



ALAYEN IRAQI
UNIVERSITY
AUIQ



COLLAGE OF DENTISTRY

الفرع: POP

المادة: Preventive dentistry

المحاضرة: Dental carrier Development

رقم المحاضرة: 2

اسم تدريسي المادة: د. وسام رسول

Dental caries (tooth decay or cavity)

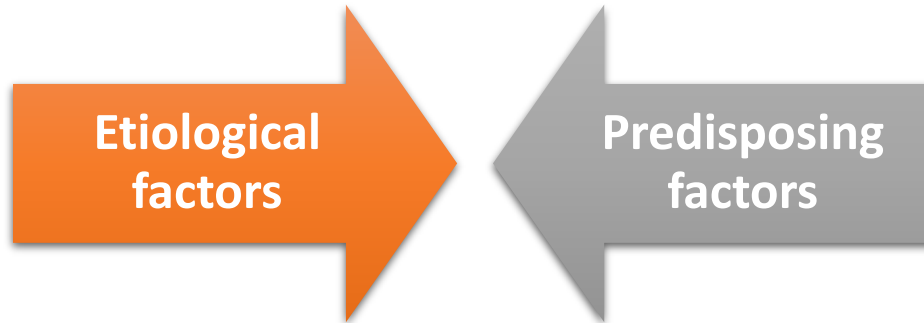
- a localized chemical dissolution of the tooth surface caused by metabolic events taking place in the biofilm (dental plaque) covering the affected area.
- It is a multifactorial disease characterized by “demineralization of the mineral components and dissolution of the organic matrix”. The destruction can affect enamel, dentin and cementum.



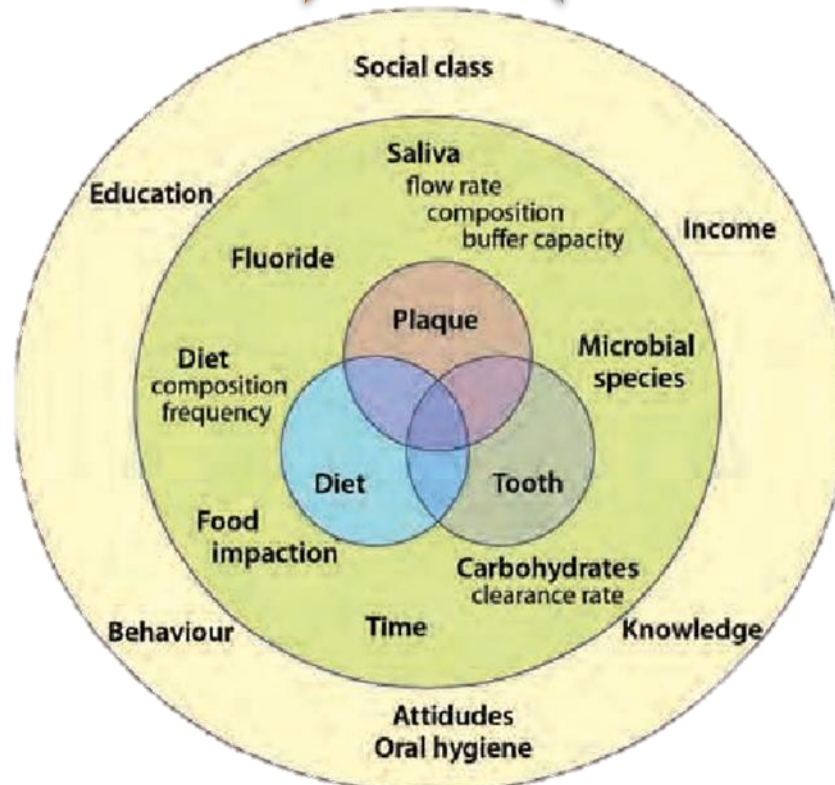
Etiology of Dental caries

It is a multifactorial disease results from interaction of:

