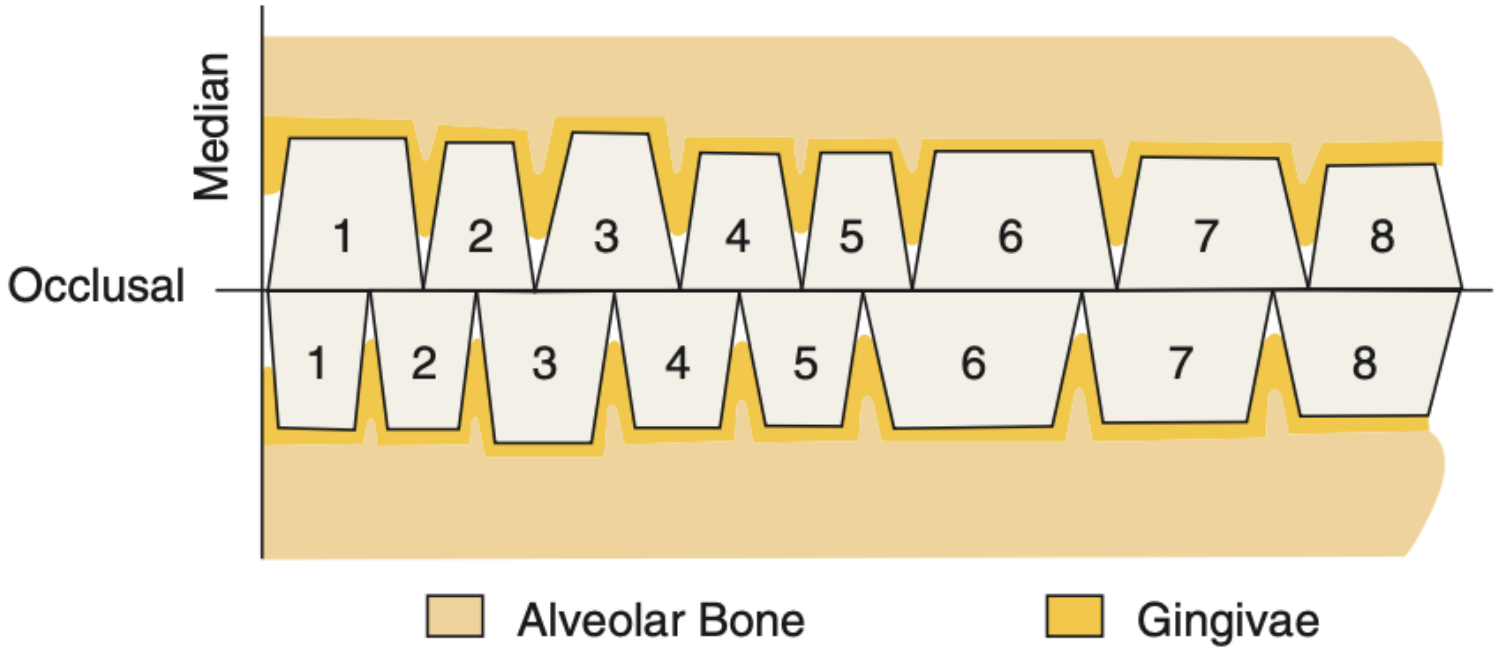
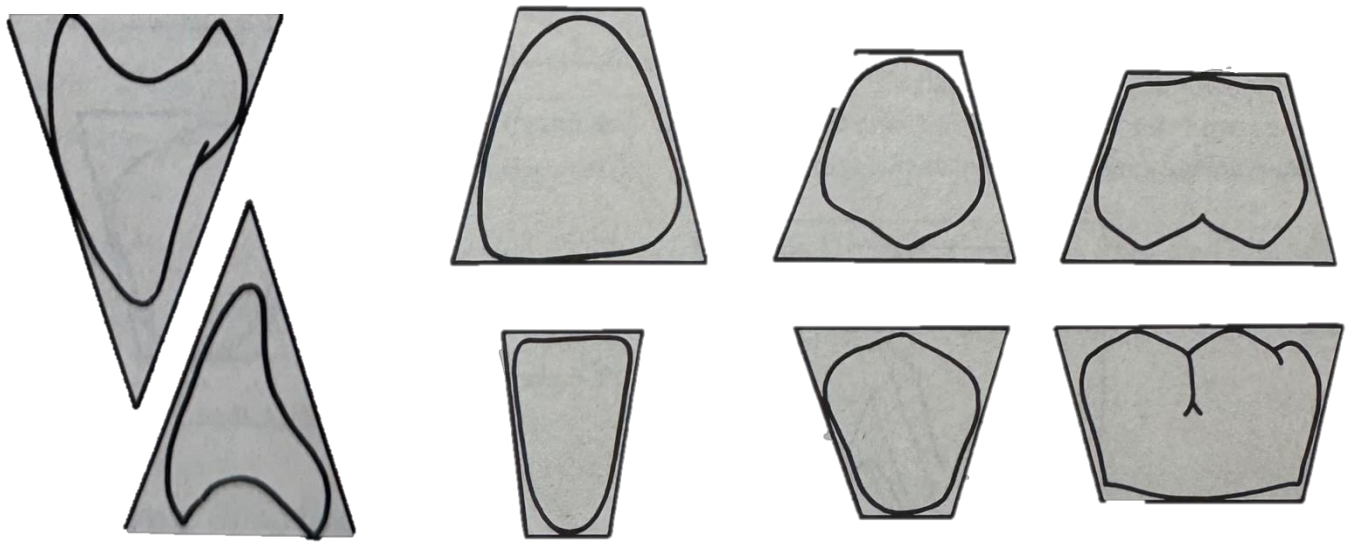


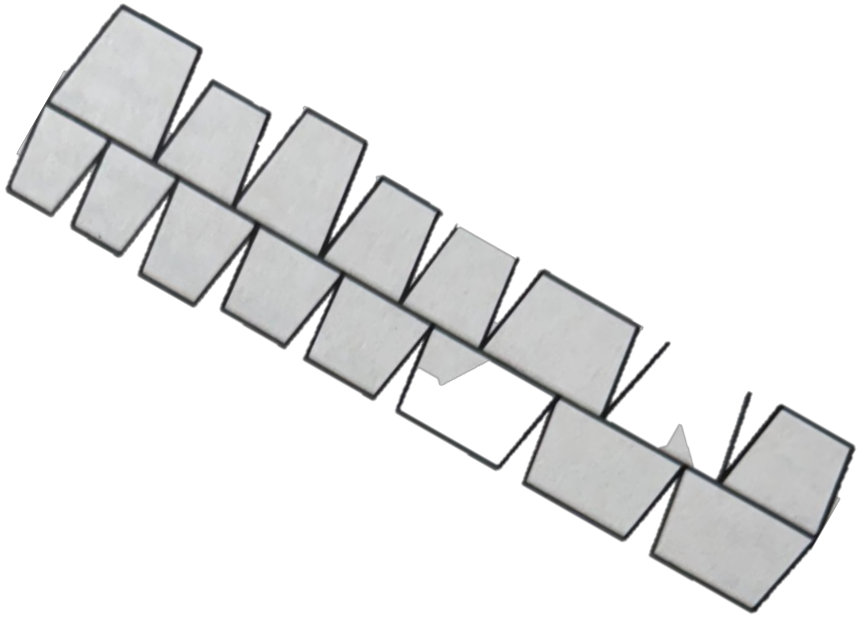
Common principle of tooth shape & relations

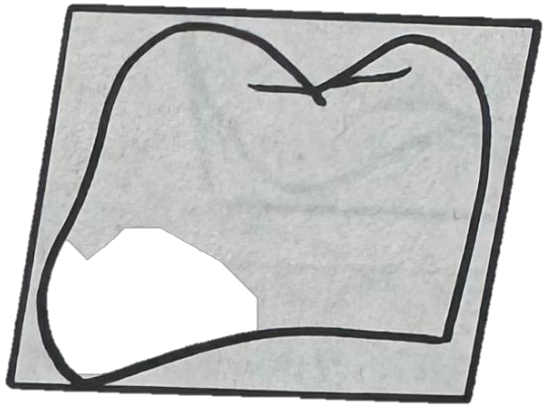
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FORM AND FUNCTION









