Chapter 10





Tooth Identification

It is rare to find a full set of teeth in which every tooth met all the anatomic criteria of what a perfect tooth should be; too much variation occurs among individual teeth. When studying tooth identification, it is important to remember the extreme amounts of variation possible. The individual tooth you are trying to identify may meet most of the criteria of a maxillary central incisor, may be missing certain criteria for a maxillary central incisor, and may even meet some of the criteria of a maxillary canine or lateral incisor, yet it may still be a maxillary central incisor. Only after compiling all of the characteristics of the tooth in question and categorizing these characteristics can the individual tooth be identified—and then only *after* it becomes apparent that the tooth meets more characteristics of one type of tooth than another.

Following is a description of general characteristics of each of the teeth by their respective groupings: incisors, canines, premolars, and molars.* In identifying teeth, it is necessary to be able to differentiate among the left and right teeth in any particular group.

GENERAL RULES OF TOOTH IDENTIFICATION

1. The curvature of the cementoenamel junction (CEJ) is usually about 1 mm less on the distal surface of the tooth than on the mesial.
2. Tooth roots do not always curve; however, if they do curve, they usually curve distally, especially at the apex of the root. It is not uncommon, however, for the root to curve toward mesially.
3. The distal incisal edges of anterior teeth are more rounded than the mesial incisal edges.
4. Mandibular anterior teeth tend to wear on their labial incisal edges, whereas maxillary teeth wear on their lingual incisal edges. Unless a person has a class III occlusion, the maxillary teeth are facial to the mandibular teeth.
5. Permanent molars are generally smaller in height and have fewer cusps the more posteriorly they are positioned. For example, the permanent first molar usually has five cusps and is larger than a second or third molar. A mandibular first molar has a distal cusp on its facial surface, and a maxillary first molar has a cusp of Carabelli. The second and third molars are less likely to have these cusps; however, when they do, cusps are less well developed and are more like tubercles than cusps.
6. Permanent molars tend to have more **secondary** and **tertiary anatomy** the more posterior they are positioned. **Secondary anatomy** consists of extra grooves and pits in addition to the main primary developmental anatomy. These grooves and pits are more shallow than the primary anatomy and are more likely to be found on second and third molars. **Tertiary anatomy** refers to the extremely shallow and even more numerous grooves, pits and lines that third molars often have, giving them a more wrinkled appearance than first or second molars.
7. The roots of molars tend to be shorter and closer together the more posterior the molars are positioned, and the roots are often fused into one. First molars have the widest and longest roots of all molars.
8. The more posterior the molars are positioned, then the more variation of the anatomy is evident. Third molars

*The term *facial* has been used synonymously with *labial* and *buccal*. In general, the terms *labial* and *buccal* are used because they are most commonly accepted; however, *facial* is also used. *Facial* can be substituted for either *labial* and/or *buccal but labial is used only with the anterior teeth* and buccal only with the posterior teeth.

are more wrinkled and unpredictable in shape than second or first molars; they could have six cusps or one single conical cusp. They are also more likely to be congenitally missing than other molars.

INCISORS

1. Incisal two thirds appear flattened on labial and lingual sides (Fig. 10-1)
2. Incisal "biting" edge, not a cusp (Fig. 10-2)

Maxillary

1. Crown wider mesiodistally than faciolingually (Figs. 10-3 and 10-4)
2. Root has triangular cross section, being broader on facial side

Central

1. Greater crown-to-root ratio than lateral incisors (crown larger, root about same as or smaller than lateral incisors) (Figs. 10-5 and 10-6)
2. Mesioincisal angle relatively sharp (90-degree angle), with contact area in incisal third
3. Broad, smooth lingual fossa with well-developed cingulum

Lateral

1. Lesser crown-to-root ratio than central incisors (crown smaller, root about same as or larger than central incisors)
2. Mesioincisal angle rounded, with contact area at junction of middle and incisal thirds
3. Small cingulum, often with a lingual pit (Figs. 10-7 and 10-8)

Right-left

1. Mesioincisal angles more square than distoincisal angles (Fig. 10-9)
2. Crest of cervical line more often displaced toward distal from labial or lingual view
3. Mesiocervical line curves more incisally than distocervical line (Figs. 10-10)