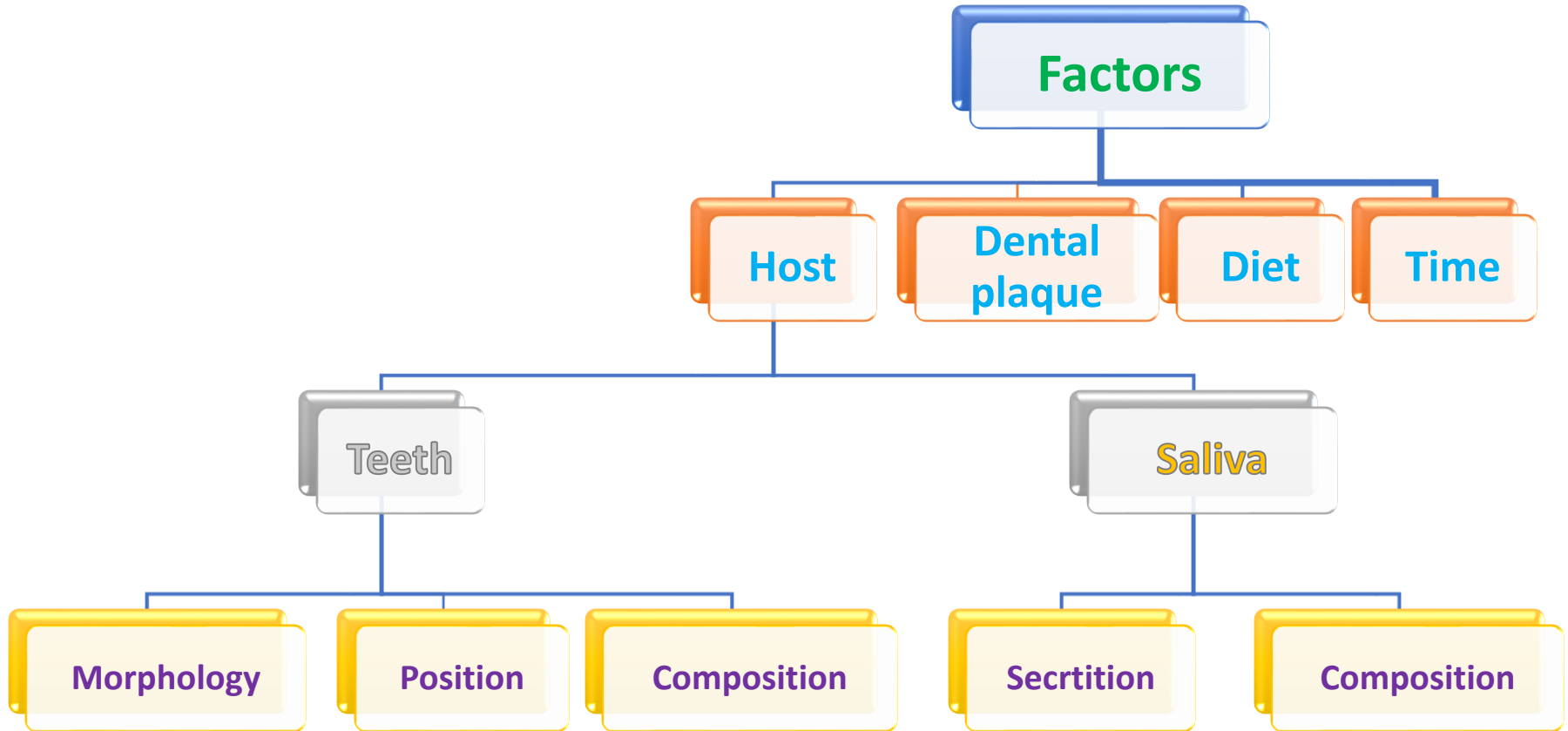
Host
Plaque
Diet
Time



oral hygiene dietary
habits behavior
attitude
dental knowledge
others



Factors affecting caries process:



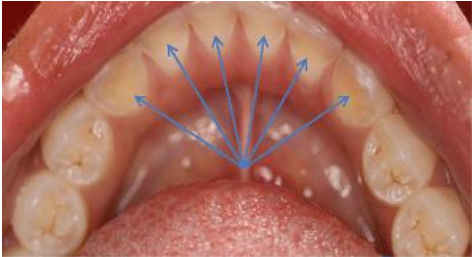
- **Host factors (tooth and saliva):**
Tooth (*morphology*)

