

# Introduction to Dental Anatomy

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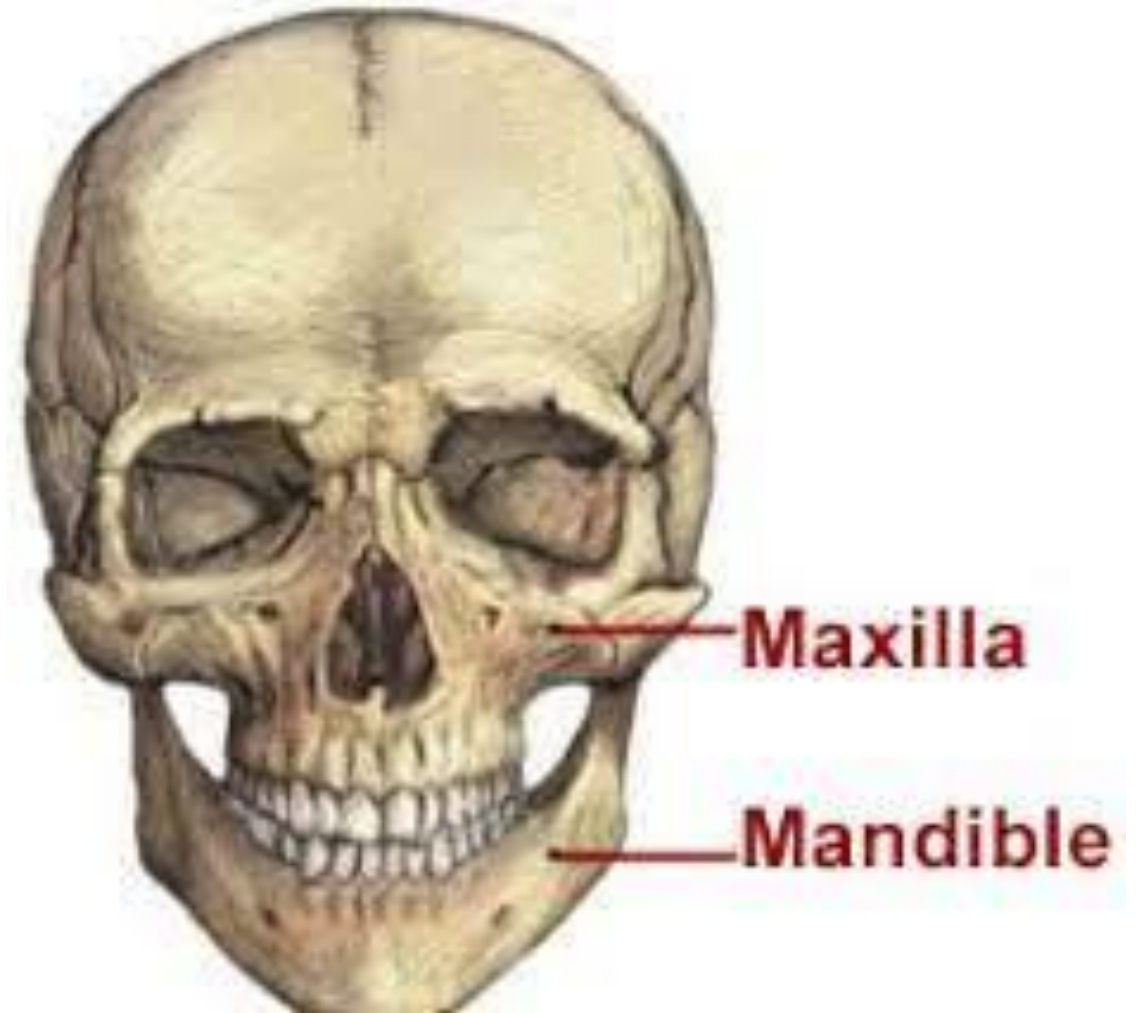
# Dental Anatomy

- Dental anatomy is defined as the study of the **development, morphology, function, and identity of each of the teeth** in the human dentitions, as well as the way in which **the teeth relate in shape, form, structure, color, and function** to the **other teeth** in the **same dental arch** and to the teeth in the **opposing arch**.
- Thus, the study of dental anatomy, physiology, and occlusion provides one of the basic components of the skills needed to practice all phases of dentistry.

# Nomenclature

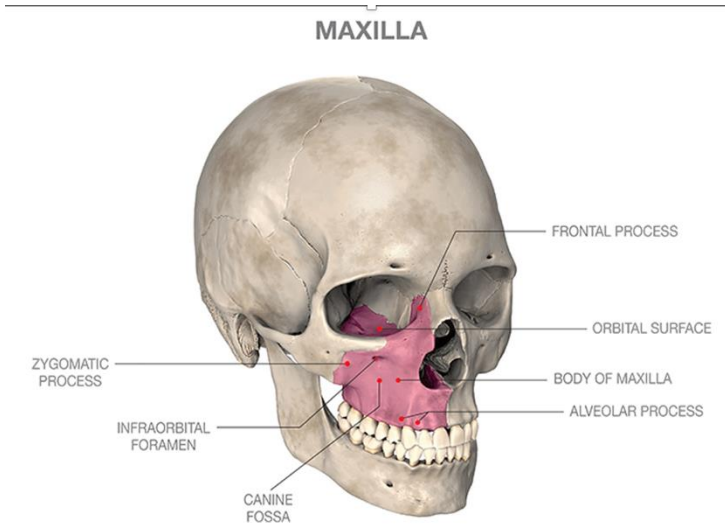
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- The term **maxillary** refers to the upper jaw, or maxilla.
- The term **mandibular** refers to the lower jaw, or mandible.



# The maxilla and maxillary arch

- The maxilla is two bones forming the upper jaw; they are rigidly attached to the skull.



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## The mandible and mandibular arch

- The mandible is a horse-shoe shaped bone which articulates with the skull by way of the temporo-mandibular joint (TMJ).

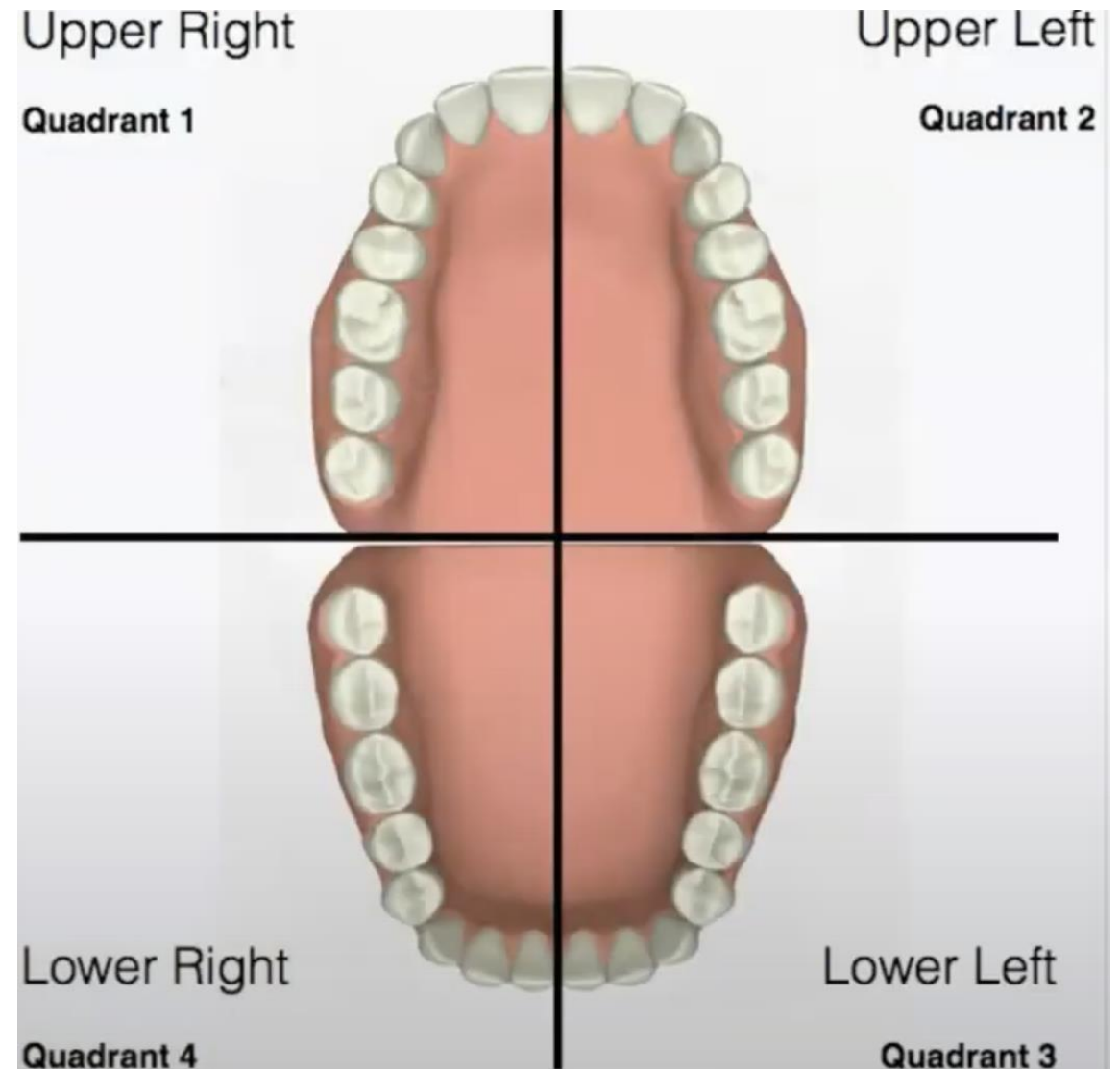


# Quadrants

## Right & Left Quadrants

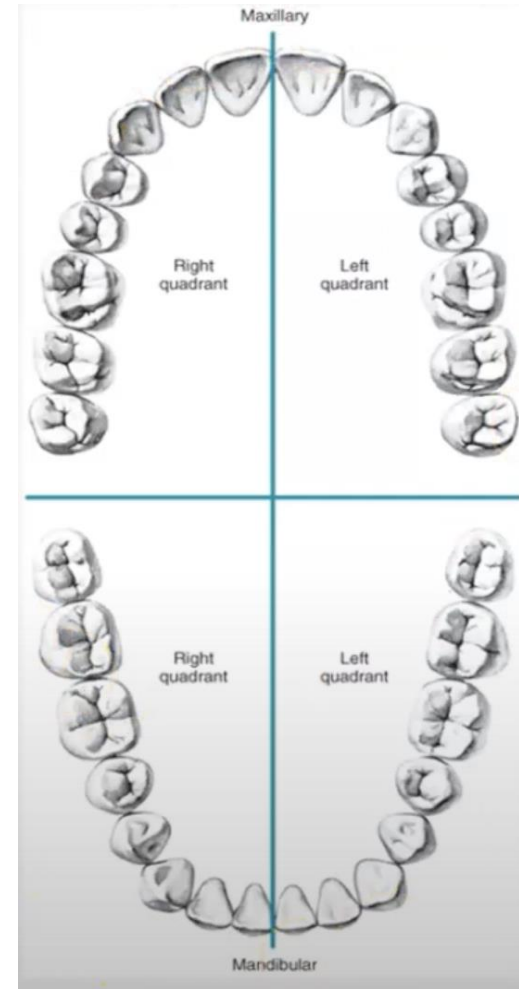
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- Each arch can further be divided into the left and right halves, also known as **left** and **right quadrants** since each **quadrant** contains one fourth of all teeth in that dentition.