Mandibular

1. Smaller than maxillary central or lateral incisor (Figs. 10-11 and 10-12)
2. Crown wider faciolingually than mesiodistally
3. Root with oval cross section
4. Incisal edge wears on labial surface (Fig. 10-13); incisal edge angled toward the lingual side

Central

1. Incisal view: incisal edge perpendicular to faciolingual axis of tooth
2. Mesial and distal lobes appear identical (Fig. 10-14)



FIG. 10-1. Maxillary right central incisor, mesial view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-2. Maxillary right central incisor, labial view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

Right-left

1. Cervical line curves more incisally on mesial than on distal surface
2. Height of curvature of cervical line on mesial greater than on distal surface
3. Root tip may have slight distal curve
4. Incisal edge worn wider on distal surface



Fig. 10-3. Maxillary right central incisor, lingual view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



Fig. 10-4. Maxillary right central incisor, distal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



Fig. 10-5. Maxillary right central incisor, labial view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



Fig. 10-6. Maxillary left lateral incisor, labial view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

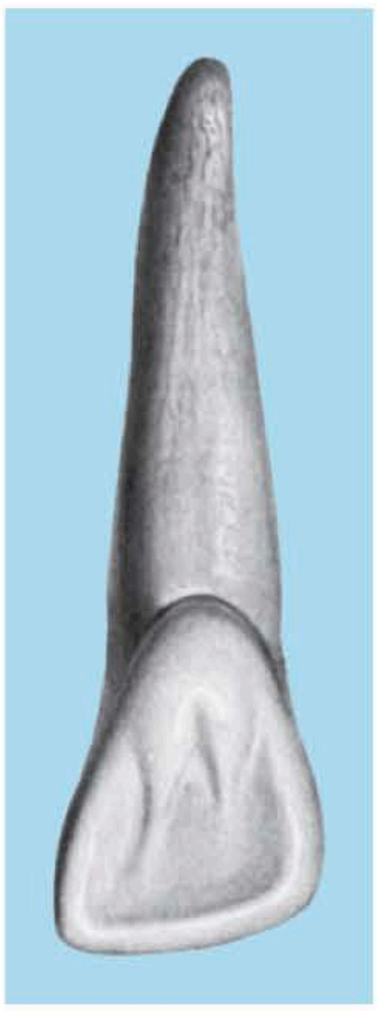


FIG. 10-7. Maxillary right lateral incisor, lingual view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

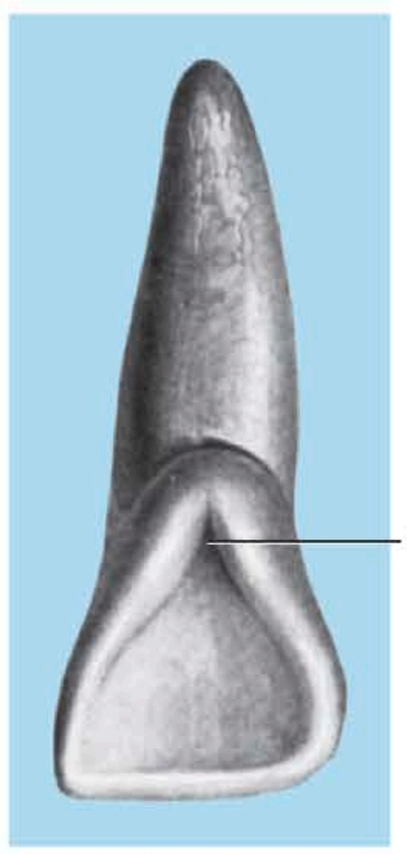


FIG. 10-8. Maxillary right lateral incisor, lingual view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