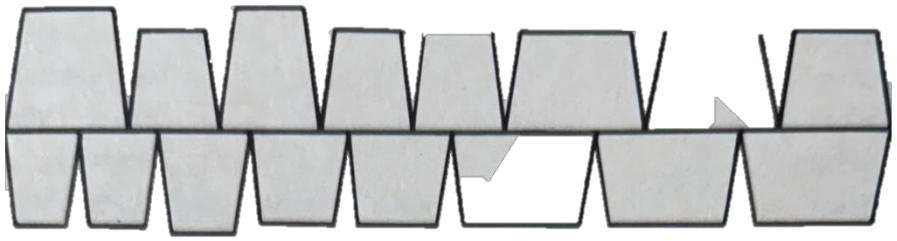
FORM AND FUNCTION

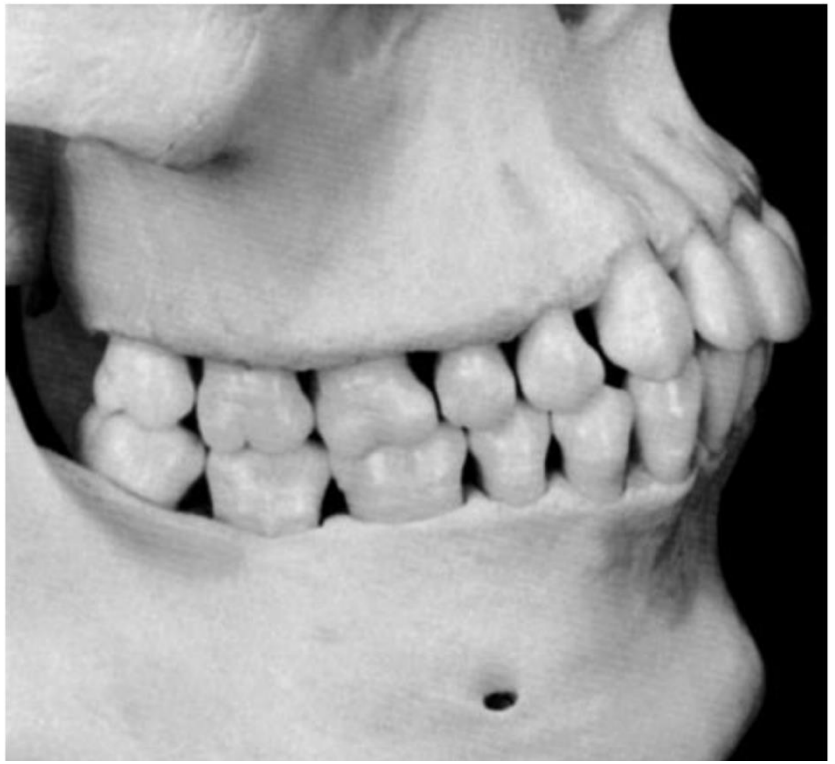
Geometries of crown outlines

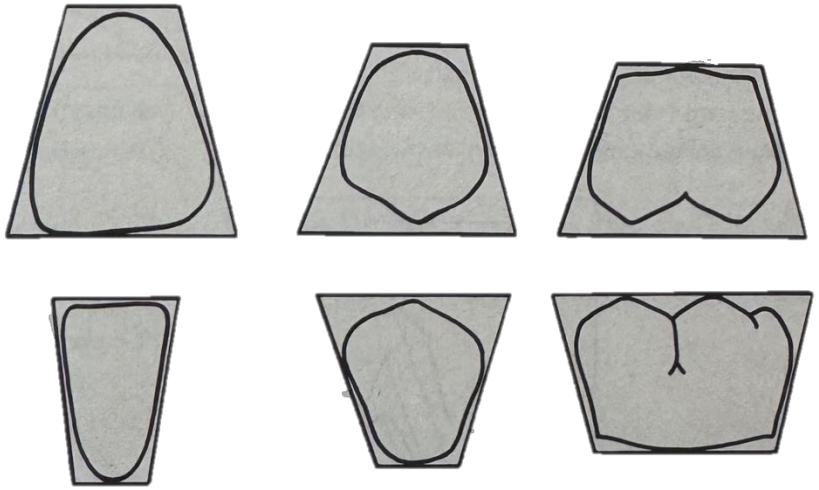
- Triangle
- Trapezoid
- Rhomboid

Facial & Lingual
“ Trapezoid ”

- Cervical < incisal / occlusal
  - Interproximal spaces accommodate interproximal tissue
  - Spacing between the roots allows sufficient bone tissue and supporting structures
- Each tooth crown in dental arch must be in contact with adjacent tooth
  - To help protect interproximal gingival tissue from trauma during mastication
  - Ensure occlusal stability
- Each tooth in dental arch has 2 antagonists in opposing arch except 31, 41, 18, 28







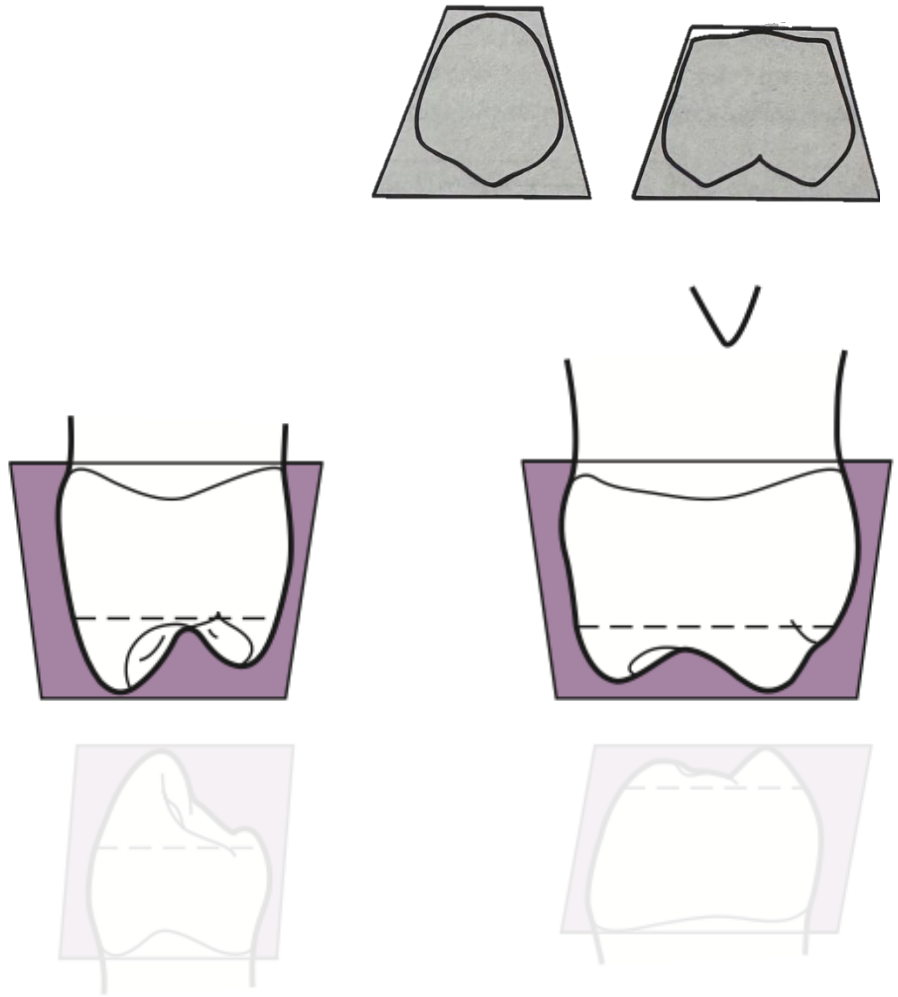


Mesial - Distal of Anterior teeth “Triangle”

- Base of triangle is cervical
- Apex is incisal ridge
- Wide base for strength
- Tapered outlines (labially and lingually)
  - Narrowing down to thin ridge, which facilitates the penetration of food material

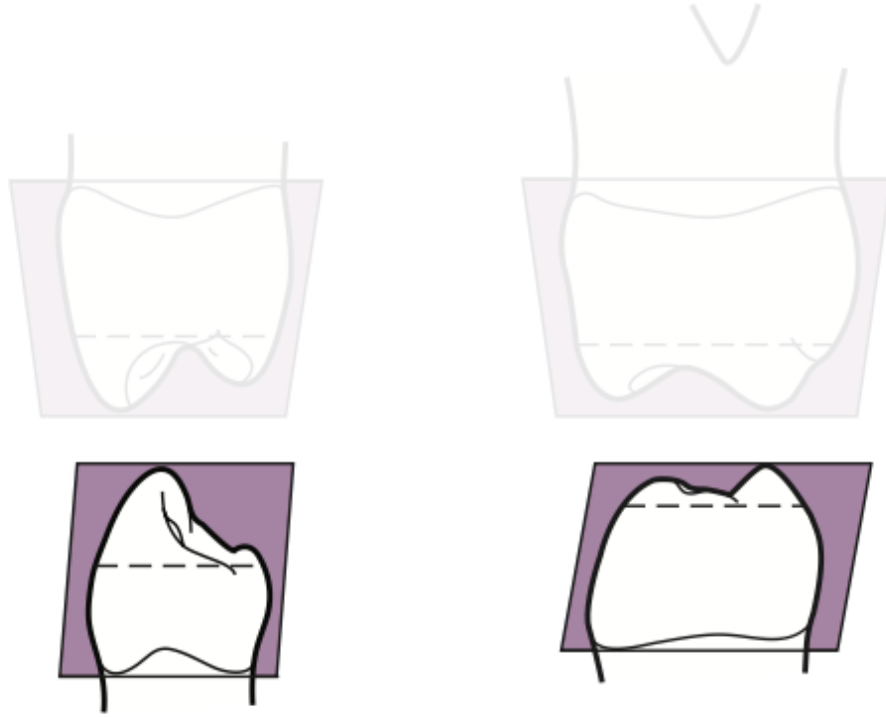
Mesial – distal of <u>Upper</u> posterior teeth “Trapezoid”

- Cervical > occlusal
- Occlusal is constricted, tooth can be forced into food material more easil
- If occlusal was as wide as base of crown, additional chewing surface would multiply forces of mastication



Mesial – distal of <u>Lower</u> posterior teeth “Rhomboid”

- Inclines the crown lingual to root bases, which bring cusps into prope occlusion with cusps of their maxillary opponents
- The axis of crowns and roots of the teeth of both jaws are kept parallel



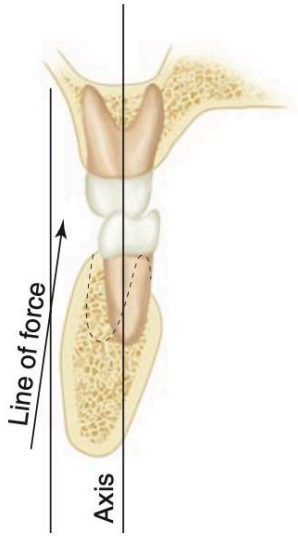


FIGURE 4-18 Schematic representation of line of forces being incorrectly directed tangentially to the long axis of the teeth. An acceptable clinical method to determine force vectors has yet to be established.

