1.Tooth Origin and Formation
2.Dental Instruments

Dr. Lama Hammoud

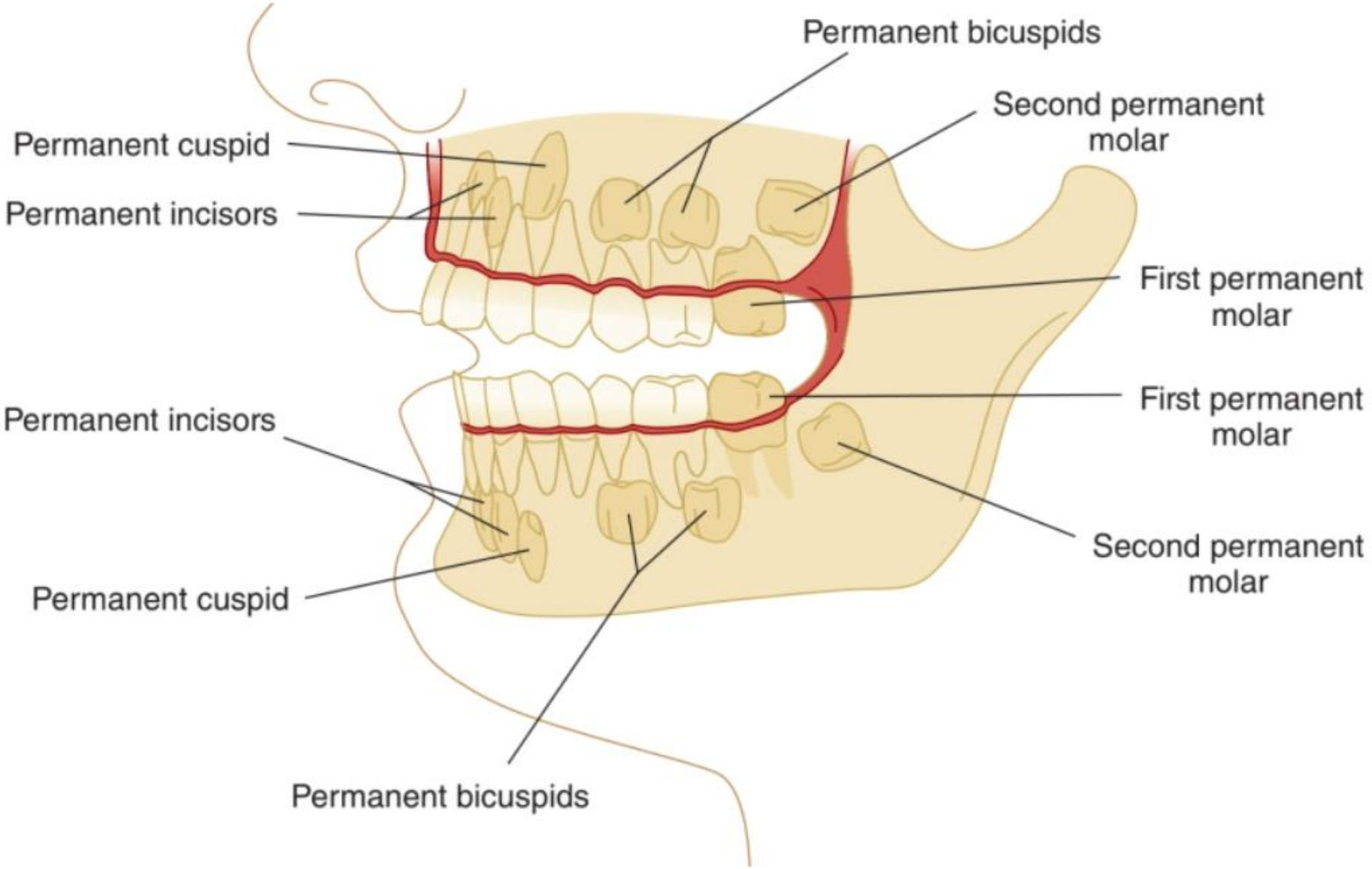
Classification of the Human Dentition:

Each human receives two sets of teeth. The first set or **deciduous** teeth are followed by the permanent **dentition**.

The 20 deciduous teeth erupting first are commonly called baby teeth or primary teeth.

The 32 permanent teeth that erupt and replace the deciduous teeth are commonly called secondary teeth.

Mixed dentition occurs from age 6 to 16 .


Permanent bicuspids
Second permanent molar
Permanent cuspid
Permanent incisors
First permanent molar
First permanent molar
Permanent incisors
Second permanent molar
Permanent cuspid
Permanent bicuspids

Histological Stages of Tooth Development

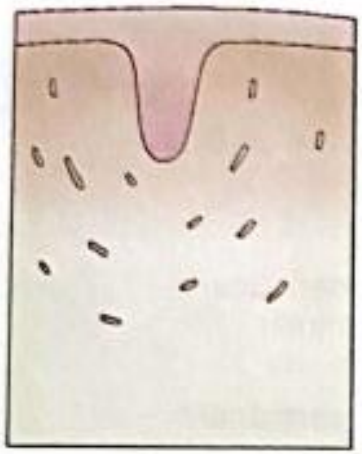
Odontogenesis refers to the formation and the origin of the tooth.

First stage of development:

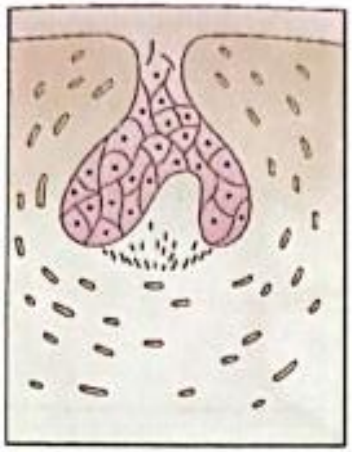
The first, or bud, stage of development is termed the initiation. At fifth or sixth week in utero, the dental lumina (membrane band containing organs of future teeth) develops in the primitive oral cavity epithelium (mucosa tissue covering and connective tissue layer).

Second stage of development:

The second stage of development, called proliferation includes the bud and early cap stage. Proliferation begins during the fourth or fifth month in utero when small buds appear at different time periods until all deciduous teeth are apparent. Permanent teeth follow the same pattern but begin development in utero and after birth.



Initiation
(bud stage)



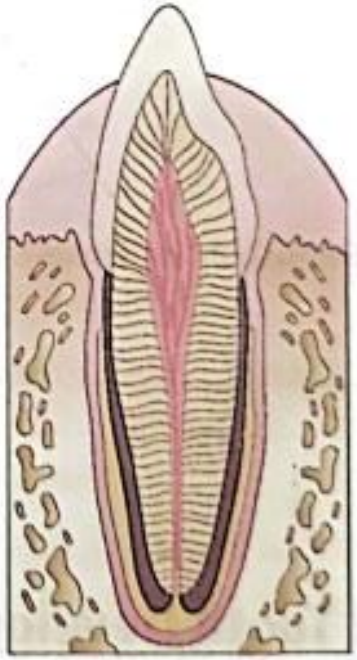
Proliferation
(cap stage)

Histodifferentiation
(bell stage)

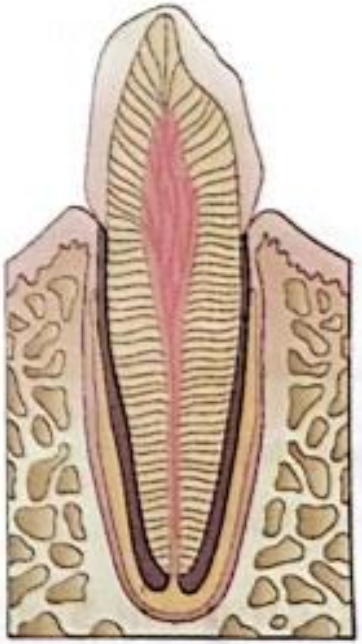
Morphodifferentiation

Apposition
(maturation stage)

Calcification



Eruption



Attrition

- **The tooth bud consist of three parts:**

Dental organ (enamel organ): derived from the ectoderm(outer layer), gives the tooth bud its covering.

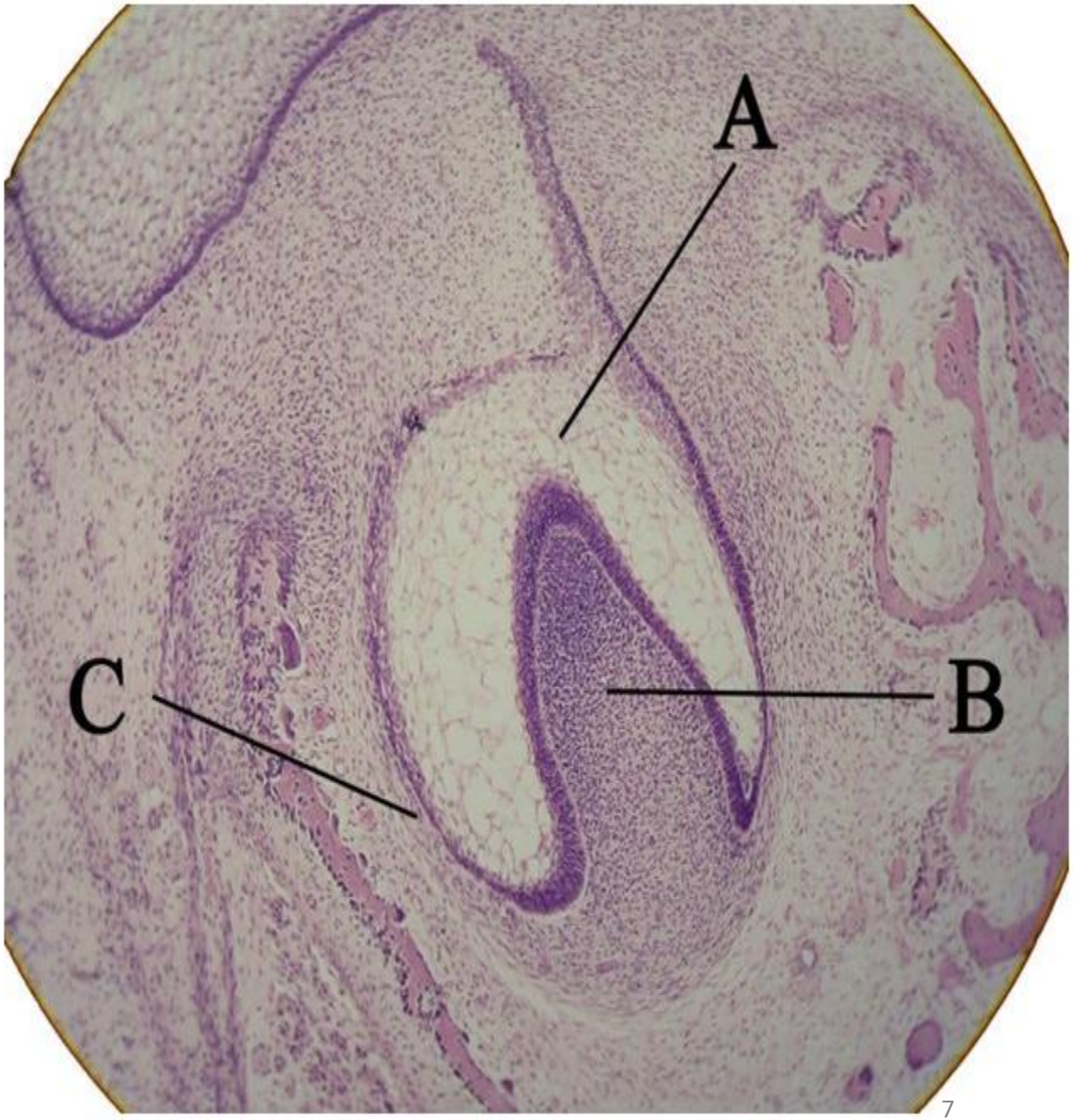
Dental papilla: (tissue development giving rise to dentin,pulp), and is derived from the mesoderm (middle layer) in particular from the mesenchyme (connective tissue cells).

Dental sac (pocket covering): derived from the mesoderm makes up the surrounding covering for the dental organ and papillae; gives rise to the cementum, or root covering tissue, the periodontal ligaments that hold the tooth in the alveolar socket, and the alveolar band; also called *dental follicle*.

A: enamel organ

B: dental papilla

C: dental follicle



Third Stage of Development

It occurs in two ways:

Histodifferentiation (branch into different tissue)

Morphodifferentiation (change into other shape)

Tooth development:

This process occurs because of the appearance of specialized germ cells:

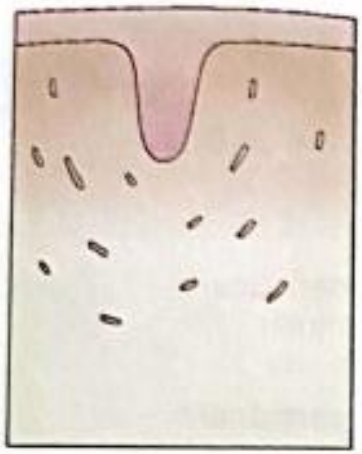
Odontoblasts: encourages cell growth to form the dentin, the bulk of the tooth.

Ameloblast: encourages cell growth to form the enamel covering tissue of the tooth.

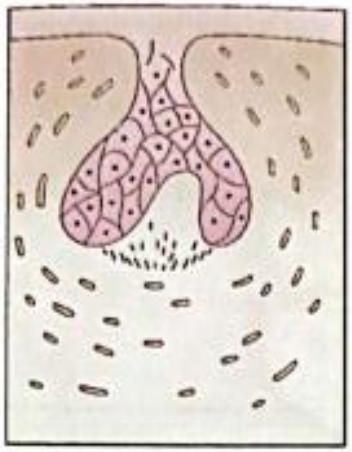
Cementoblasts: encourages cell growth to form the root-covering cementum tissue.

Fibroblasts: encourages cell growth to form the periodontal ligaments.

Osteoblasts: encourages cell growth to form the alveolar bone and the alveolar plate.



Initiation
(bud stage)



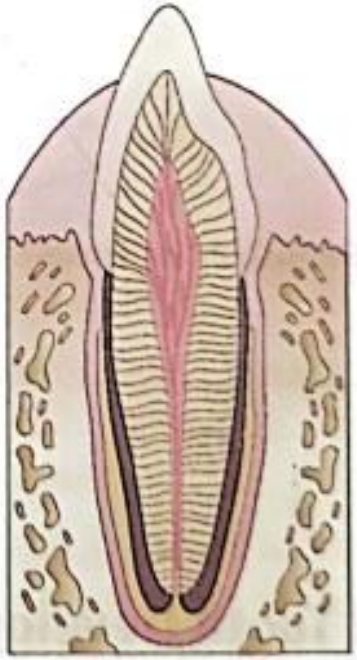
Proliferation
(cap stage)

Histodifferentiation
(bell stage)

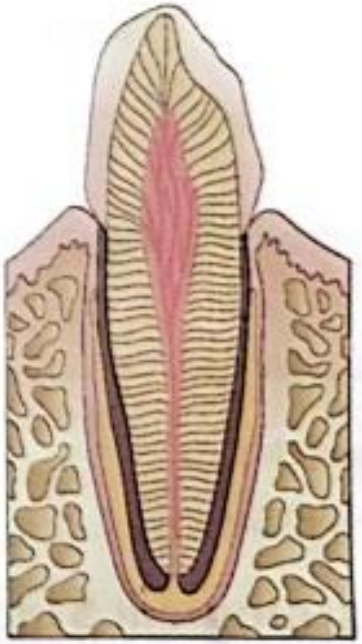
Morphodifferentiation

Apposition
(maturation stage)

Calcification



Eruption



Attrition

- **Fourth stage of development:**

Apposition (addition of parts) maturation stage

- **Fifth stage of development:**

Calcification (deposit of lime salts)

- **Sixth stage of development:**

Eruption (this stage is commonly called cutting of the teeth.

- **Final stage of development:**

Attrition(abrasion).

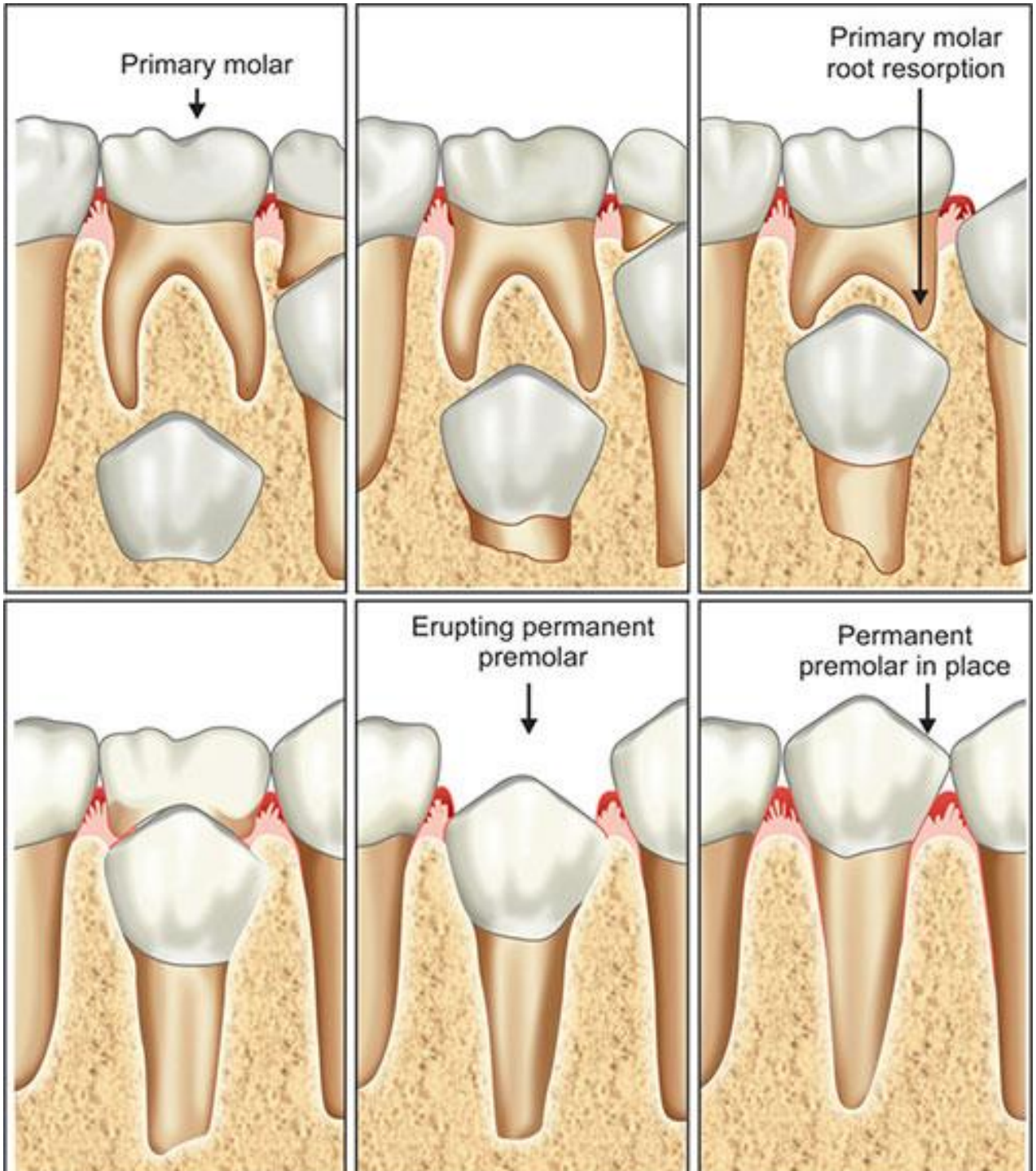
This wearing away occurs where teeth interact through mastication and speech

In addition to the constructive developing actions, some degenerative periods are necessary to remove deciduous teeth, making room for the permanent dentitions. Several specialized cells cause root resorption (removal of hard tooth surface) and degeneration of deciduous teeth.

