

5 Dental anatomy



Structure of Teeth

- Even though teeth differ in size and shape, their basic structure is the same.
- Teeth are made up of three parts: the crown, neck, and root
- 1. Crown** is the part of a tooth visible above the gum line, and it, too, has several parts.
 - ✓ covered by enamel, portion of the tooth visible in the oral cavity
 - ✓ Is a working part of tooth
 - ✓ This white appearing part of the tooth is made up of enamel. The enamel varies in size and is the thickest over the biting and chewing edges.
- 2. Root-** portion of the tooth embedded in the jawbone
 - ✓ covered by cementum and they join at the cemento-enamel junction (CEJ) or cervical line
 - ✓ Not visible in the mouth and is anchored within the bone

The number of roots of tooth

Division of the tooth root is known as furcation

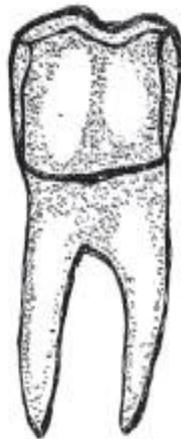
1. Single root: in all anterior teeth, mandibular premolars and maxillary second premolar.

2. Two roots with bifurcation: in mandibular molars and maxillary first premolar.

3. Three roots with trifurcation: in maxillary molars.



Single root



Two roots



Three roots

Tooth tissues

❖ There are four main tissues and substances that form teeth

A. Enamel: the hardest calcified tissue covering the dentine in the crown of the tooth (96%) mineralized

- Makes up anatomic crown
- Hardest material and the most compact portion
- Incapable of remodeling and repair

B. Dentine: hard calcified tissue surrounding the pulp and underlying the enamel and cementum.

- Makes up the bulk of the tooth, (70%) mineralized.
- Covered by enamel on crown and by cementum of the root
- Is sensitive to cold, hot air and touch
- Is the middle layer of tooth
- Is nourished by pulp
- Has yellowish color

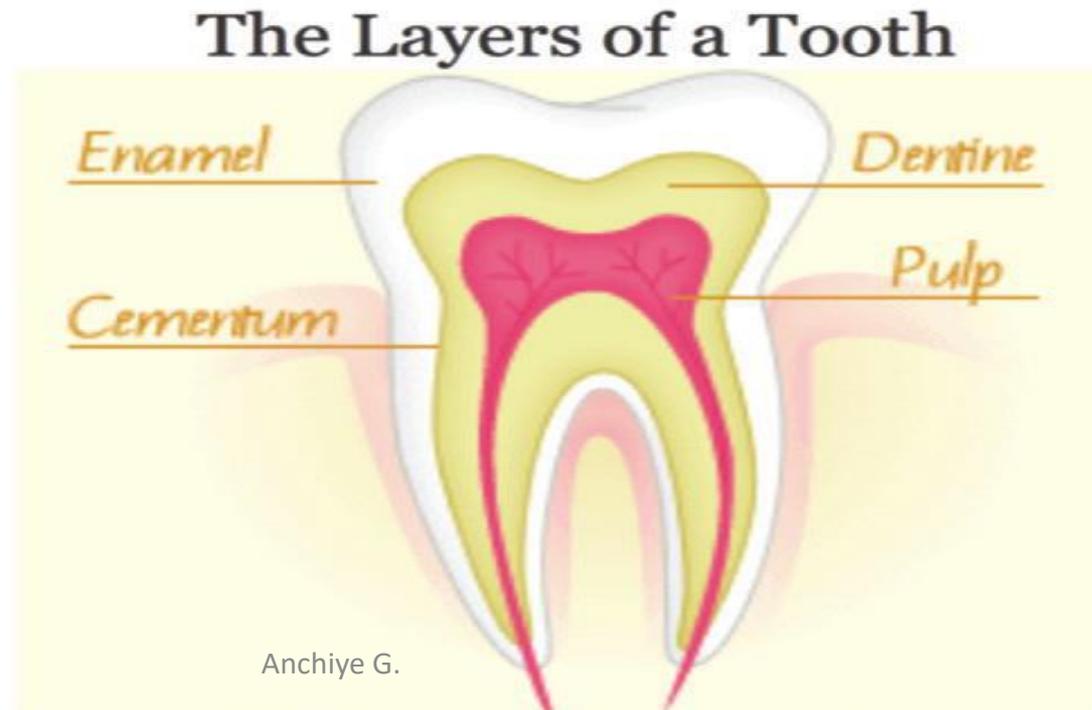
Pulp: the innermost noncalsified tissues

- ✓ The pulp is found in the center of the tooth and contains all the blood vessels and nerves that keep the tooth alive
- ✓ They nutrition the dentain
- ✓ Most of the cell of the pulp are fibroblast
- ✓ The material can be enter to the pulp through **foramen**
- ✓ Is the place where give response for cold and hot stimulation and send signal to brain in very much the same manner that the sensory nerves of body operates
- ✓ They make secrete fluid which is baths dentin that permit elasticity
- ✓ The pulp is extremely sensitive to any kind of trauma or damage
- ✓ Damage to the pulp can result in severe pain and possibly the need for extensive dental treatment

Cementum: bone like calcified tissue covering the dentin in the root of the tooth, 50% mineralized.

