

# ***INTRODUCTION & NOMENCLATURE***



The first step in understanding dental anatomy is to learn the nomenclature, or the system of names, used to describe or classify the material included in the subject.

# NOMENCLATURE

## *THE DECIDUOUS TEETH*

At birth there are usually no teeth visible in the mouth, but many teeth in various stages of development are found in the jaws. The post natal period of development of the deciduous dentition spans about 2 1/2 years.

This primary dentition remains intact until a child is about 6 years of age, when the transition to the permanent dentition begins. The no. of deciduous teeth present in the child is usually 20 if none are congenitally missing or lost as a result of disease.

The denomination and no. of teeth for all mammalia are expressed by formulae.

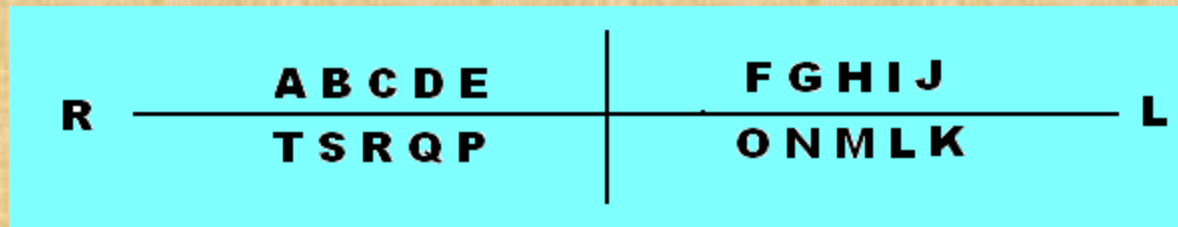
The denomination of each tooth is represented by its initial letter, I for incisor, C for canine, P for premolar, M for molar; each letter is followed by a horizontal line and the no. of each type of tooth is placed above the line for the maxilla (upper jaw) and below the line for the mandible (lower jaw). The formula includes one side only.

The deciduous dental formula in humans is:

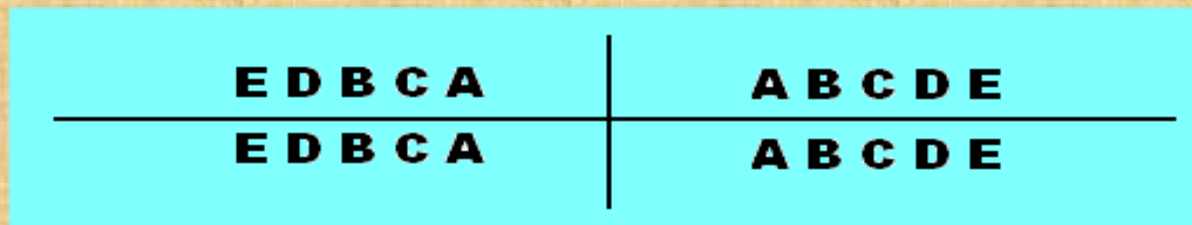
$$\mathbf{I\ 2/2\ C\ 1/1\ M\ 2/2 = 10}$$

This formula should be read thus: Incisors, two maxillary and two mandibular; canines, one maxillary and one mandibular; molar, two maxillary and two mandibular – or ten altogether on one side, right or left.

In clinical practice, the deciduous teeth in the maxillary arch, beginning with the right second molar, are designated by letters A through J. Beginning with the left mandibular second molar, the teeth are designated by letters K through T. the notation for the entire deciduous or primary dentition is



Another notation system divides the arches into quadrants with the entire dentition notated as



Thus for a single tooth, such as the left maxillary central incisor the designation is  $\underline{L}A$ .

## THE PERMANENT TEETH

The transition to the permanent dentition begins with the emergence and eruption of the first permanent molars, shedding of the deciduous incisors, and emergence and eruption of the permanent incisors.

After the shedding of the deciduous canines and molars, emergence and eruption of the permanent canines and premolars, and emergence and eruption of the second permanent molars, the permanent dentition is completed except for the third molar.

This process required about 20 years to complete. The permanent or succedaneous teeth replace the exfoliated deciduous teeth in a sequence of eruption that exhibits great variety.

The no. of teeth in adults, including third molars when present is 32

The permanent dental formulae in human is:

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

Premolars have now been added to the formula, two maxillary and two mandibular, and a third molar has been added, one maxillary and one mandibular.

In a clinical notation system for the permanent dentition, the maxillary teeth are numbered from 1 through 16, beginning with the right third molar. Beginning with the mandibular left third molar, the teeth are numbered 17 through 32.