Odontoclasts: cells that bring about absorption of primary tooth roots.

Cementoclasts: cells that destroy tooth cementum.

Osteoclasts: cells that destroy or cause absorption of bone tissue.

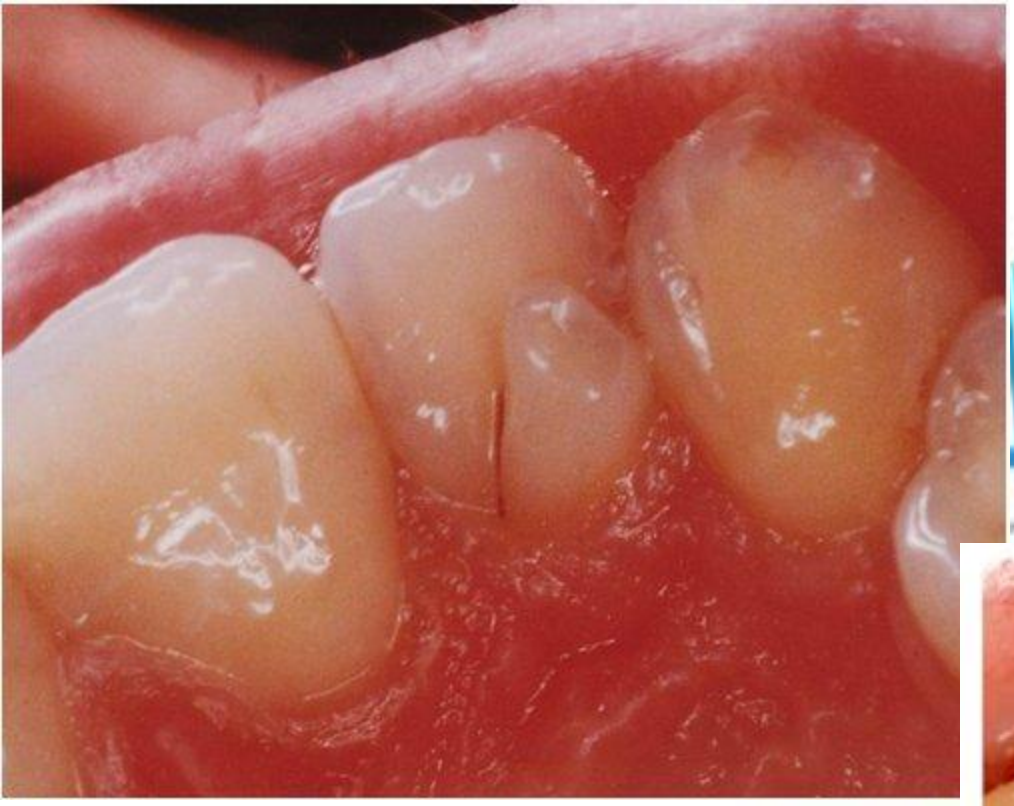

Primary molar
Primary molar root resorption
Erupting permanent premolar
Permanent premolar in place

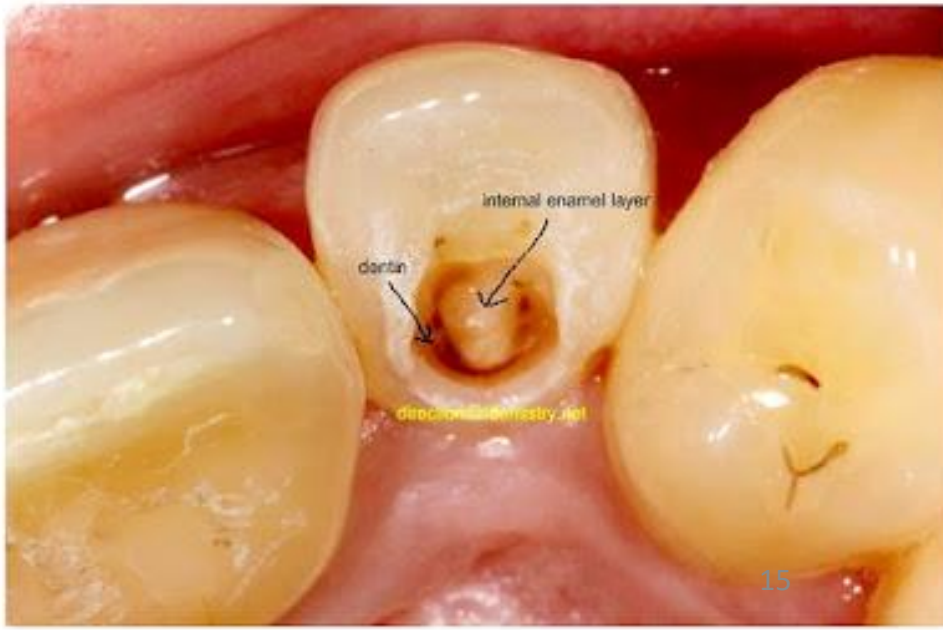
Tooth Abnormalities

amelogenesis (process of forming tooth enamel) **imperfecta**: a genetic disorder resulting in the formation of defective enamel.

anodontia: partial or total lack of teeth.

dens in dente: tooth in tooth , found most commonly on the lingual surface of the maxillary laterals.

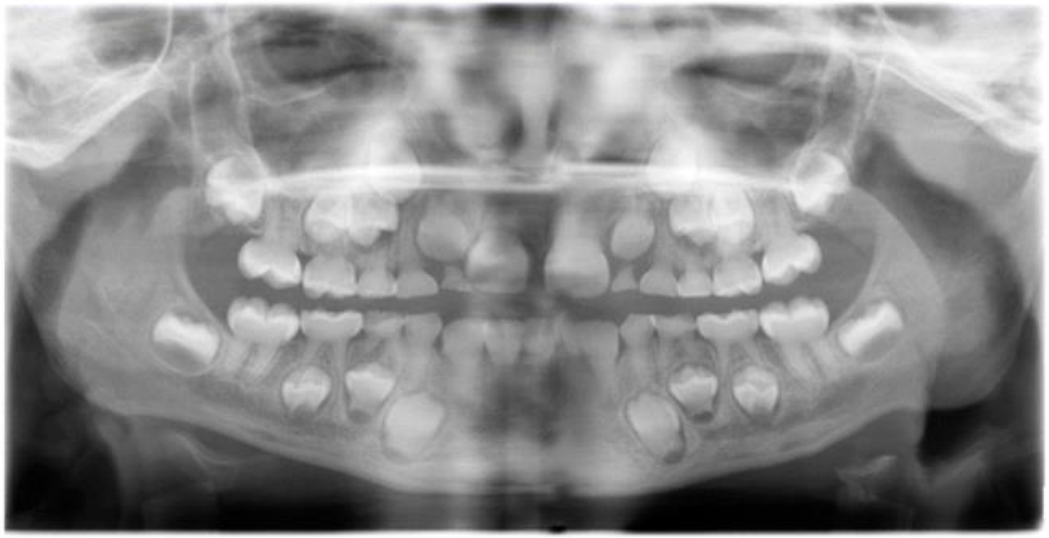




Dentinogenesis imperfecta: a genetic disorder characterized by weakened or gray-colored teeth resulting from poor formation.

a

b



Fluorosis: reaction to overfluoridation , also called "mottled enamel".

NORMAL

MILD

MODERATE

SEVERE

Fusion: union of tooth buds resulting in large crown or root.

Germination: single tooth germ separating to form two crowns on a single root.

Fig. 1

Fig. 3

Fig. 2

Fig. 4

Hutchinsonian incisors: saw like incisal edges of maxillary incisors, caused by material syphilis during tooth formation.

Hypocalcification : incomplete calcification , lack of harding tissue resulting in weak.

Hypoplasia : underdevelopment of tissue .

Macrodontia: abnormally large tissue.

Microdontia: unusually small teeth.

Peg-shaped teeth: a condition of small rounded teeth that usually occurs in the maxillary lateral incisor.

Supernumerary: more than the normal amount of teeth.

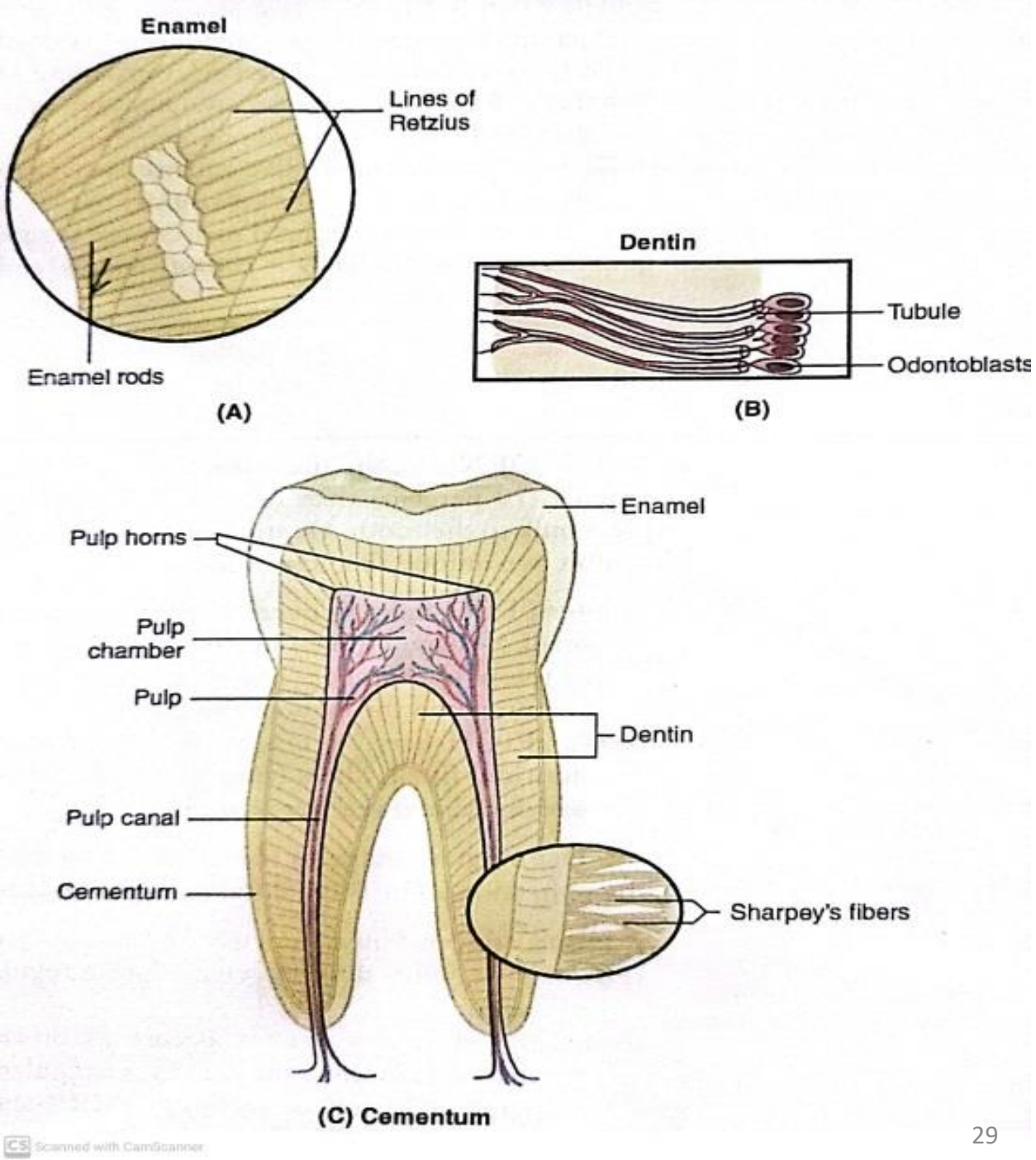
Tooth Eruption

Months	Tooth
Primary Dentition	
6-12 months	**Mandibular central incisor, 6-10 months** **Maxillay central incisor, 6-10 months** **Mandibular lateral incisor, 7-10 months** **Maxillary lateral incisor, 9-12 months**
12-18 months	**Mandibular First molar, 12-18 months** **Maxillay First molar, 12-18 month**
16-22	**Mandibular cuspid/canine 16-22 months** **Maxillay cuspid/canine 16-22 months**
20-32 months	**Mandibular second molar, 20-32 months** **Maxillay second molar, 24-32 months**

Months	Tooth
Permanent Dentition	
6-8 years	Mandibular First molar, 6-7 years Maxillay First molar, 6-7 years Mandibular central incisor, 6-7 years Maxillay central incisor, 7-8 years
9-12 years	Mandibular cuspid/canine 9-10 years Maxillay cuspid/canine , 11-12 years
10-12 years	Mandibular first premolar /bicuspid,10-11 years Maxillay first premolar /bicuspid,10-11 years Mandibular second premolar /bicuspid,11-12years Maxillay second premolar /bicuspid,11-12years
11-13years	Mandibular second molar, 11-13 years Maxillay second molar, 12-13 years
17-21 years	All third molars (if present and eruption)

Tissue structure of the teeth:

All teeth possess the same tissue formations, anatomical basics, and structural landmarks.



Enamel:

enamel : is a hard tooth covering that is 96 percent inorganic.

Cuticle : also called Nasmyth membrane, a tissue layer convering the tooth surface ; soon wears away after eruption.

Lines/ stripes of Retzius: lines in enamel; also called bands or striae of Retzius.

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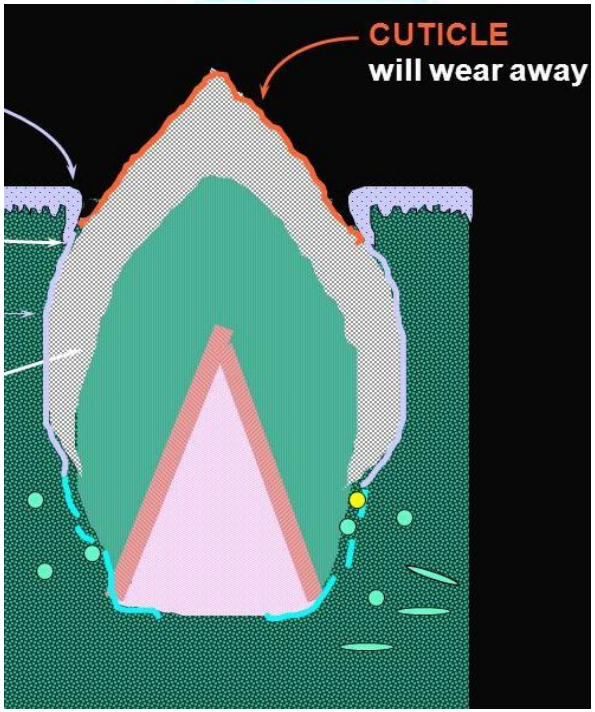
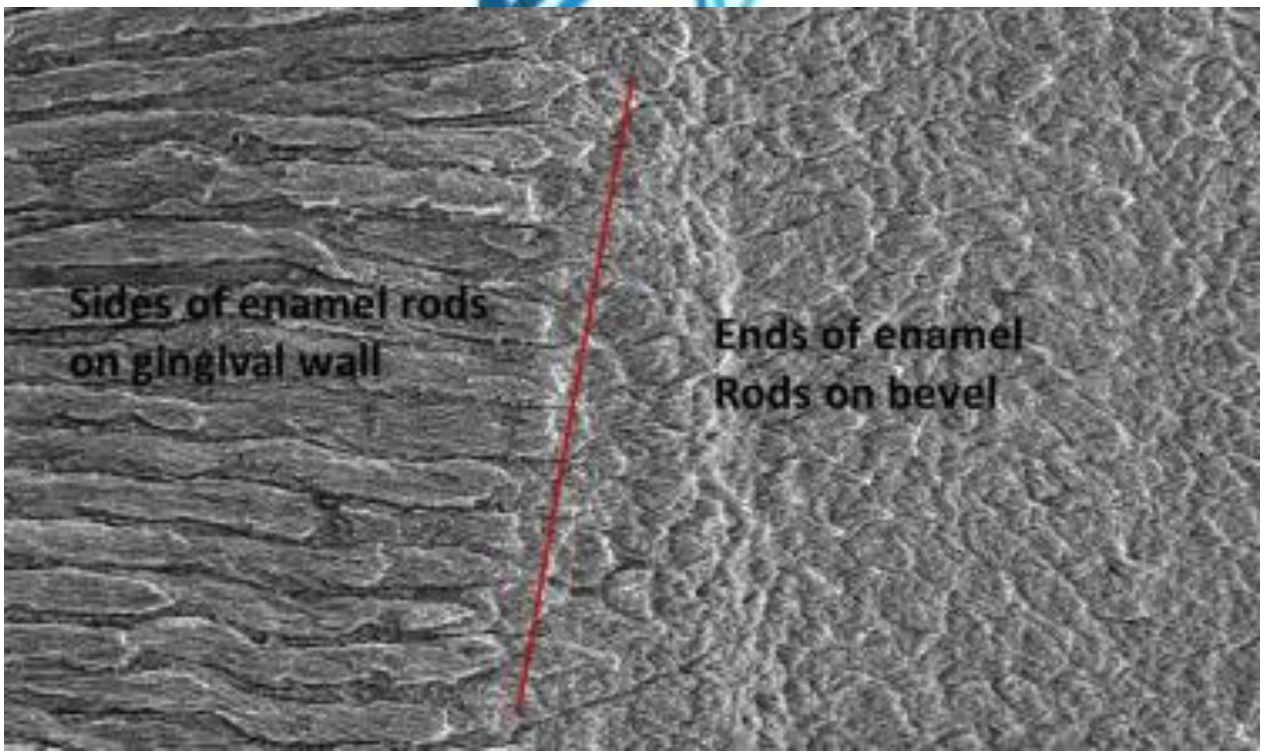
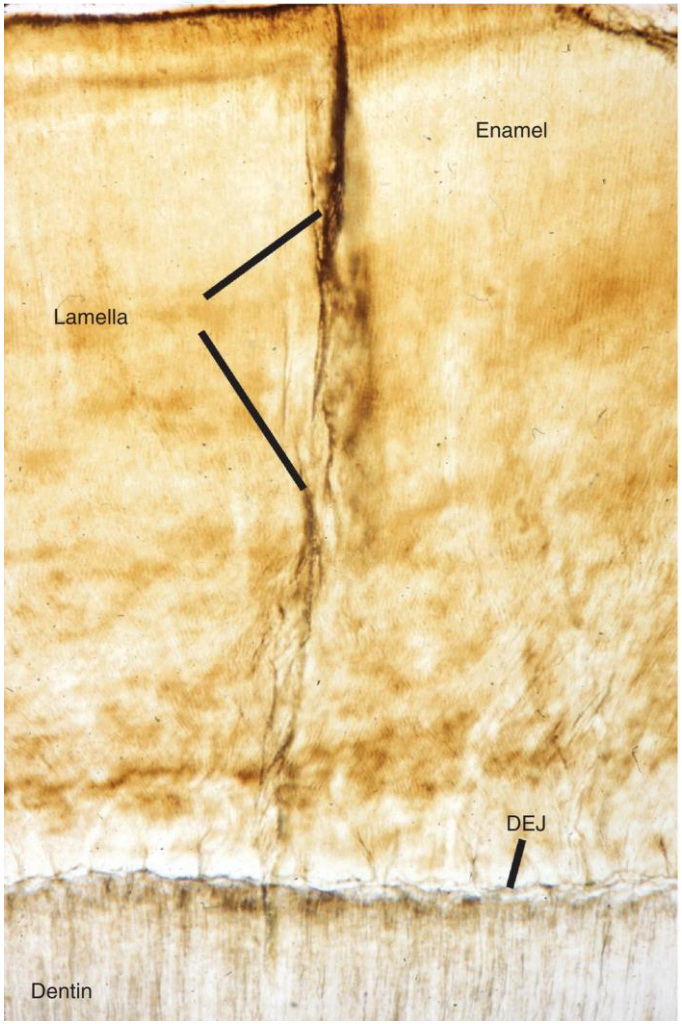


Rods: slightly curved prism- like structures that extend from the dentinoenamel junction to the outer surface; tightly packed with an organic matrix material to give a smooth, hard surface.