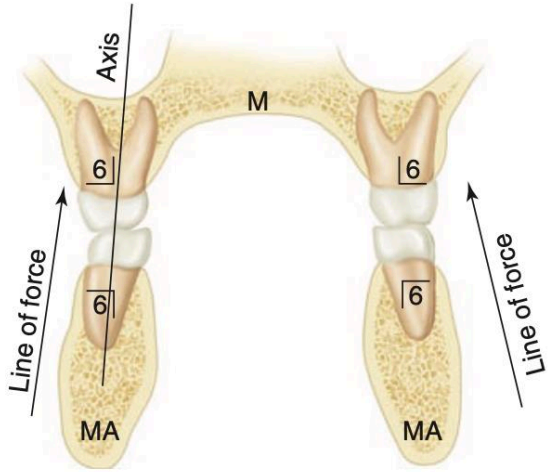


FIGURE 4-17 Schematic representation of clinical principle of making restorations and implants consistent with directing lines of forces parallel with long axes of the teeth. *M,* Maxilla; *MA,* mandible. Teeth numbered using Zsigmondy/Palmer notation.

The axis of crowns and roots of the teeth of both jaws are kept parallel.

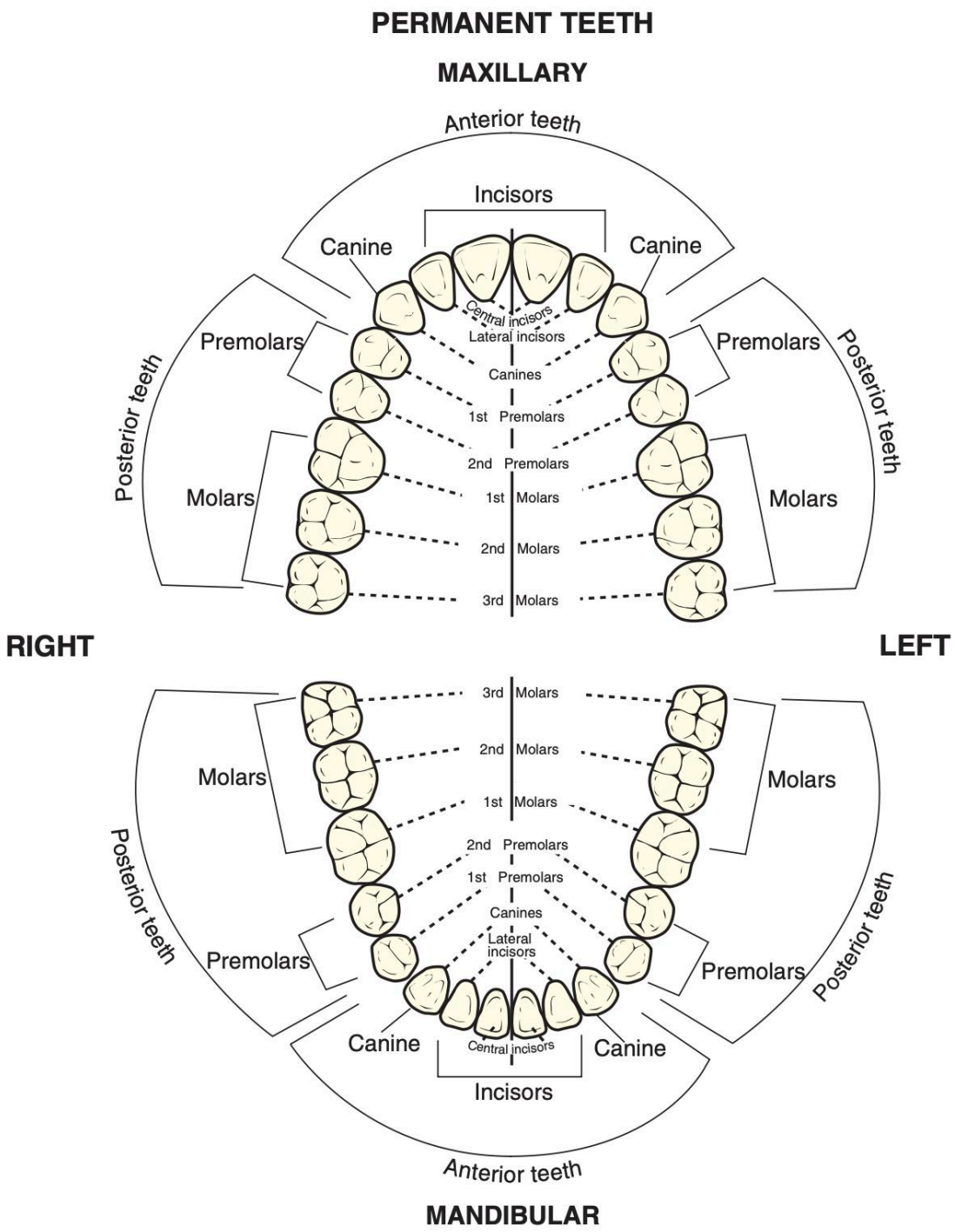
FORM AND FUNCTION

Anterior teeth

- Cut / tear the food
- Good appearance
- Phonetic

Posterior teeth

- Chew the food
- Maintain vertical dimension



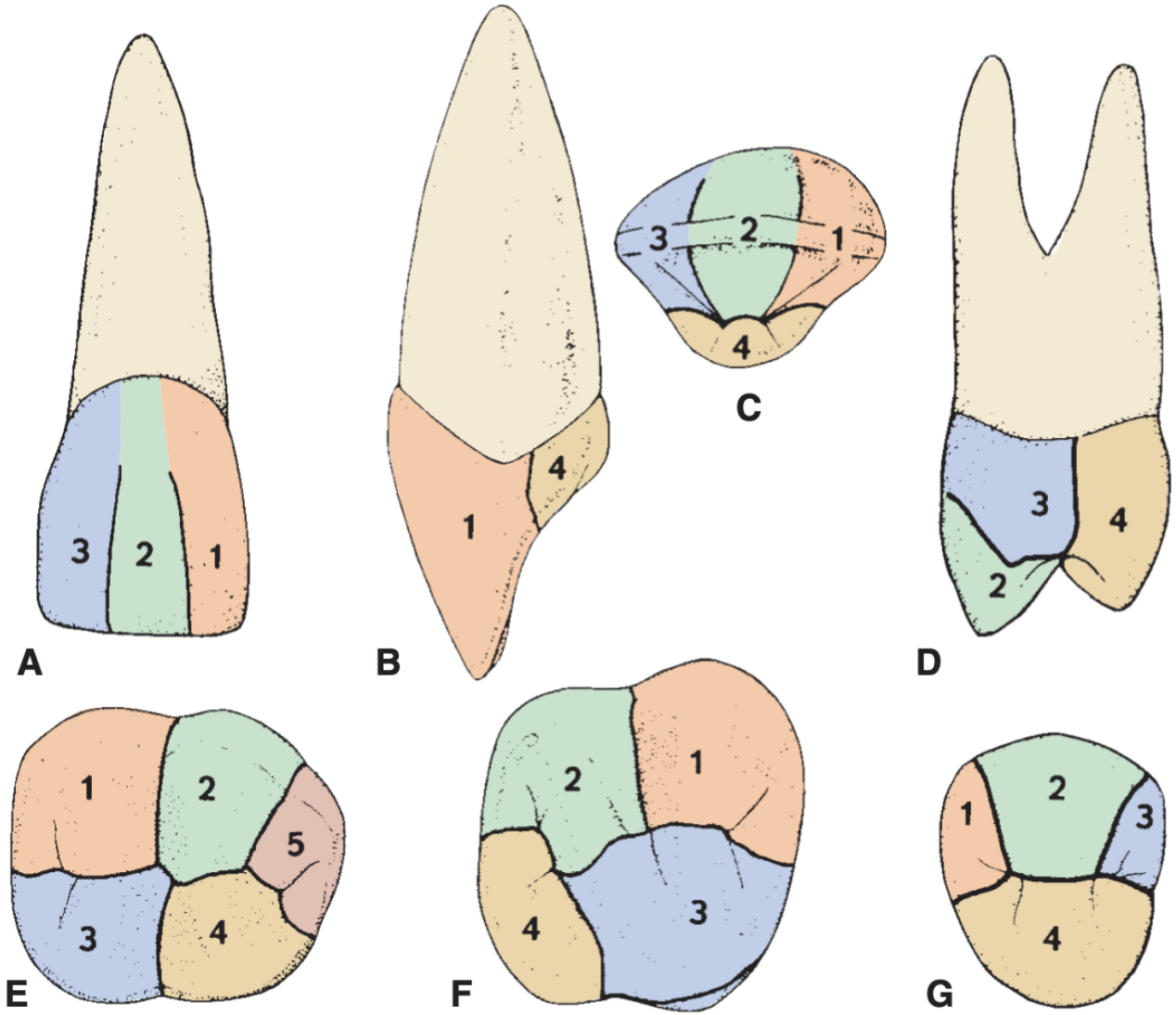
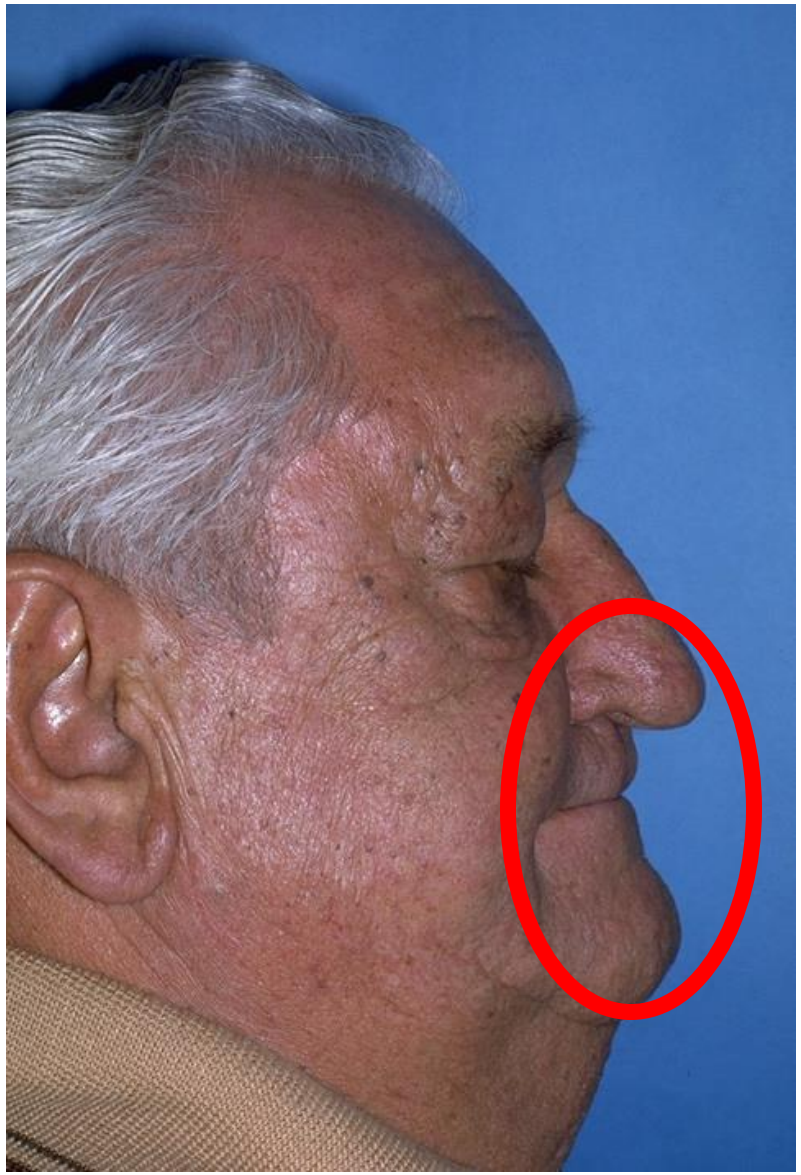
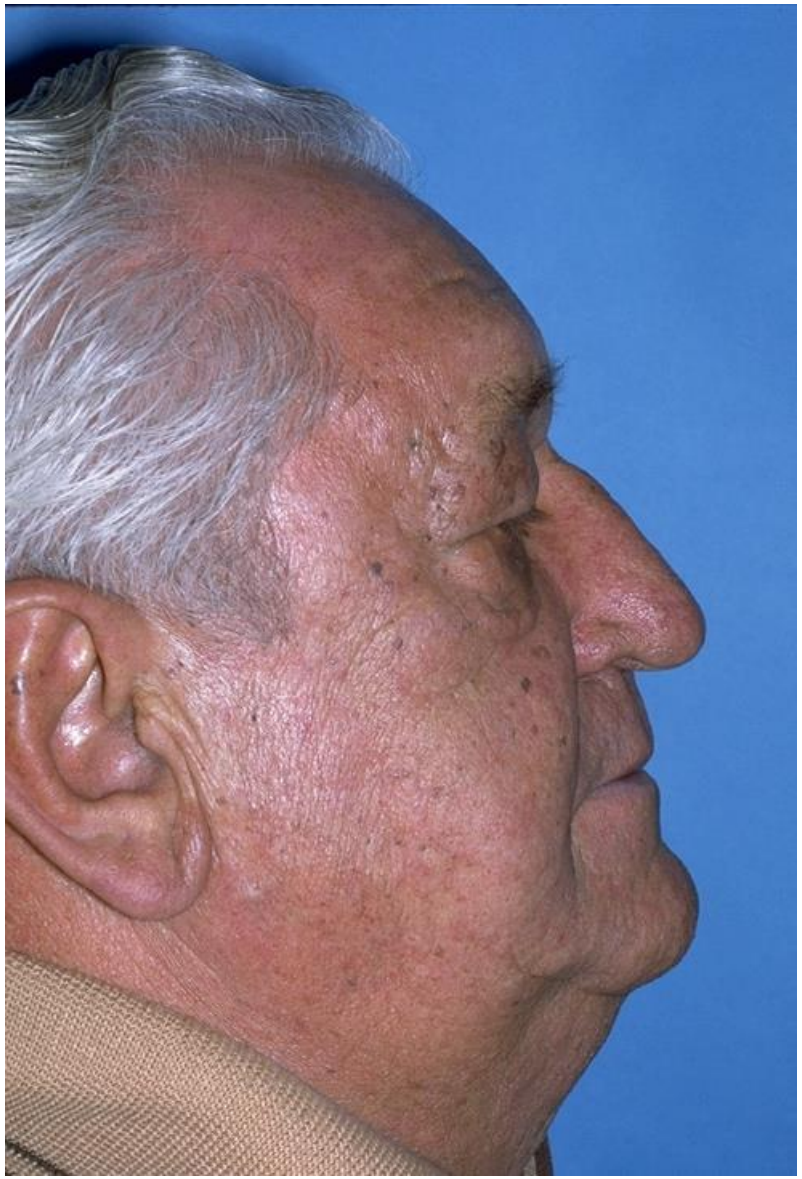


FIGURE 1-45. **Lobes** or primary anatomic divisions on teeth. Drawings A, B, and C show the facial, mesial, and incisal views of a maxillary central incisor that, like all *anterior teeth*, forms from *four* lobes. The lingual cingulum develops from one lobe (labeled 4) seen in views B and C. Mamelons may appear on the incisal edge of newly erupted incisors, an indication of the three labial lobes. Drawings D and G are the mesial and occlusal view of a *two-cusped premolar* that also forms from *four* lobes. As with anterior teeth, the facial cusp forms from three lobes, and one lingual lobe forms the lingual cusp. The divisions between the facial and lingual lobes are evidenced by the marginal ridge developmental