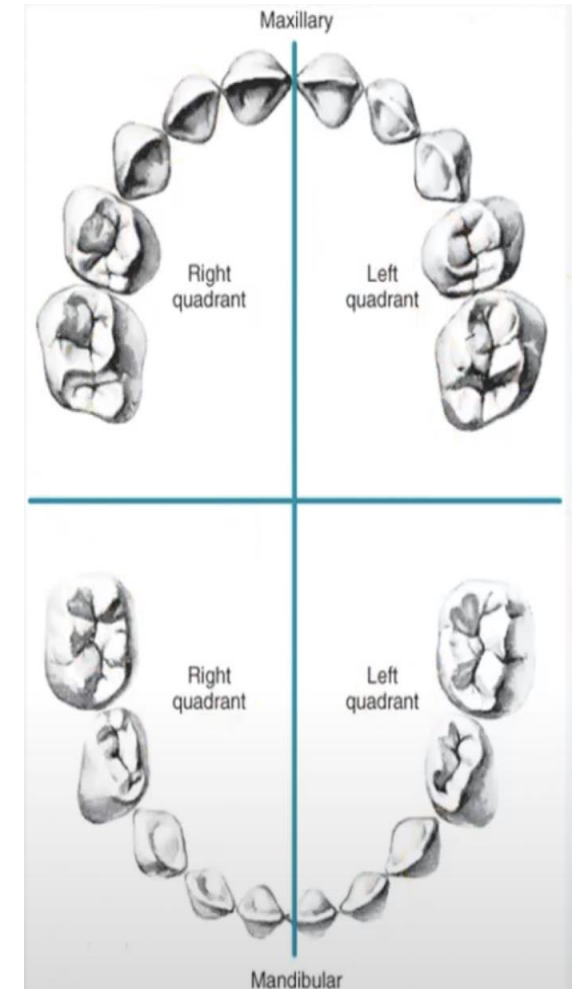


# Types of Dentitions

- Humans have two sets of teeth throughout life:
  1. The first set of teeth to be seen in the mouth is the **Primary** or **Deciduous** dentition.
  2. The second sets of teeth is **Permanent** or **Succedaneous** dentition.



**Permanent Dentition**



**Deciduous Dentition**

# FOUR TYPES OF HUMAN TEETH







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## Type Of Teeth

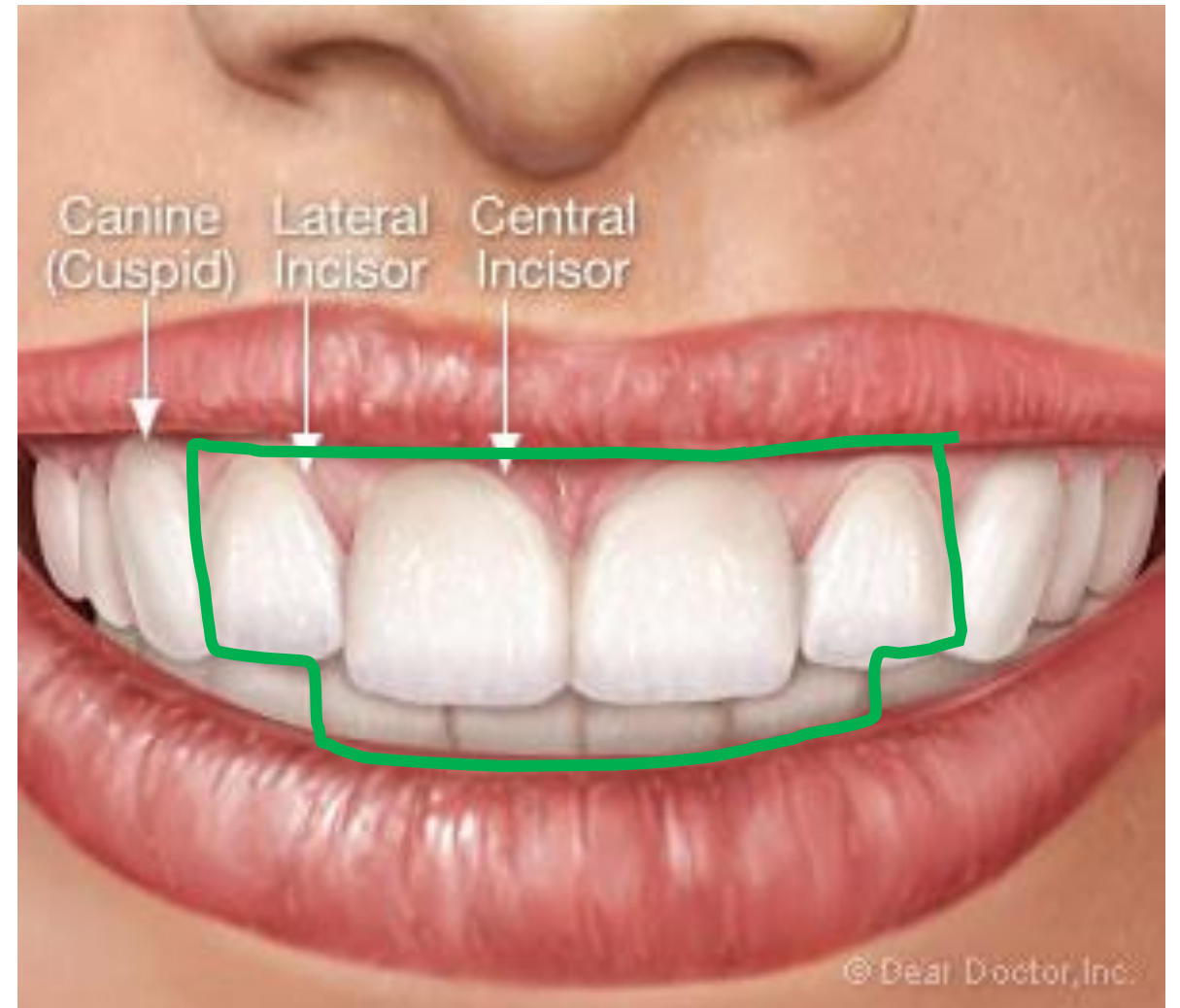
Teeth are grouped into:

- **Anterior teeth:** which include the incisors and canines.
- **Posterior teeth:** which include premolars and molar.

# Incisors Teeth

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- **Incisors are incising food.**
- **There are two types of incisors in human dentition:**
  - **Central Incisors**: It is the closest tooth to the arch midline separating the right and left quadrants. They are four in number (Two Maxillary and Two Mandibular; One in each quadrant).
  - **Lateral Incisors**: It is the tooth next to, or lateral to, the central incisor. They are four in number (Two Maxillary and Two Mandibular; One in each quadrant).



# Incisors Teeth

Upper

Lateral Incisors

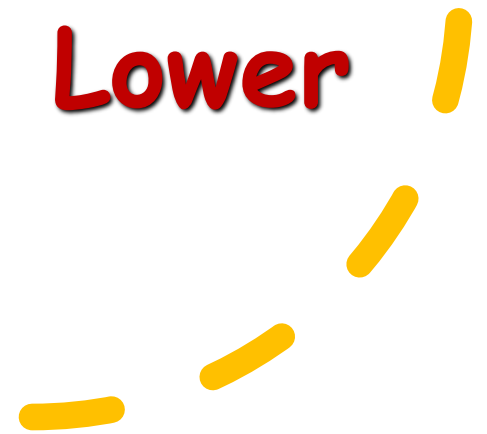
Lower



Upper

Central Incisors

Lower



# Canines

- Canines are pierce and hold food.
- It is the tooth next to lateral incisor.
- They are four in number (Two Maxillary and Two Mandibular; One in each quaderant).



Canines  
Teeth

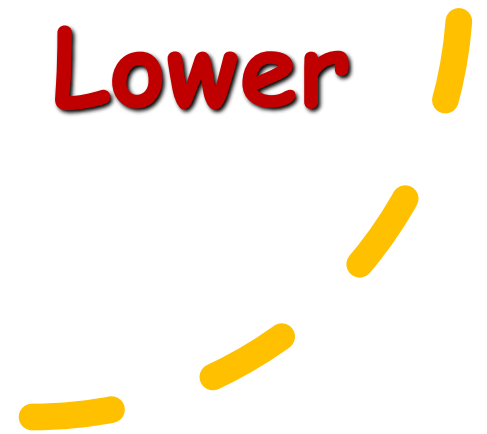
Upper



Lower

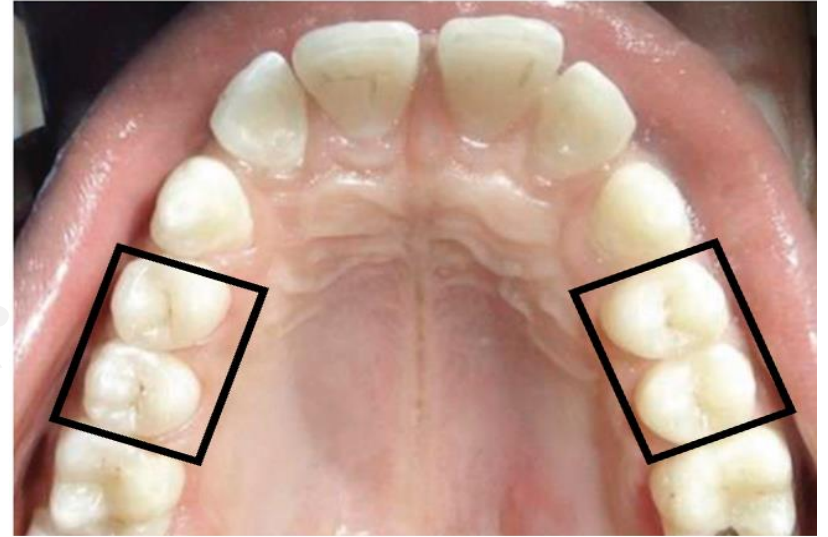


Upper



# Premolars

- Premolars are a new class for permanent teeth shaped to chew food.
- Following to the canines in the permanent dentition only; there are Premolar teeth (First & Second). They are eight in number; two in each quadrant.