Thus, the right maxillary first molar is designated as 3, the maxillary left central incisor as 9, and the mandibular right first molar as 30. The entire dentition is designated by the notation

<b>R</b>	<b>1 2 3 4 5 6 7 8</b>	<b>9 10 11 12 13 14 15 16</b>	<b>L</b>
	<b>32 31 30 29 28 27 26 25</b>	<b>24 23 22 21 20 19 18 17</b>	

Another notation system uses the quadrant system, in which, beginning with the central incisor, the teeth are numbered 1 through 8.

For example, the maxillary left first molar is designated as  $\overline{L}6$

The palmer notation for the entire permanent dentition is:

<b>8 7 6 5 4 3 2 1</b>	<b>1 2 3 4 5 6 7 8</b>
<b>8 7 6 5 4 3 2 1</b>	<b>1 2 3 4 5 6 7 8</b>

# THE CROWN AND ROOT

Each tooth has a crown and root portion. The crown is covered with enamel, and the root portion is covered with cementum. The crown and root join at the cements-enamel junction. This junction, also called the cervical line, is plainly visible on a specimen tooth.

The main bulk of the tooth is composed of dentine, which is clear in a cross section of the tooth. This cross section displays a pulp chamber and a pulp canal, which normally contain the pulp tissue. The pulp chamber is in the crown portion mainly, and the pulp canal is in the root. The spaces are continuous with each other and are spoken of collectively as the pulp cavity.

The four tooth tissues are enamel, cementum, dentine, and pulp. The first three are known as hard tissues, the last as soft tissue. The pulp tissue furnishes the blood and nerve supply to the tooth. The tissues of the teeth must be considered in relation to the other tissues of the orofacial structures if the physiology of the teeth is to be understood.

The crown of the incisor tooth may have an incisal ridge or edge, as in the central and lateral incisors; a single cusp, as in the canines; or two or more cusps, as on premolars and molars. Incisal ridges and cusp form, the cutting surfaces on tooth crowns.

The root portion of the tooth may be single, with one apex or terminal end, as usually found in anterior teeth and some of the premolars; or multiple, with a bifurcation or trifurcation dividing the root portion into two or more extension or roots with their apices or terminal ends, as found on all molars and in some premolars.