grooves. **Each cusp of a molar is formed by one lobe**. Drawing E is a mandibular first molar with five lobes, three buccal, and two lingual, which is one lobe per cusp. Drawing F is a maxillary first molar with three larger lobes and one smaller lobe, or one per cusp. A very small fifth (Carabelli) cusp, when present, may form from a part of the large mesiolingual lobe, or may form from a separate lobe.

Vertical Dimension of Occlusion





Facial and Lingual Heights of Contour

Contours aid in the protection and stimulation of the gingival tissue.

A. Correct Contour

B. Under-contour: Food was forced to gingival sulcus -> Gingivitis and Gingival recession

C. Over-contour: Dental plaque and bacteria accumulated under the contour -> Dental caries (cervical) and Gingivitis

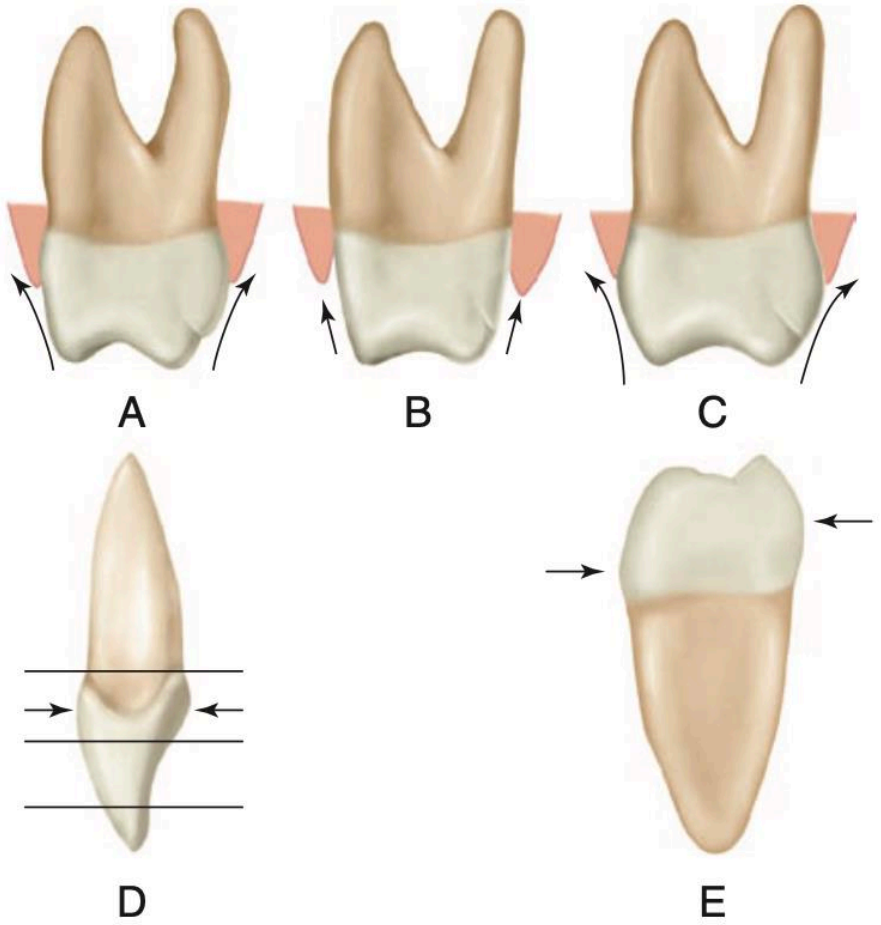


FIGURE 5-18 Schematic drawings of curvatures labially, buccally, and lingually. **A,** Normal curvatures as found on maxillary molar. Arrow shows theoretical path of food during mastication. **B,** If molar shows little or no curvature, there is possibility for food impaction. **C,** Molar with curvature in excess of normal. The significance of such an excess in curvature has not been firmly established. **D,** Normal cervical curvatures as found on maxillary incisors. The crests of curvature are opposite each other labiolingually. **E,** Curvatures as found on mandibular posterior teeth.