# Premolars Teeth

**Upper**

First  
Premolars

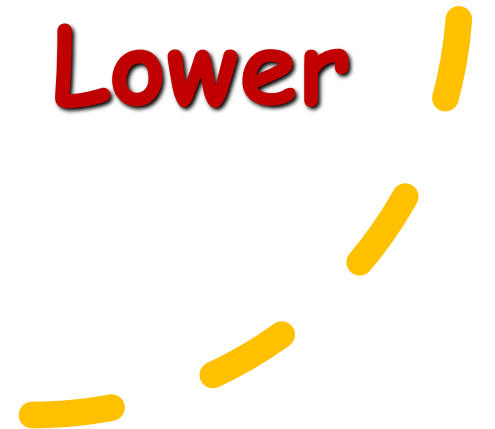
**Lower**



**Upper**

Second  
Premolars

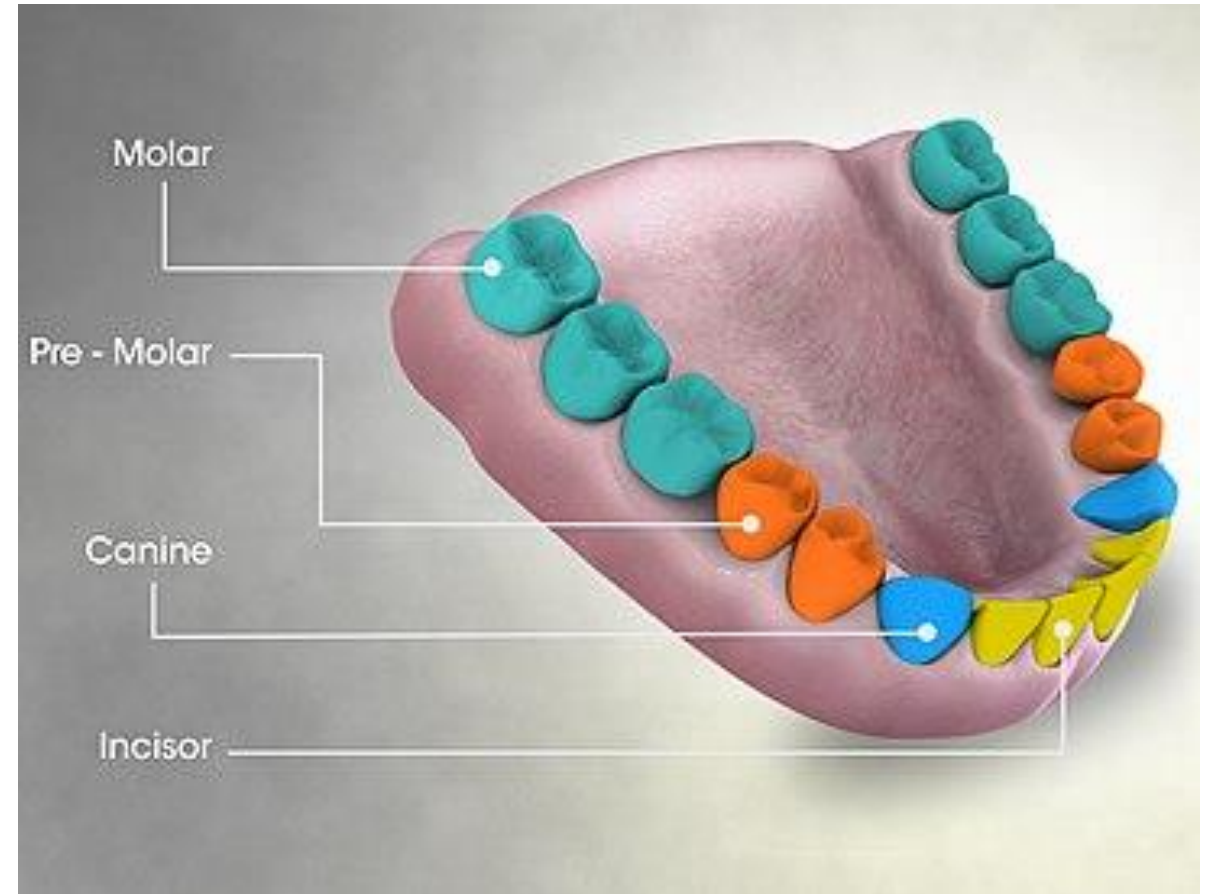
**Lower**



# Molars Teeth

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- **Molars**, also shaped to chew and grind food.
- **In Primary Dentition:** the molar teeth are next to canines. They are **eight in number**; two in each quadrant.
- **In Permanent Dentition:** the molar teeth are next to the premolars. They are **12 in number**; three in each quadrant.





# Molars Teeth

Upper

First  
Molars

Lower



Upper

Second  
Molars

Lower

A **third molar** (sometimes referred to as a **wisdom tooth**)

# Primary Dentition

- They are also called: Deciduous ,baby and milk teeth:
  - Twenty ( 20) primary teeth.
  - 10 in each arch
  - 5 in each quadrant (2 incisors, 1 canine, and 2 molars).

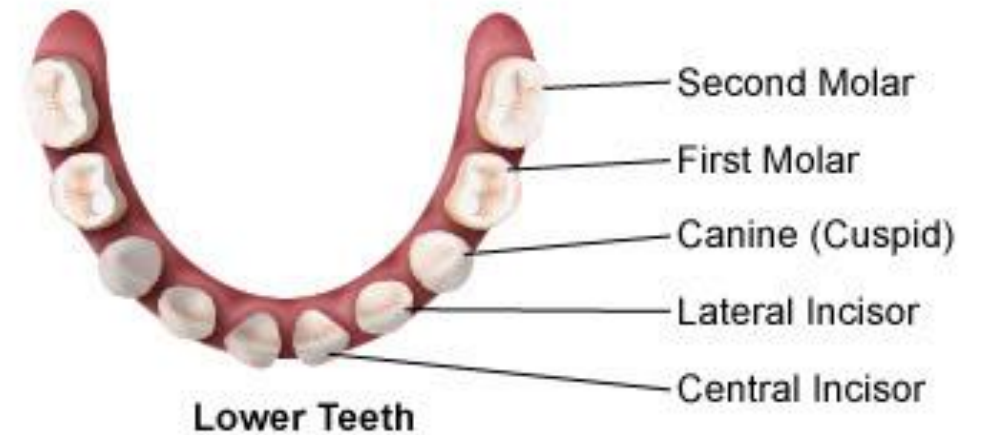
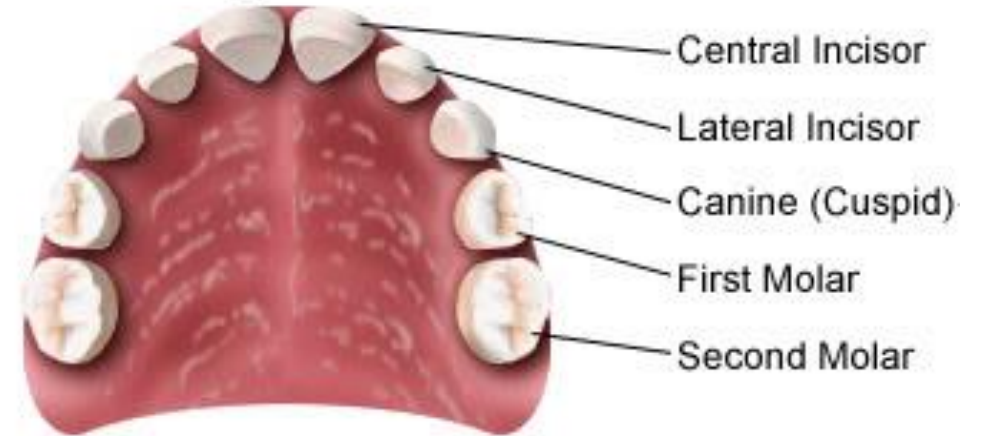
- **The dental formula is:**