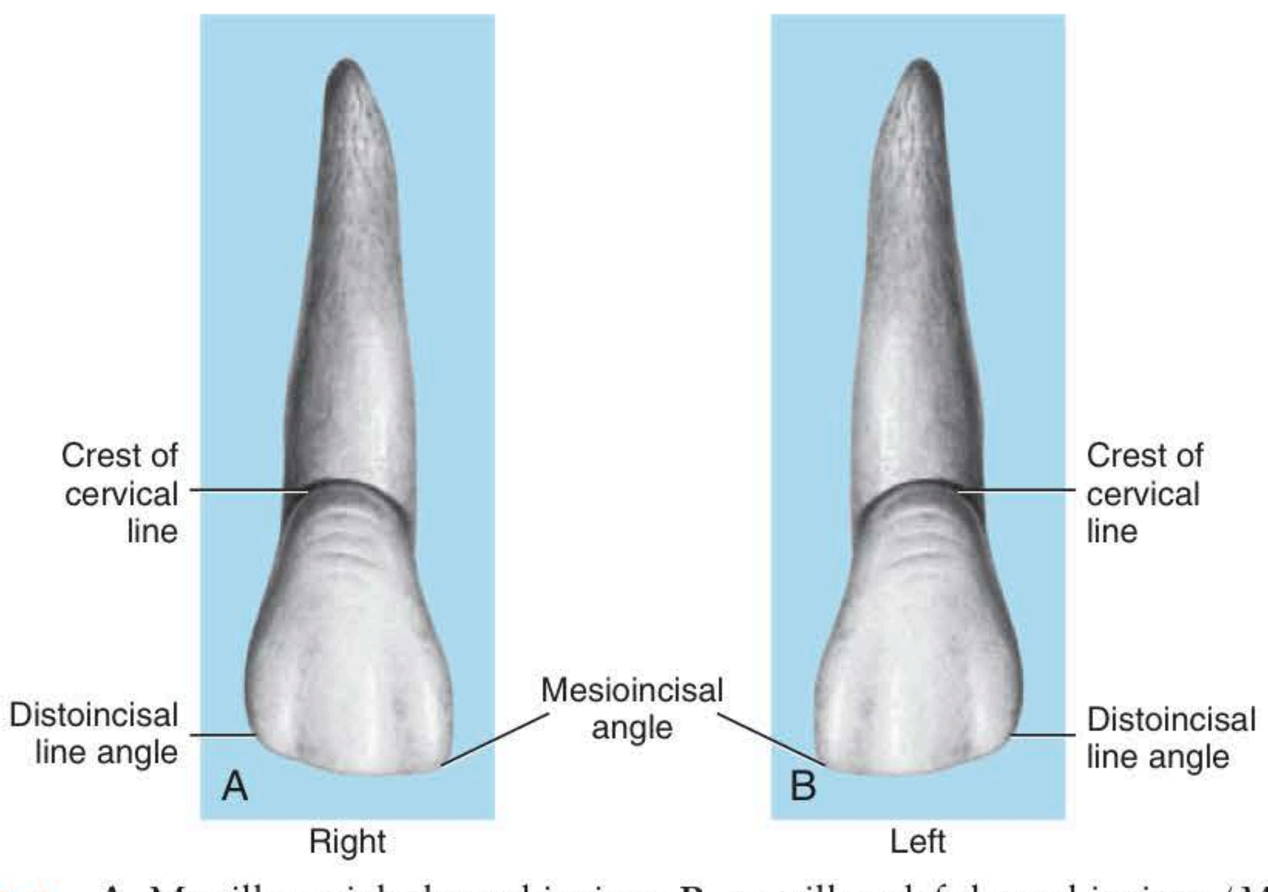


FIG. 10-9. **A,** Maxillary right lateral incisor; **B,** maxillary left lateral incisor. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