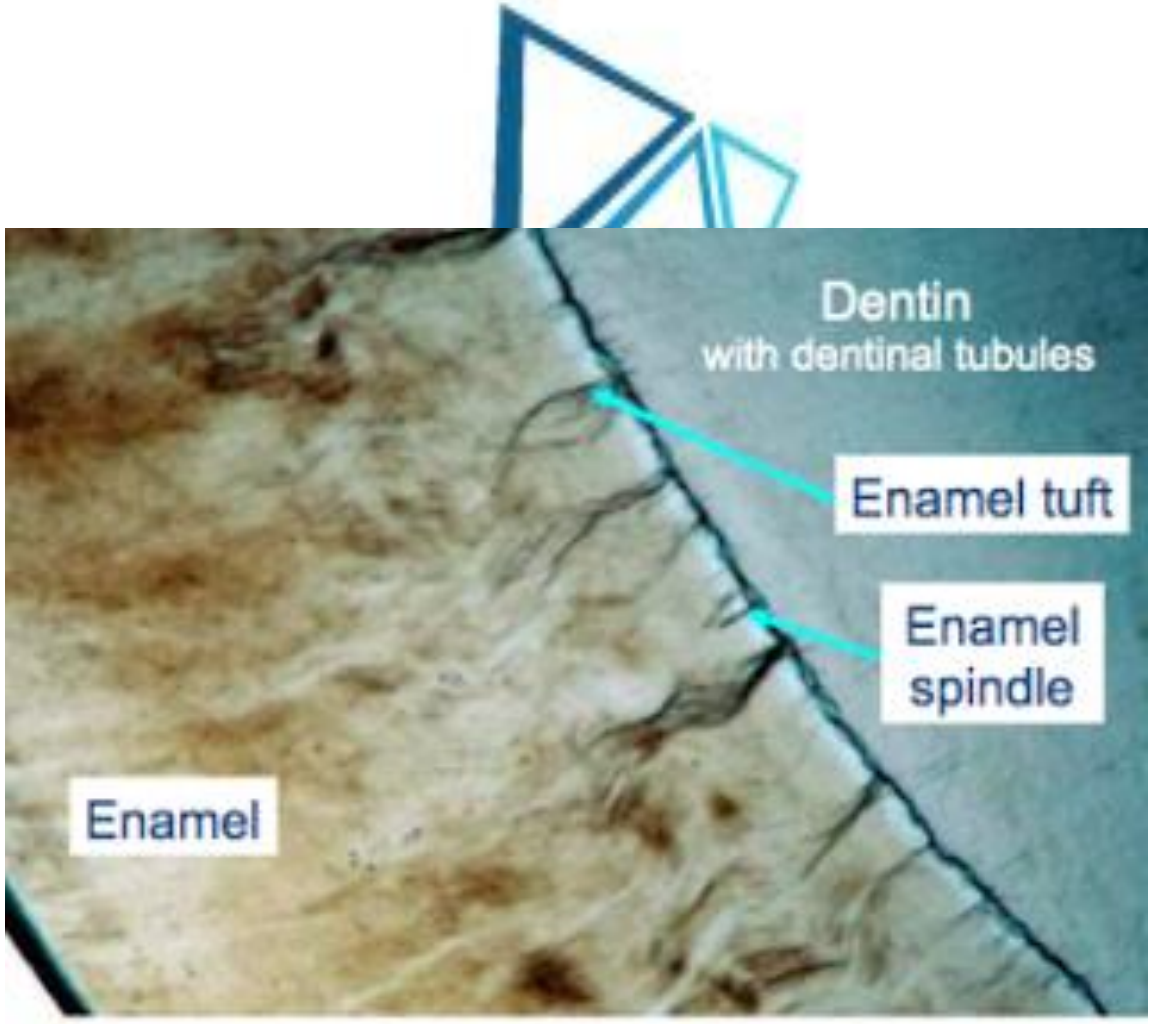


Lamellae: developmental cracks or imperfections in enamel tissue extending toward or into the dentin.

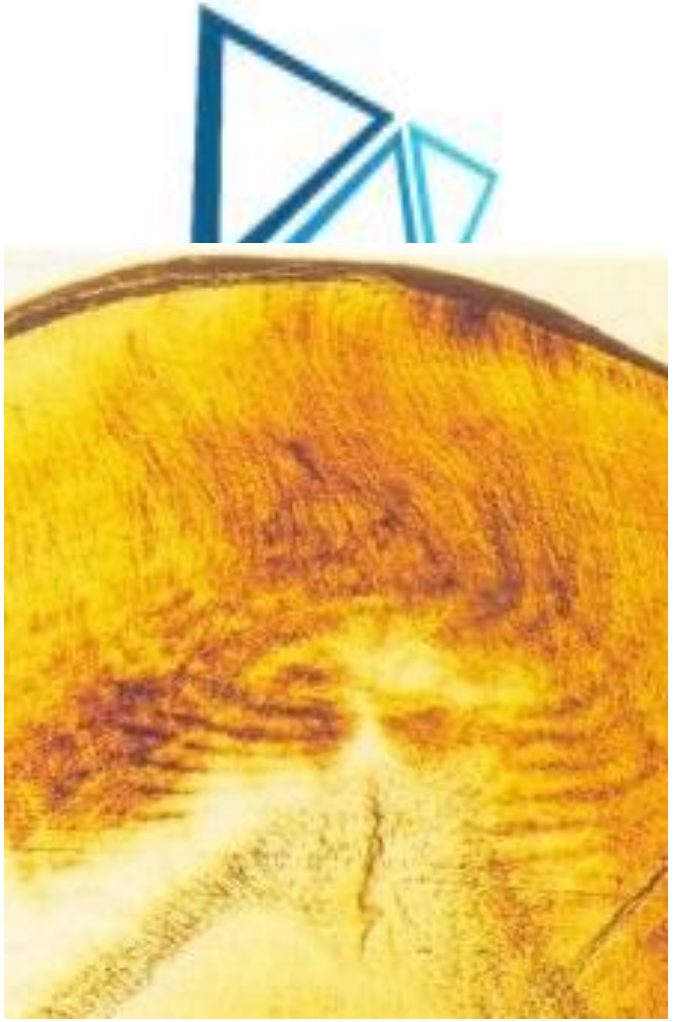


Tuft: irregular grouping of under calcified enamel.

Spindles : end areas of union for odontoblasts and enamel rod endings.



Gnarled enamel: enamel rod twisting and curving within the tooth tissue

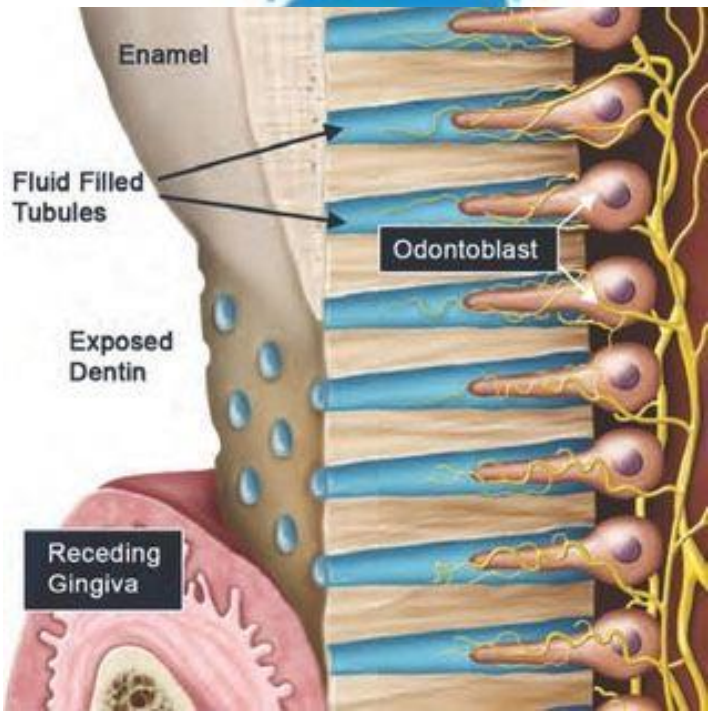


Dentin :

The main tissue of tooth surrounding the pulp, is less inorganic (70 percent) than enamel. Its yellow-brown in color. Dentin is present in both the crown and root.

Tubules also known as Tomes dentinal tubules, small, s-shaped tubes or channels extending from the dentinoenamel wall to the pulp chamber. The tubules transmit pain stimuli and nutrition throughout the tissue.

Fibers : also known as Tomes dentinal fibril, fibers lying within the dentin tubules and help the dentin to nourish and register sensation.

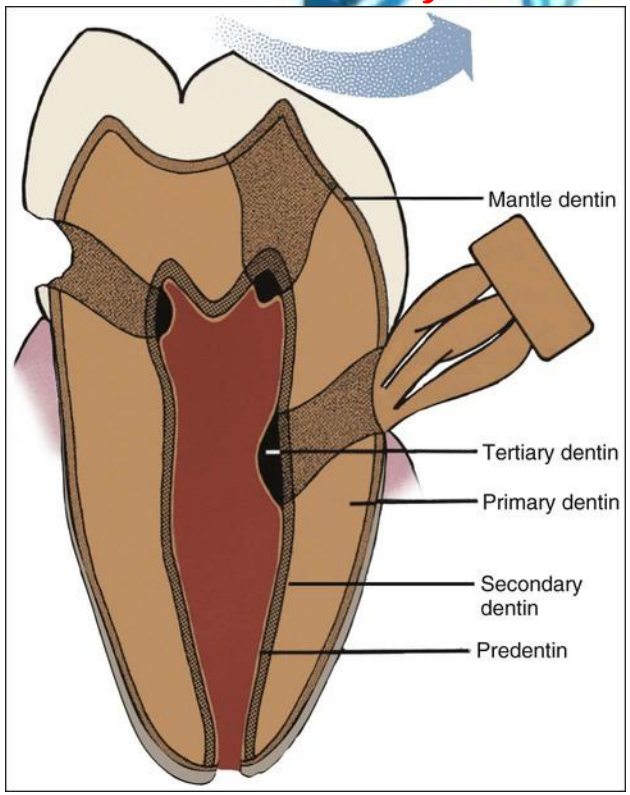


Dentin gives shape to the tooth. It is softer than enamel but harder than the pulp tissue. The three different types of dentin tissue are:

Primary dentin: dentin in newly formed tooth, the original dentin.

Regular secondary dentin: occurs during regular development and maturing of tooth.

Irregular secondary dentin :occurs as protection from irritation, decay, trauma, attrition, and the like. This Irregular secondary dentin is also called "reperative dentin" **or tertiary dentin**, the third type of dentin.



Pulp

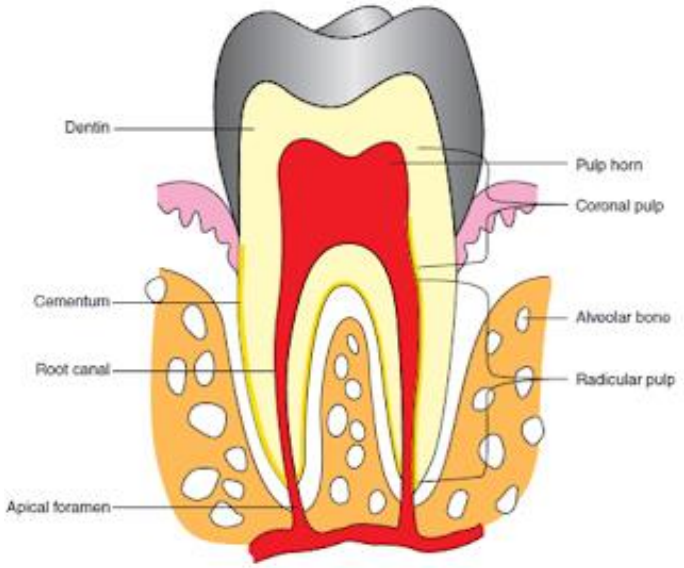
Pulp (soft, vascular tooth tissue) is found in the center of the tooth.

Pulp horns are pointed edges of the pulp chamber extending towards the chewing surfaces.

Pulp performs four main functions: nourishment, defense, registration of sensation/pain and dentin protection .

The tooth pulp is composed of multiple cells called **fibroblasts**.

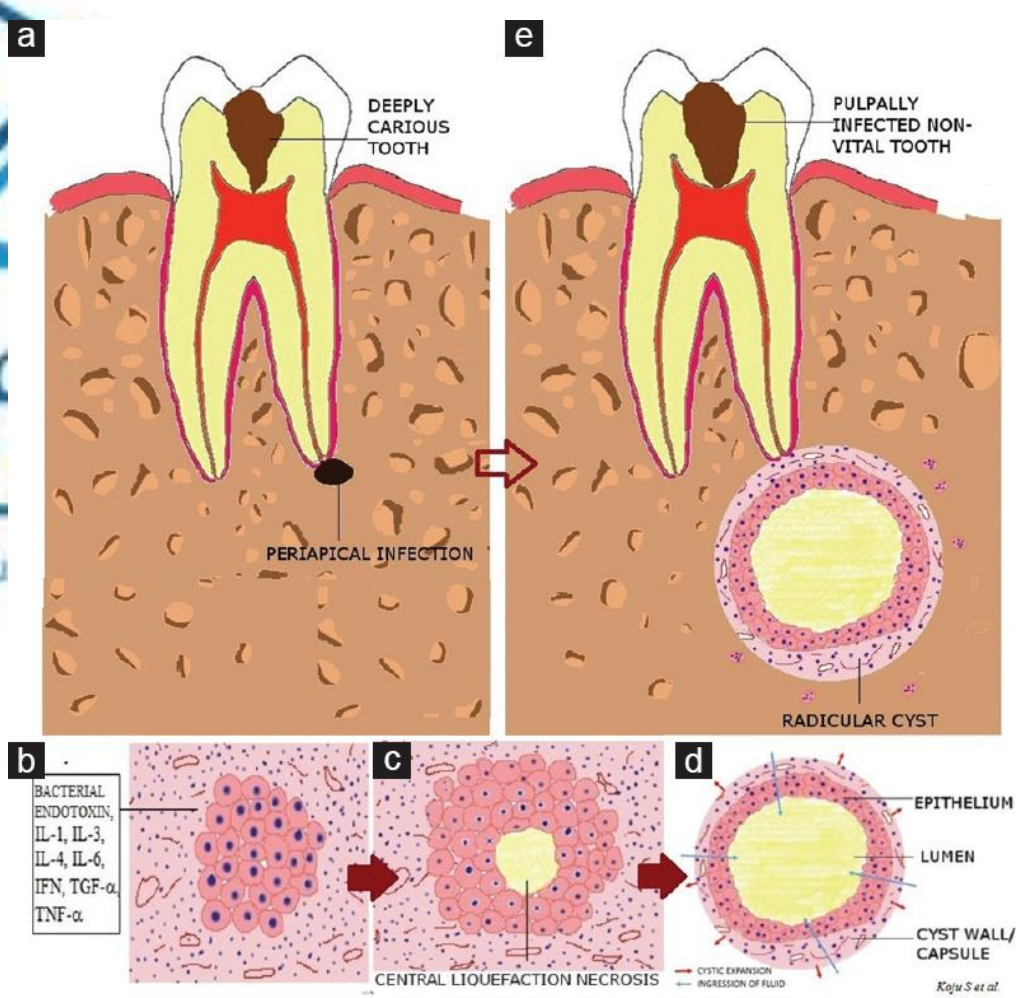
Pulpitis also called toothache; occurs for many reasons.



Pulp stone also known as denticle, a small growth in a tooth.

Pulp cyst: a closed, fluid-filled sac within the pulp tissue.

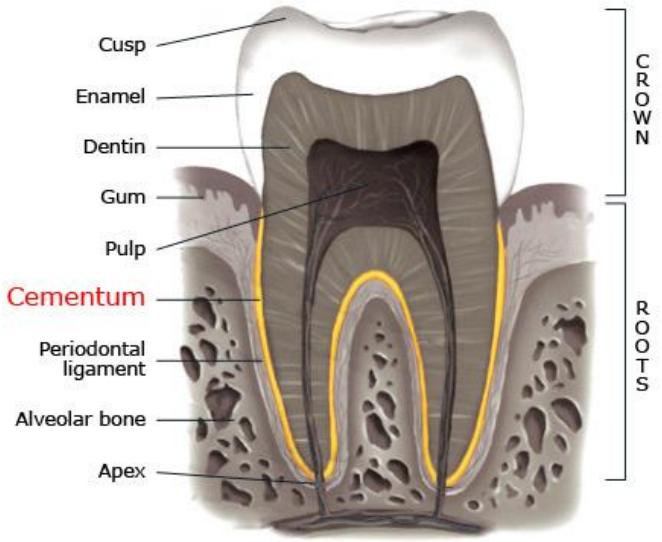
Granuloma: a growth or tumor usually found in the root area.