2      1      2  
I ---    C ----    M ----- = 10  
2      1      2

- In function: from 2 years to 12 years

## Baby Teeth

### Upper Teeth



# Primary Teeth

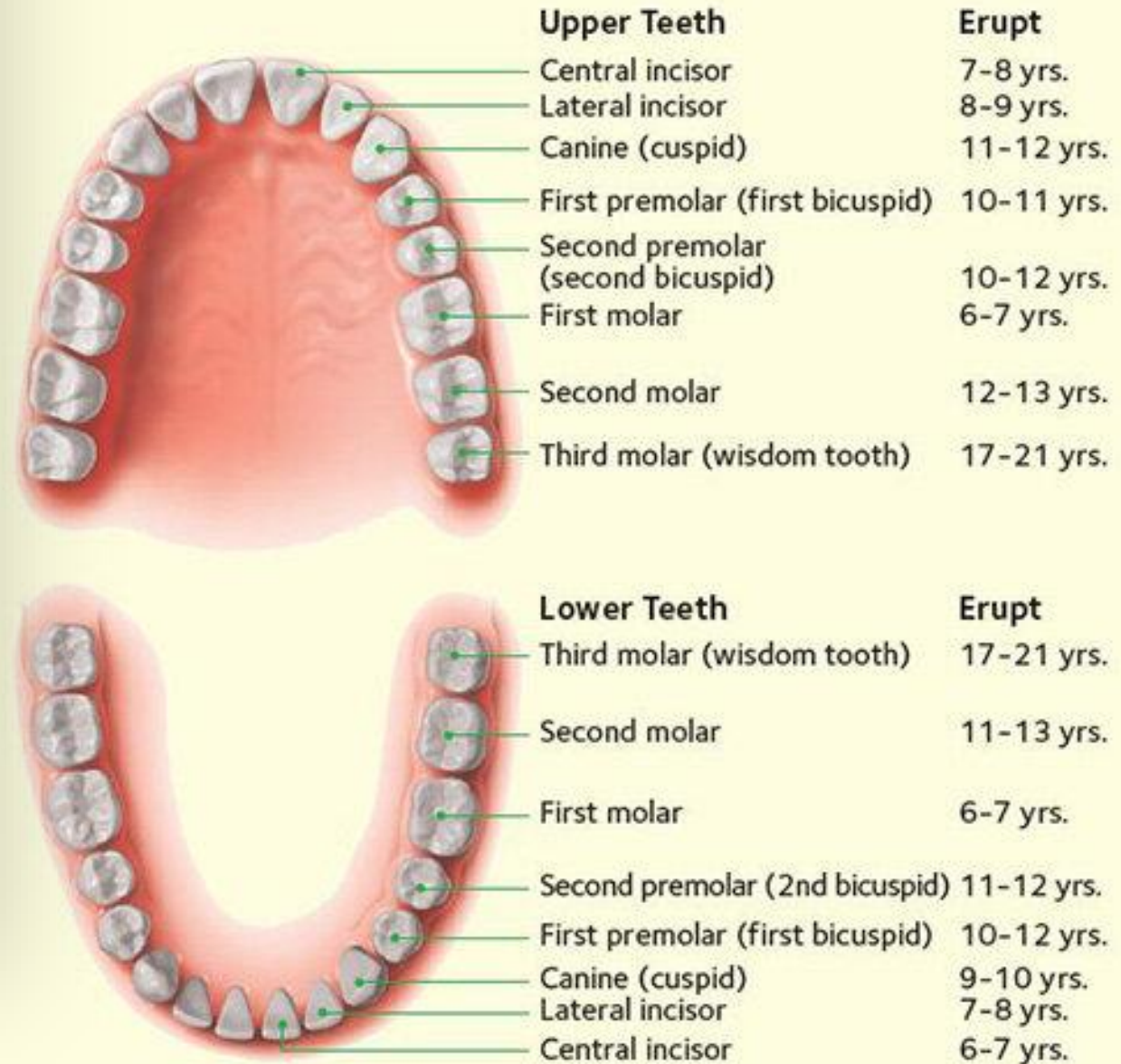


# Permanent Dentition

- They are also called: secondary, adult or succedaneous teeth.
  - 32 teeth, 16 maxillary and 16 mandibular.
  - 8 teeth in each quadrant are present (2 incisors, 1 canine, 2 premolars, and 3 molars).
- **The dental formula is :**

$$\begin{array}{cccc} 2 & 1 & 2 & 3 \\ | & - & - & - \\ I & - & C & - & PM & - & M & - & = & 16 \\ 2 & 1 & 2 & 3 \end{array}$$
- The permanent molars are not preceded with deciduous teeth so they may be termed as non-succedaneous teeth.
- In function: from 12 years to throughout life.

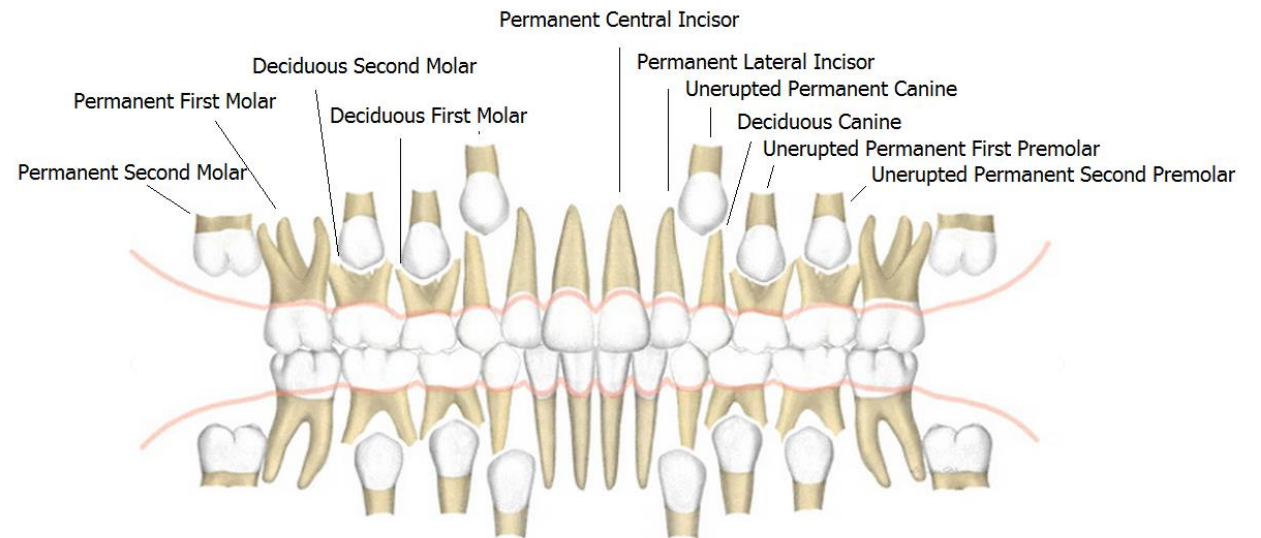
## Permanent Teeth



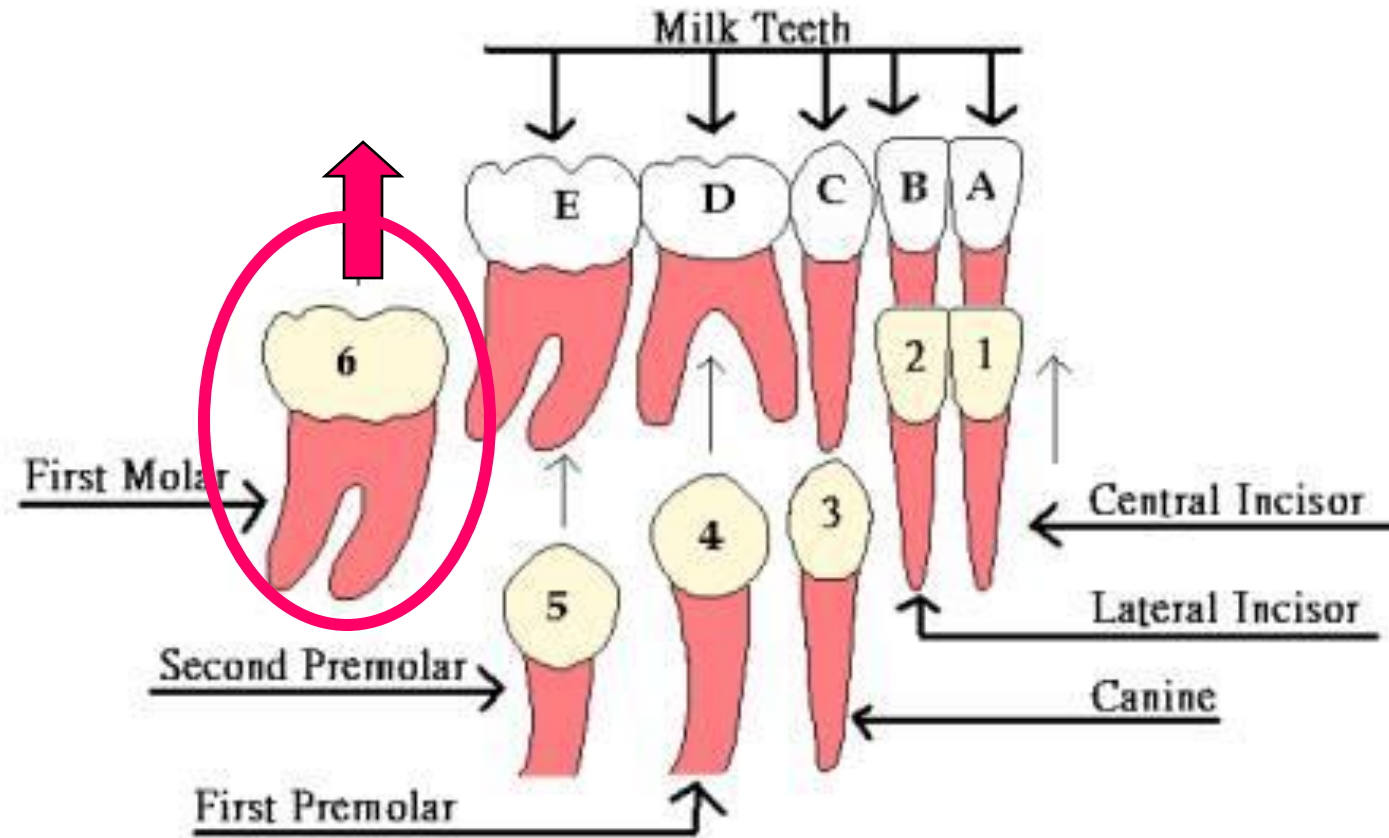
# Transition or Mixed Dentition Period

- The mixed dentition is the term used to describe the dentition where there is a mixed secondary and primary teeth visible in the mouth at the same time.
- during that time after permanent teeth have begun to replace primary teeth but before all primary teeth have been lost.
- It lasts from 6 to 12 years.