Facial and Lingual Heights of Contour

- Food impaction, impinging trauma from tough foods, and accumulation of dental plaque may be the consequence of malposed teeth or overcontouring or undercontouring of restoration involving buccolingual surfaces.
- Overcontouring of facial and lingual surfaces may inhibit natural cleaning by tongue, cheeks, and passage of food.

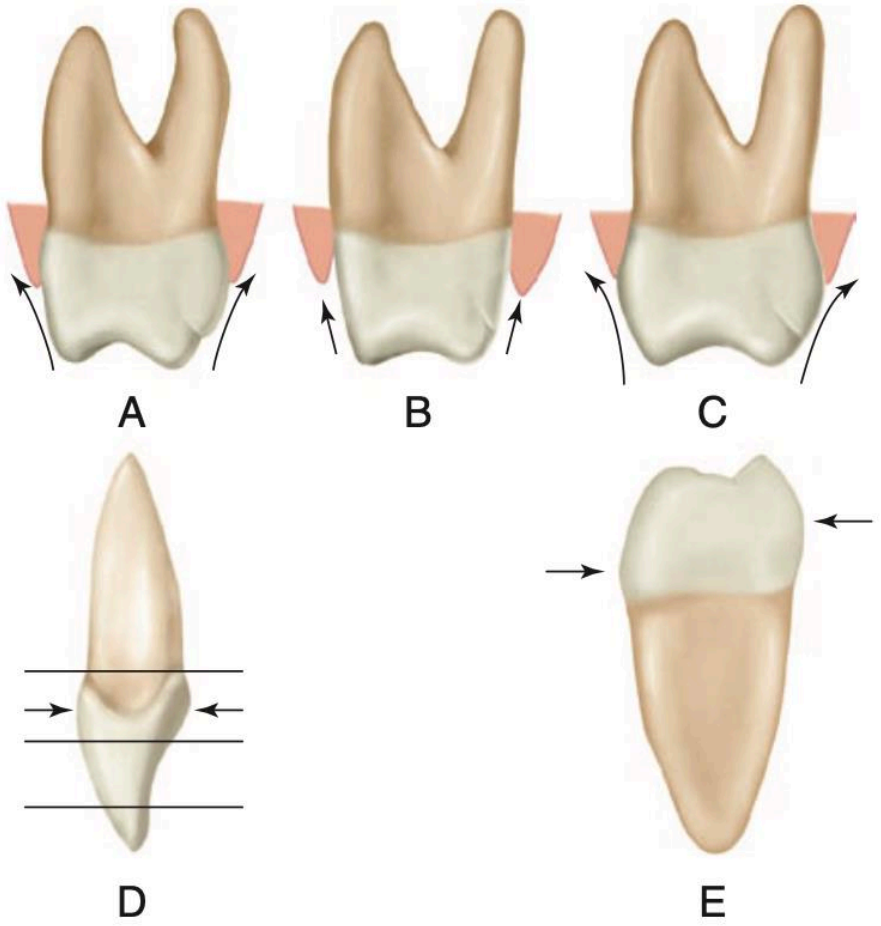
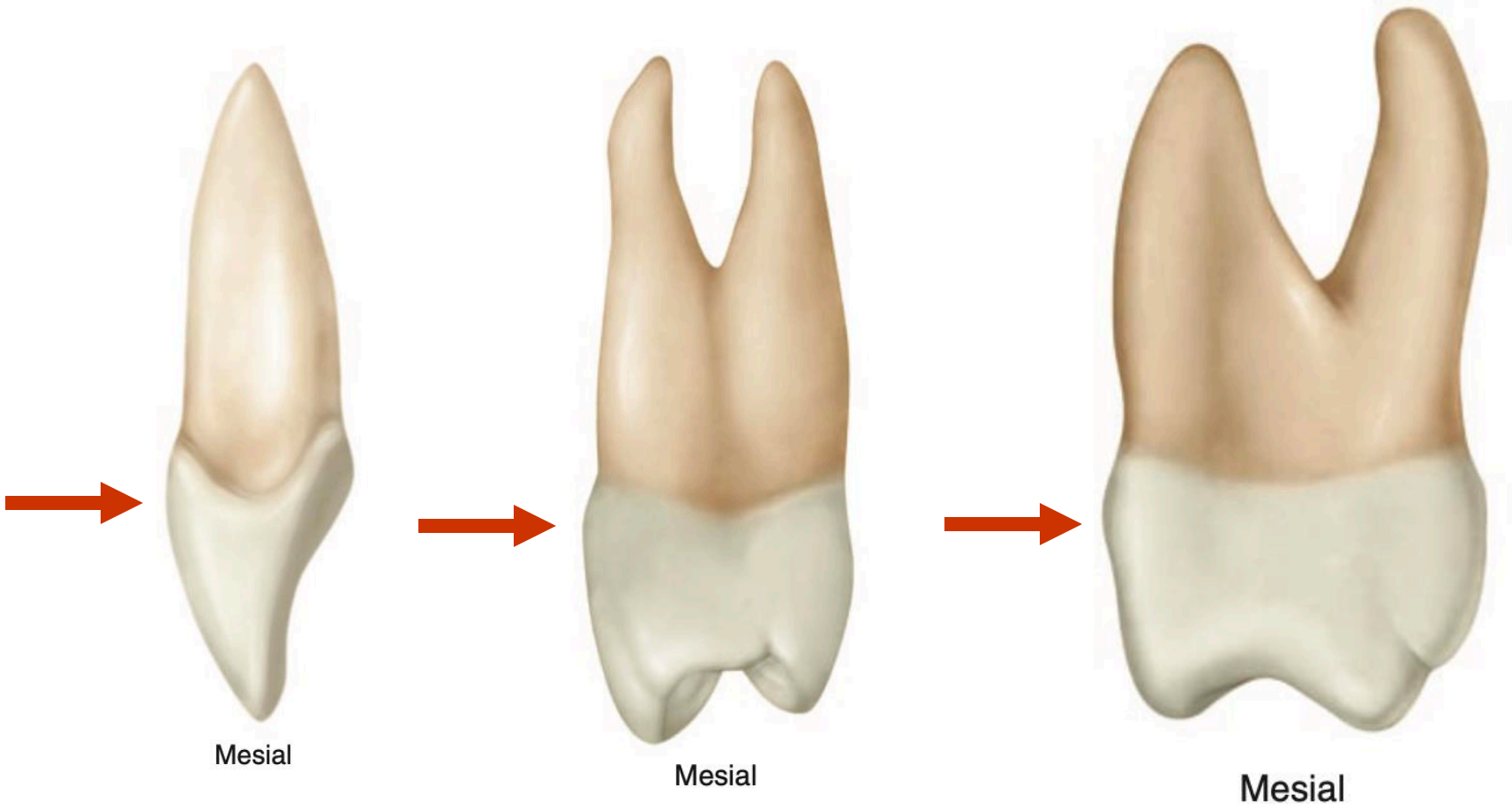


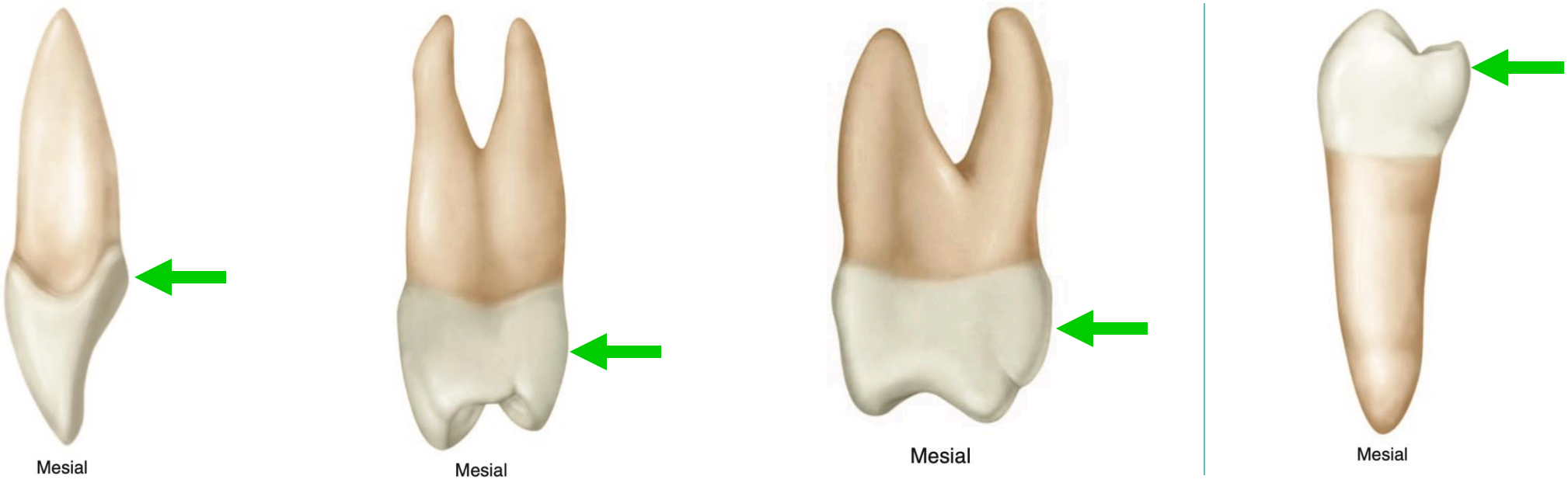
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Heights of Contour:

Facial surfaces

The height of contour of all teeth is located in the cervical one-third.