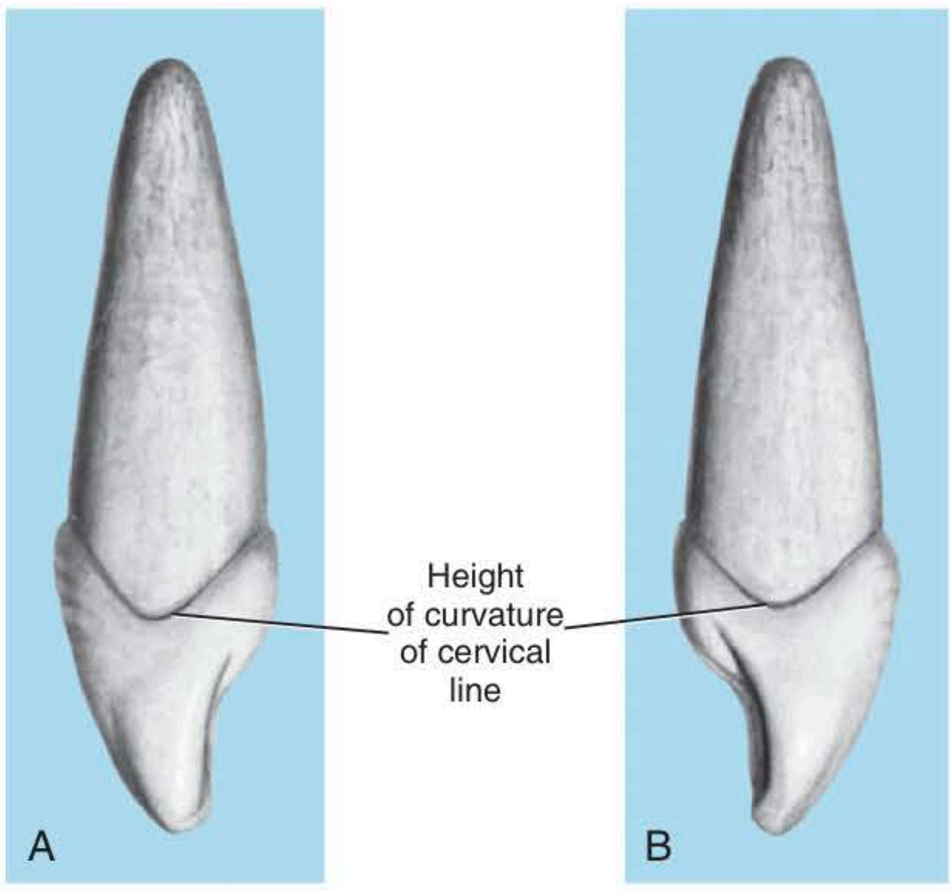


Fig. 10-10. **A,** Maxillary right lateral incisor, mesial view. **B,** Maxillary right lateral incisor, distal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



Fig. 10-11. Maxillary left lateral incisor is shown inverted for comparison. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



Fig. 10-12. Mandibular right lateral incisor. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

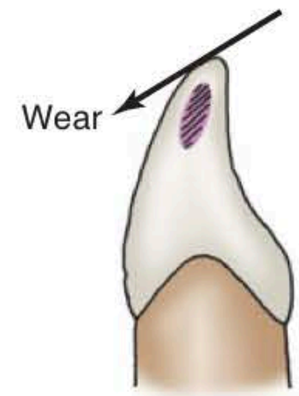


Fig. 10-13. Mandibular right lateral incisor, mesial view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



Fig. 10-14. Mandibular right central incisor, incisal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-15. Mandibular right lateral incisor, incisal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-16. Maxillary right canine, lingual view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

Lateral

1. Incisal view: distoincisal edge angled toward lingual side
2. Distal lobe appears larger than mesial lobe (Fig. 10-15)

Right-left

1. Cervical line curves more incisally on mesial than on distal surface
2. Incisal view: distal half of incisal edge rotated toward lingual side
3. Incisal edge worn wider and longer on distal surface

CANINES

1. Single conical cusp with well-developed mesiofacial lobe
2. Lingual cusp ridge from cusp tip to lingual fossa



FIG. 10-17. Maxillary right canine, labial view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

Maxillary

1. Lingual surface has well-developed marginal ridges, cingulum, and fossa (Fig. 10-16)
2. Larger and bulkier crown than incisors and lower canines; more distal convexity (Fig. 10-17)
3. Cusp tip directly midcenter over root

Right-left

1. Cervical line curves more incisally on mesial than on distal surface (Figs. 10-18 and 10-19)
2. Incisal view: distofacial lobe elongated or pulled out
3. Facial view: distal surface rounded and contact area located more cervically