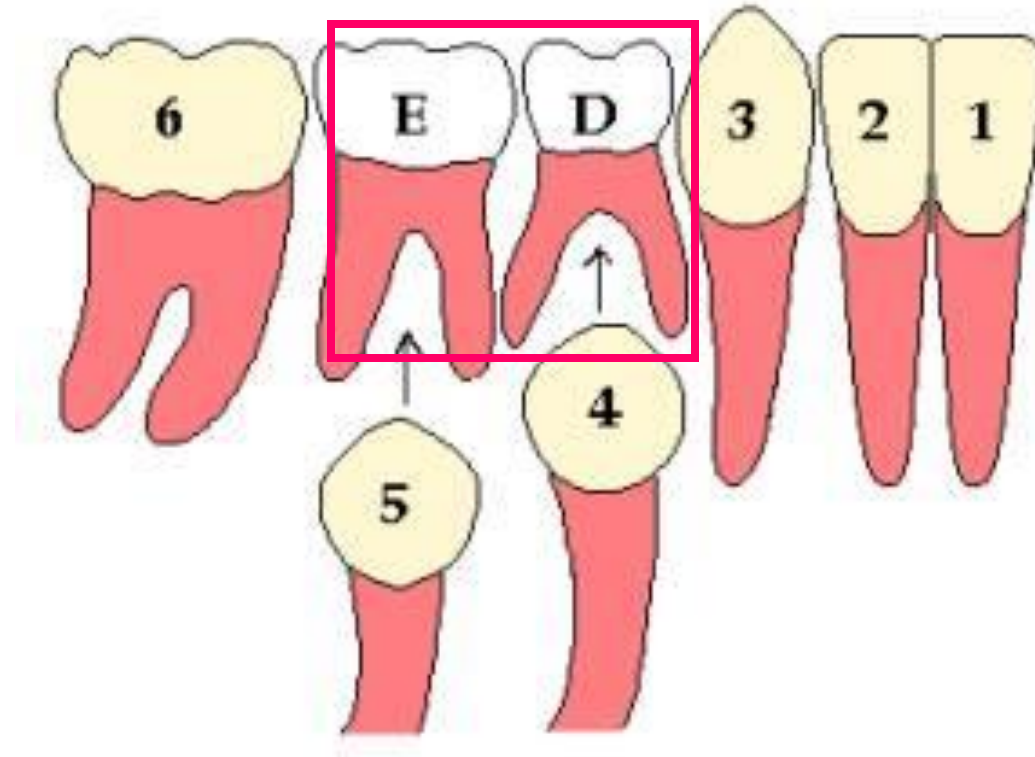
## Mixed Dentition



6 years ⇒ Eruption of first permanent molar



12 years ⇒ Shedding of last primary molar

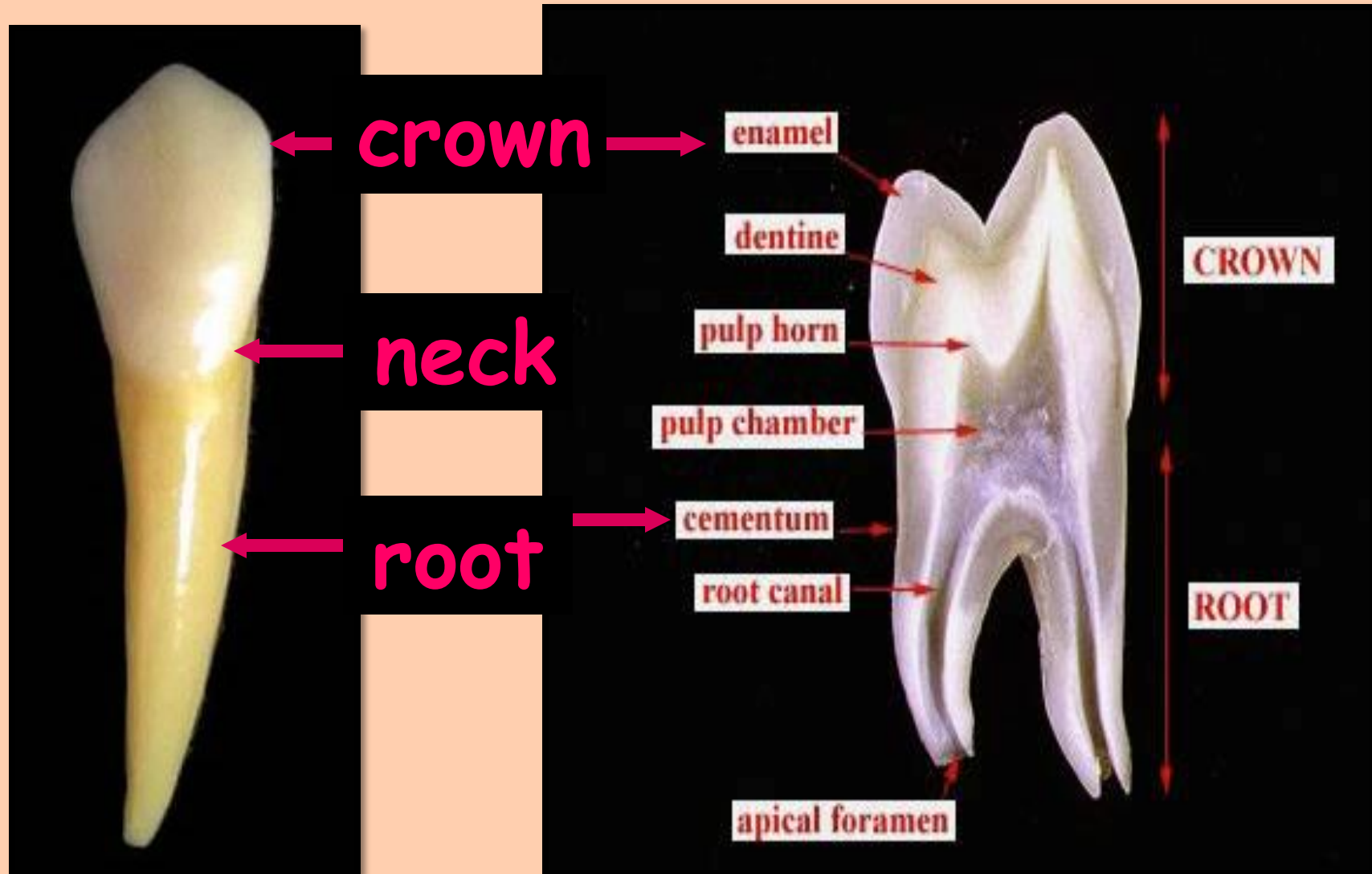




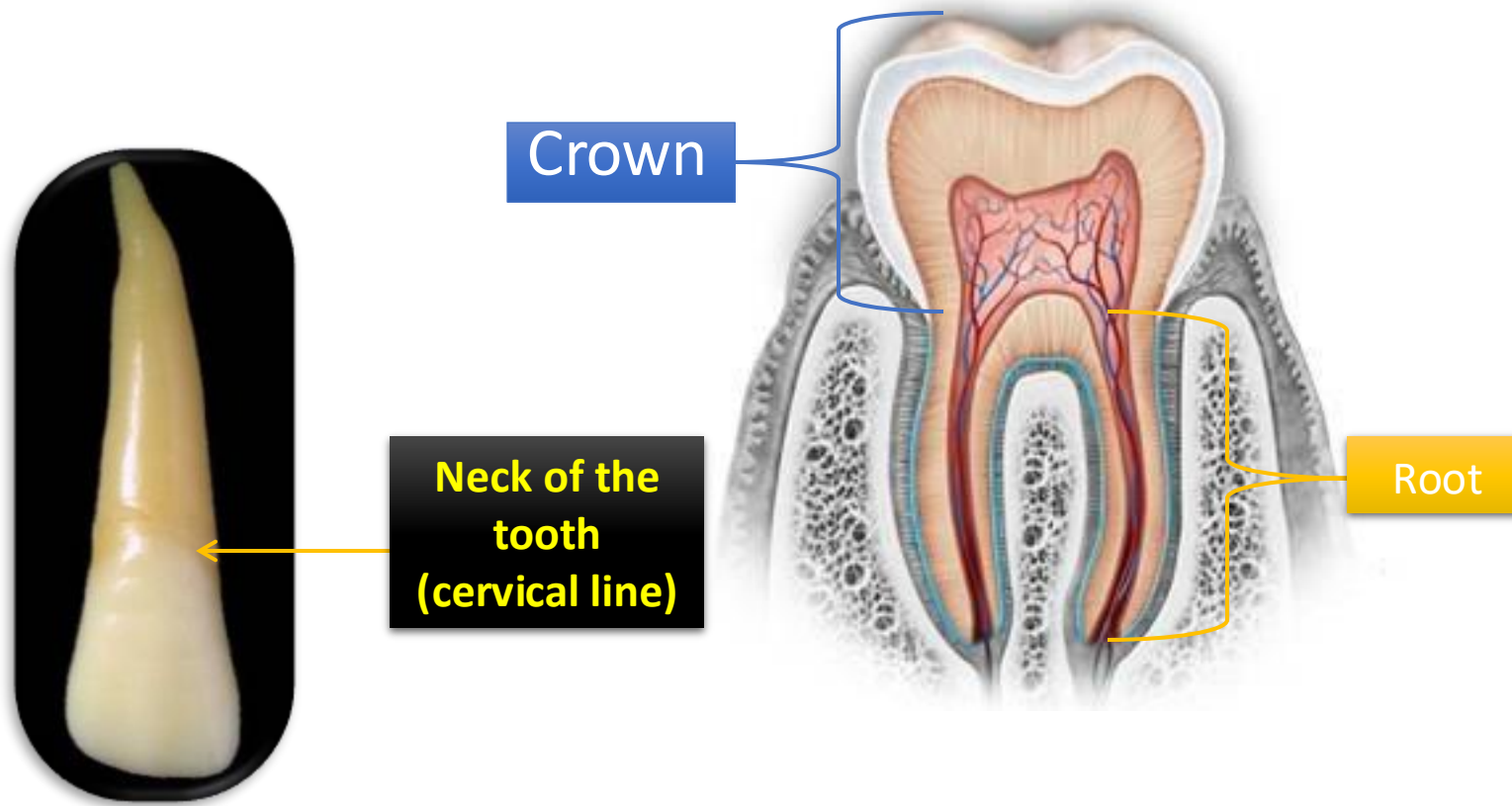
- 1. Incisors**
- 2. Canines**
- 3. Premolars**
- 4. Molars**