- ✓ They overlies the dentin and joins the enamel at cemento-enamel junction (CEJ)
- ✓ used for anchor the tooth to the bony socket with attachment fibers

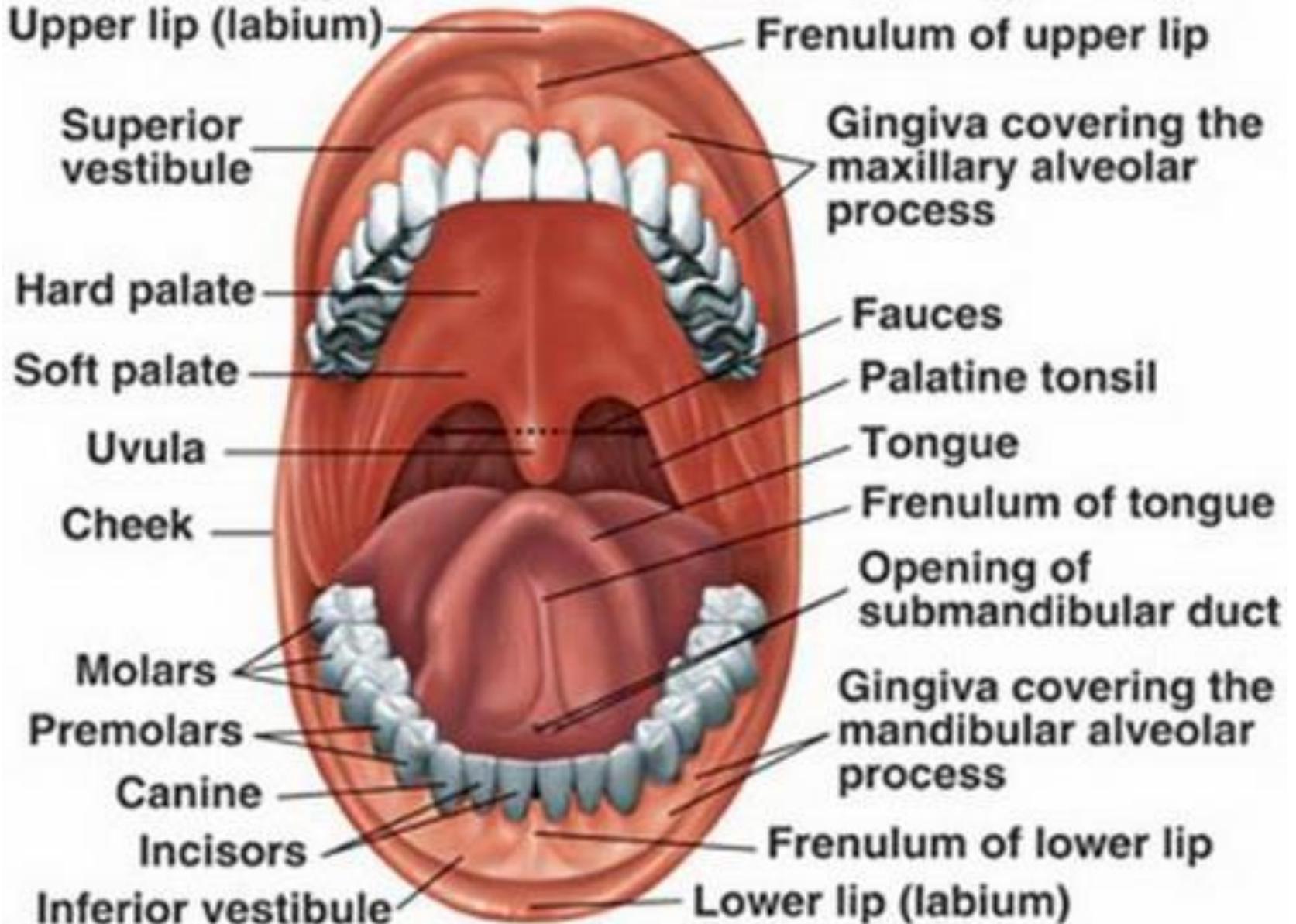
Neck of tooth:- is simply described as constriction separating the crown the root of tooth