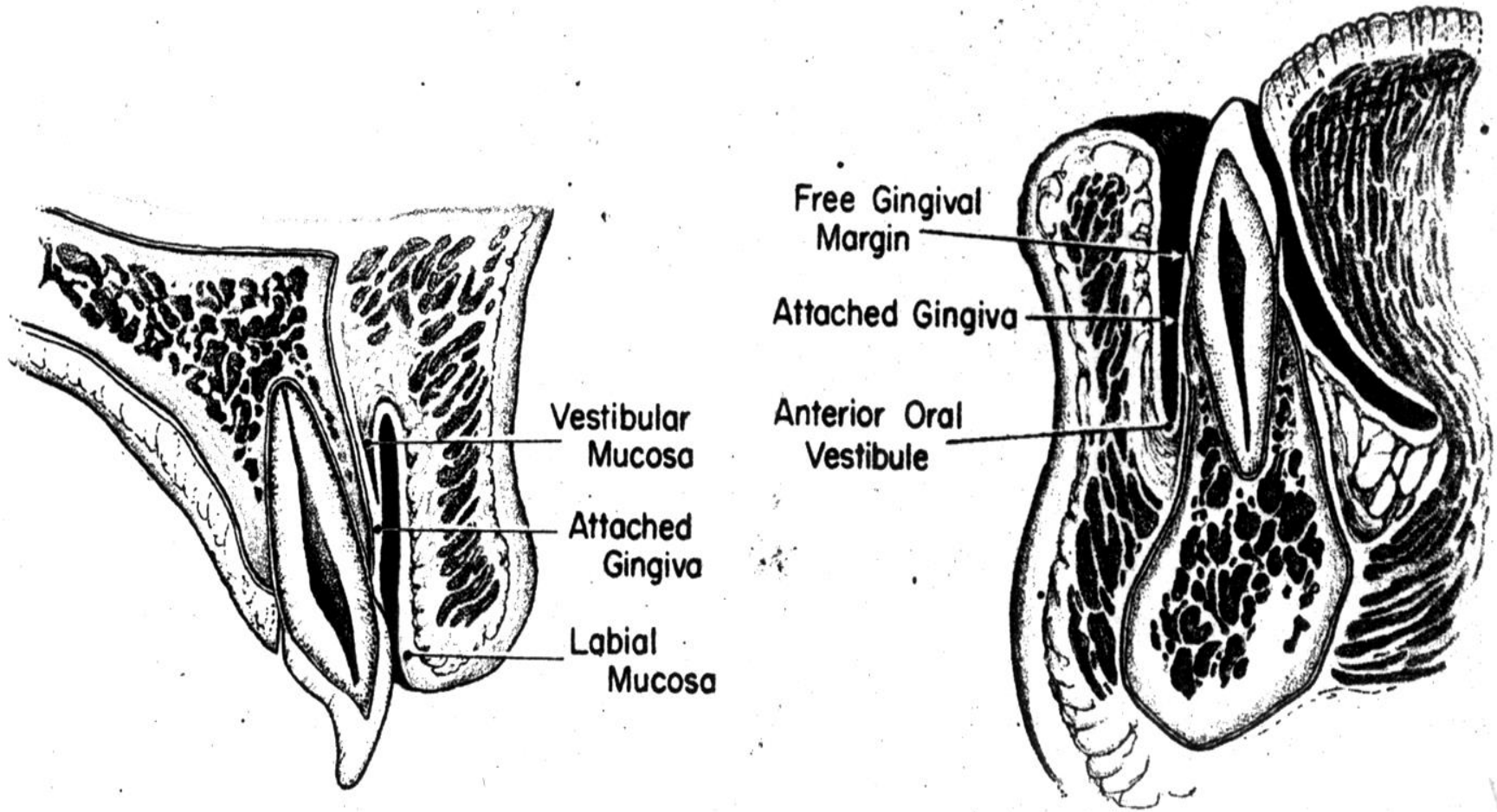
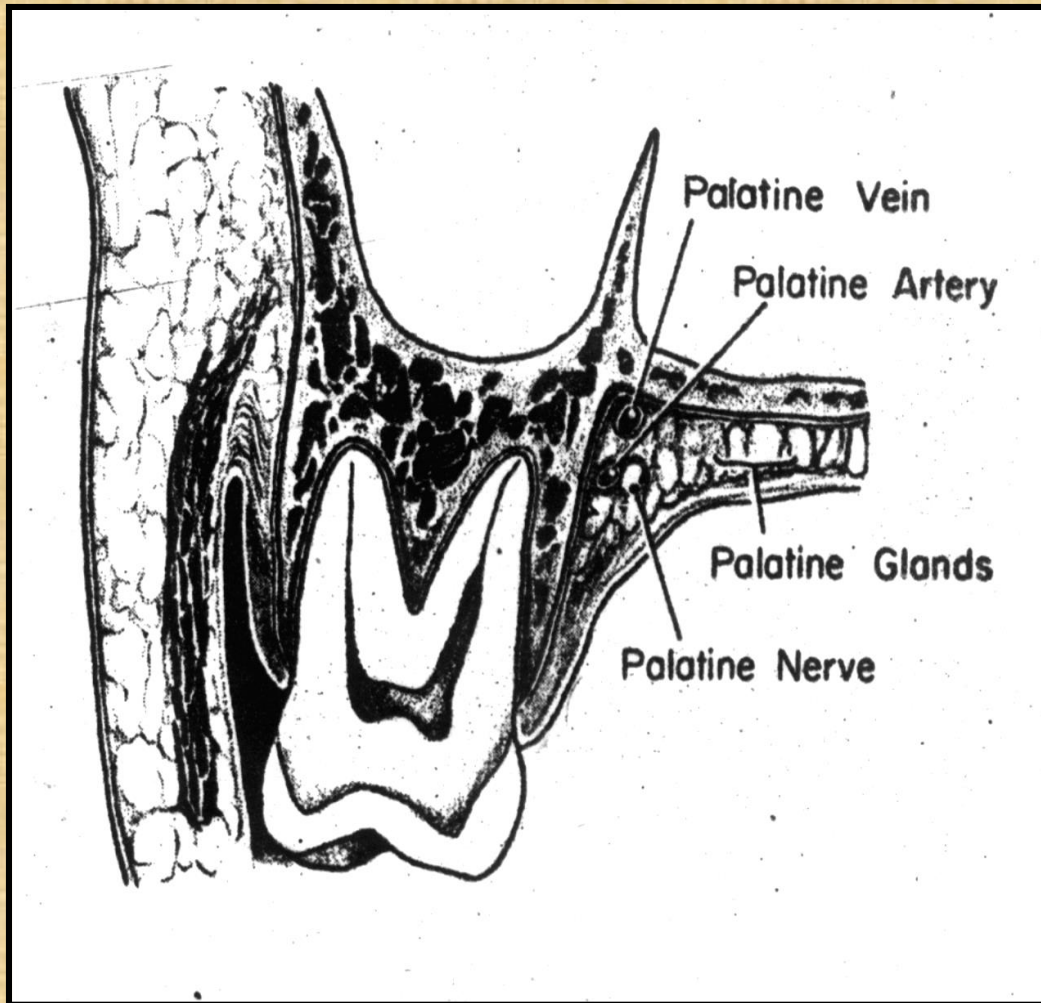


Figure 1-4. Sagittal sections through the maxillary and mandibular central incisors.