# MACRO & MICRO-ANATOMY OF TEETH



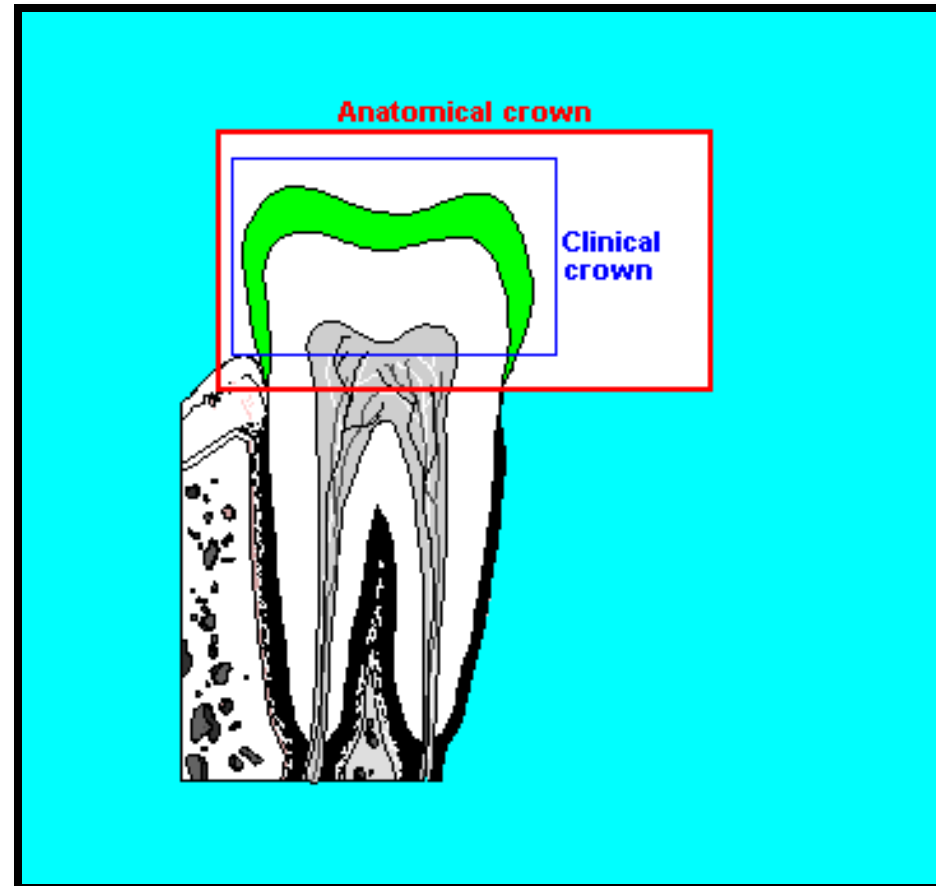
# 1- Macro-anatomy of the tooth



# Anatomical And Clinical Crown

## Clinical Crown

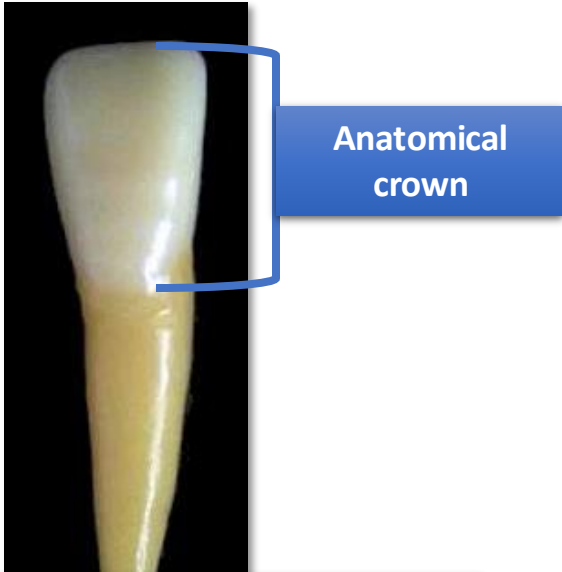
Portion of the tooth that is visible in the oral cavity



## Anatomical Crown

It is the portion of the tooth that covered by enamel

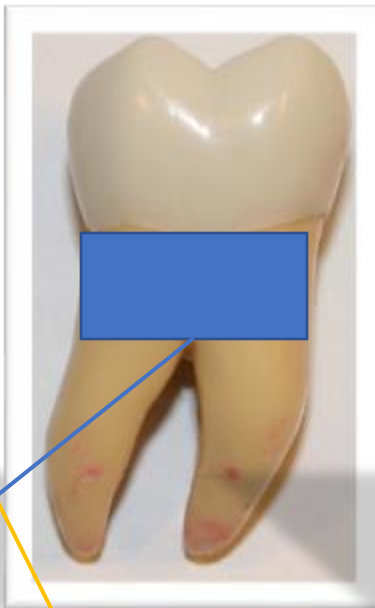
# Anatomical Crown & Clinical Crown



# Teeth may be divided according to the number of roots in to Single-rooted or Multi-rooted



**Single-rooted teeth**



**Multi-rooted teeth**

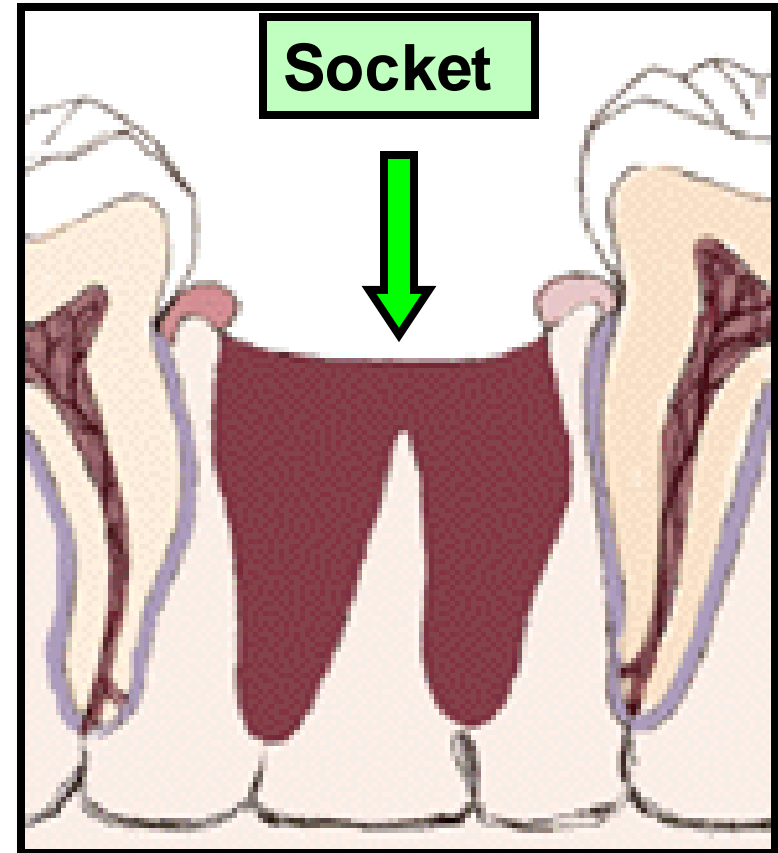
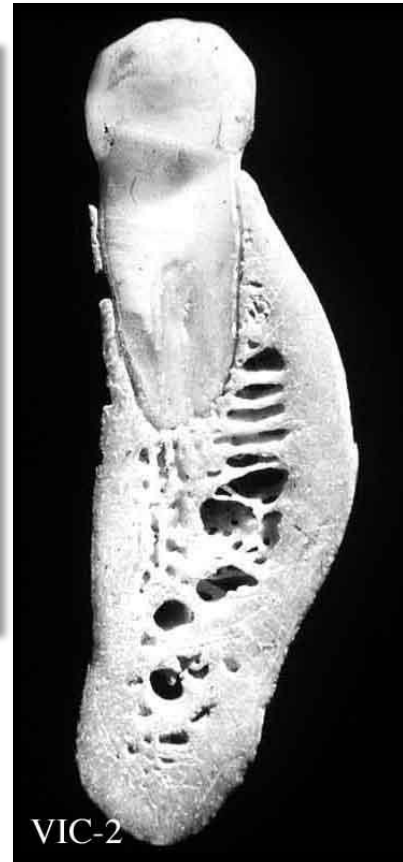
The undivided portion of the root is called: Root Trunk.

Bifurcation

Trifurcation

## Surrounding Bone (Dental Alveolus) Socket ⇨ erupted tooth root

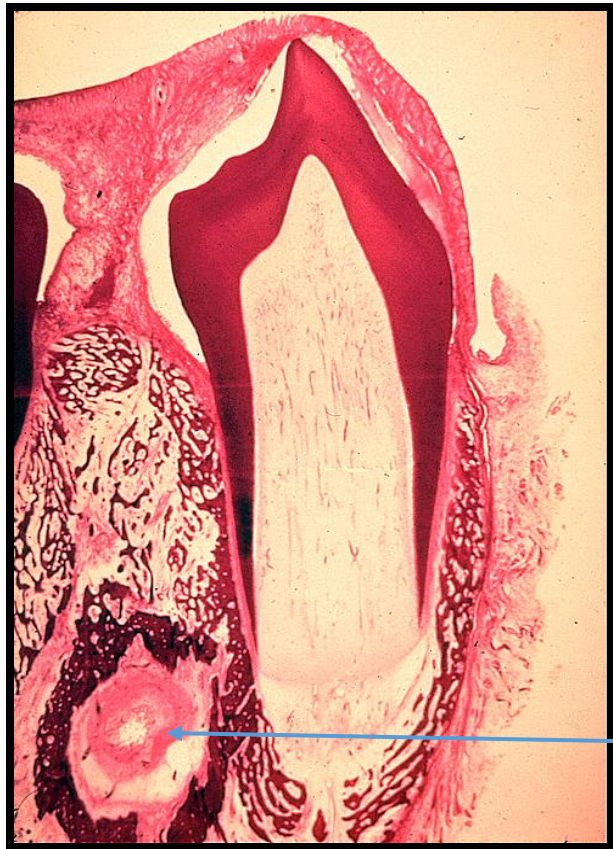
- Dental alveoli (singular alveolus) are sockets in the jaws in which the roots of teeth are held in the alveolar process with the periodontal ligament.



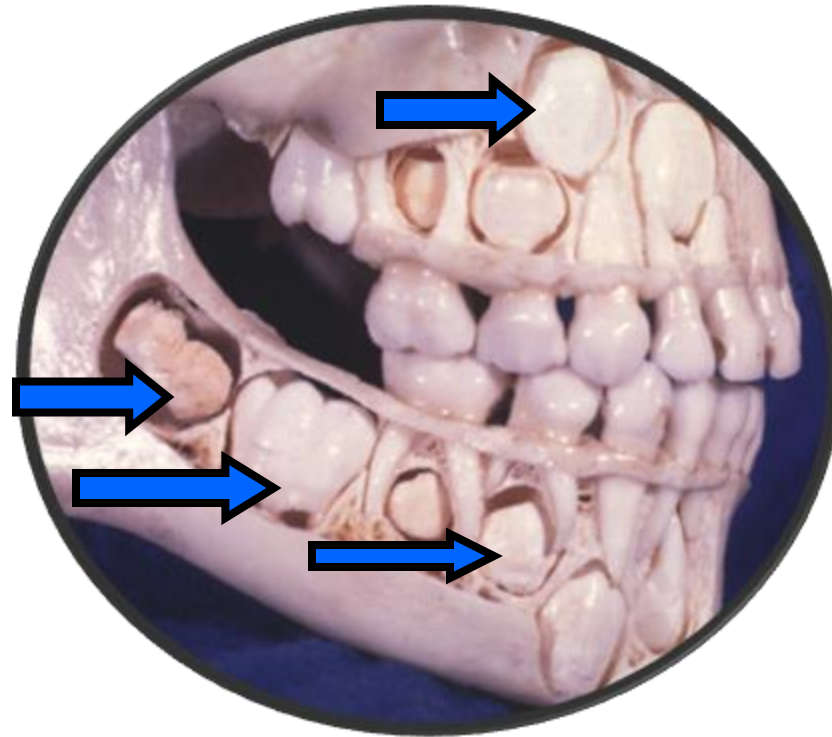
## Surrounding Bone (Dental Alveolus)

Crypt ⇨ developing tooth

- The small hole in the bone in which a **tooth bud germ forms** is called a crypt; it later becomes a tooth socket, which houses the root of the tooth.