Arches of the Mouth

- Two arches form the shape of the mouth: maxillary and mandibular arches.
- **The maxillary arch** is that part of the skull that forms the upper jaw
- Composed from two maxillae (left and right)
- It consists of two irregularly shaped bones in the face that hold the upper teeth in place.
- connects to the left and right cheeks or zygomatic bones and socket of each orbits
- They extends behind the maxillary teeth to form most of the roof the mouth and the hard palate

- The mandibular arch** is made up of the mandible or lower jaw
- ❖ This bone is the largest in the face and holds the lower teeth in place and it is the moveable bone of the skull
 - ❖ They lies inferior to the teeth and below ear
 - ❖ When a normal anatomical arrangement is present, the upper arch is larger than the lower one and the upper teeth overlap the lower ones.
 - ❖ **Gingiva:** They surrounds the crown of the tooth and protects the root and bone which are subgingival (below the gum line).
 - ❖ is the first line of defense against **periodontal disease**
 - ❖ The space where the gingiva meets the crown is where periodontal pockets develop.
 - ❖ Measurements are taken here with a periodontal probe to assess the stage of periodontal disease.
 - ❖ When periodontal disease progresses it can involve the **Alveolar Bone**, leading to bone loss and root exposure.



Tooth Identification

- In both the maxillary and mandibular arch there are similar teeth
- There are **four types** of teeth in both arches.
- Each of these teeth are located in a different area of the mouth and serve different functions

1. Incisors – The four front teeth in the mouth

- They are located in both the maxillary and mandibular arches.
- The two center teeth are known as **central incisors** and the teeth on either side of them are known as **lateral incisors**.
- Used for cutting or biting food.
- They act like scissors.

2. Canines – The teeth located distal to the lateral incisors

- These teeth form the corners of the mouth.
- There are 2 canines in the maxillary arch and 2 canines in the mandibular arch.
- Used for tearing food particles when chewing.

3. Premolars –located distal to the canines

- There are 4 premolars in each arch and two are located behind each canine in the arch.
- smaller than the molars and used for crushing food in the chewing process.
- These teeth are only present in the permanent dentition.
- The primary dentition only consists of incisors, canines and molars.

4. Molars – There are normally 6 molars in each arch; three on the left and three on the right side.

- They are referred to as first, second and third molars.
- Some people never develop third molars and often these are the molars that are so far back in the mouth that they have difficulty coming in and may have to be taken out.
- The role of the molars in chewing is to grind the food.
- Because they large chewing surface

Types of Teeth

1. The Deciduous Teeth

- At birth there are no teeth present in the mouth, but many teeth in various stages of development are found in the jaws.
- After birth (post natal period) the eruption of deciduous teeth starts at six months and lasts until two and half years (28 ± 4 months).
- The deciduous teeth stay until the permanent teeth erupt at about six years of age when the transition to the permanent dentition begins.
- The deciduous teeth are 20 in number. They have the following formula:
 - $I \ 2 \setminus 2 \ C \ 1 \setminus 1 \ M \ 2 \setminus 2$ totally=10 (For each jaw)
 - I=Incisors (central and lateral).
 - C=Canine.
 - M=Molars (first and second).