Heights of Contour: Lingual surfaces

- Anterior teeth: located in the cervical one-third.
- Posterior teeth: located in the occlusal or middle one-third.

Curvatures of Cervical Line (CEJ)

- The cervical line is curved (convex) toward the incisal (occlusal) on the mesial and distal surfaces and curved toward the apical on the facial and lingual surfaces.
- The depth of the curvature is greater on the mesial than the distal surface.
- The depth of the curvature on all surfaces is greatest on central incisors and decreases posteriorly.

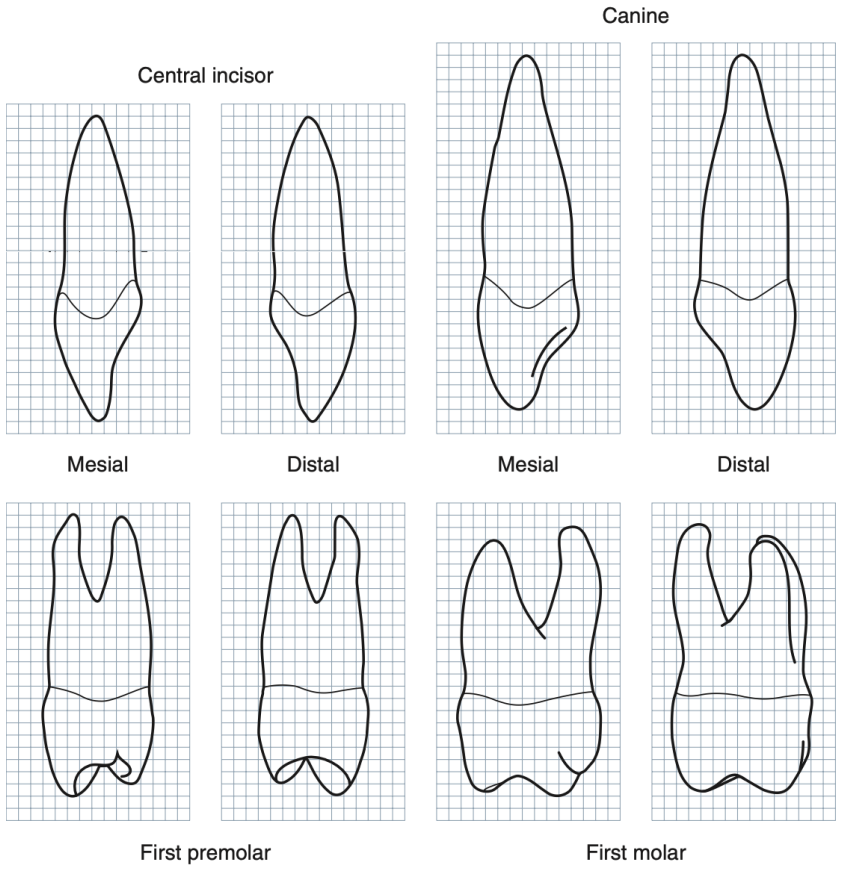


FIGURE 5-26 Graphs of typical forms of maxillary teeth accenting the outlines of cervical lines mesially and distally.

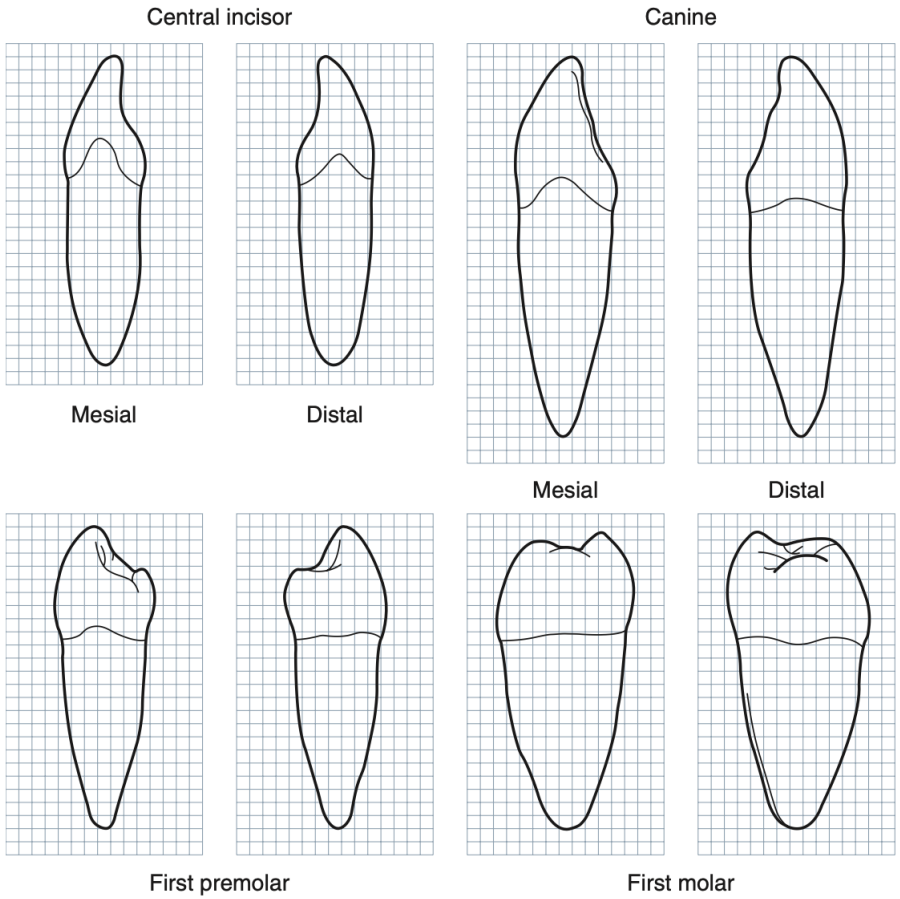


FIGURE 5-27 Graphs of typical forms of mandibular teeth accenting the outlines of cervical lines mesially and distally. (Grid = 1 sq mm.)

Proximal Contact Areas

- Contact areas increase in size with age. (Point -> area)
- Due to the abrasive action, the teeth become narrower mesiodistally and moving mesially.
- Aid in stabilizing the dental arch, prevent food packing between the teeth and important in the food flow pattern
- Become more cervically located and increase from anterior to posterior
- The distal contact area has a more cervical location than the mesial contact area.

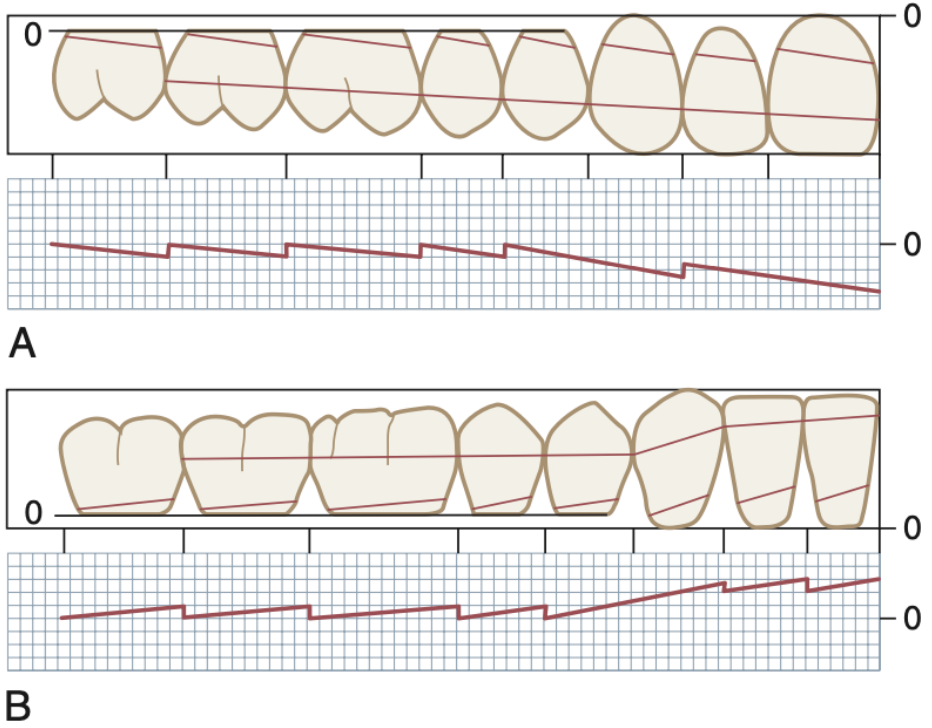


FIGURE 5-25 Schematic drawing of the crowns of maxillary and mandibular teeth with associated graphs of the average extent of curvatures of the cervical line mesially and distally. **A,** Maxillary teeth. **B,** Mandibular teeth. Compare the graph of cervical curvatures with a line drawn through the center of contact areas. Note that the graph tends to run somewhat parallel to this line. (Grid = 1 sq mm.)