Susceptible sites



The biofilm is allowed to stagnate there for prolonged time

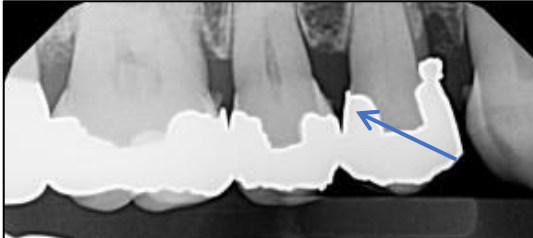
Protective sites



By mechanical action of tongue, cheek and food



Dental caries may occur in the protected sites due to the insertion of foreign bodies to the dentition



- Host factors (tooth and saliva)
Tooth (*position*)



More affected than



The most susceptible permanent teeth are



The least affected teeth

- **Host factors (tooth and saliva)**

Tooth (*composition*)

Tooth composition

Inorganic

(96% in enamel and 70% in dentin)

Organic and water

Major elements:
calcium,
phosphorous,
hydroxyl group

$\{Ca_{10}(PO_4)_6(OH)_2\}$
hydroxyapatite
crystals.

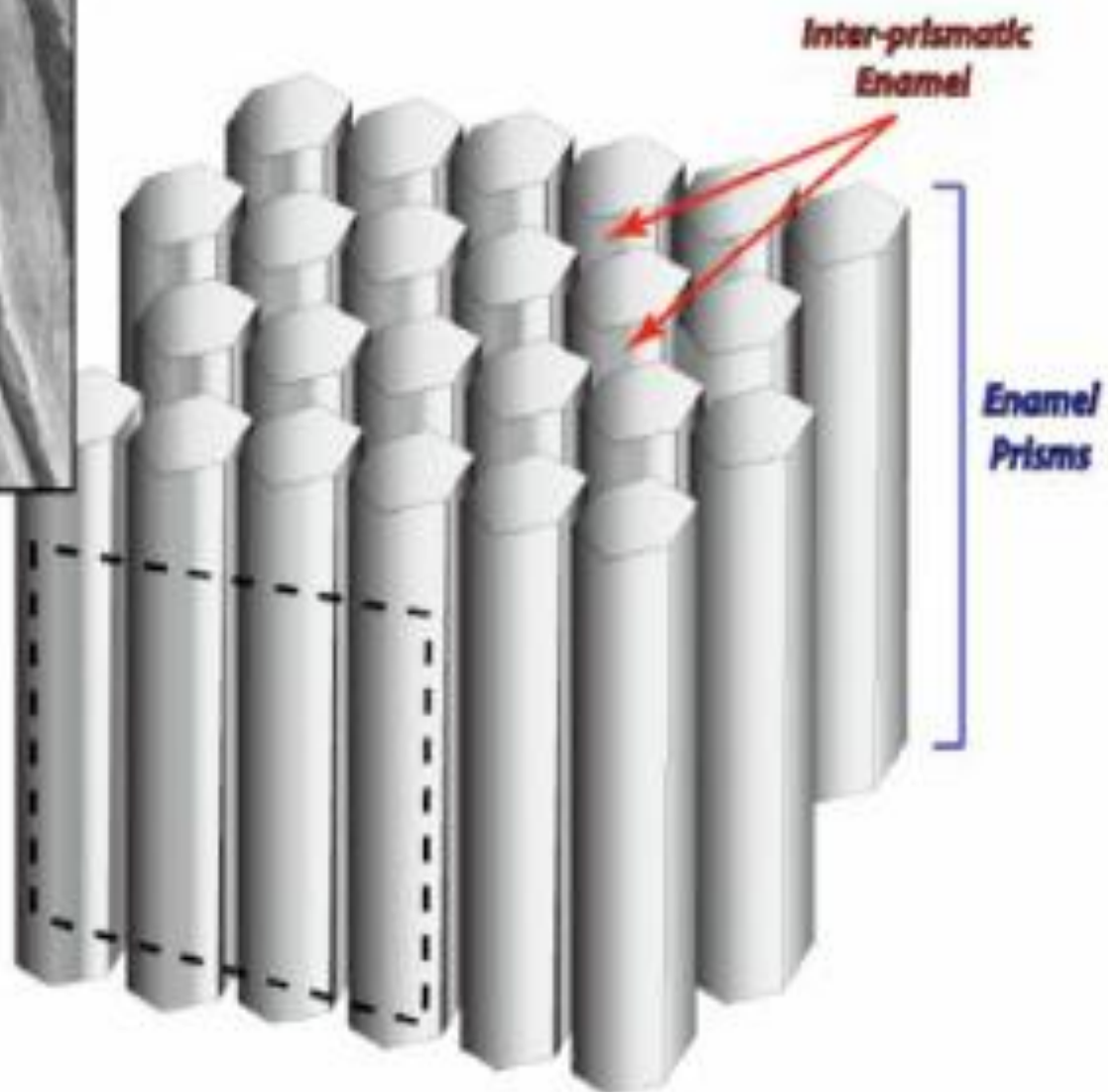
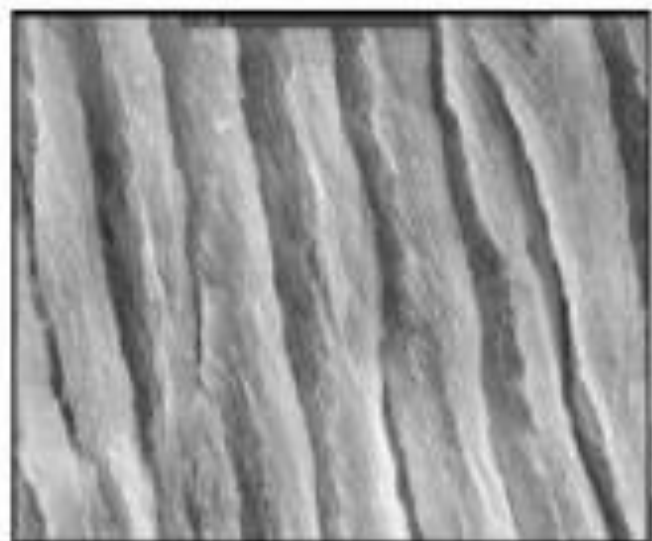
Minor elements:

Zinc, copper,
strontium,
magnesium,
fluoride, etc.

Act as a
cushion for
intense biting
pressure to
prevent
fracture

permit the
penetration of ions
for physiological
remineralization-
demineralization
process

Act as a
diffusion
pathway for
bacterial acids
increasing the
tooth
destruction



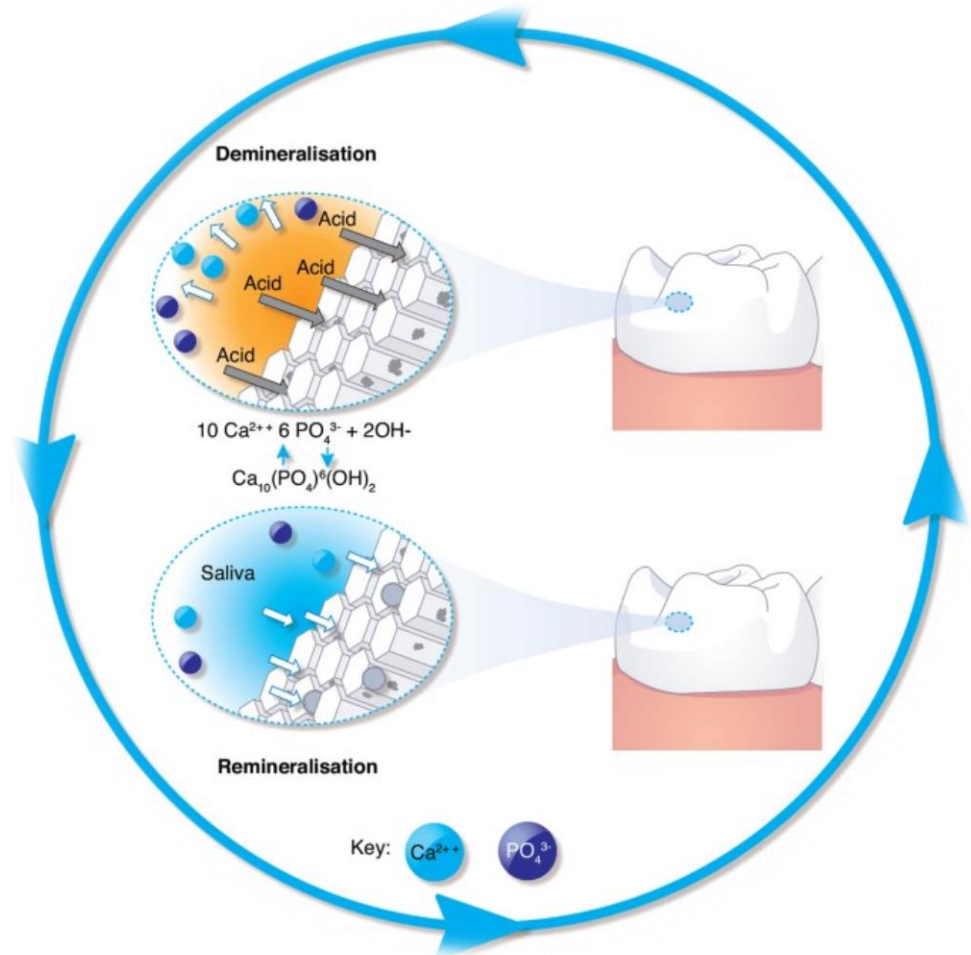
**Inter-prismatic
Enamel**

**Enamel
Prisms**

Host factors (tooth and saliva)

saliva

- affect the number of microorganisms through cleansing action (oral clearance)
- Defence mechanism (immune system)
- buffer system in saliva affects the integrity of teeth as well as calcium and phosphate.



Dental plaque

mutans streptococci, *lactobacilli*



ferment carbohydrate



acid



demineralization of tooth surface



mutans streptococci



lactobacilli

Diet



Reacting with the enamel surface

Serving as a substrate



Incorporate the outer enamel surfaces

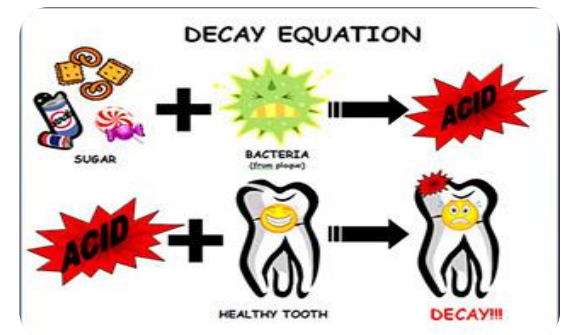
Frequent consumption of sweets between meals