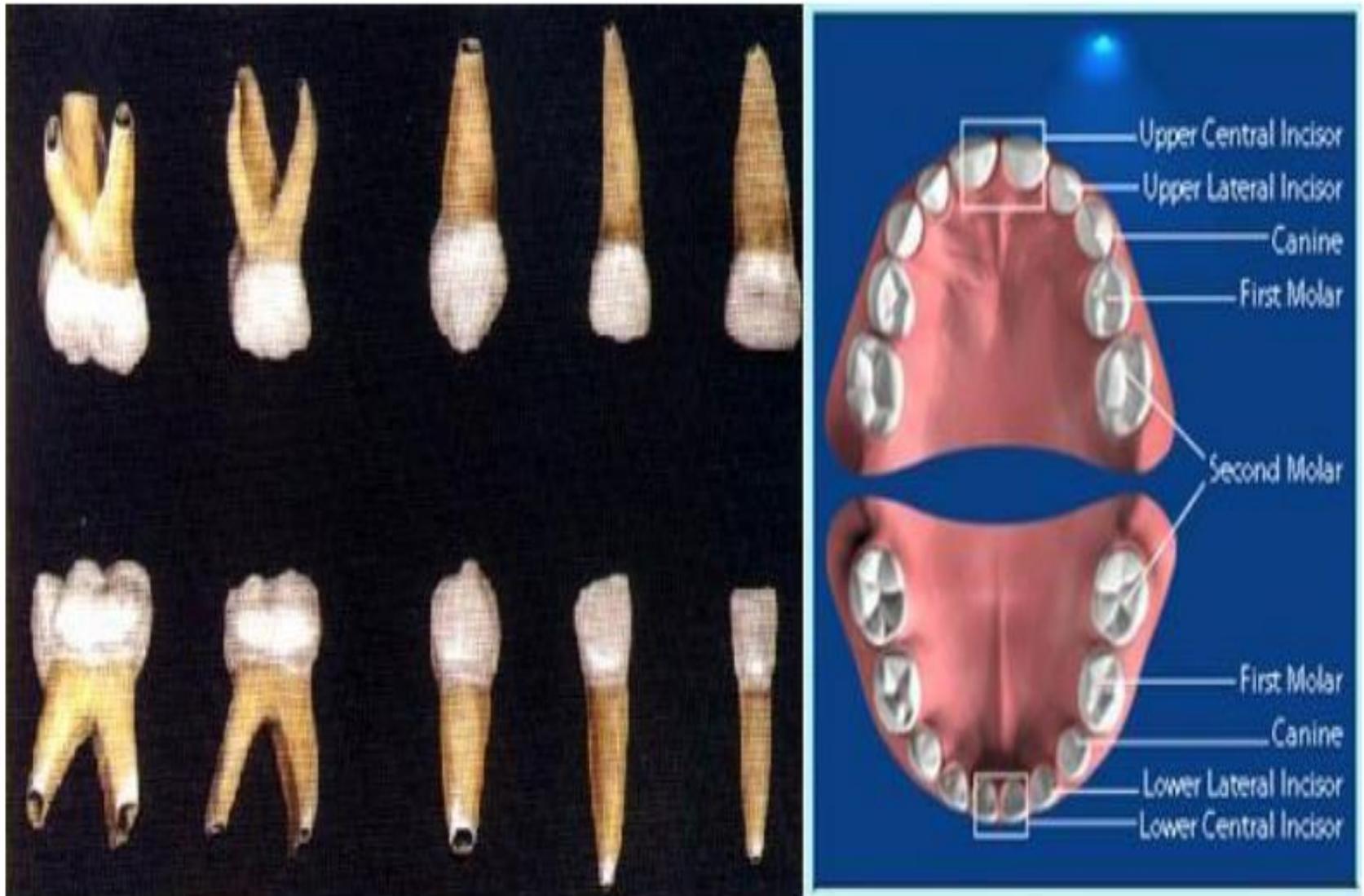


Figure (1): Deciduous dentition

2. The permanent teeth

- The transition to permanent dentition begins with the emergence and eruption of the first permanent molars at the age of six years, followed by shedding of the deciduous teeth, emergence and eruption of the remaining permanent teeth.
- This process requires about 20 years to be completed.
- The number of permanent teeth including third molars when present is 32.
- $I \ 2 \ 2 \ C \ 1 \ 1 \ P \ 2 \ 2 \ M \ 3 \ 3$ totally=16 (For each jaw)
- I=Incisors (central and lateral).
- C=Canine.
- P=Premolars (first and second).
- M=Molars (first, second and third).