Mandibular

1. Lingual surface almost smooth with poorly developed ridges, cingulum, and fossa (Fig. 10-20)
2. Narrower mesiodistal width than maxillary
3. More wear on facial (labial) surface (Fig. 10-21) when compared with maxillary canine

PREMOLARS

At least two cusps, one a single facial cusp, with one or two lingual cusps

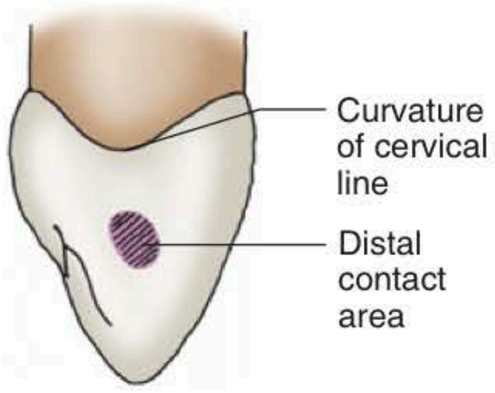


FIG. 10-18. Maxillary right canine, distal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

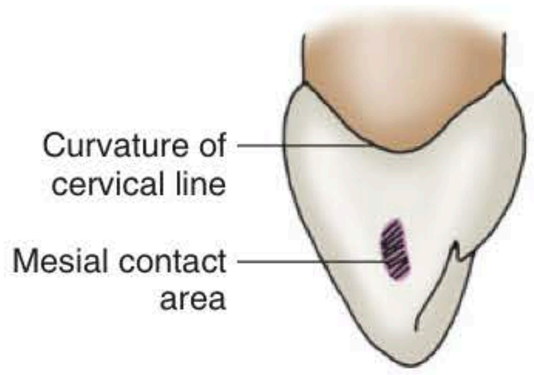


FIG. 10-19. Maxillary right canine, mesial view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-20. Mandibular right canine, lingual view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

Maxillary

1. Two major cusps, one buccal and one lingual, approximately equal in size
2. Distinctly wider faciolingually than mesiodistally
3. Proximal view: facial and lingual cusps nearly same height and both located over root trunk (Fig. 10-22)

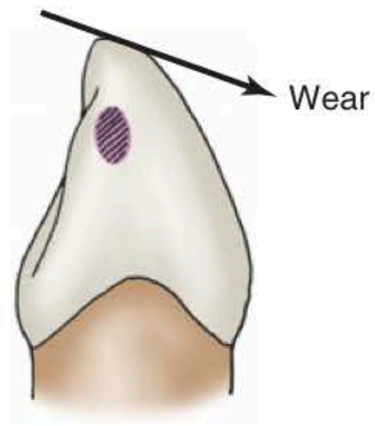


FIG. 10-21. Mandibular right canine, mesial view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-22. Maxillary right second premolar, distal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

First premolar

1. Facial cusp slightly longer than lingual cusp (Fig. 10-23)
2. Often has two roots, buccal and lingual
3. Occlusal surface has well-developed central groove, with little supplemental grooving
4. Mesial surface has depression above contact area starting below cervical line and usually extending onto root

Right-left

1. Mesial marginal groove
2. Cervical line on mesial curves more occlusally than on distal surface
3. Occlusal view: mesiofacial cusp ridge forms 90-degree angle with mesial marginal ridge; distofacial cusp ridge forms rounded angle with distal marginal ridge (Fig. 10-24)



FIG. 10-23. Maxillary right first premolar, mesial view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-24. Maxillary right first premolar, occlusal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-25. Maxillary right second premolar, mesial view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-26. Maxillary right second premolar, occlusal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-27. Mandibular right first premolar, mesial view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

Second premolar

1. Facial and lingual cusps are nearly same height (Fig. 10-25)
2. Usually single rooted
3. Short central groove, with frequent and numerous supplemental grooves
4. No depression on mesial or distal crown surfaces

Right-left

Lingual cusp displaced slightly toward mesial side (Fig. 10-26)

Mandibular

1. Prominent facial cusp with one or two much smaller lingual cusps
2. Nearly equal faciolingual and mesiodistal widths
3. Proximal view: facial cusp much larger; facial cusp tip at or near midaxis of root; lingual cusp(s) extend lingually past lingual border of root (Fig. 10-27)