continuous drop of pH



demineralization will occur



Terminology of caries

Dental caries may be classified according to their anatomical sites

- Primary caries



- Secondary caries



- Pits and fissure caries



- Smooth surface caries



- Arrested caries



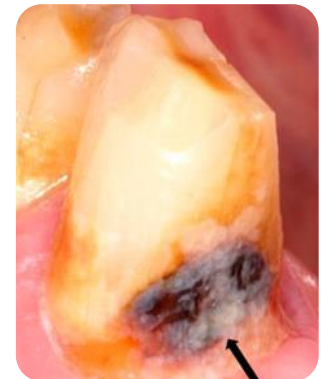
- Rampant caries



- Nursing caries



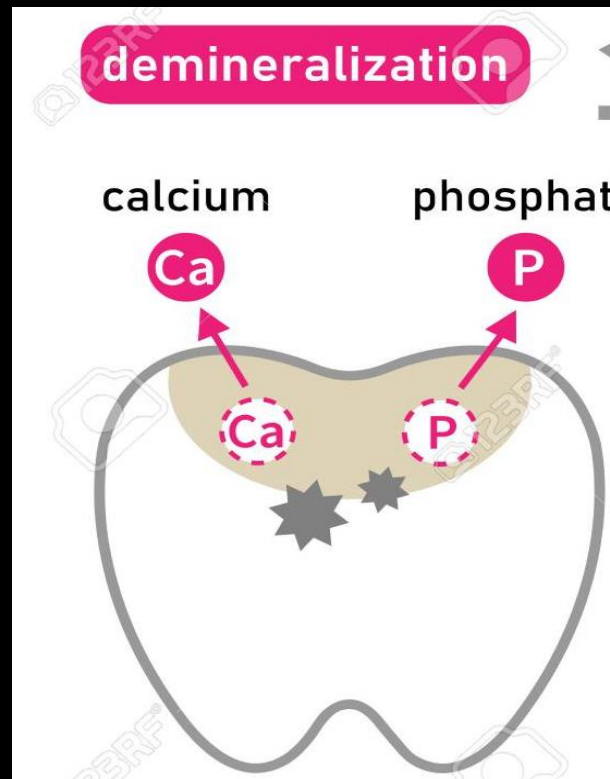
- Root caries



Dynamics Process of De-/Remineralization

Demineralization

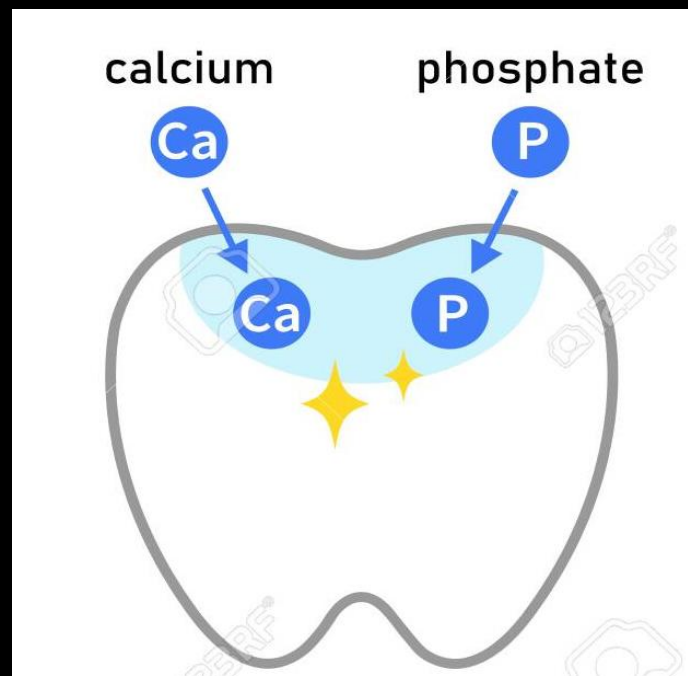
is a continual imbalance between pathological and protective factors that results in the dissolution of apatite crystals and the net loss of calcium, phosphate, and other ions from the tooth



Dynamics Process of De-/Remineralization

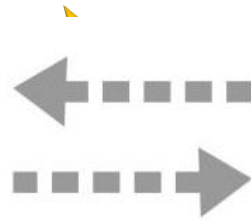
Remineralization

It is mineral gain and it is the body's natural repair process for subsurface non-cavitated carious lesions. In this process calcium and phosphate ions are supplied from a source external to the tooth to promote ion deposition into crystal voids and protect enamel