Sagittal sections through the maxillary and mandibular central incisors.



Section through the second maxillary molar and adjacent tissues.

The root portion of the tooth is firmly fixed in the bony process of the jaw, so that each tooth is held in its position relative to the others in the dental arch.

That portion of the jaw which serves as a support for the tooth is called the alveolar process. The bone of the tooth socket is called the alveolus (plural, alveoli)

The crown portion is never covered by bone tissue after it is fully erupted, but it is partly covered at the cervical third in young adults by soft tissue of the mouth known as the gingival or gingival tissue, or gum tissue. In older persons, all of the enamel and frequently some cervical cementum may be exposed in the oral cavity.

# SURFACES AND RIDGES

The crowns of the incisors and canines have four surfaces and a ridge, and the crowns of the premolars and molars have five surfaces. The surfaces are named according to their positions and uses.

In the incisors and canines, the surfaces toward the lips called labial surfaces; in the premolars and molars, those facing the cheek are the buccal surfaces. When labial and buccal surfaces are spoken of collectively, they are called facial surfaces.

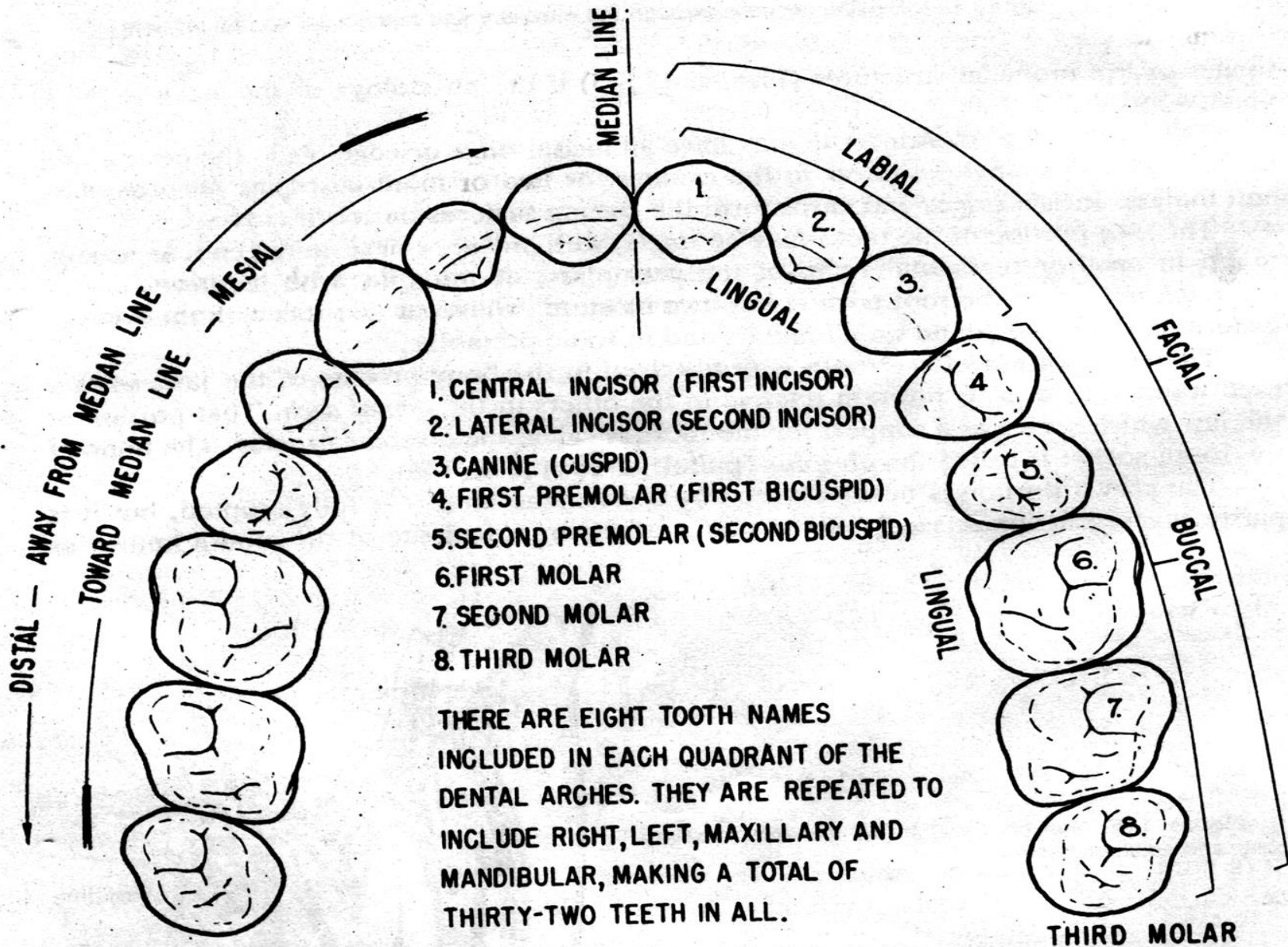
All surfaces facing toward the tongue are called lingual surfaces. The surfaces of the premolars and molars which come in contact with those in the opposite jaw during the act of closure are called occlusal surfaces. In incisors and canines, those surfaces are called incisal surfaces.