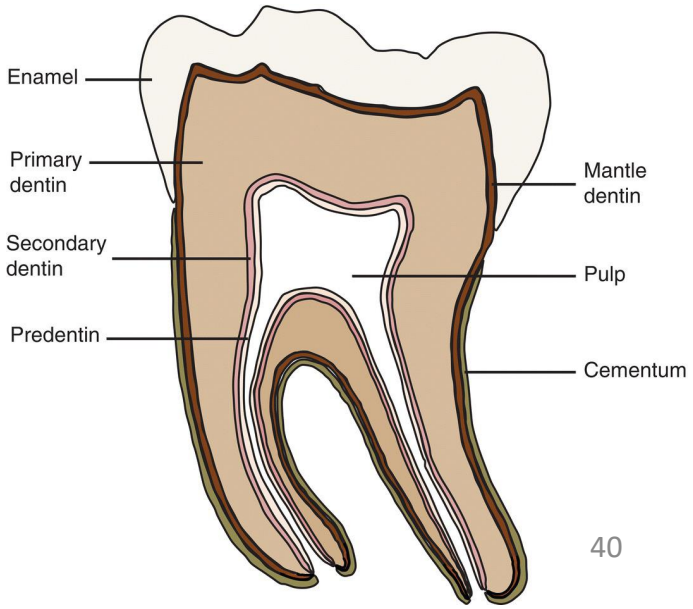


Cementum:

Cementum = (tissue covering of tooth root) is approximately 55 percent inorganic, rough in texture, and meets the enamel tissue at the cementoenamel (cement-enamel union) junction that is located at the neck of the tooth. The function of cementum is to protect the root and provide rough surface anchorage for attachment of Sharpey's fibers which are connective tissue fibers of the periodontal ligament. There are two kinds of cementum:

- **Primary cementum : also called acellular cementum.**
- **Secondary cementum: also called cellular cementum.**



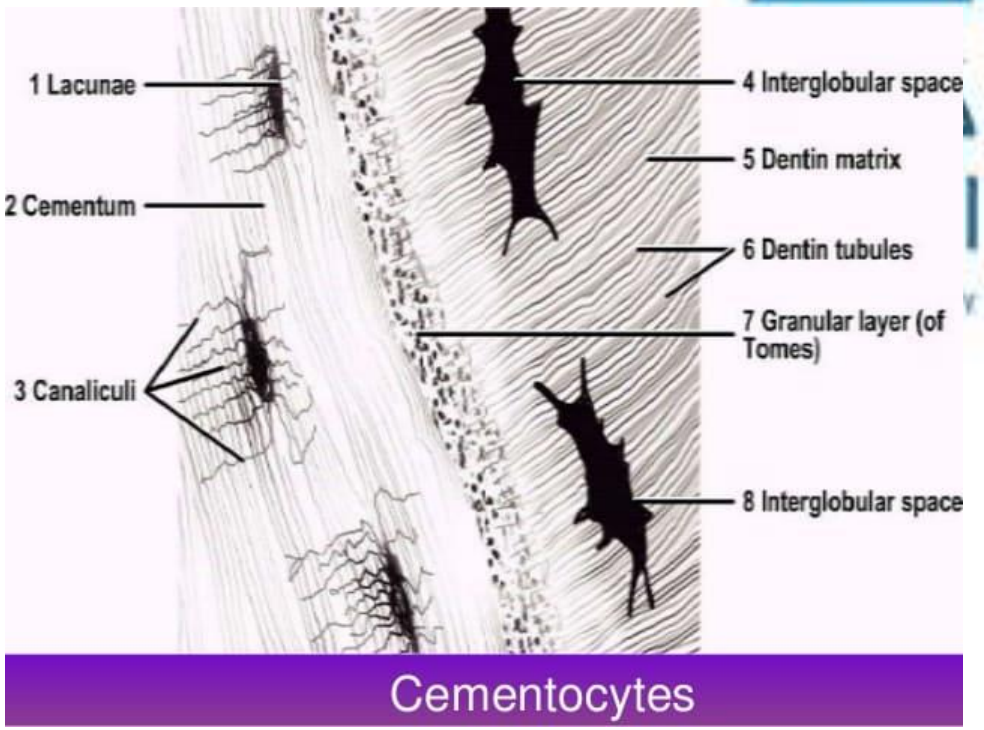


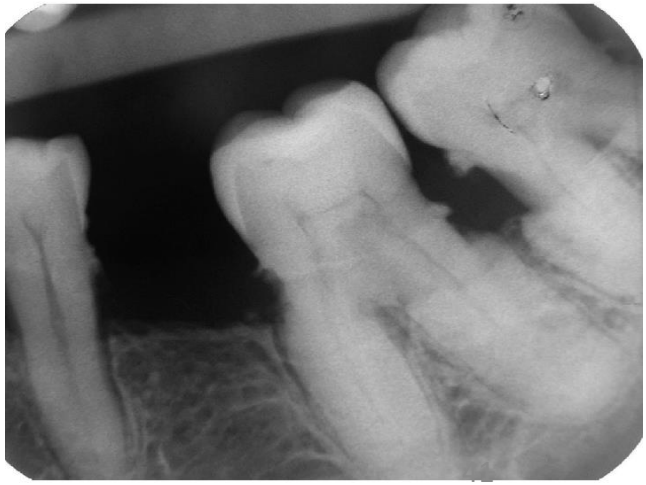
In addition to matrix material and cementoblasts, other features may be present in cementum:

Lacuna: tiny cavities that may contain cementocyte

Canaliculi: small channels.

Hypercementosis : overgrowth of cementum tissue





Tissue Composition of the Periodontium:

Periodontium (tissues surrounding teeth). The periodontium is composed mainly of four separate tissues:

1. Periodontal: membrane and fibers that anchor the tooth in the alveolar socket.
2. Alveolar: bone, bony sockets for teeth placement, also gives support to the teeth.
3. Gingiva: mucous tissue surrounding the teeth, also gives protection to the teeth and underlying tissues.
4. Cementum

Periodontal Membranes:

Periodontal Membranes or ligaments. The functions of each are as follows:

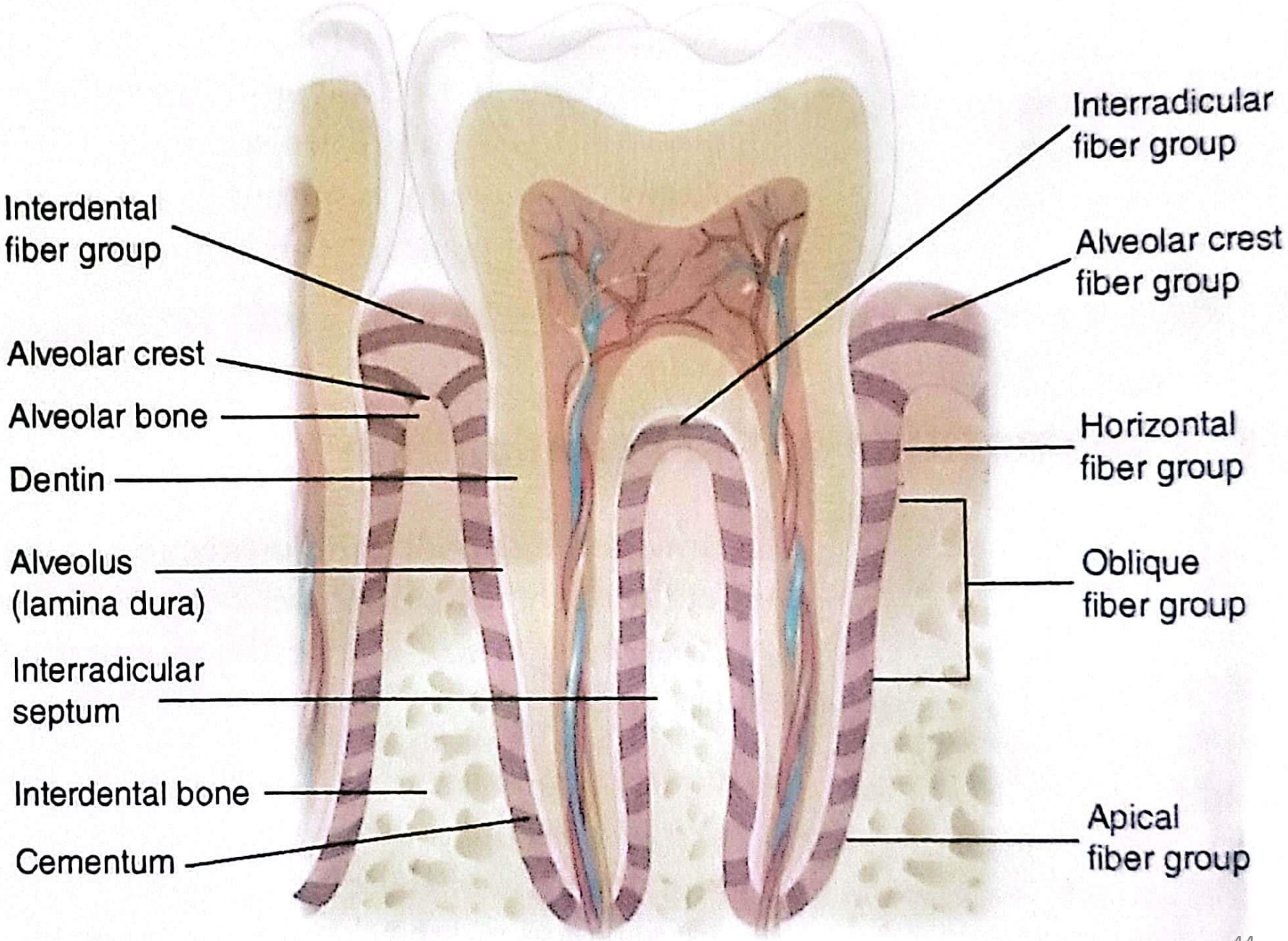
Alveolar crest fibers: found at the cementoenamel junction, they help to retain the tooth in its socket.

Horizontal fibers: connect the alveolar bone to the upper part of the root and assist with the control of the lateral movement.

Olique fibers: attach the alveolar socket to the majority of the root cementum and assist in the resistance of the axial forces.

Apical fiber bundles: running from the apex of the tooth to the alveolar bone, these fibers help prevent dislocation, as well as protect the nerve and blood supply to the tooth.

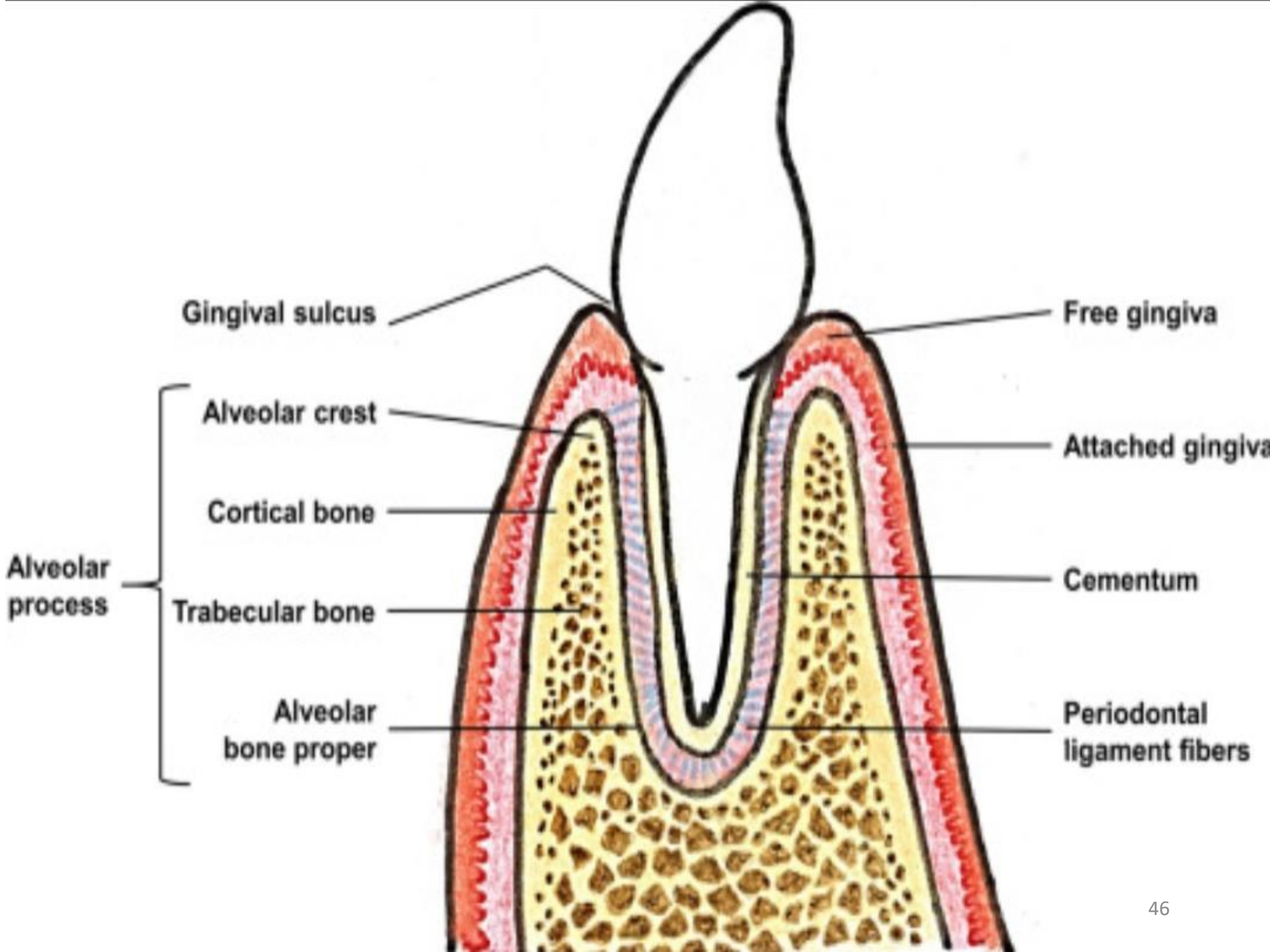
Interradicular fiber bundles: present in multirooted teeth, extending apically from tooth furcation, help the tooth resist dislocation.



Alveolar bone:

Alveolar bone, also called the alveolar process, is composed of an alveolar socket and a dense covering of compact bone with an inner and outer growth called the cortical plate.

Lining the alveolar socket is a thin cribriform plate covering called the lamina dura.


Gingival sulcus
Free gingiva
Alveolar crest
Attached gingiva
Cortical bone
Alveolar process
Cementum
Trabecular bone
Alveolar bone proper
Periodontal ligament fibers

Gingiva

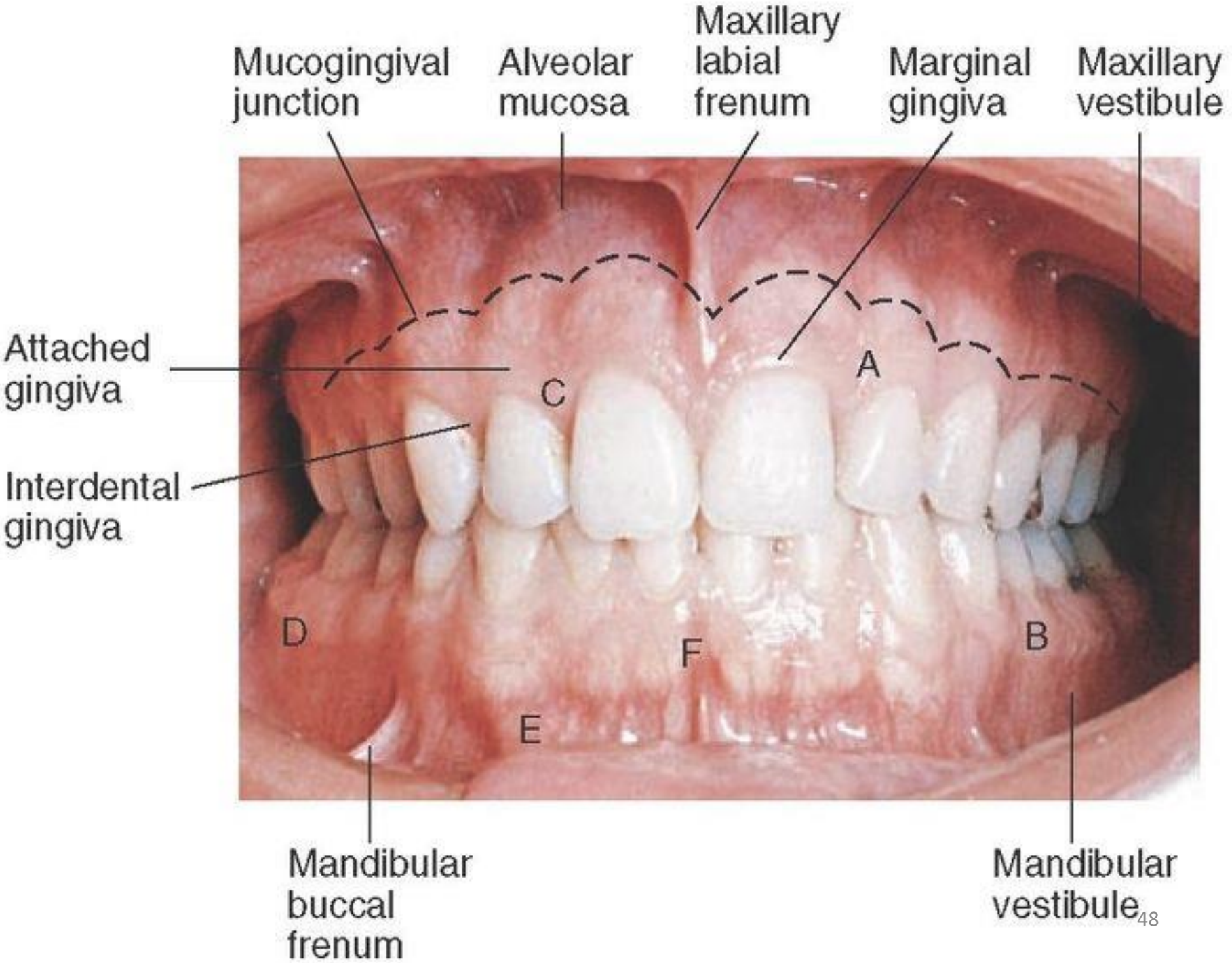
Also known as gum tissue, the gingiva protects the tooth root and underlying tissues.

Attached: the portion that is firm, dense, and bound to the underlying periosteum, tooth, and bone.

Keratinized: the area where the gingiva and mucous membrane unite is called the mucogingival junction.

Marginal : also called the free margin gingiva forming the gingival sulcus space between the tooth and attached gingival measuring approximately 1 to 3 mm in depth.

Papillary : the part of the marginal gingiva that occupies the interproximal spaces; normally triangular and filing the tooth embrasure area; also called interdental papilla.


Mucogingival junction
Alveolar mucosa
Maxillary labial frenum
Marginal gingiva
Maxillary vestibule
Attached gingiva
Interdental gingiva
A
B
C
D
E
F
Mandibular buccal frenum
Mandibular vestibule

Cementum

The function of the cementum in the periodontium is to provide surface anchorage for the tooth in the alveolar socket. This is accomplished by the covering of Sharpey's fibers that extend between the rough cementun surface and the alveolar wall.

Odontology / Morphology :

The study of teeth in general is called odontology , while the study of tooth form and shape is termed morphology.

The dentition shares the following mouth division characteristics and terminology.

Maxillary: upper tooth area; normally the maxilla slightly overlaps the mandible.