Interproximal form





FIGURE 5-4 Schematic representation of form of gingiva in relation to contact area.

- Proximal contacts of approximating teeth in the arch protect soft tissues (gingiva) between the teeth; interproximal spaces
- Gingiva normally fills this pyramidal-like space and extends from alveolar bone to and around proximal contacts of the teeth; gingival or interdental papilla

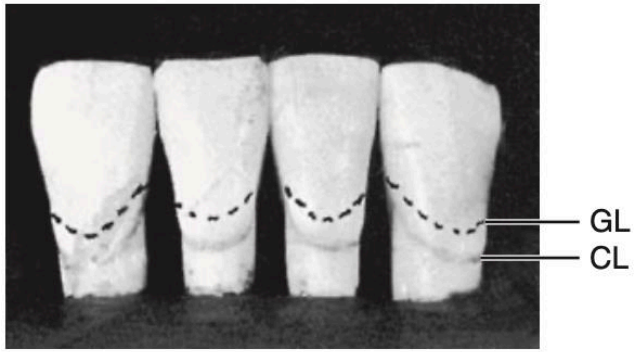


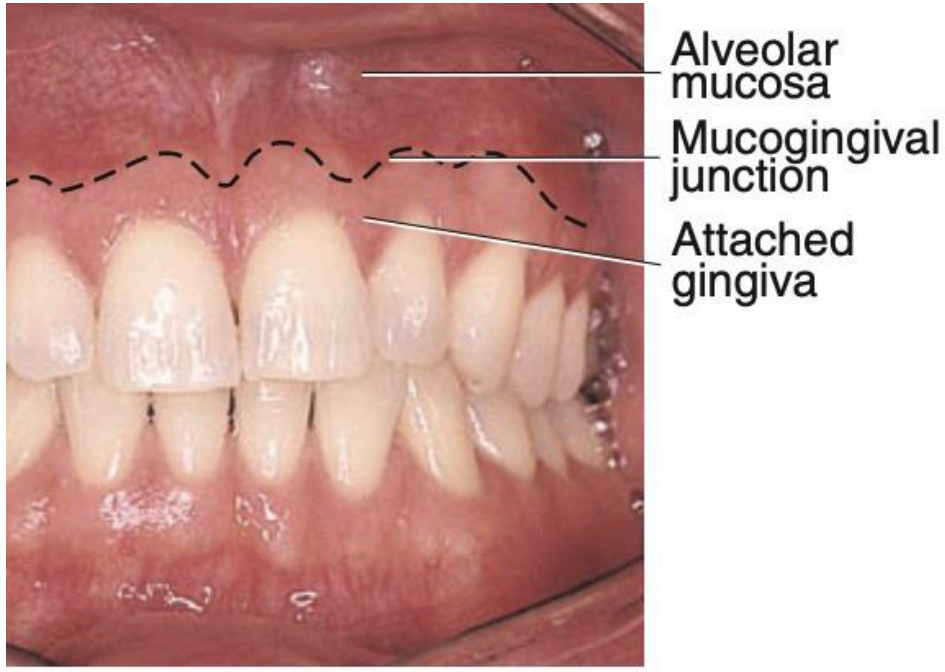
FIGURE 4-19 The mandibular centrals and laterals contact each other at the incisal third. The form of each tooth, plus the location of the contact areas, creates narrow pointed spaces between the teeth that differ from other interproximal spaces in other segments of the arches. *GL,* Variable gingival line representing the gingival level; *CL,* cervical line as established by the cementoenamel junction.



FIGURE 4-20 Contact design and interproximal (sometimes called *interdental*) spaces illustrated by the mandibular canine and first and second premolars. Note the variation in contact areas in relation to crown length.

Interproximal form

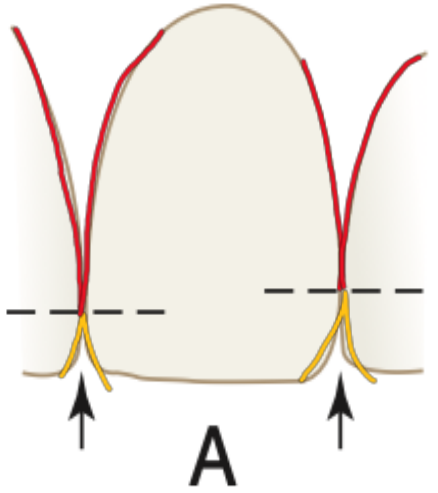
- The interproximal space (formed by proximal surfaces in contact) between the teeth are triangularly shaped spaces normally filled by gingival tissue.
- Base of triangle is alveolar process, sides of triangle are proximal surfaces of contacting teeth, and apex is in the area of contact.
- Proper contact and alignment of adjoining teeth allows proper spacing between them for the normal bulk of gingival tissue attached to bone and teeth.
- The surface keratinization of gingiva and the density and elasticity of gingival tissues help maintain tissues against trauma during mastication and invasion by bacteria.



Embrasures (Spillways)

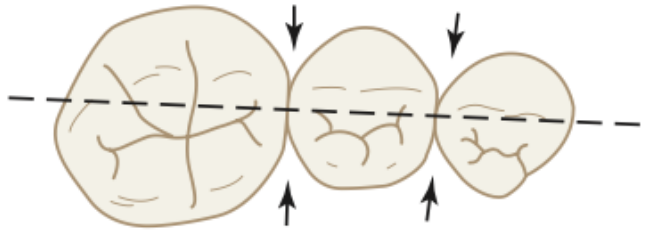
- When two teeth in the same arch are in contact, their curvatures adjacent to the contact areas form spillway spaces called “embrasure”
- Embrasure has two main physiological purposes
  - It provides a spillway for food during mastication, physiologic form that reduces forces brought to bear on teeth
  - It prevents food from being forced through contact areas
- The cervical embrasure corresponds to the interproximal space and is larger than the occlusal embrasure.
- The cervical embrasures are important for restoration

Cervical (gingival) embrasures (larger V)



Incisal (occlusal) embrasures (small v)

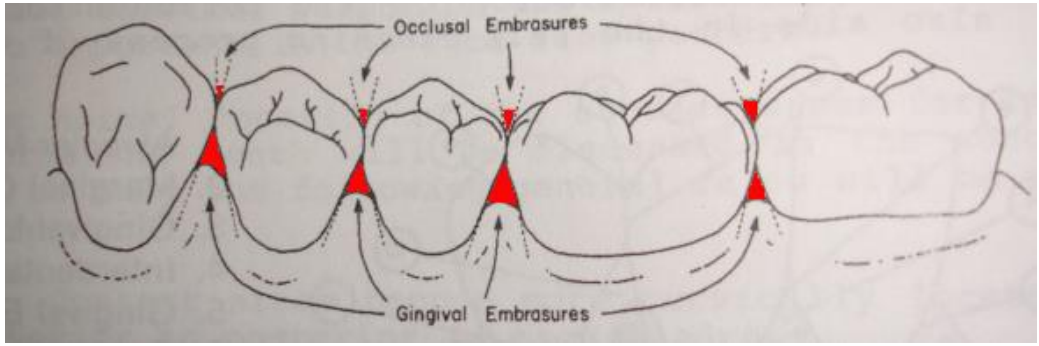
Labial (buccal) embrasures (small v)

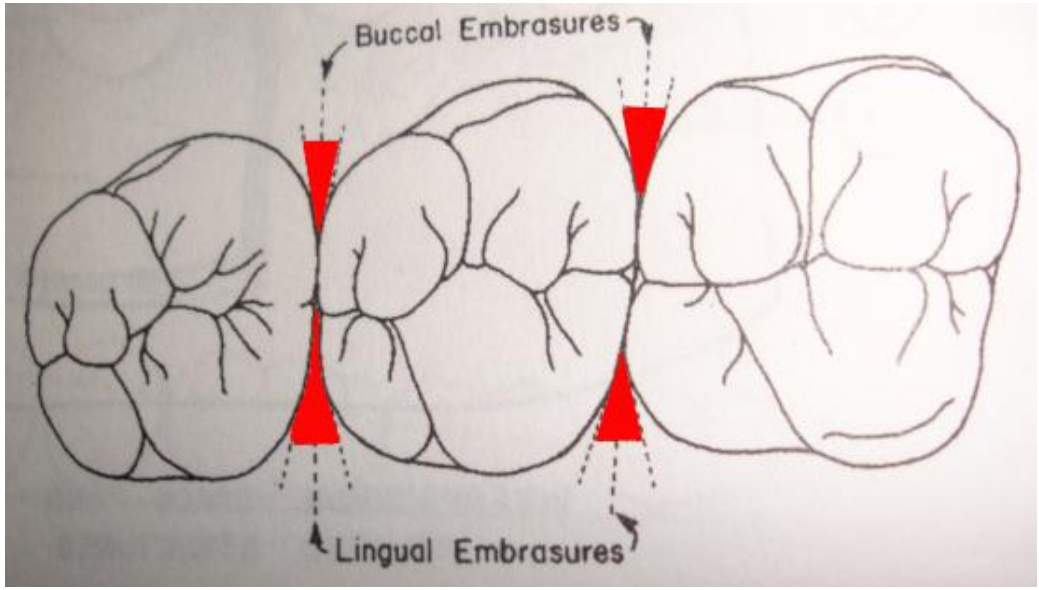


Lingual embrasures (larger V)

Embrasures (Spillways)

- Contact area becomes more cervically located the farther posteriorly, the relative size of the occlusal embrasure increases, the cervical embrasure decreases.
- Contact area moves farther to the buccal, the relative size of the lingual embrasure becomes larger.