The surfaces of the teeth facing toward adjoining teeth in the same dental arch are called proximal or proximate surfaces. The proximal surfaces may be called either mesial or distal.

These terms have special reference to the position of the surfaces relative to the median line of the face.

This line is drawn vertically through the center of the face, passing between the central incisors at their point of contact with each other in both maxilla and the mandible.

Those proximal surfaces which, following the curve of the arch, are faced toward the median line, are called mesial surface, and those most distant from the median line are called distal surfaces.



**Figure 1-7.** Application of nomenclature. Tooth numbers 1 to 8 indicating left maxillary teeth. Tooth surfaces related to the tongue (lingual), cheek (buccal), lips (labial), and face (facial) apply to four quadrants as well as to the upper left quadrant. The teeth or their parts or surfaces may be described as being away from the midline (distal) or toward the midline (mesial).

Four teeth have mesial surfaces that contact each other: the maxillary and mandibular central incisors.

In all other instances, the mesial surface of one tooth contacts the distal surface of its neighbor, except for the distal surfaces of third molars of permanent teeth and distal surfaces of second molars in deciduous teeth, which have no teeth distal to them.

The area of the mesial or distal surface of a tooth which touches its neighbor in the arch is called the contact area.

# OTHER LANDMARKS

In order to study an individual tooth intelligently, we must be able to recognize all landmarks of importance by name. Therefore, at this point it will be necessary to become familiar with additional terms, such as:

Cusp	Triangular ridge	Development groove
Tubercle	Transverse ridge	Supplemental groove
Cingulum	Oblique ridge	Pit
Ridge	Fossa	Lobe
Marginal ridge	Sulcus	

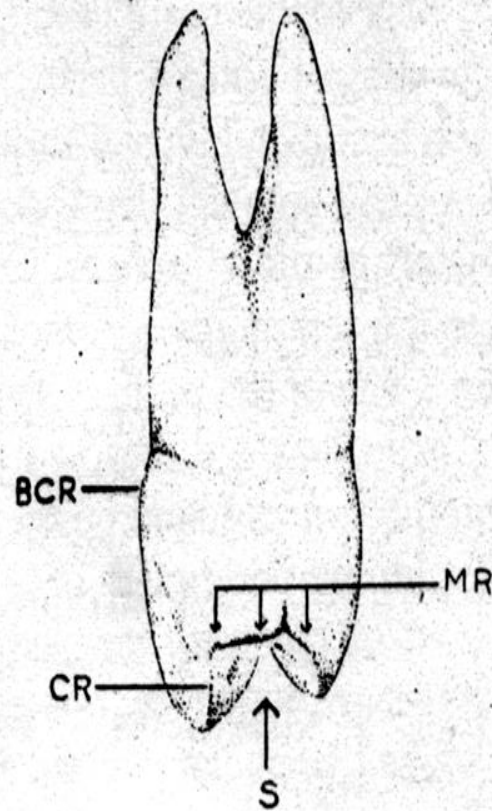
A **cuspid** is an elevation or mound on the crown portion of a tooth making up a divisional part of the occlusal surface.

A **tubercle** is a smaller elevation on some portion of the crown produced by an extra formation of enamel. These are deviation from the typical form.

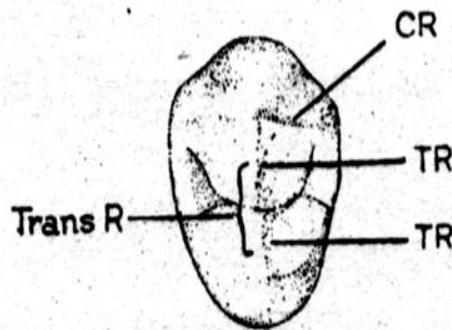
A **Cingulum** is the lingual lobe of an anterior tooth. It makes up the bulk of the cervical third of the lingual surface. Its convexity mesiodistally resembles a girdle encircling the lingual surface at the cervical third.

A **ridge** is any linear elevation on the surface of a tooth and is named according to its location.(e.g. buccal ridge).