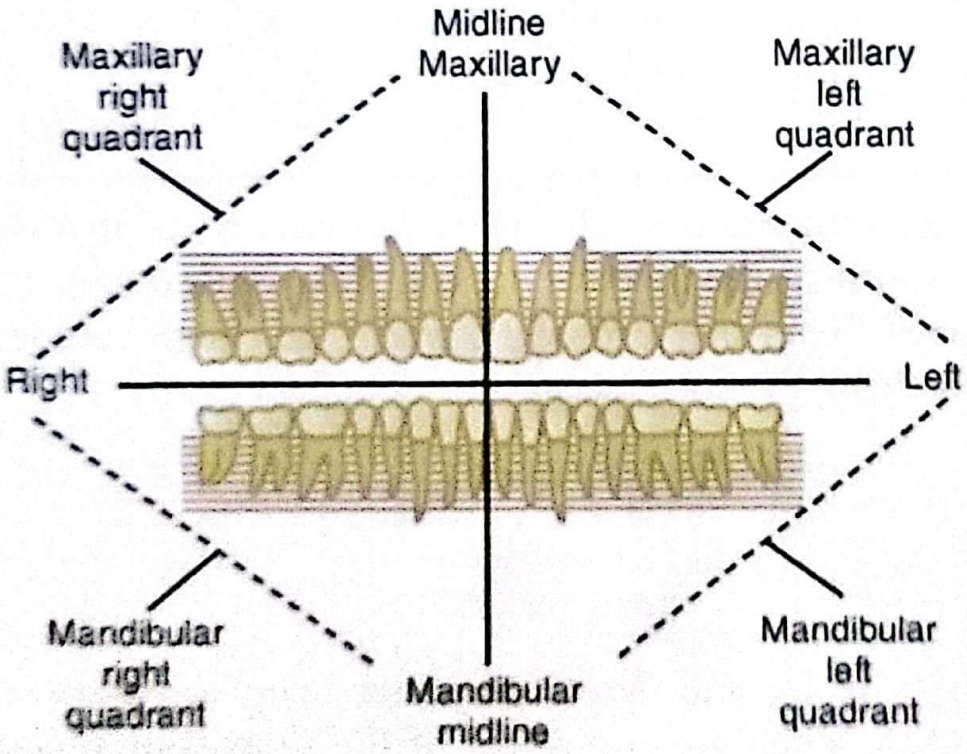
Mandibular: lower tooth area.

Arch: half of the mouth, either maxillary or mandibular.

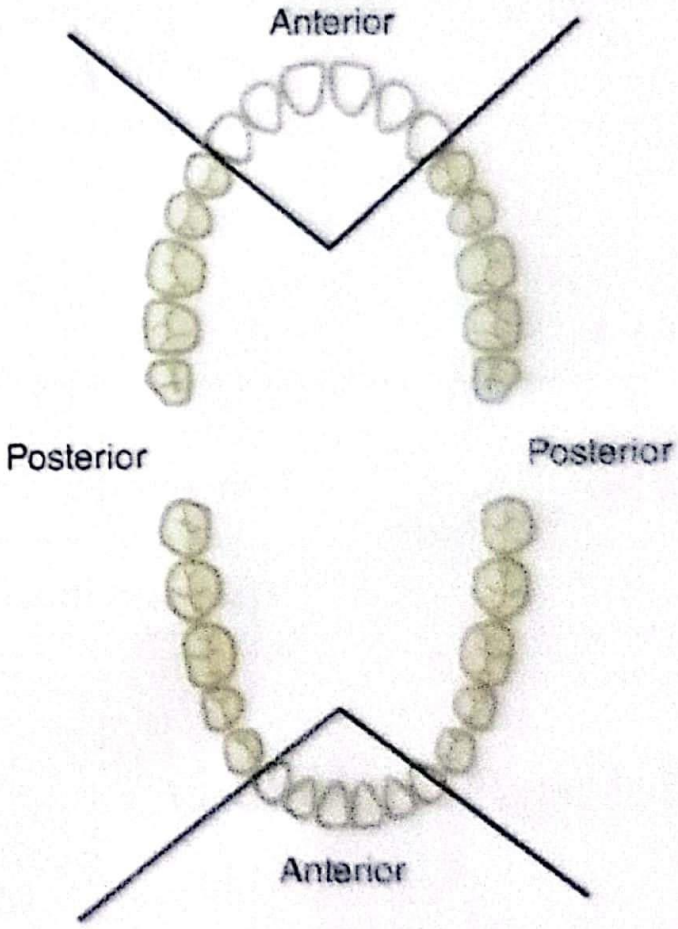
Quadrant : half of an arch, right or left, and containing eight teeth.

Anterior : front area of the mouth, from canine to canine.

Posterior: area back from the corners of the mouth, not including the canine or incisor teeth.


Midline
Maxillary
Maxillary
right
quadrant
Maxillary
left
quadrant
Right
Left
Mandibular
right
quadrant
Mandibular
midline
Mandibular
left
quadrant

(A)


Anterior
Posterior
Posterior
Anterior

(B)

Types of teeth

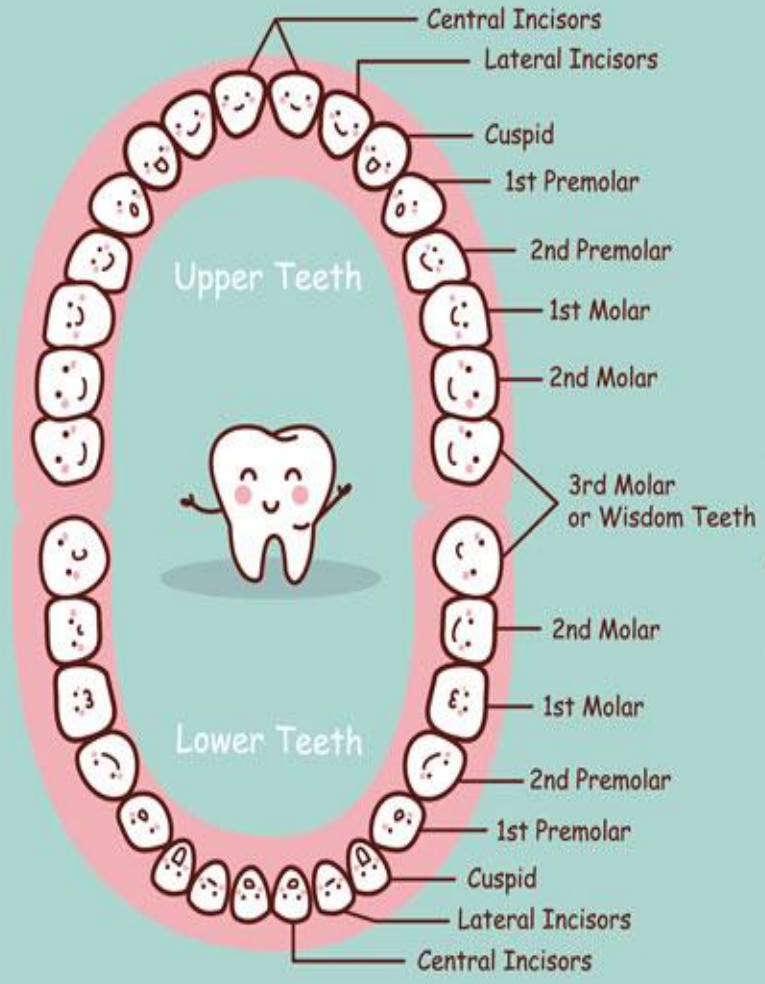
The four types of teeth are incisors, cuspids (canines), premolars (bicuspids) and molars.

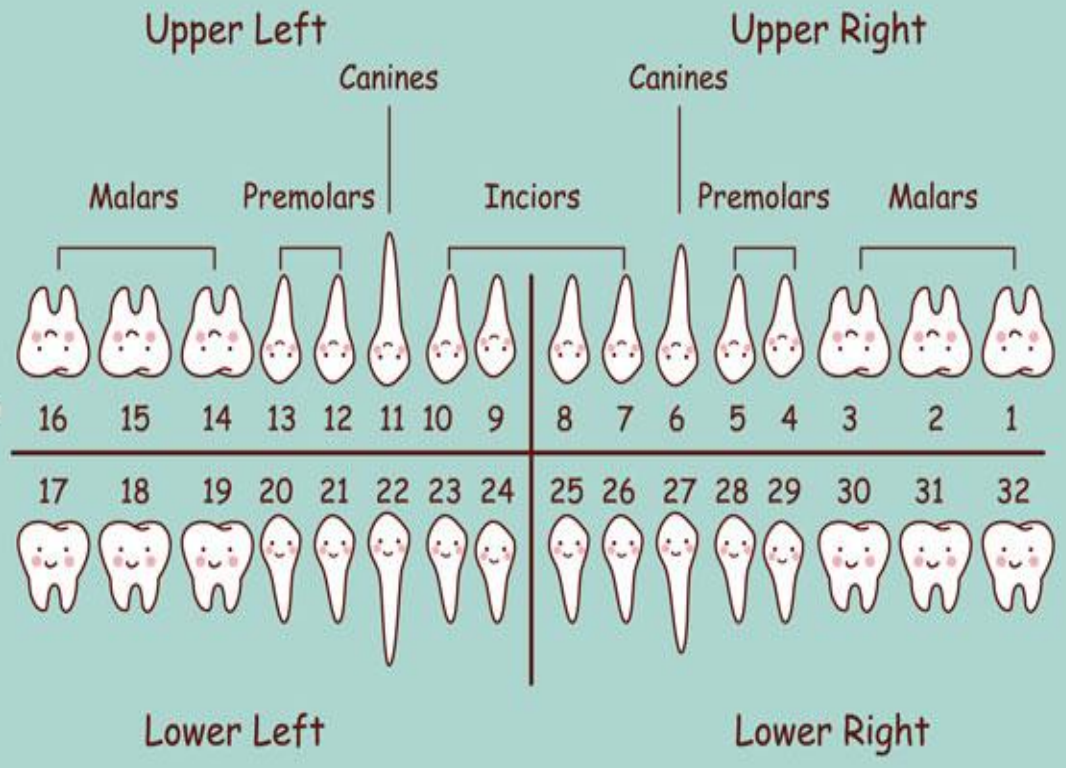
Incisors: are single rooted anterior teeth with a sharp cutting edge. Maxillary incisors are larger than mandibular incisors. The root is approximately 1.5 times longer than the crown area. The lateral incisors resemble the central but are smaller.

Cuspids: are single rooted anterior teeth at the corner of the mouth; they are also called the canines. The cuspid is the longest tooth in the mouth.

Premolars: are the fourth and fifth teeth posterior from the center of the mouth. The maxillary first bicuspid exhibits two root canals and it is normally smaller than its second bicuspid.

Molars are the most posterior teeth. The maxillary molar teeth have three roots, termed **trifurcation**. The mandiblular molars have two roots, termed **bifurcation**.


Central Incisors
Lateral Incisors
Cuspid
1st Premolar
2nd Premolar
1st Molar
2nd Molar
3rd Molar
or Wisdom Teeth
2nd Molar
1st Molar
2nd Premolar
1st Premolar
Cuspid
Lateral Incisors
Central Incisors
Upper Teeth
Lower Teeth


Upper Left
Upper Right
Canines
Canines
Malars
Premolars
Inciors
Premolars
Malars
16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Lower Left
Lower Right

- The maxillary first molar, the largest of the three, can exhibit an extra cusp on the meso-lingual cusp area, which is called the cusp carabelli.
- The second molar resembles the first but is smaller. The mandibular second molar is smaller than the first molar .
- The maxillary and mandibular third molars are often misshapen or distorted due to their placement. These molars are termed "wisdom teeth" because their eruption dates are late, from 17-21 years of age.

Tooth Anatomy/ Morphology

Crown: the top part of the tooth containing the pulp chamber, dentin, and enamel covering. The crown classified in two ways:

- **Anatomical crown :** covered with enamel and may not be totally visible
- **Clinical crown:** surface visible in the oral cavity

Root: buttom part of a tooth

Cervical line: the place where the enamel of the crown meets the cementum of the root. This area is called the cementoenamel junction.

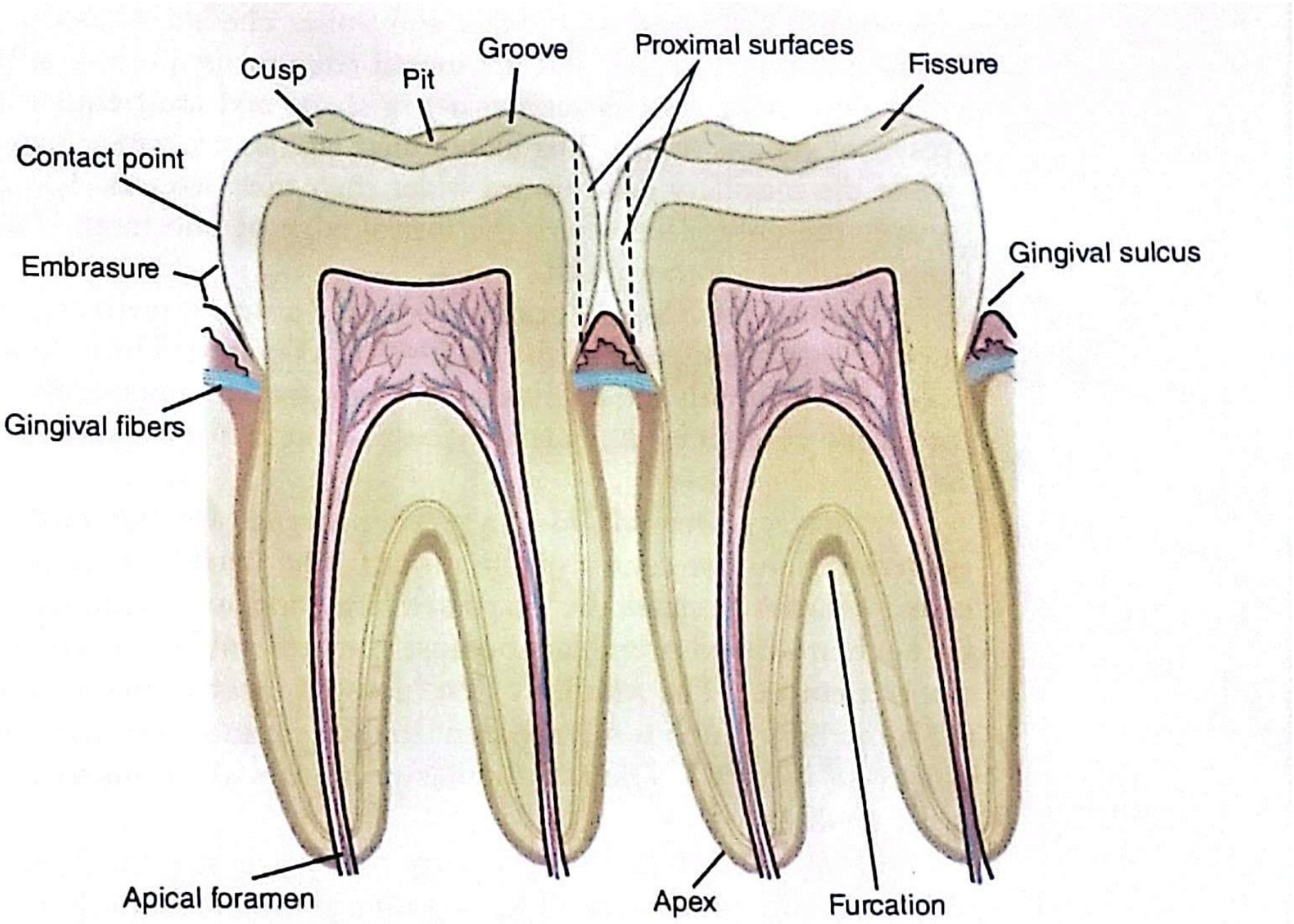
Apex: the tip end of a tooth.

Contact area: surface point where two teeth meet side by side ; if no contact occurs, the open area is referred to as a **diastema.**

Embrasure : a V-shaped area located between the contact point of two teeth and gingival crest.

Proximal surface: side wall of tooth that meets the side wall of another tooth.

Axial surface: long-length surface of the tooth.


Cusp
Pit
Groove
Proximal surfaces
Fissure
Contact point
Embrasure
Gingival sulcus
Gingival fibers
Apical foramen
Apex
Furcation

Tooth Surface

A tooth have six major surfaces. The following terms indicate the various surfaces of teeth:

Facial (F)

Buccal(B or Buc)

Labial (La or Lab)

Lingual (Li)

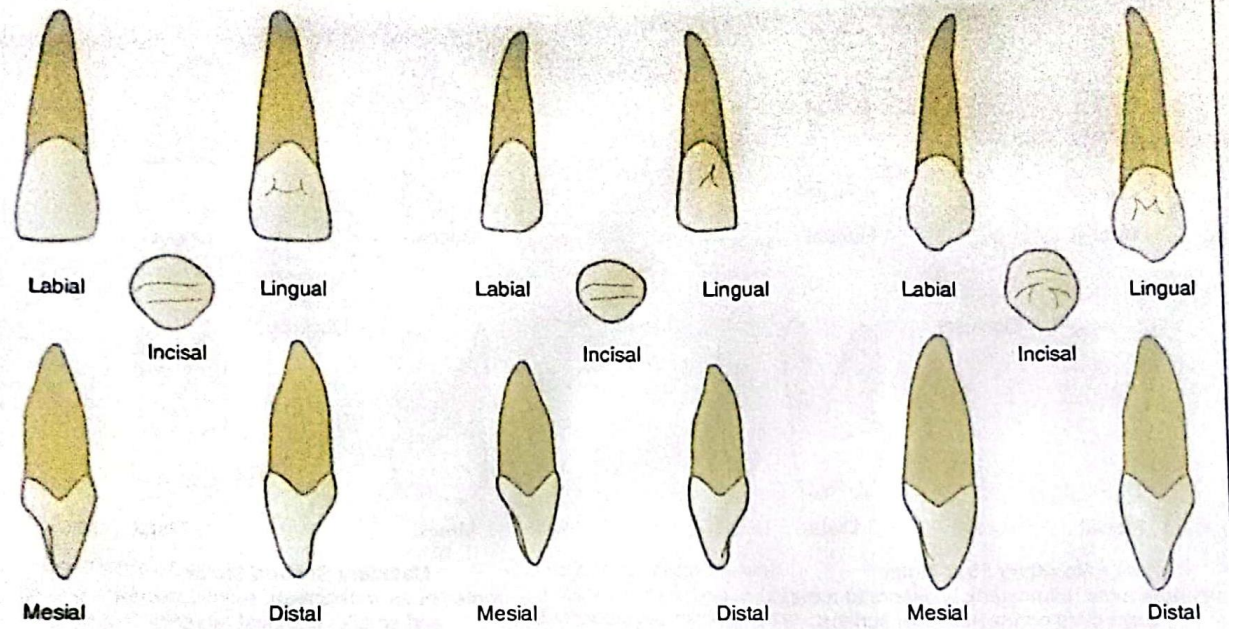
Mesial (M)

Distal (D)

Incisal (I)

Occlusal (O or Occ)