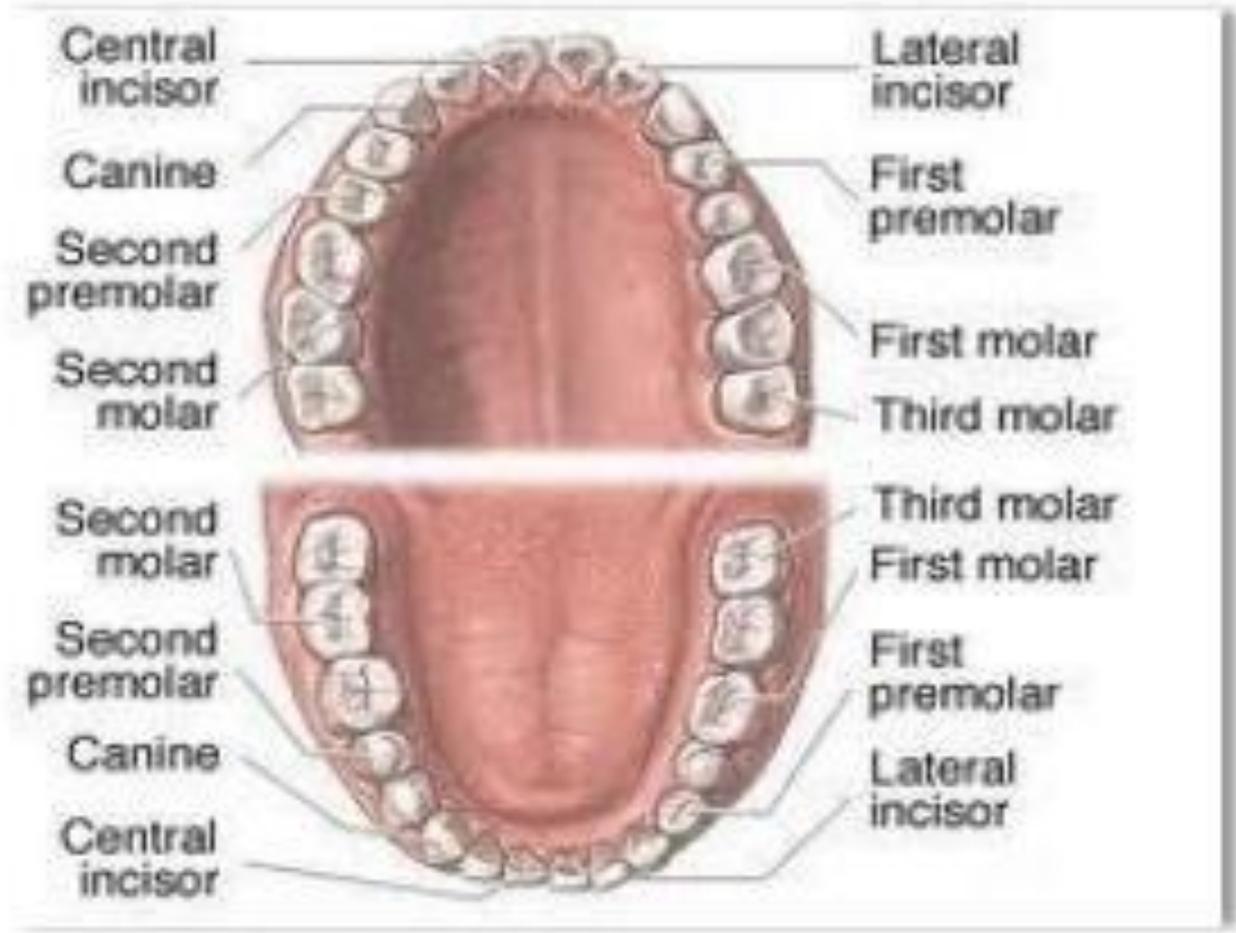


Figure (2):Permanent dentition

Tooth and Gum Disease

- Teeth are the hardest substances in the body, but they are still susceptible to trauma and disease.
- In fact, teeth are made up of various parts, any one of which can be the source of a dental problem
- Anyone who has had root canal surgery can attest to the fact that because of the anatomical location of the nerve root, this procedure is a lot different than merely having a surface cavity repaired.
- Dental caries- gradual demineralization of enamel and dentin by bacterial action
- Dental plaque, a film of sugar, bacteria, and mouth debris, adheres to teeth.
- Acid produced by the bacteria in the plaque dissolves calcium salts
- Without these salts, organic matter is digested by proteolytic enzymes
- Daily flossing and brushing help prevent caries by removing forming plaque.

- **Gingivitis** – as plaque accumulates, it calcifies and forms calculus, or tartar
- **Accumulation of calculus:**
 - ✓ Disrupts the seal between the gingivae and the teeth
 - ✓ Puts the gums at risk for infection
- Periodontitis – serious gum disease resulting from an immune response
- Immune system attacks intruders as well as body tissues, carving pockets around the teeth and dissolving bone
- Increases enamel resistance to acid demineralization
- Increases rate of enamel maturation after eruption.
- Remineralization of incipient lesions
 - ✓ At the enamel surface.
 - ✓ >1 ppm fluoride needed to slow demineralization process
- Interference with microorganisms
- Improved tooth morphology

Tooth Decay Process

- ❖ Bacteria in mouth convert sugars to polysaccharides
- ❖ Plaque = coating of bacteria + polysaccharides
- ❖ Other bacteria convert the carbohydrates in the plaque to carboxylic acids such as lactic acid
- ❖ Tartar = plaque that combines with Ca^{2+} and PO_4^{2-} ions in saliva to form a hard yellow solid
- ❖ Formation of acid by microorganisms in plaque overlay the enamel
- ❖ Requires the simultaneous presence of three factors
 - 1- microorganisms,
 - 2- a diet for the microorganisms
 - 3- a susceptible host or tooth surface
- ❖ If 1, 2 and 3 are absent no caries develop