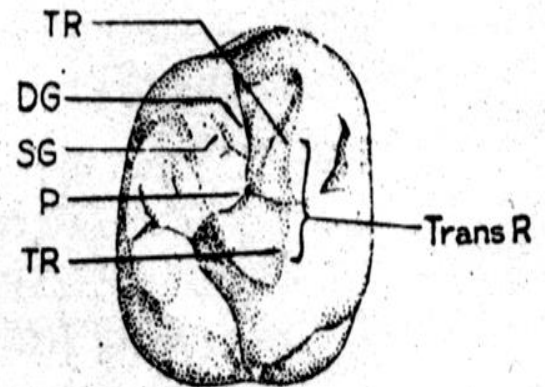
**Figure 1-10.** a, Mesial view of a maxillary right first premolar. *S*, Sulcus traversing occlusal surface; *MR*, marginal ridge; *CR*, cusp ridge; *BCR*, buccocervical ridge. b, Occlusal view of maxillary right first premolar; *CR*, cusp ridge; *TR*, triangular ridges; *Trans R*, transverse ridge, formed by two triangular ridges crossing the tooth transversely. c, Occlusal view of a maxillary right molar. *TR*, triangular ridge; *DG*, developmental groove; *SG*, supplemental groove; *P*, pit formed by junction of developmental grooves; *TR*, triangular ridge; *Trans R*, transverse ridge.



a



b



c

**Marginal ridges** are those rounded borders of the enamel that form 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.

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.

The **oblique ridge** is a ridge crossing obliquely the occlusal surfaces of maxillary molars. It is formed by the union of the triangular ridge of the distobuccal cusp and the distal ridge of the mesiolingual cusp.

A **fossa** is an irregular depression or concavity. Lingual fossae are on the lingual surface of incisors. Central fossae 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 grooves

**Triangular fossae** are found on molars and premolars on the occlusal surfaces mesial or distal to marginal ridges. They are sometimes found on marginal ridges and the Cingulum meet.

A **Sulcus** is 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.

A **developmental groove** is a shallow groove or line between the primary parts 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 grooves found on the buccal and lingual surfaces of posterior teeth.

**Pits** are small pinpoint 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.

A **lobe** is one of the primary sections of formation in the development of the crown. Cusps and mamelons are representative of lobes.

A mamelon is any one of the three rounded protuberances found on the incisal ridge of newly erupted incisor teeth.

# **DIVISION INTO THIRDS, LINE ANGLES, AND POINT ANGLES**

For purposes of description, the crowns and roots of teeth have been divided into thirds and junctions of the crown surfaces are described as line angles and point angles.

Actually, there are no angles or points or plane surfaces on the teeth anywhere except those that appear from wear (abrasion) or from accidental fracture.

Line angle and point angle are used only as descriptive terms to indicate a location.

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# DIVISION INTO THIRDS, LINE ANGLES, AND POINT ANGLES

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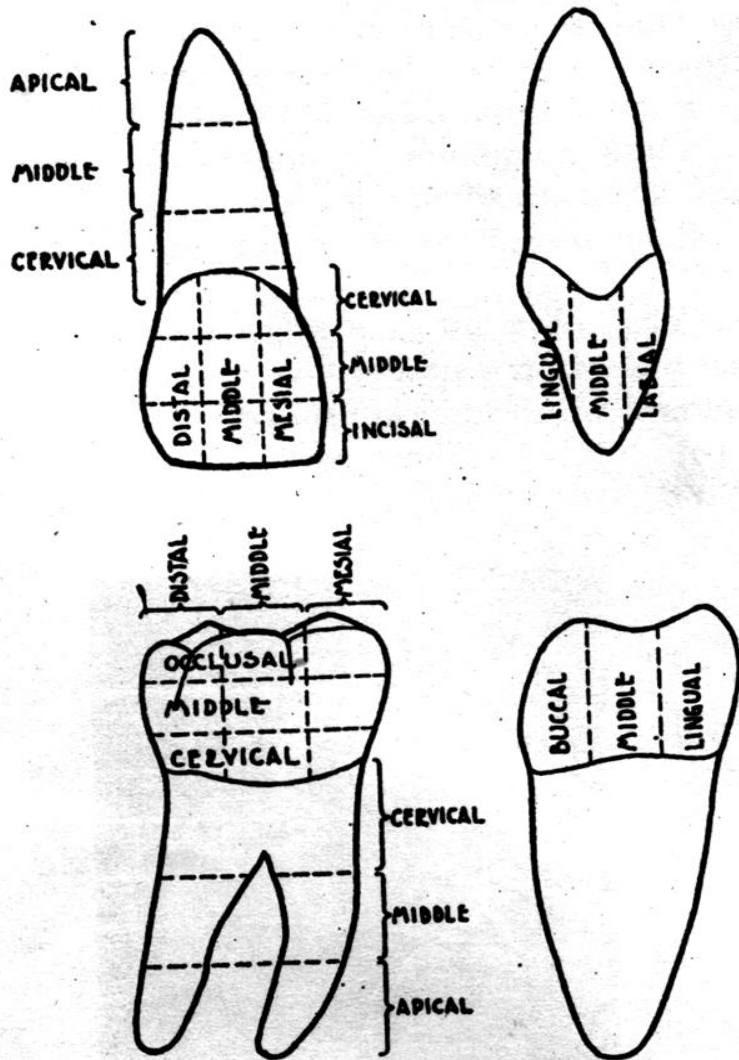