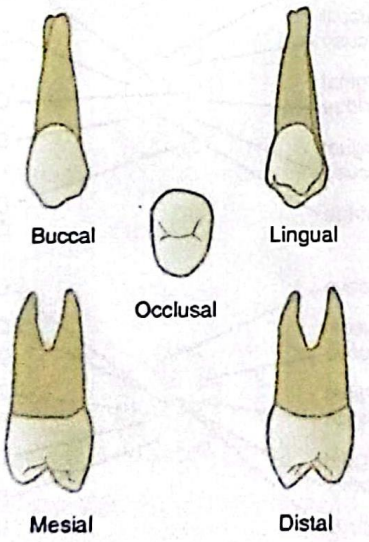
Apical



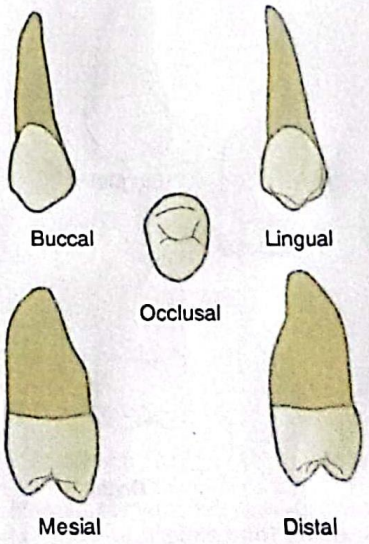
Maxillary Central Incisor
sharp edge, large, thumbnail in shape, single root

Maxillary Lateral Incisor
similar to central but smaller in size

Maxillary Cuspid
rounder incisor with pointed cutting edge, thicker on distal side

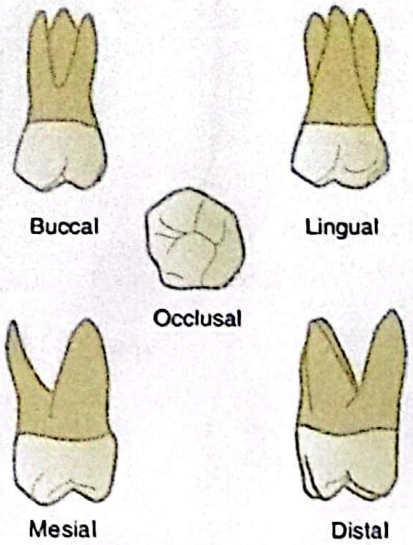


Maxillary First Bicuspid (Premolar)
two-cusped tooth, cusps are pointed shape, has small two-rooted root section (or two canals in root)

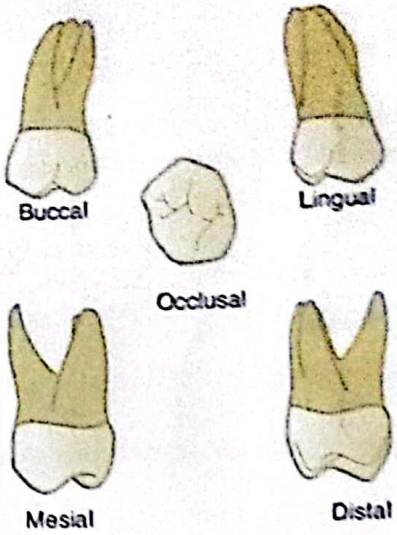


Maxillary Second Bicuspid (Premolar)
smaller, less bulky than the first bicuspid, singular root with one canal

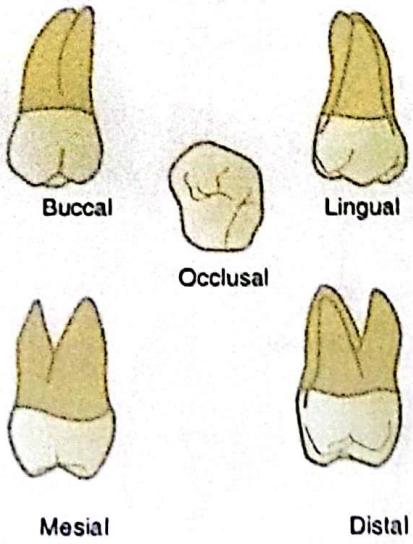
(A)



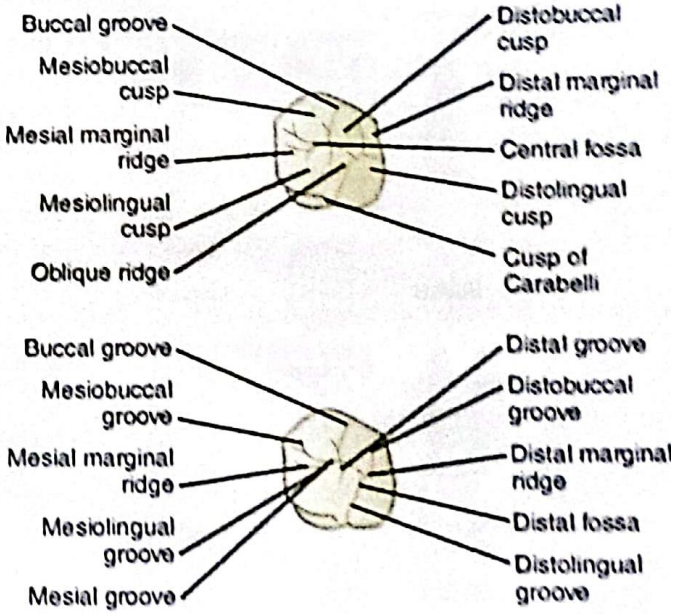
Maxillary First Molar
three roots (trifurcated), widespread roots, extra cusp on mesiolingual surface



Maxillary Second Molar
roots not as widespread, slightly shorter and smaller than first molar

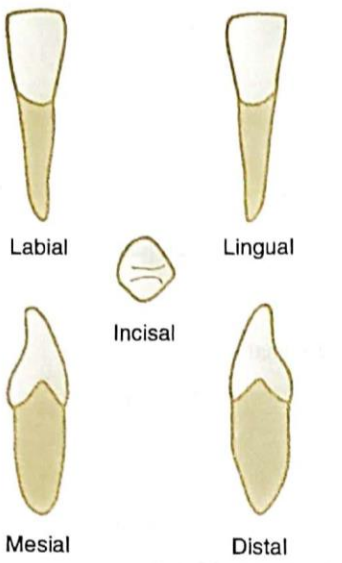


Maxillary Third Molar
may be distorted, resembles first molar but roots and crown may appear crimped and wrinkled

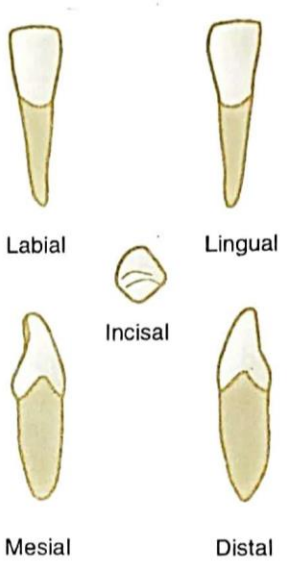


Occlusal Surface of Maxillary First Molar

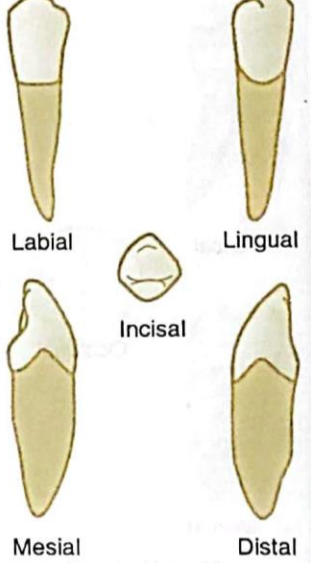
(B)



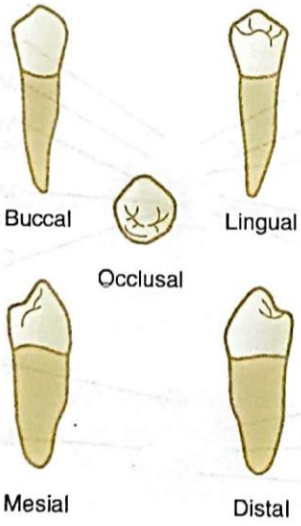
Mandibular Central Incisor
no cingulum, resembles maxillary, central but smaller, single root



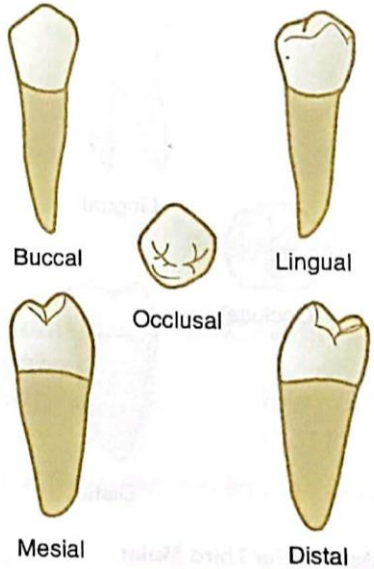
Mandibular Lateral Incisor
larger than central incisal edge, incisal edge curves towards distal



Mandibular Cuspid
bulkier, pointed cutting edge, single root

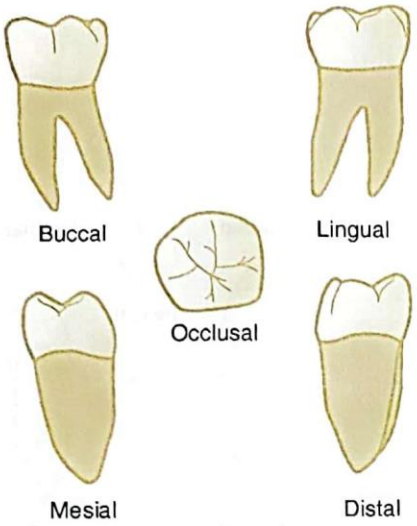


Mandibular First Bicuspid (Premolar)
lingual cusps smaller than buccal cusps, single root, smaller than second premolar, occlusal view may appear as bell shape

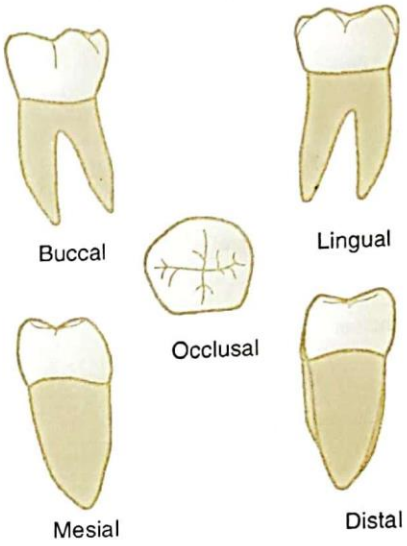


Mandibular Second Bicuspid (Premolar)
larger than first bicuspid, lingual cuspid may split or look like two buccal cusps, single root, sometimes looks like a three-cusped tooth

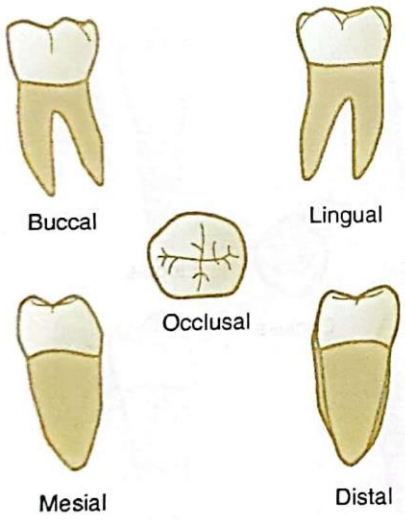
(C)



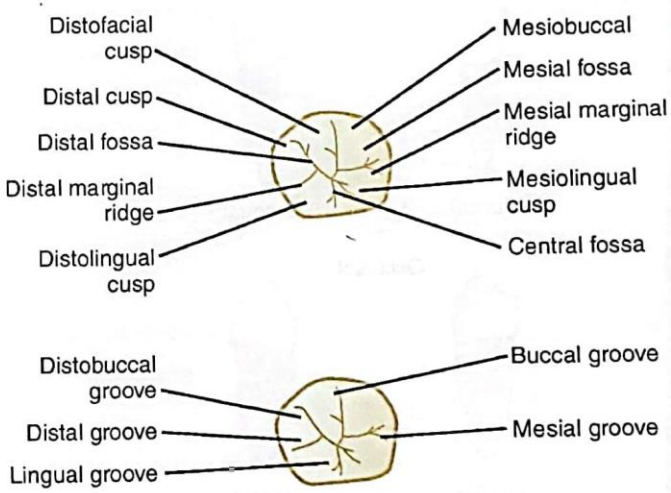
Mandibular First Molar
two roots (bifurcated), widespread, boxy shape with five cusps



Mandibular Second Molar
two roots, rectangular, box shape with four regular cusps



Mandibular Third Molar
two roots and cusps underdeveloped, usually wrinkled



Occlusal Surface of Mandibular First Molar

(D)

Dental Professionals :

Dentist : The dentist who is Doctor of Dental Surgery (DDS) OR A Doctor of Medical Dentistry (DMD).

The official ADA- recognized special areas are listed here:

Prosthodontist: replace missing teeth with artificial appliances such as dental crowns, full mouth dentures or partial bridge work.

Periodontist treats disease of periodontal (gingiva and supporting tissue.

Orthodontist: corrects malocclusion and improve jaw alignment.

Pediatric dentist: performs dental procedures for the child patient, also called pedodontist.

Endodontist: treats the diseased pulp and periradicular structures.

Oral and maxillofacial surgeon: performs surgical treatment of the teeth, jaws, and related areas.

Public health dentist: works on causes and prevention of common dental diseases and promotes dental health to the community or general population.

Oral pathologist: studies the nature, diagnosis, and control of oral diseases.

The official organization of the dentists and dental specialists the American Dental Association (ADA) has branches on the state and local levels.

Dental Instruments

Dental Hand Instruments

Each profession employs its own type and kind of instrumentation. dentistry requires specialized equipment for operation. Some tools are in common use in all aspects of dentistry, and others are constructed for various specialized procedures. Following are the standard instruments, grouped by their related family of use.

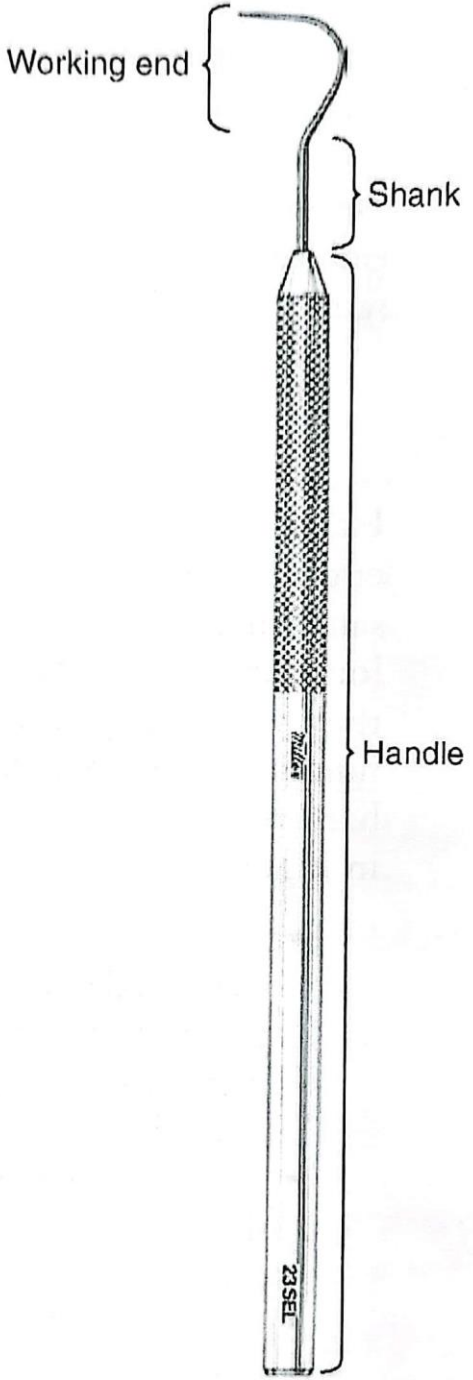
Hand Grasp instruments

Hand instruments may have one working end or a working end at each of the opposite sides. Working ends on the same instrument may vary in size, function, or location of operative site locations. Many instruments are named for an inventor or school where they were designed. Instruments are grouped into families according to function and are constructed of various materials from stainless steel to hard resin. All instruments have the following three compenents:

Shaft or handle: used to grasp the instrument; supplied in various weights, diameters, and surfaces that may be smooth, padded, grooved or serrated; may be rounded or octagonal-shaped plastic or metal with manufacturer's name and/or formula code etched on one side.

Shank: connects the handle to the working end, sometimes called the *instrument neck*. The shank may be straight, curved, or angled to accommodate specific areas of the mouth.

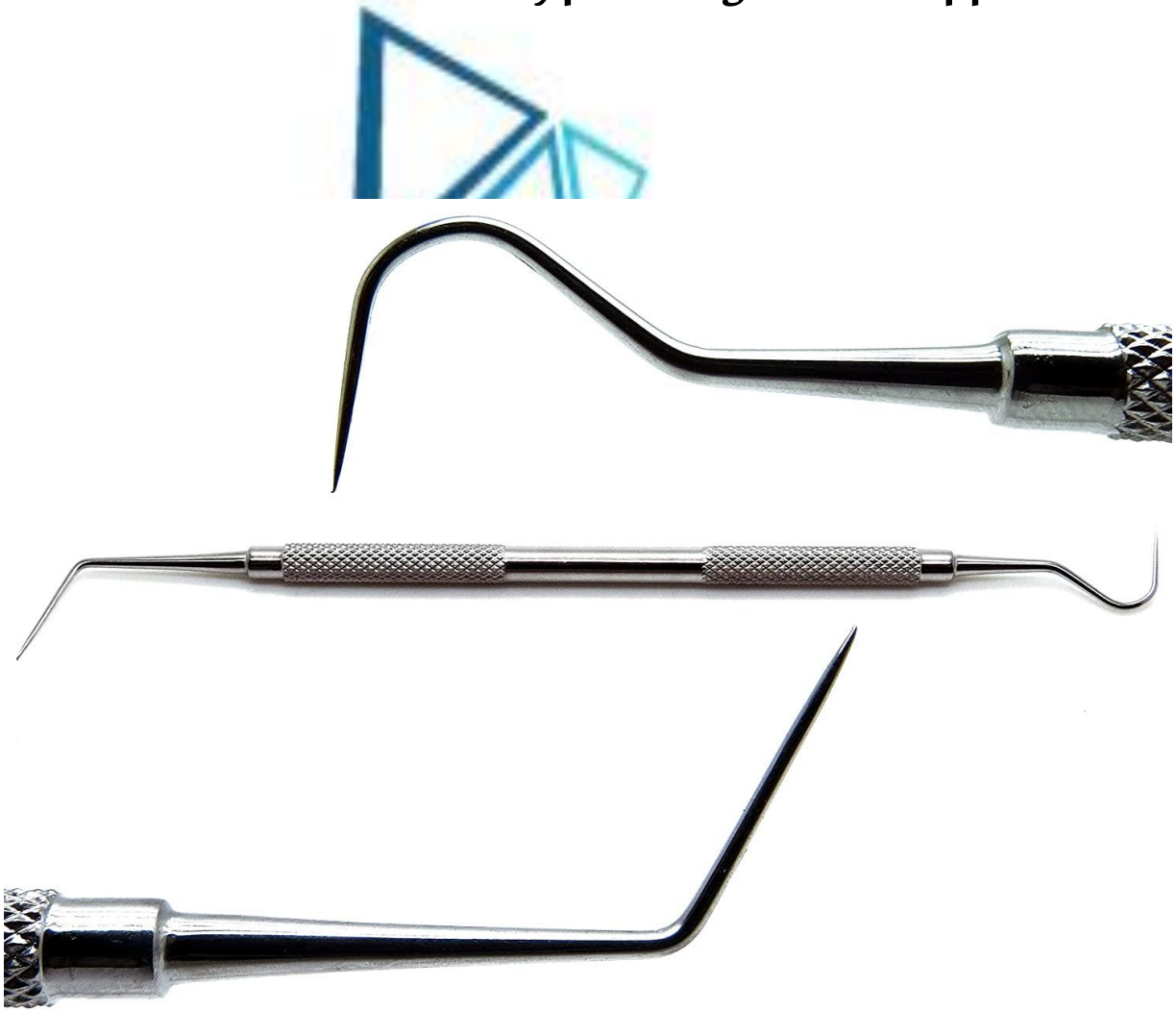
Working end: also called *blade* or *nib*; rounded end is the toe; the pointed end is the *tip*, which may be beveled, curved,, or spoon shaped and present on both ends.