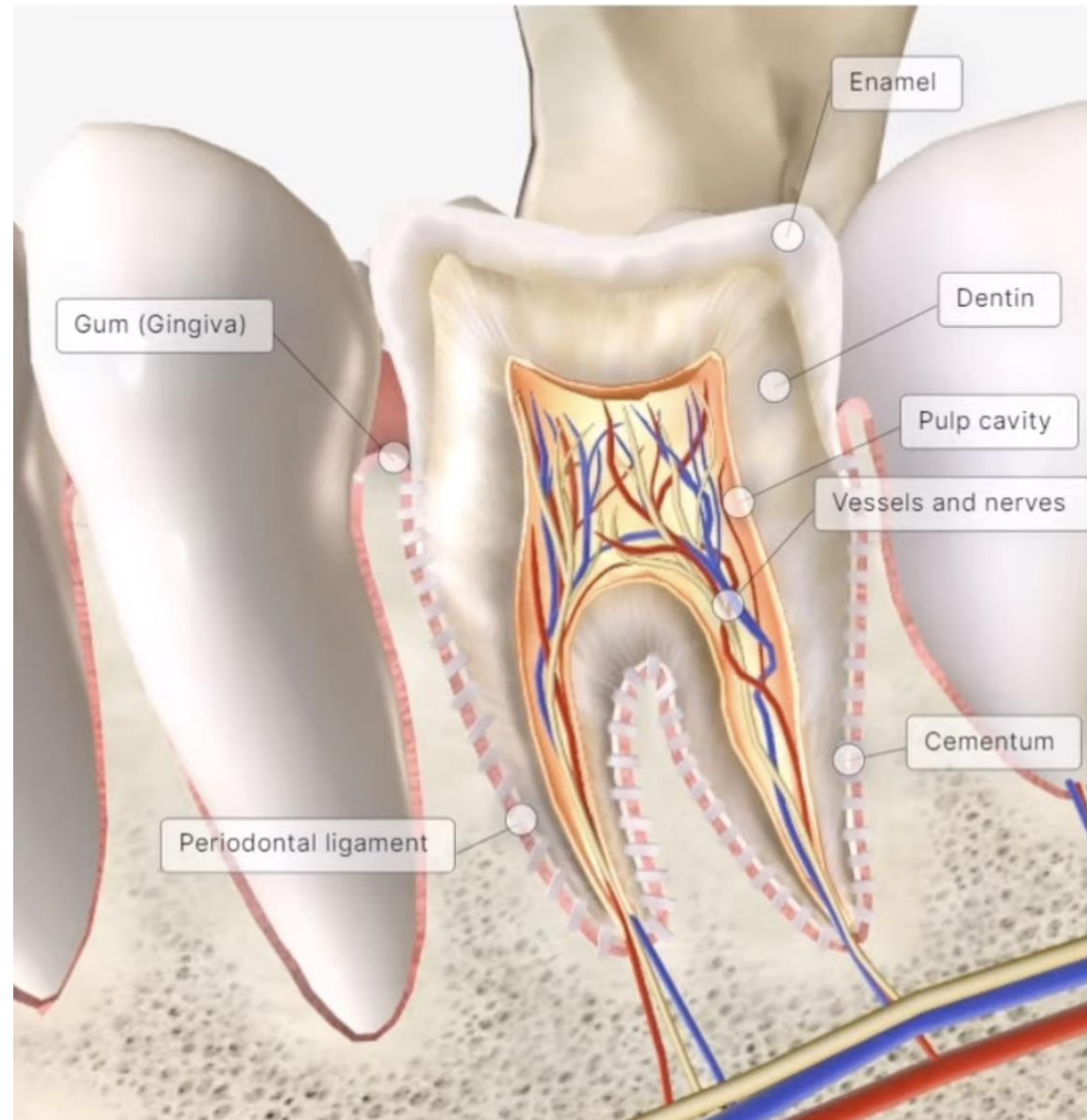


Crypt



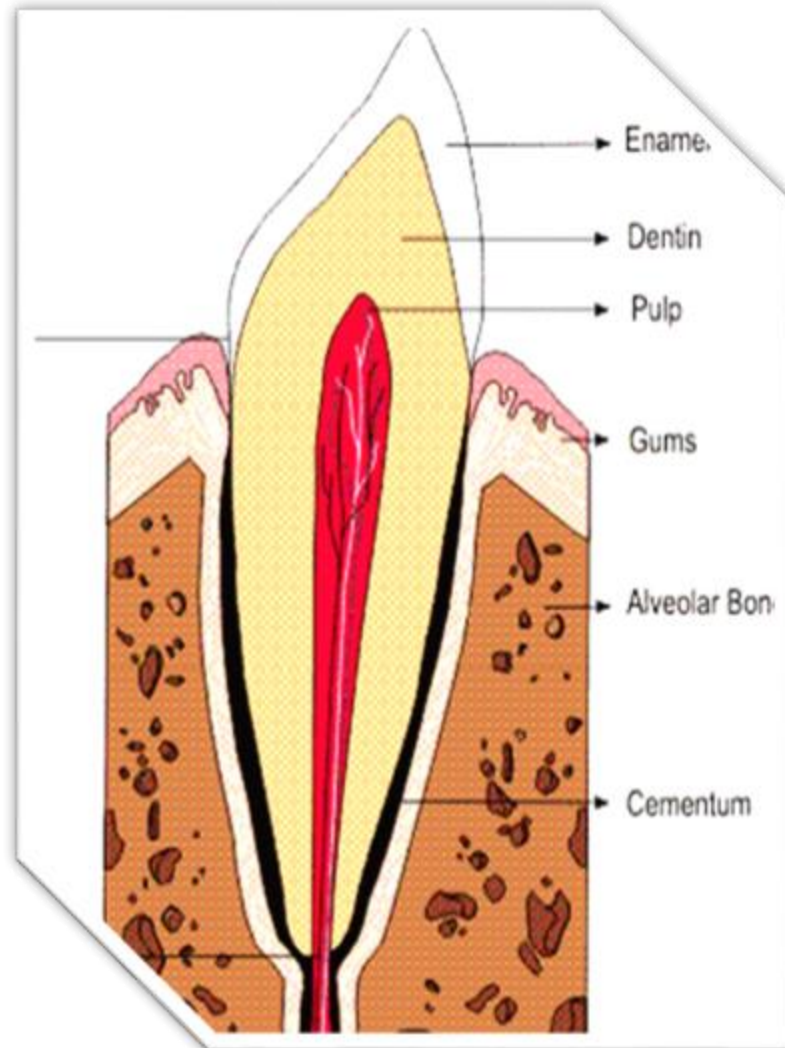
Crypt

# Micro- Anatomy of the tooth





# Micro-anatomy of Teeth



- Three calcified tissues:
  - Enamel.
  - Dentin.
  - Cementum.
- One soft specialized connective tissue:
  - Pulp.

# Micro-anatomy of Teeth

- **Enamel** covers the portion of the tooth known as the **anatomic crown**, and **cementum** covers the portion of the tooth known as the **anatomic root**.
- **Enamel** is the relatively white, protective external surface layer of the anatomic crown. It is highly calcified or mineralized and is the hardest substance in the body.
- **Cementum** is the dull yellow external layer of the anatomic root. The cementum is very thin, especially next to the part of the root where the crown joins with the root.
- The **Cementoenamel Junction (CEJ)** is the junction between the enamel covering the anatomic crown and the cementum covering the anatomic root. This junction is also known as the **cervical line**, denoting that it surrounds the neck or **cervix** of the tooth.
- **Dentin** is the hard yellowish tissue underlying the enamel and cementum. It makes up the bulk of the inner portion of each tooth crown and root.
- The **Dentinoenamel Junction** is the inner surface of the enamel where enamel joins dentin. This junction can be best seen on a radiograph (x-ray).
- The **Cementodentinal Junction** is the inner surface of cementum where cementum joins dentin.
- **Pulp** is nonmineralized connective tissue containing a rich supply of blood vessels and nerves located in the cavity or space in the center of the crown and root called the **pulp cavity**.



Dentinoenamel junction

Enamel

Dentin

Pulp

Periodontal ligament  
(dark line)