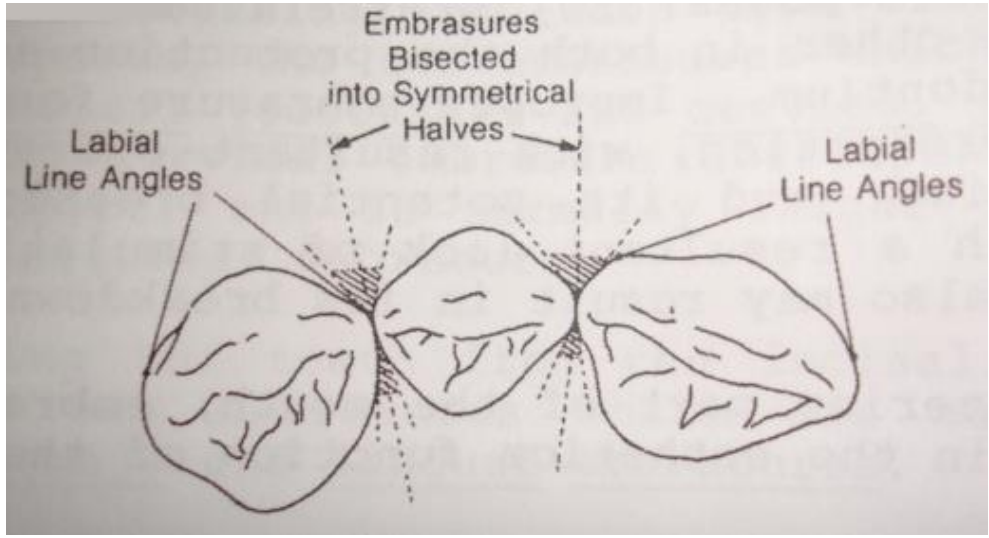




Embrasures (Spillways)

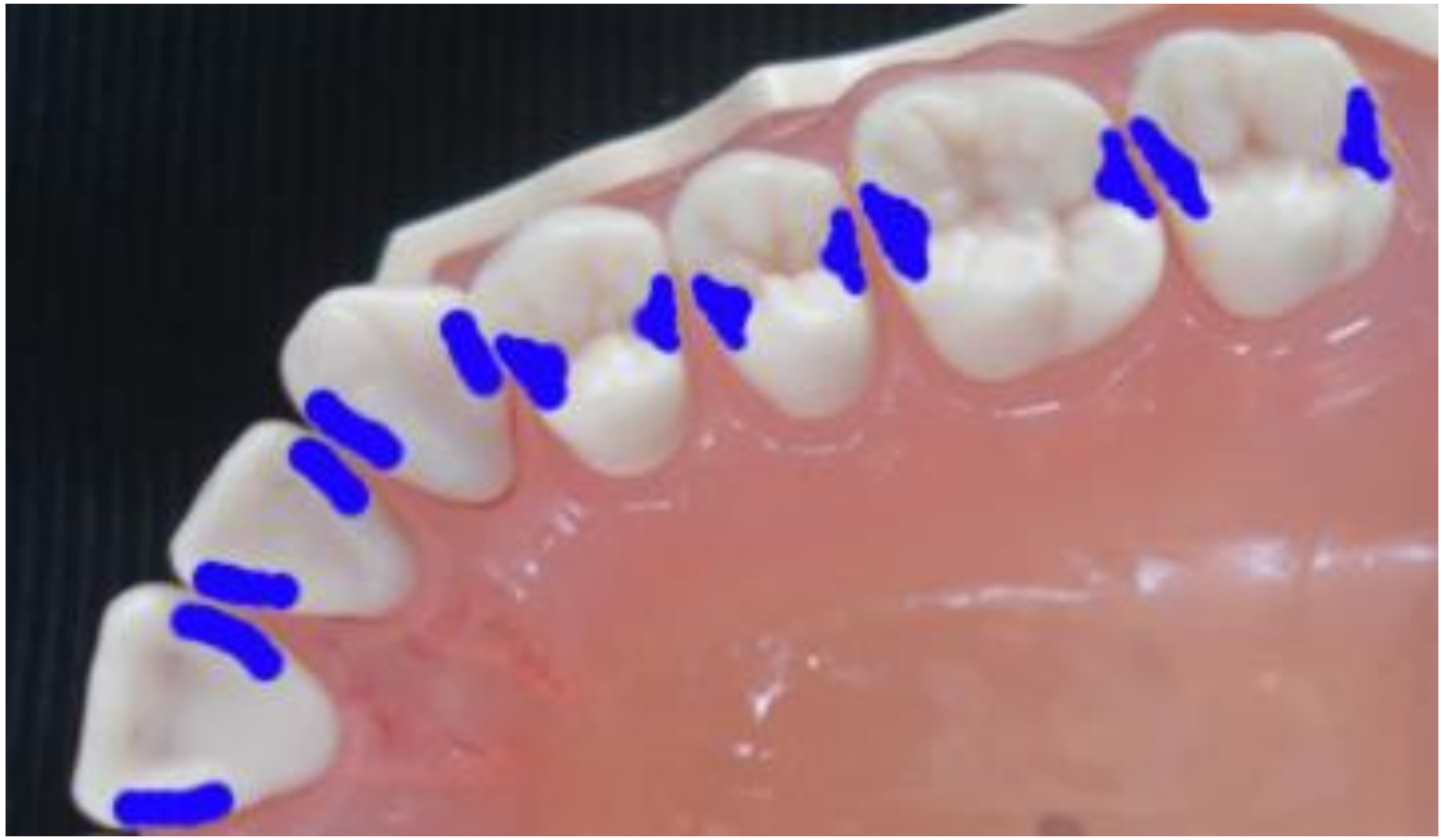
In the anterior teeth, embrasure is a factor in the esthetics function.





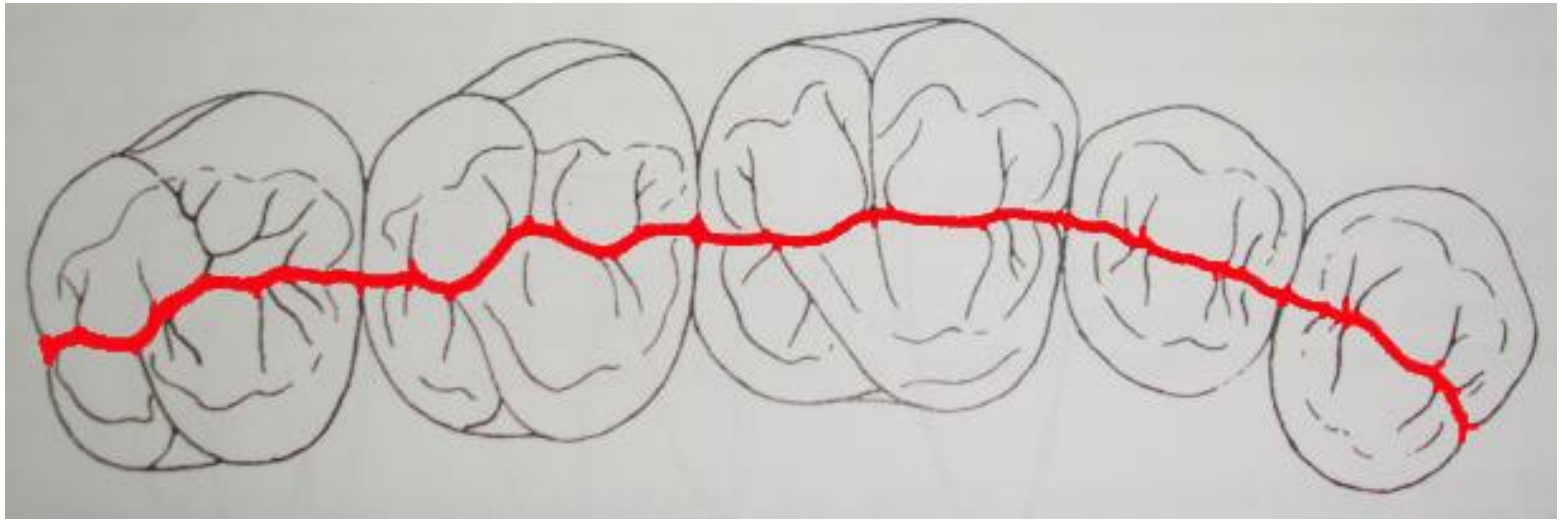
Continuity of Marginal Ridges

The heights and shapes of the adjacent marginal ridges directly affect the embrasure form.



Continuity of Central Grooves of Posterior teeth

Which results in a more efficient food flow pattern during mastication.



Good alignment







References

- Wheeler’s dental anatomy, physiology, and occlusion / Stanley J. Nelson, Major M. Ash Jr.—9th ed.
- Woelfel's dental anatomy/ Rickne C. Scheid, Gabriela Weiss,—8th ed.