- **Basic or Diagnostic Grouping:**

Mouth mirror: used for reflection, retraction, and visual observation; supplied in various sizes from 1 (16 mm) to 2 (26 mm) and may have one side or double-sided plain faces or faces that magnify the view. Some are solid, one piece; others have cone screw-in handles.

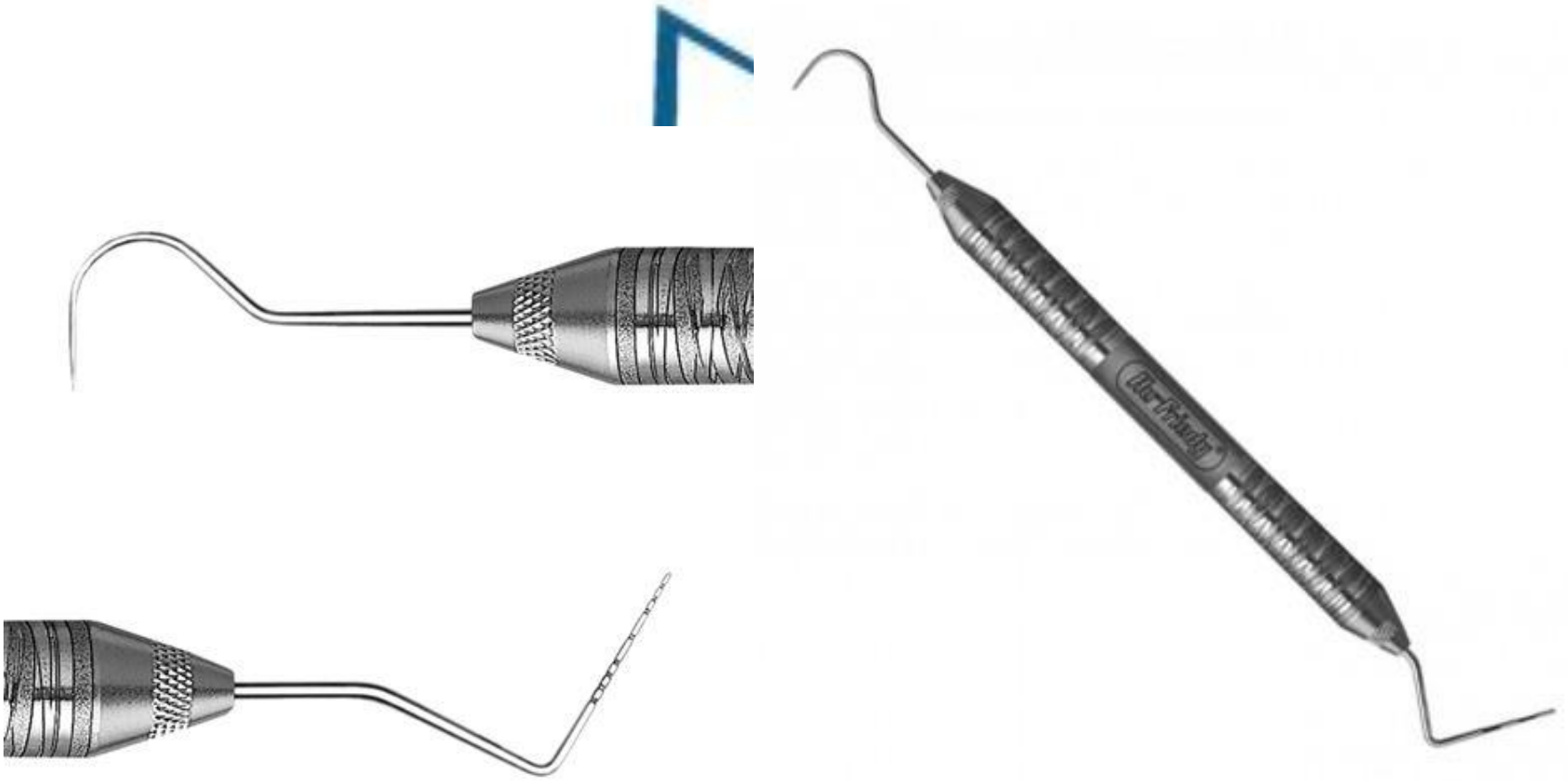
Explorer: a sharp, flexible, pointed instrument used to detect caries and calculus; to explore restorations, surfaces; to make location marks; and to pick up cotton points or materials. This tool is supplied in multiple shapes as single or double ended with an explorer edge on one side and another type of edge on the opposite side.

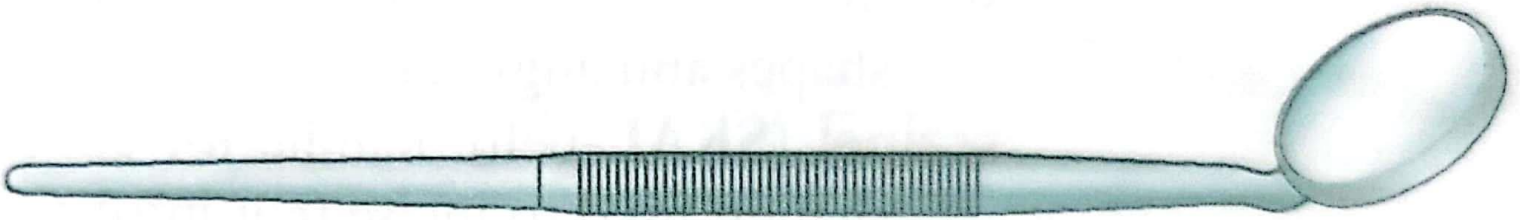


Cotton forceps: tweezer-like pinchers used to transport materials to or from the mouth; available with or without serrated tips.

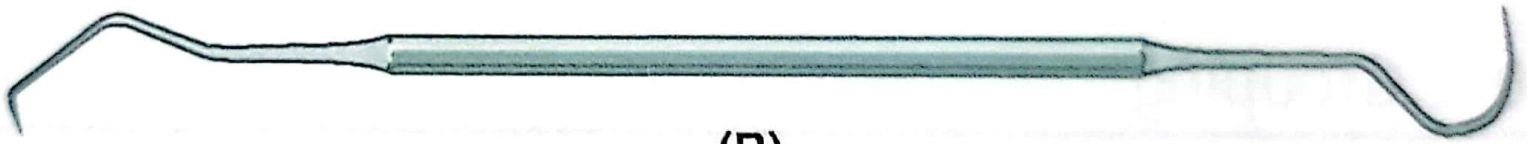
Periodontal probe: a longer pointed instrument with measured marks on the tip; used to assess depths of tissue pockets; available with a round or flat blade and may be color-coded to help determine measurements.

Expro: double-ended instrument with a diagnosing probe tip at one end an explorer tip at the other end.





(A)



(B)

(C)

(D)

Periodontal Grouping

The periodontal is a family of instruments used to treat and care for the gingival and periodontal tissue.

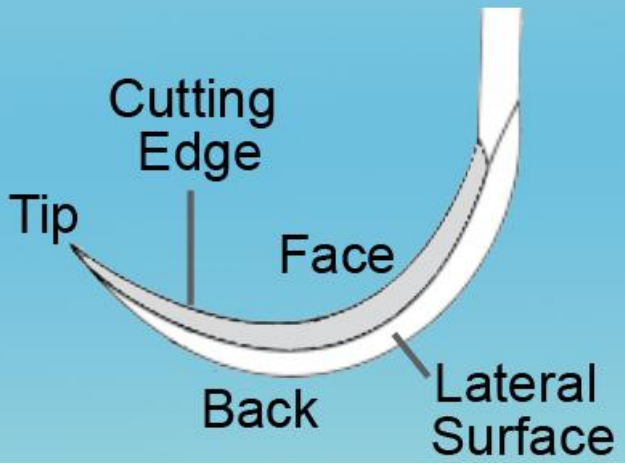
Scaler: thin-bladed hand instrument with pointed tip and two cutting edged; used to scale or supragingival hard deposits from teeth.

Sickle scaler: sharp blade in the shape of a sickle; used to remove calculus from tooth surfaces.

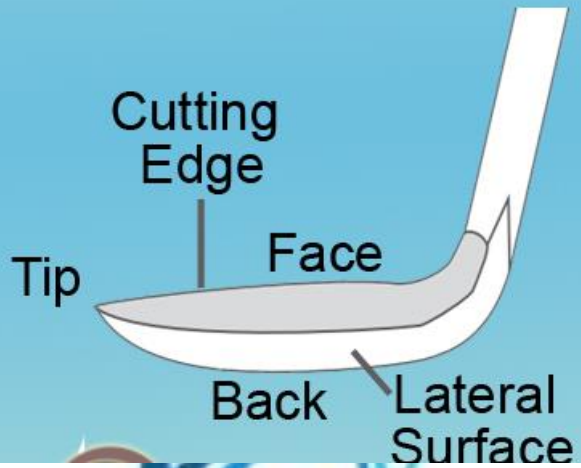
Scalette: hygiene instrument combining a scaler on one tip and a curette on the other tip to save time and tray space during treatment.

Curette: rounded-tipped thin blade with a longer neck and two cutting edges; designed for specific tooth area and used to remove subgingival deposits.

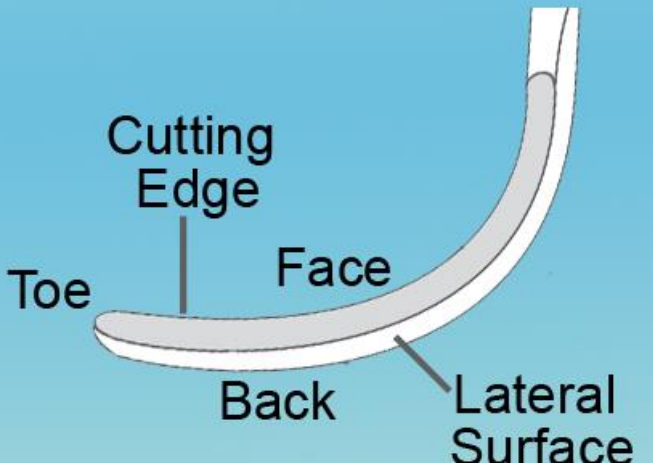
Sickle Scaler
(Curved Blade)

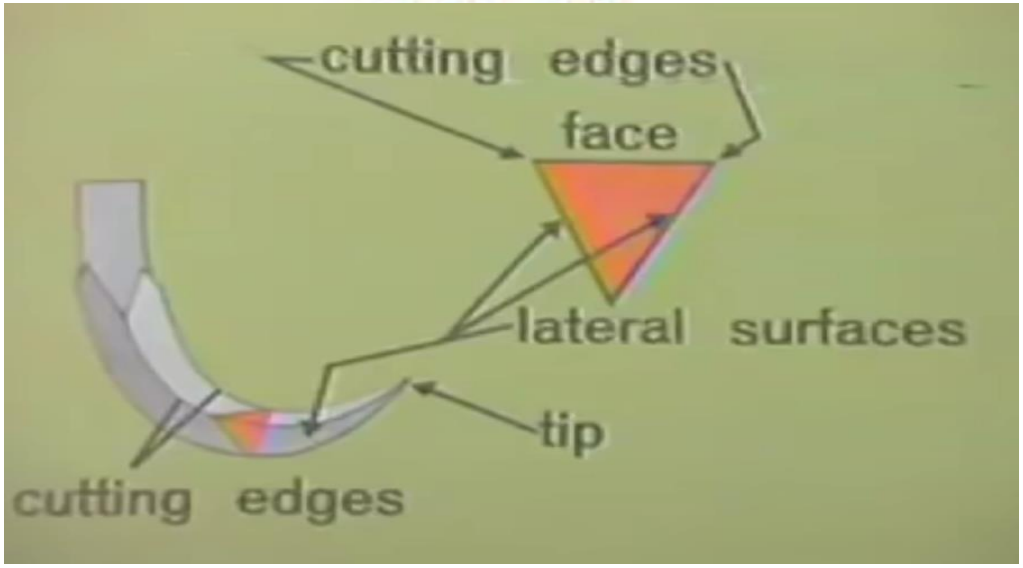


Sickle Scaler
(Straight Blade)



Curette





Implant scaler/curette: nonmetallic, resin-tipped instrument, designed to remove deposits around titanium implant abutments. Some thin bladed, titanium scalers/curettes have been developed to use safety and not mar the metal implant abutments.

Periodontal file: **hand instrument with rough edge or teeth working surfaces; used to smooth in root planning and for debridement in deep socket.**

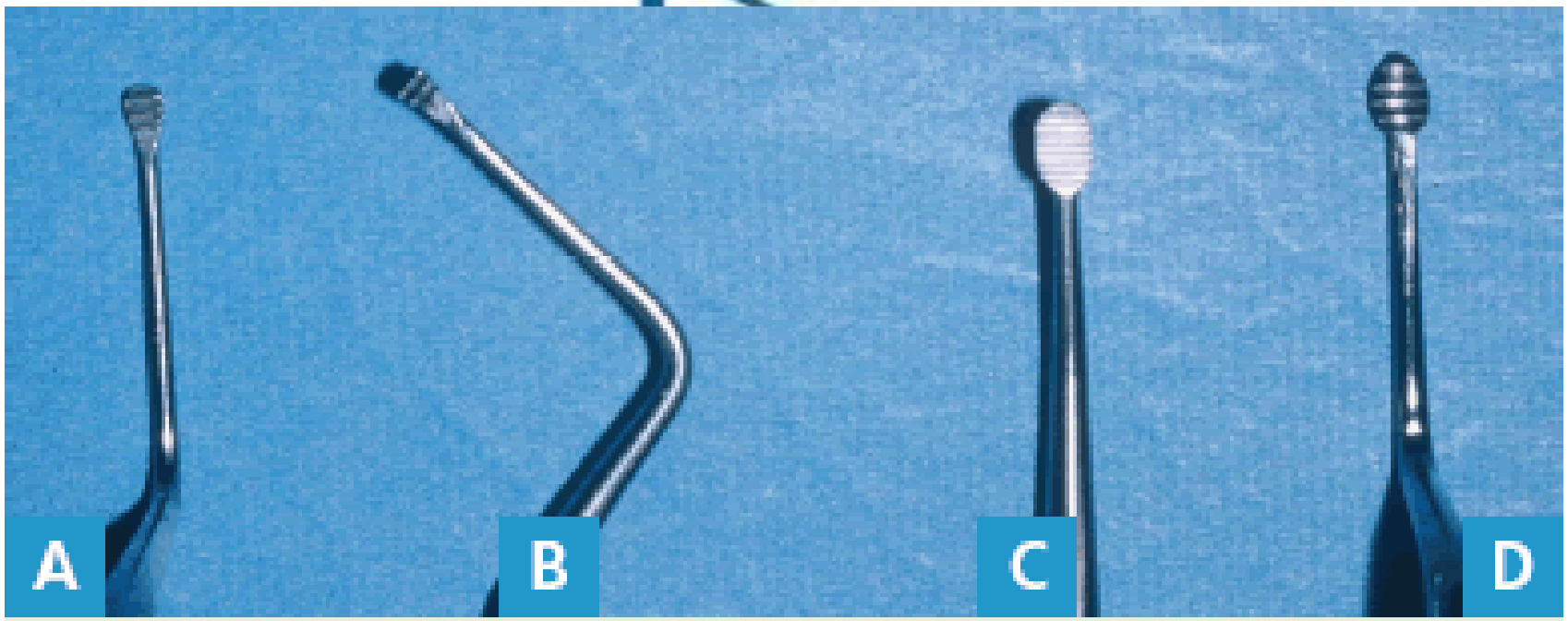
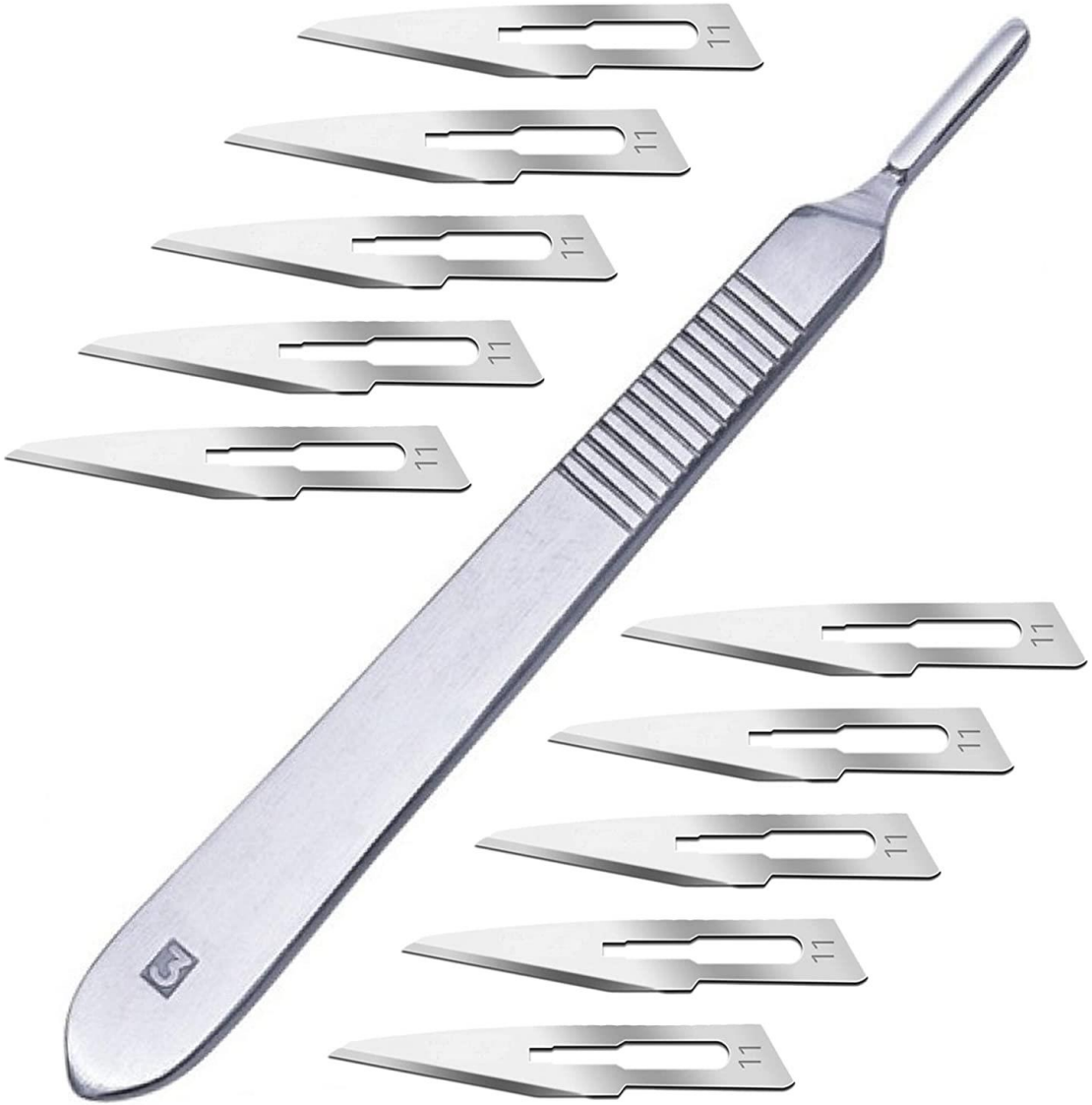


Figure 1. Files
A. Hirschfeld 5/11 B. Hirschfeld 3/7 C. Bedbug Design UW B/46 D. Orban 12/13.