Alveolar bone

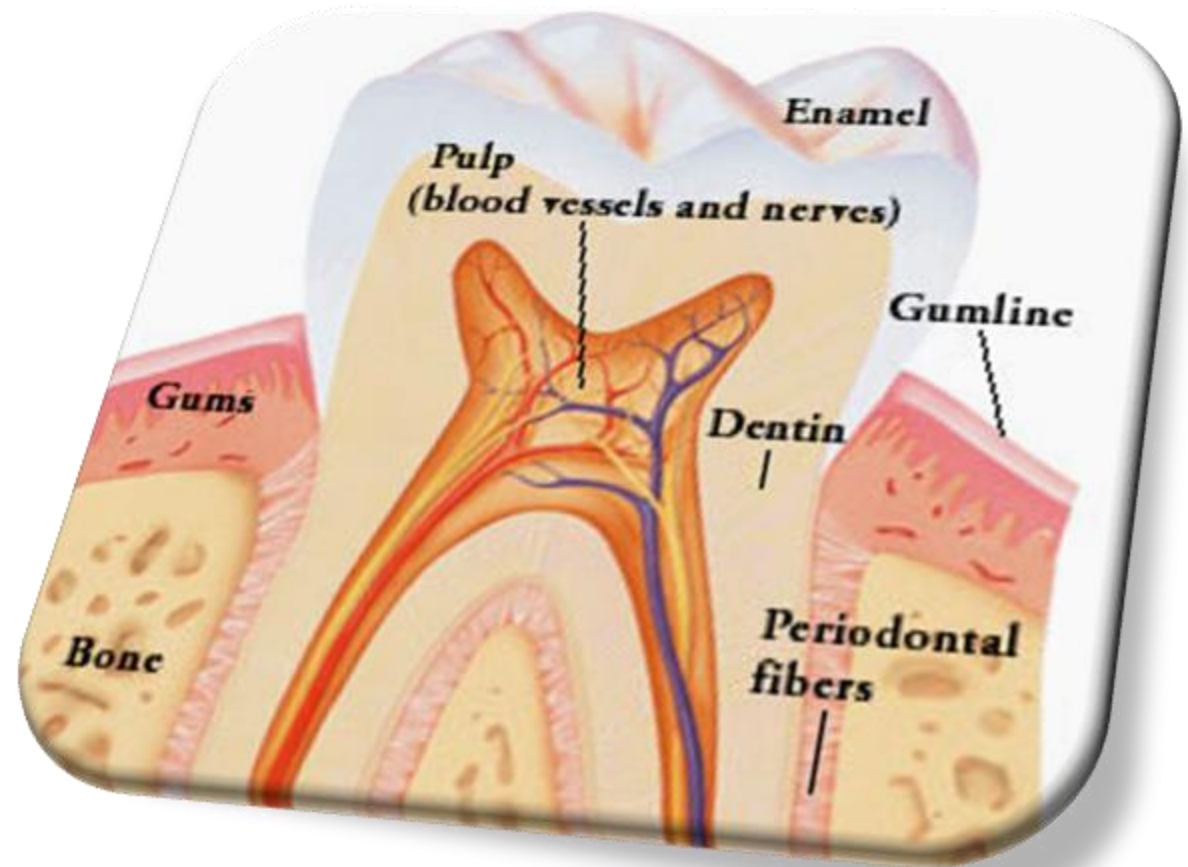
# Pulp Cavity

## 1-Coronal pulp:

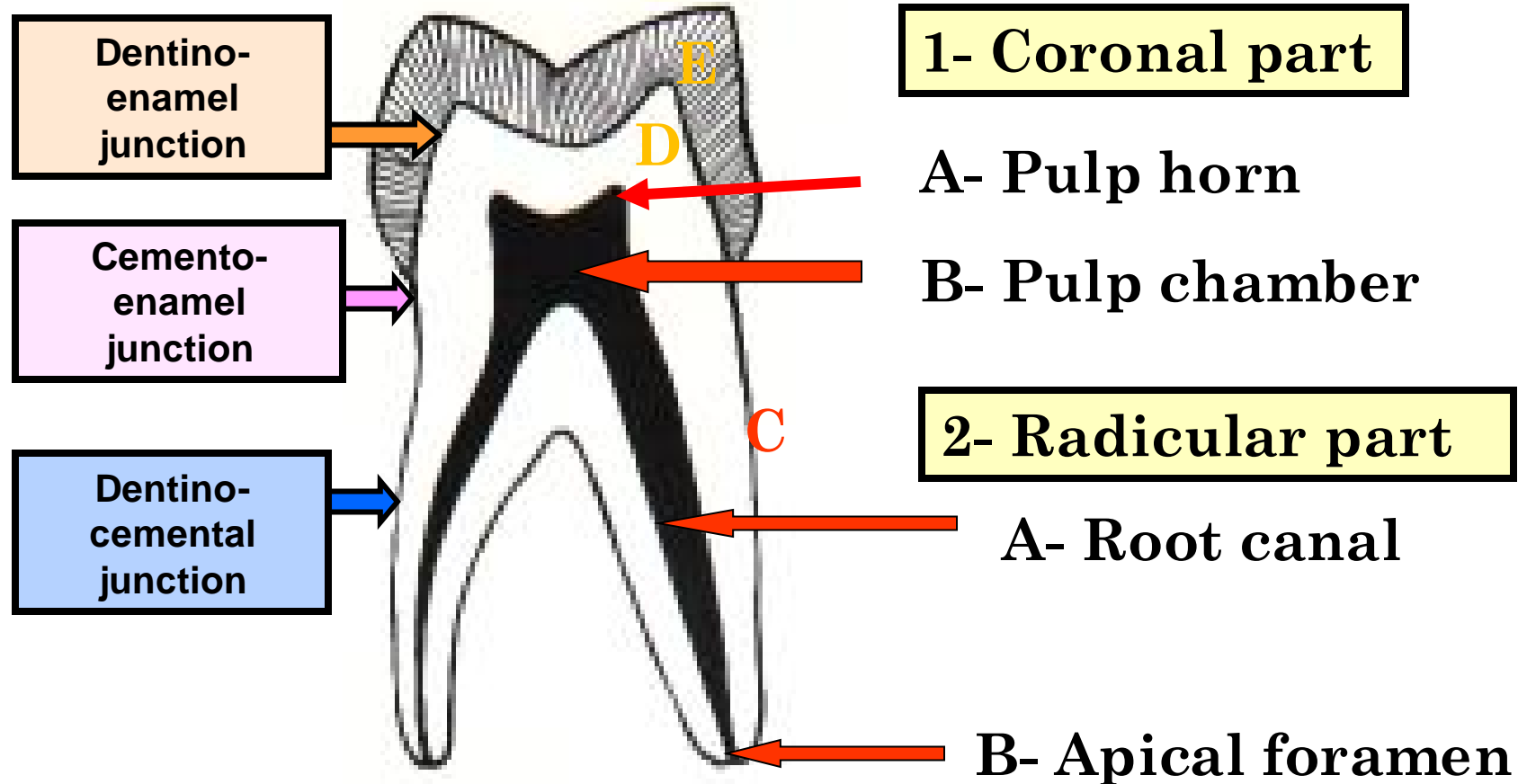
- Pulp chamber
- Pulp horns

## 2-Radicular pulp:

- Root canal
- Apical foramen

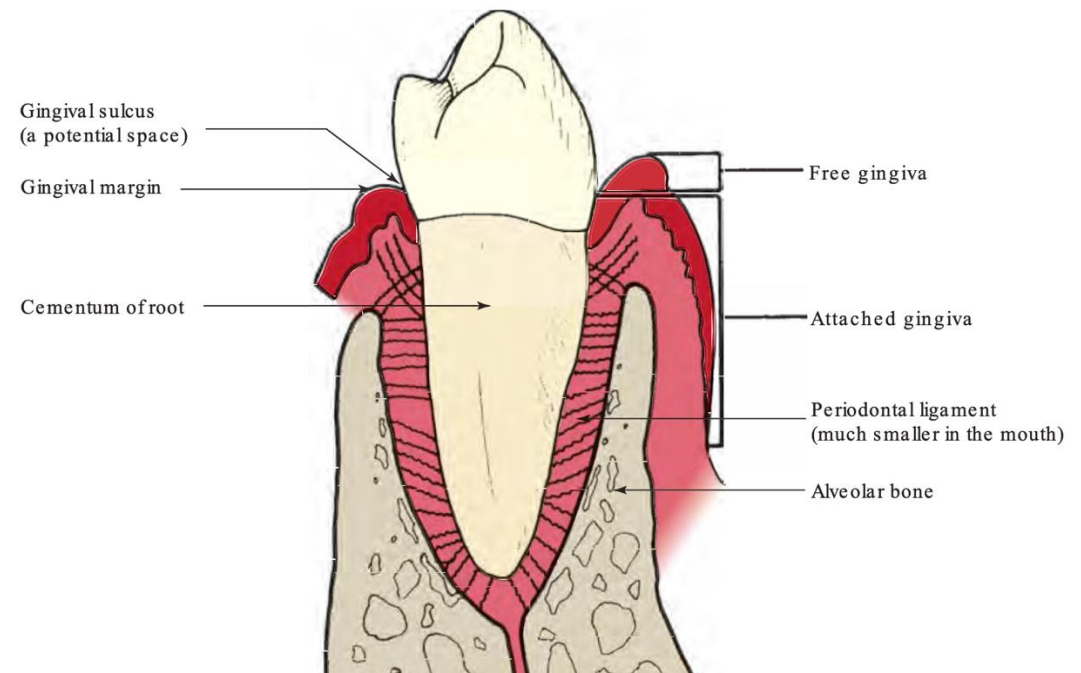


# Pulp Cavity



# PERIODONTIUM

- **Periodontium** is an attachment apparatus of the teeth to the jaws bone.
- The periodontium composed of:
  - Cementum.
  - Periodontal Ligament.
  - Alveolar bone.
  - Gingiva facing the tooth.



# PERIODONTIUM



# Functions of Teeth

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1. Mastication: Teeth are designed to perform this function.

Incisors



Chisel like  
Cutting  
or  
incising

Canine



Wedge like  
Cutting  
and  
tearing

Premolars



At least two  
projections  
(cusps)  
Tearing and  
grinding

Molars



Multiple  
projections  
(cusps)  
Grinding

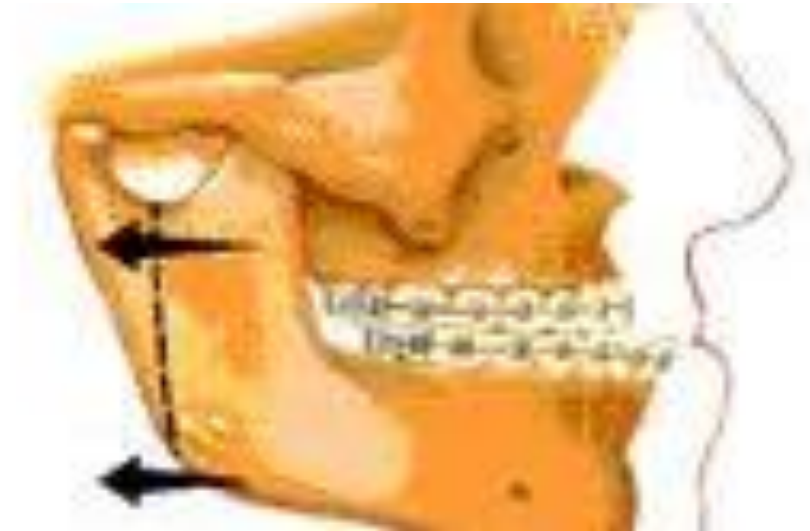


# Functions of Teeth

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2. Appearance:
  - Well-arranged clean teeth with proper alignment give nice appearance to the face.
  - Teeth give support to the facial expressions.
3. Speech: for clear pronunciation and production of sound.
4. Growth of jaws: The teeth play a role in the growth of the jaws in some periods of life.





Thank you