Figure 1-12. Division into thirds.

When the surfaces of the crown and root portions are divided into thirds, these thirds are named according to their location.

Looking at the tooth from the labial or buccal aspect, we see that the crown and root may be divided into thirds from the incisal or occlusal surface of the crown to the apex of the root.

The crown is divided into an incisal or occlusal third, a middle third, and a cervical third. The root is divided into a cervical third, a middle third, and a cervical third.

The crown may be divided into thirds in three directions: incisal or occlusocervically, mesiodistally, or labio- or buccolingually.

Mesiodistally, it is divided into the mesial, middle, and distal thirds.

Labio- or buccolingually it is divided into labial or buccal, middle, and lingual third.

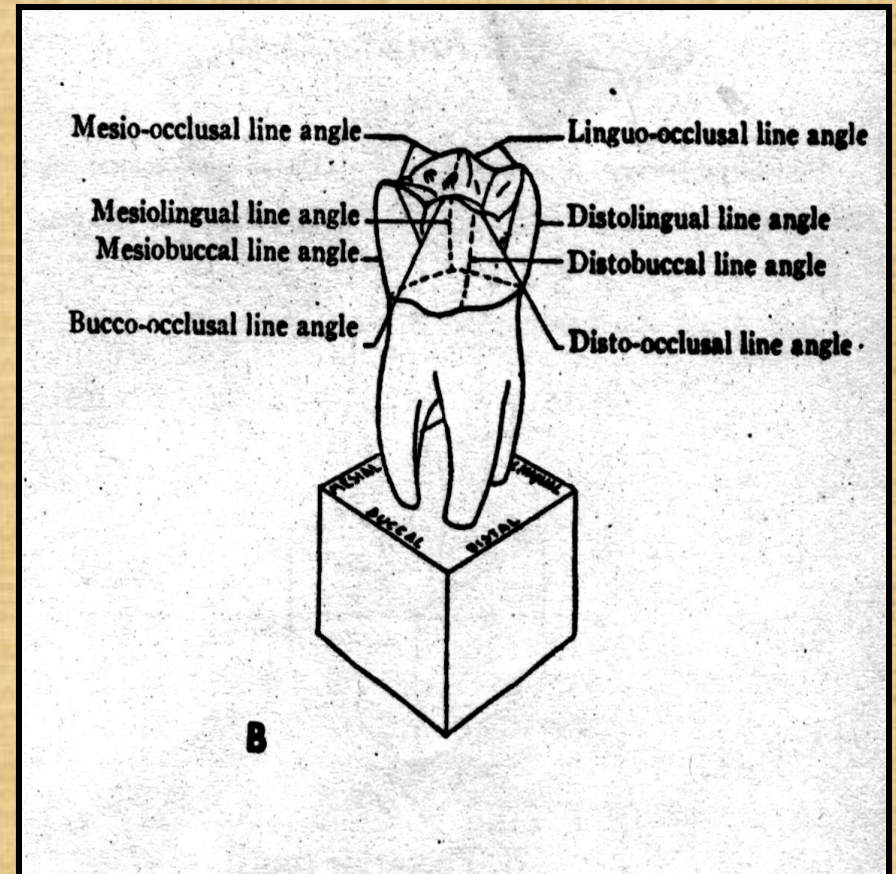
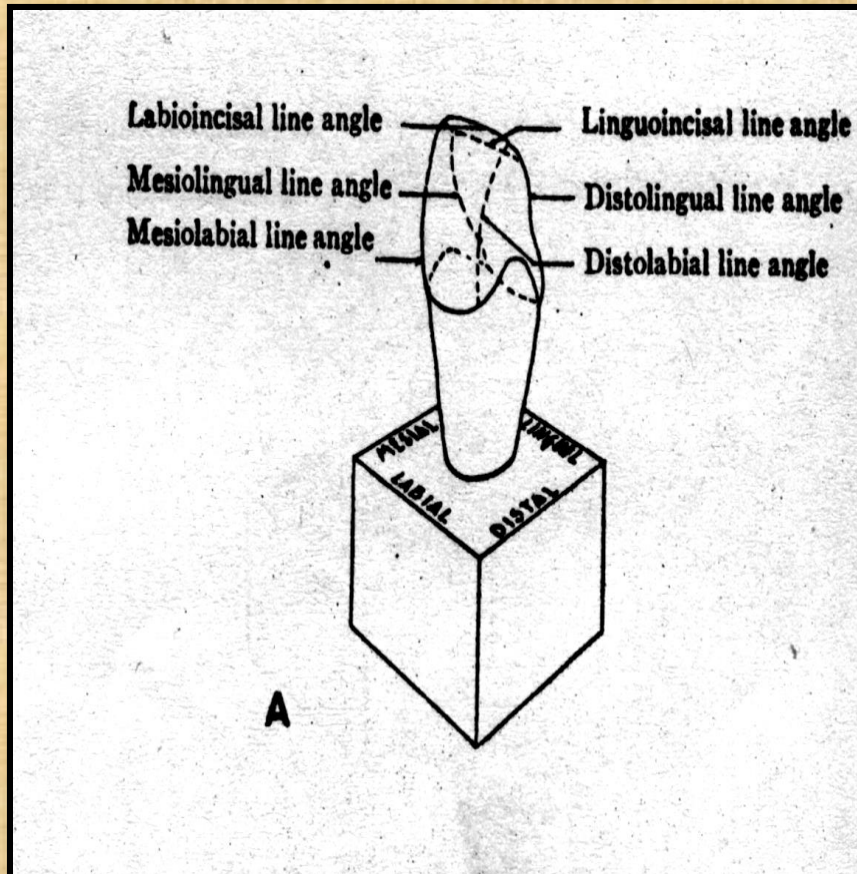
Each of the five surfaces of a crown may be so divided. There will be one middle third and two other thirds, which are named according to their location, e.g., cervical, occlusal, mesial, lingual.