Periodontal knife: hard instrument with flat-bladed incision tip of various shapes and angles; used to remove or recouncour soft tissue.

Scalpel: handle for attachment of blades of assorted sizes and shapes; used to incise or remove tissue; also used in specialized dental procedures.



Restorative Grouping

The restorative grouping as an assortment of hand instrument used to remove decay, make preparations, and restore tooth surfaces.

Excavator: hand instruments with long-necked, sharp-edged blades; used to remove soft decayed tissue from preparation; also may be called *spoon excavators*.

Gingival margin trimmer: hard instrument with long, slender, curved, flat blade; used to break away enamel margins during tooth preparations and smooth the cavity preparations.

Hoe: smaller bladed instrument with a tip resembling a farm hoe; used to break or pull away enamel tissue during preparations.

Hatchet: **hand instrument with a sharp-edged hatchet-like tip; used to remove hard tissue.**

Chisel: hand instrument with cutting edge that is used to cut and plane away enamel and dentin. Chisels have straight shanks, or a curved shank, such as the wedelstaedt chisel, or may have an extra angled shank, such as the bin-angle chisels.

Carver: thin-bladed hand instrument used to crave newly placed restorative material; blade faces come in various shapes. Popular types are the Hollenback, Wards, and Frahms carvers.

Filling and Finishing Grouping

After the preparation is complete, it must be filled with an appropriate restorative material and then restored to a natural appearance and function. The following instruments may be used to complete this process.

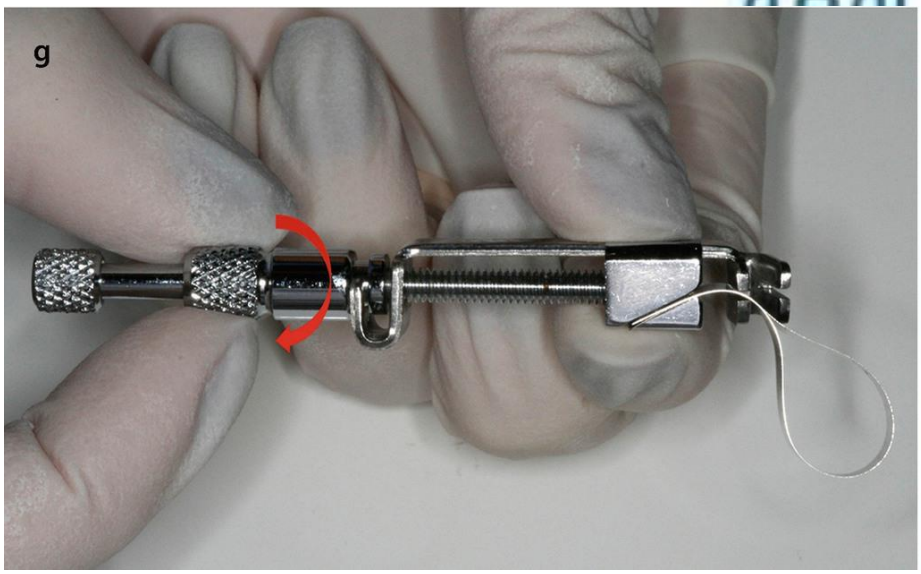
Plastic filling instrument (PFI): hand instrument with a flat blade; used to carry, transfer, and pack materials, or to crave restorative material while it is still in a movable or plastic stage.

Condenser: hand instrument with a thick, rounded, or oval-shaped flat head that is sometimes serrated. It is used to pack or condense restorative material into the cavity preparation. Double-ended ones vary in sizes and/or surfaces.

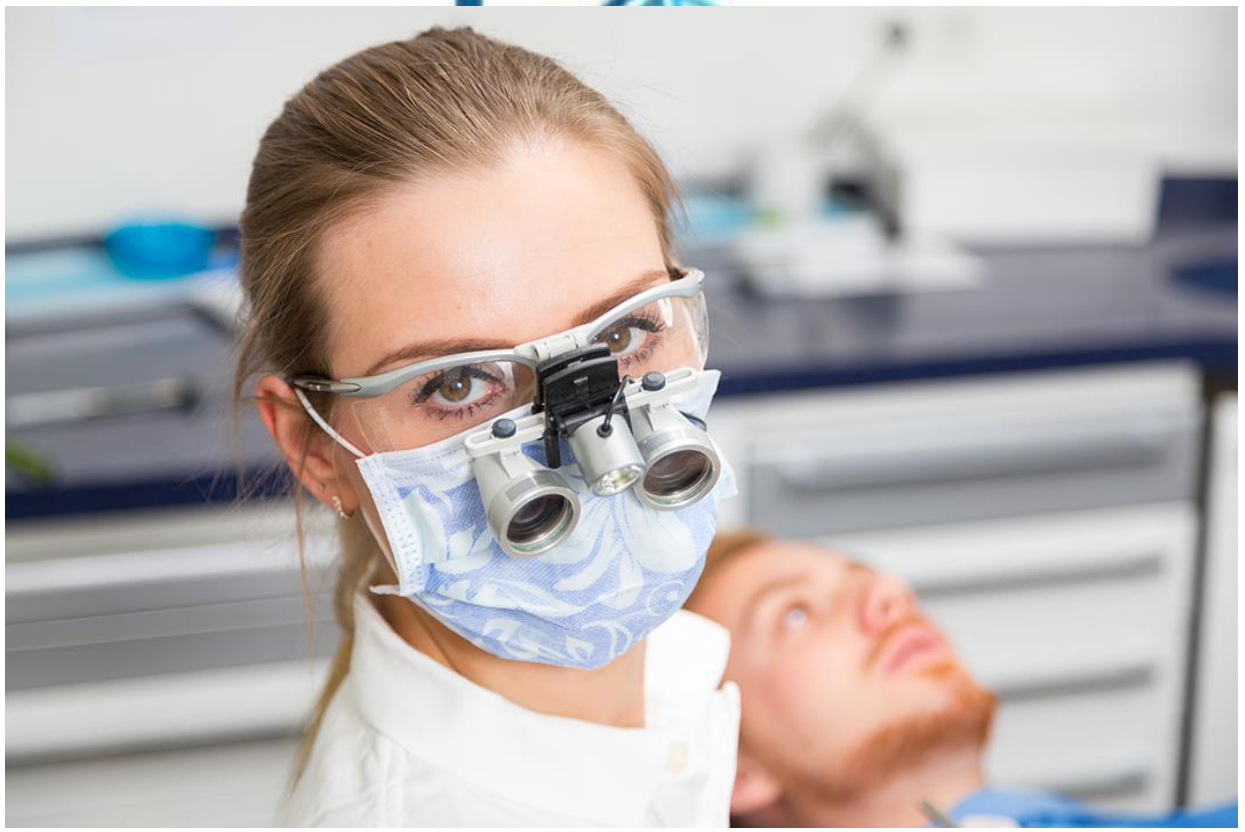
Burnisher: hand instrument with a smooth, rounded head that comes in various shapes; used to smooth out restorative material or other metal surfaces.

Amalgam carrier: hand instrument with holding cylinder for the transfer of amalgam material; it has a spring lever pusher to expel the material into the preparation. Another type of amalgam carrier is the amalgam gun with a thumb spring push to expel the material.

Matrix holder, matrix strip, and wedge: holder device used to maintain artificial wall around the tooth preparation. A wooden or resin triangular wedge is used to hold the strip in place and prevent the material from leaking.



Loupes: though not considered an instrument, eye loupes are glasses used for magnification, precision, and identification purposes, and are required in many procedures.



Evacuation

Evacuation of the mouth is accomplished by using tips that are inserted into suction tubing. The two types of handheld evacuator tips commonly used in saliva evacuation are:

High volume evacuator (HVE): metal or resin, beveled tip with a large hole, inserted into a high evacuation tube system handle with off/on and intensity controls; used for gross removal of fluids and debris from the mouth.

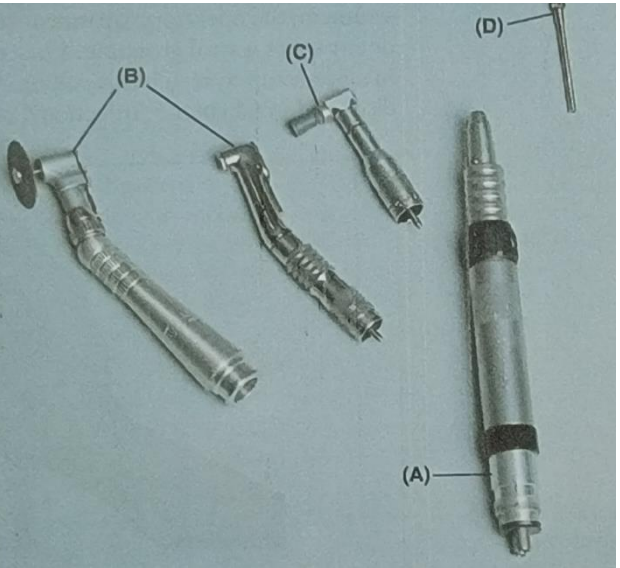
Saliva ejector tip: smaller suction tip that is inserted into the evacuation tubing from the dental unit; used for a steady, constant fluid removal from the oral cavity.

Various mechanical devices are used to isolate and maintain a dry field such as the disposable *Isolite* illuminator, a device placed into the mouth that will serve as a tongue retainer, and a huminated evacuation unit that is maintained by the patient in a bite block position.

Rotary Dental Instruments

Rotary instruments are power-driven tools that operate in a circular motion at various speeds. The rate of speed or rpm (rotations per minute) determines the classification of the instrument. The handpiece holds and operates the inserted instrument. It is classified as slow, high, or ultra-high speed, depending upon its rpm (10000 to 400000). Rotation is achieved by a belt-driven electric turbine or a compressed air system

Contra-angle handpiece (CAHP): handpiece with an obtuse angled head (more than 90 degrees). A CAHP is inserted into the power unit's straight handpiece and is used to gain access to posterior teeth and difficult areas.

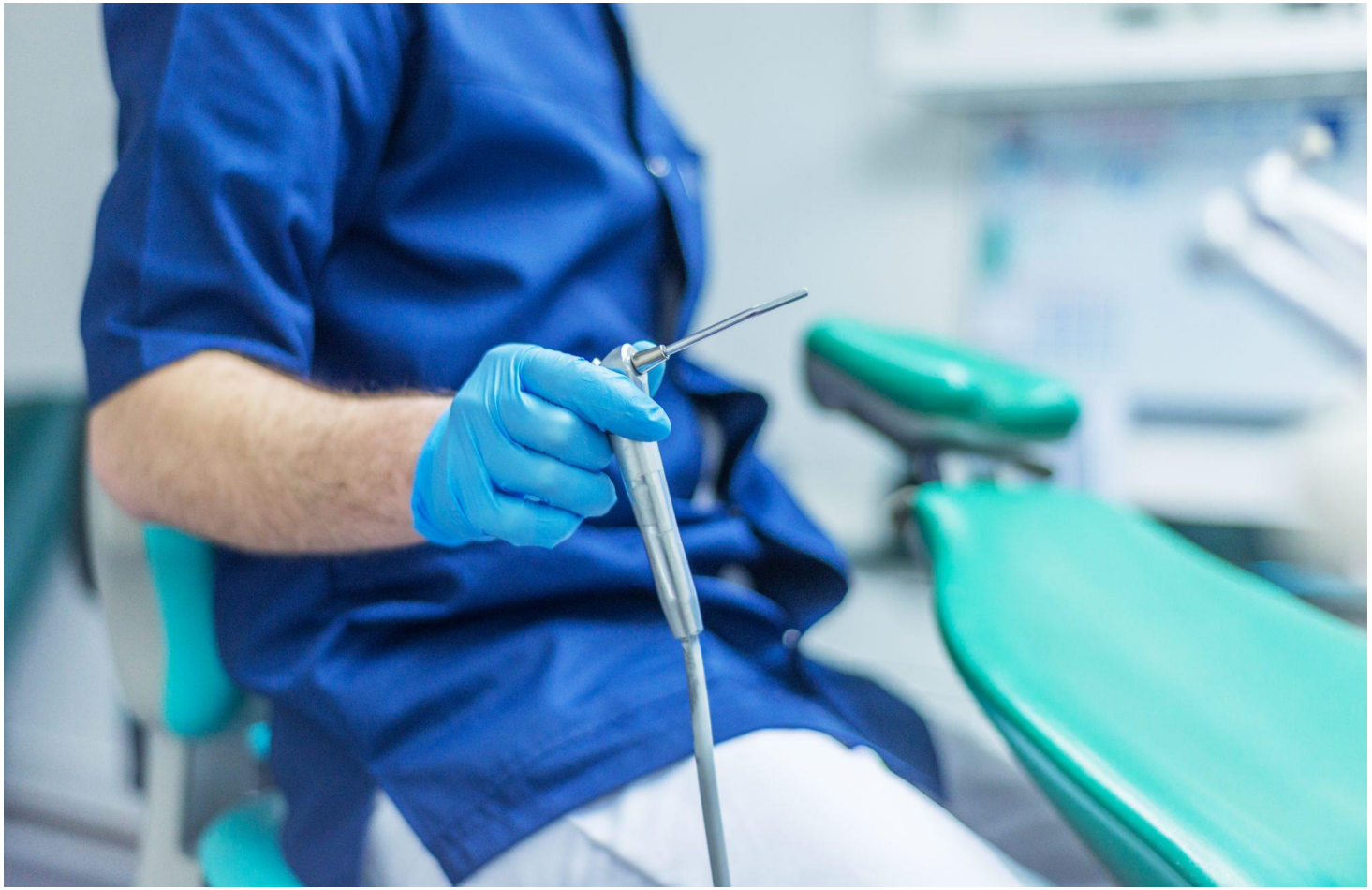


right-angle handpiece (RAHP): handpiece with an the head at a 90 degree angle; is inserted and connects into the power unit's handpiece; employed in general use throughout the oral cavity.

Prophy angle handpiece (PHP): small prophylaxis handpiece rotary angle with a 90 degree angle head; has a limited opening in the working end for polishing cups or brush placement. The PHP inserted into a slow-speed handpiece and used to polish teeth. Many PHPs are disposable, and some may be battery with swivel heads and optical light sources.

Fiber-optic handpiece: specific slow or high-speed handpiece that supplies a light source to the operative site for improved vision.

Air abrasion: air-powered handpiece delivering water under force to clean or prepare tooth surfaces .



Ultrasonic handpiece: high-speed vibration-scaling tips used for scaling and curettage purposes; sometimes called *ultrasonic scaler*.

Curing light handpiece: handheld device that focuses a light beam to cure or "set" specified materials.

Intraoral camera: handpiece with a small camera situated in the head; used to transmit various views of the oral setting.

Electrosurgery handpiece: combination of assorted metal tips that fit into a probe handle; these tips pass electrical currents that incise and coagulate the blood in a surgical procedure.

Laser handpiece: photon handpiece that emits a precise light energy wavelength that is concentrated to perform specialized tasks; various wavelength are utilized for a specific target or procedure, such as tooth whitening, caries removal, or surgical gingivectomy.

Caries detection scanner: a noninvasive lase scan that detects early decay in occlusal areas.

Implant drilling unit: lighted, digitally controlled drilling handpiece with sterile irrigation that is used to smooth alveolar bone, drill operative sites, and install implants.

All dental handpiece are expensive items and must be maintained, sterilized, and cared for in the manner specified by the manufacturer of the instrument.

Handpieces may be used to hold the burs and discs that are used in restorations and chairside dental procedures. The dental bar is the most commonly used rotary item and is employed in cavity preparation and restorations. A bur has three parts:

Shank.

Neck.

Working end or head.

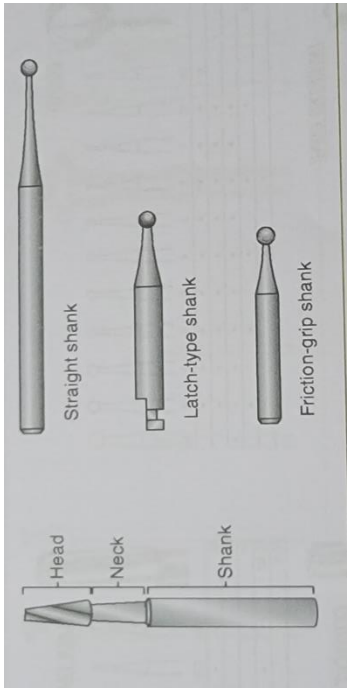
Bur types

.Three types of burs are:

Friction grip bur: smooth-ended bur, held in the handpiece by the friction grip chuck inside the hand piece head (FG).

Latch-type bur: has grooved insertion bur end that hooks and locks into the head of a latch type handpiece (RA).

Straight handpiece: has a smooth, extended shaft that fits directly into the straight handpiece (HP); available in mins, regular, or surgical lengths.



Dental Facility Operative Equipment

Each dental facility or clinic contains specialized dental equipment that is used to perform necessary treatments. Although many items are available, some for general dentistry and some for specialty use, all facilities need the basic items shown and described here:

- ❑ Operatory.
- ❑ Dental chair.
- ❑ Operatory light.
- ❑ Stools.
- ❑ Dental unit.
- ❑ Cabinets.
- ❑ Radiographic units
- ❑ Diagnostic or auxiliary units.