Fig. 10-28. Mandibular right first premolar, proximal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



Fig. 10-29. Mandibular right first premolar, occlusal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

First premolar

1. Proximal view: occlusal surface tilted strongly toward lingual side (Fig. 10-28)
2. Occlusal view: oval outline with strong transverse ridge and no central pit (Fig. 10-29)

Right-left

1. Cervical line on mesial surface curves more occlusally than on distal surface
2. Often a depression or groove where mesial marginal ridge joins lingual cusp ridge (Fig. 10-30)
3. Distal marginal ridge more prominent

Second premolar

1. Occlusal view: pentagonal outline, with a central pit and no transverse ridge (Fig. 10-31)
2. Proximal view: occlusal surface less lingually tilted (Fig. 10-32)
3. May have two lingual cusps



Fig. 10-30. Mandibular left first premolar, occlusal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



Fig. 10-31. Mandibular right second premolar, occlusal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



Fig. 10-32. Mandibular right second premolar, distal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

Right-left

Proximal view: more of occlusal surface visible from distal than from mesial because of distal inclination of crown-to-root axis

MOLARS

Three to five cusps, with at least two facial

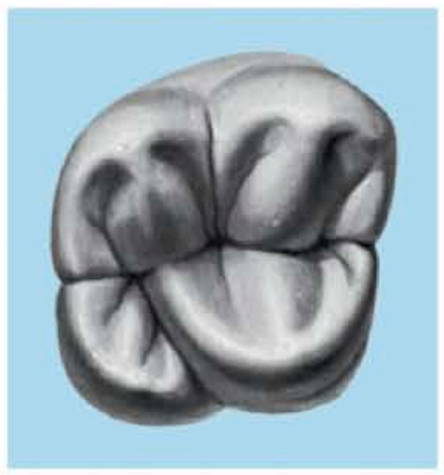


FIG. 10-33. Maxillary right first molar, occlusal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-34. Maxillary right first molar, lingual view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

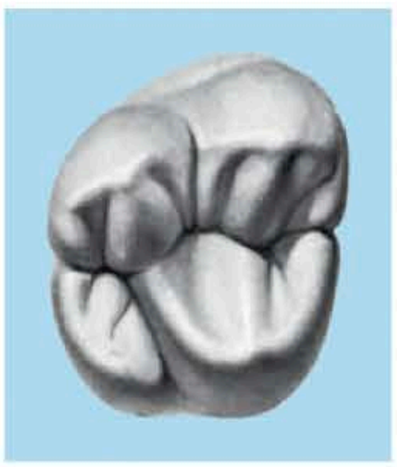


FIG. 10-35. Maxillary right second molar, occlusal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-36. Maxillary right second molar, lingual view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

Maxillary

1. Crowns wider faciolingually than mesiodistally
2. Three roots: two on facial and one on lingual side

First molar

1. Occlusal view: strong **oblique ridge** less likely to be crossed by a groove (Fig. 10-33)
2. Three roots widely separated
3. Often has a fifth cusp (Carabelli's) on mesiolingual cusp (Fig. 10-34)

Right-left

Mesiolingual cusp always much larger than distolingual cusp

Second molar

1. Occlusal view: smaller oblique ridge usually interrupted by a groove (Fig. 10-35)
2. Roots closer together (Fig. 10-36)
3. No fifth cusp
4. Distolingual cusp smaller than on first molar

Right-left

Mesiolingual cusp always much larger than distolingual cusp

Third molar

1. Distolingual cusp progressively smaller or missing entirely (Fig. 10-37)
2. Roots either fused or very close together and much shorter
3. No oblique ridge (Fig. 10-38)



Fig. 10-37. Maxillary right third molar, lingual view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



Fig. 10-38. Maxillary right third molar, occlusal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

Right-left

1. Distofacial cusp much shorter than other molars
2. Roots curved distally

Mandibular

1. Crowns wider mesiodistally than faciolingually
2. Two roots: one mesial and one distal

First molar

1. Three facial cusps and two facial grooves (Fig. 10-39)
2. Roots widely separated and relatively vertical

Right-left

Distal cusp is smallest facial cusp (Fig. 10-40)