A line angle is formed by the junction of two surfaces and derives its name from the combination of the two surfaces that join. For instance, on an anterior tooth, the junction of the mesial and labial surfaces is called the mesiolabial line angle.

The line angle of the anterior teeth are :

Mesiolabial	Distolingual
Distolabial	Labioincisal
Mesiolingual	linguoincisal

# LINE ANGLES



Because the mesial and distal incisal angles of anterior teeth are rounded, mesioincisal line angles and distoincisal line angles are usually considered nonexistent. They are spoken of as mesial and distal incisal angles only.

The line angles of the posterior teeth are:

Mesiobuccal	Distolingual	Bucco-occlusal
Distobuccal	Mesio-occlusal	Linguo-occlusal
Mesiolingual	Disto-occlusal	

A point angle is formed by the junction of three surfaces. The point angle also derives its names from the combinations of the names of the surfaces forming it.

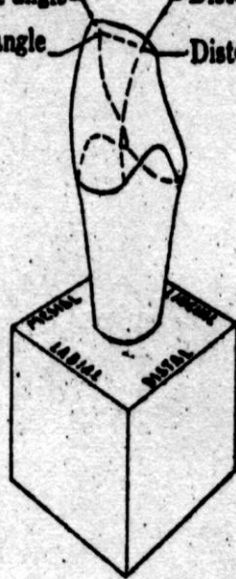
For example, the junction of the mesial, buccal, and occlusal surfaces of a molar is called mesiobucco-occlusal point angle.

The point angles of the anterior teeth are:

Mesiolabioincisal	Mesiolinguoincisal
Distolabioincisal	Distolinguoincisal

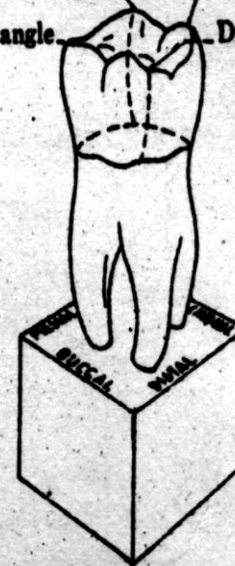
# POINT ANGLES

Mesiolabioincisal point angle  
Distolabioincisal point angle  
Mesiolinguoincisal point angle  
Distolinguoincisal point angle



**A. Anterior tooth.**

Mesiolinguo-occlusal point angle  
Distolinguo-occlusal point angle  
Mesio Bucco-occlusal point angle  
Distobucco-occlusal point angle



**B. Posterior tooth.**

The point angles of the anterior teeth are:

Mesiobucco-occlusal	Mesiolinguo-occlusal
Distobucco-occlusal	Distolinguo-occlusal

**THANK YOU**