Second molar

1. Only two facial cusps and one facial groove (Fig. 10-41)



Fig. 10-39. Mandibular right first molar, buccal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

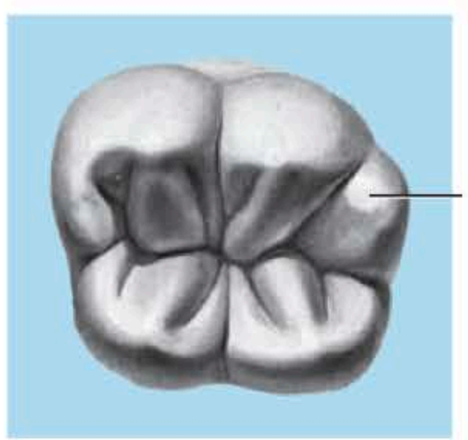


Fig. 10-40. Mandibular right first molar, occlusal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



Fig. 10-41. Mandibular right second molar, buccal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

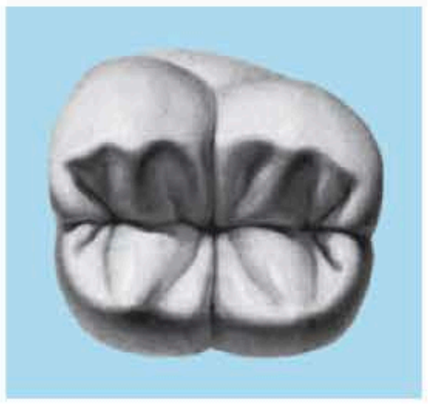


FIG. 10-42. Mandibular right second molar, occlusal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-43. Mandibular right second molar, distal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)



FIG. 10-44. Mandibular right third molar, occlusal view. (*Modified from Zeisz RC, Nuckolls J:* Dental anatomy, *St Louis, 1949, Mosby.*)

2. Occlusal groove well defined but travels straight mesial to distal and forms a cross (+) with facial and lingual grooves (Fig. 10-42)
3. Roots close together

Right-left

Buccal height of contour in cervical third; lingual height of contour in middle third (Fig. 10-43)

Third molar

1. Secondary and tertiary anatomy (Fig. 10-44)
2. Short roots, often fused and curved distally

Right-left

Crown tapers distally; wider faciolingually on mesial than on distal surface (also true of mandibular first and second molars)

REVIEW QUESTIONS

1. Which anterior incisors are much wider mesiodistally than faciolingually?
2. Which incisors, centrals or laterals, have the greater crown-to-root ratio?
3. Which incisors are nearly identical?
4. In general, does the cervical line curve more incisally on the mesial or the distal surface?
5. Which has more developed lingual marginal ridges, the maxillary or mandible?
6. On incisors, which incisal line angle is more rounded, mesial or distal?
7. Which incisor has its incisal edge worn on the labial side, maxillary or mandibular?
8. Which mandibular incisor is longer?
9. Which canine has more distal convexity?
10. Which is more concave, the inside or outside of a football helmet?
11. On canines, which surface is least convex, mesial or distal?
12. Which premolars are most likely to have two roots?
13. Which premolar is most likely to have three cusps?
14. Which premolar is most likely to have a well-defined mesial marginal groove?
15. Which molars, first or second, are most likely to have five cusps?
16. Name the smallest of the five cusps of a mandibular first molar.
17. The fifth cusp of a maxillary first molar is located on what other cusp?
18. The roots are closer together on a first or second molar?
19. The roots are longest on a first or second molar?
20. Which molar is most likely to have three buccal cusps?

21. If two teeth look identical, such as two mandibular incisors, the one that shows greater curvature of the CEJ is more likely which of the following:
    a. Central
    b. Lateral
    c. Neither
22. If the root of the tooth described in question 21 has a curve of the root at its apex, this curve more likely points in which of the following ways:
    a. Mesially
    b. Distally
    c. Neither
23. If this same tooth has a rounded incisal ridge on the same side toward which the root curves, this rounded edge is more likely to be which of the following:
    a. Mesial incisal ridge
    b. Distal incisal ridge