Dynamics Process of De-/Remineralization

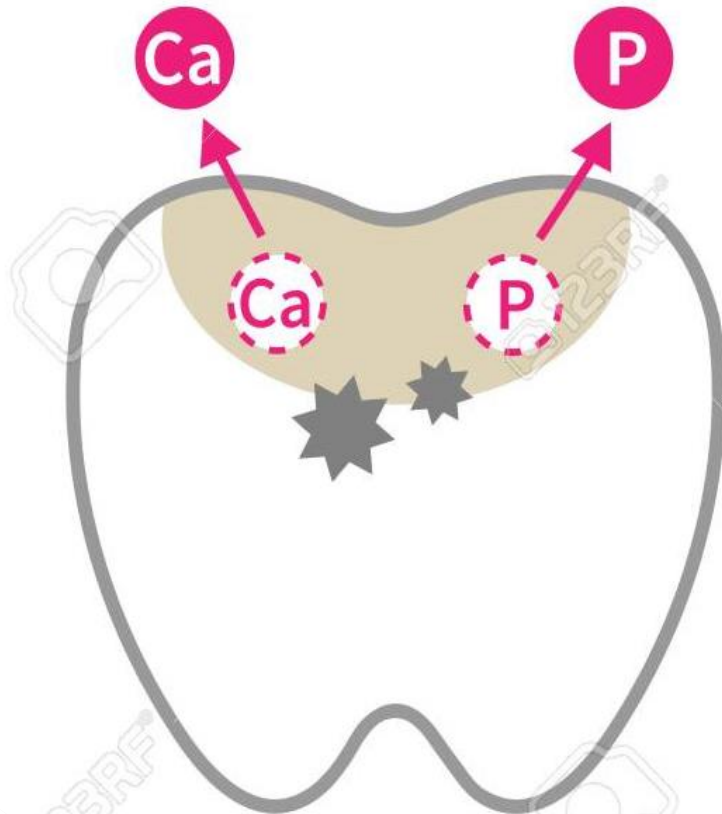
demineralization



remineralization

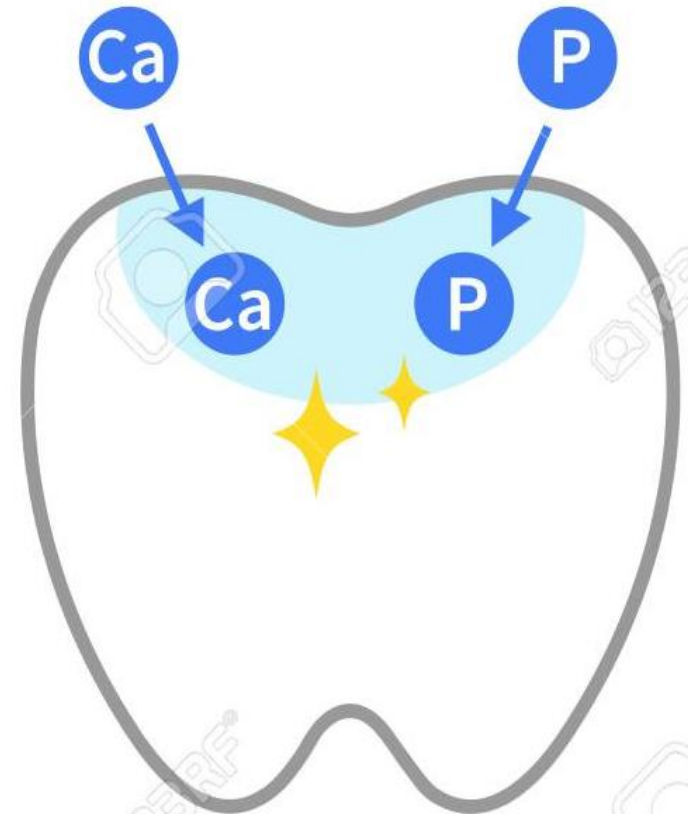
calcium

phosphate



calcium

phosphate



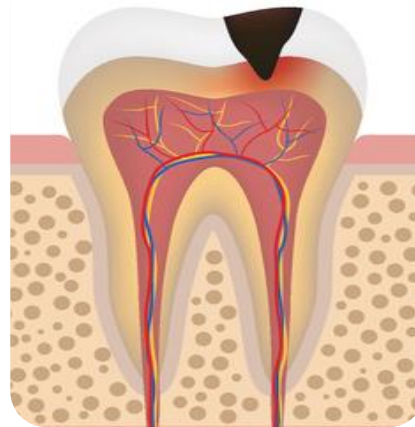
The development of a carious lesion



The earliest stage
(incipient lesion
(white spot lesion))



The second stage
progress toward the
dentino-enamel junction
and/or into the dentin; the
affected dentin displays
discoloration from brown
to dark brown or black



The final stage
overt or frank lesion,
characterized by actual
cavitation



Root caries

Chronic gingival recession is the most common cause of root caries that exposes root surfaces to oral environment

Maxilla: it is more common on incisors > canine > premolars > molars.

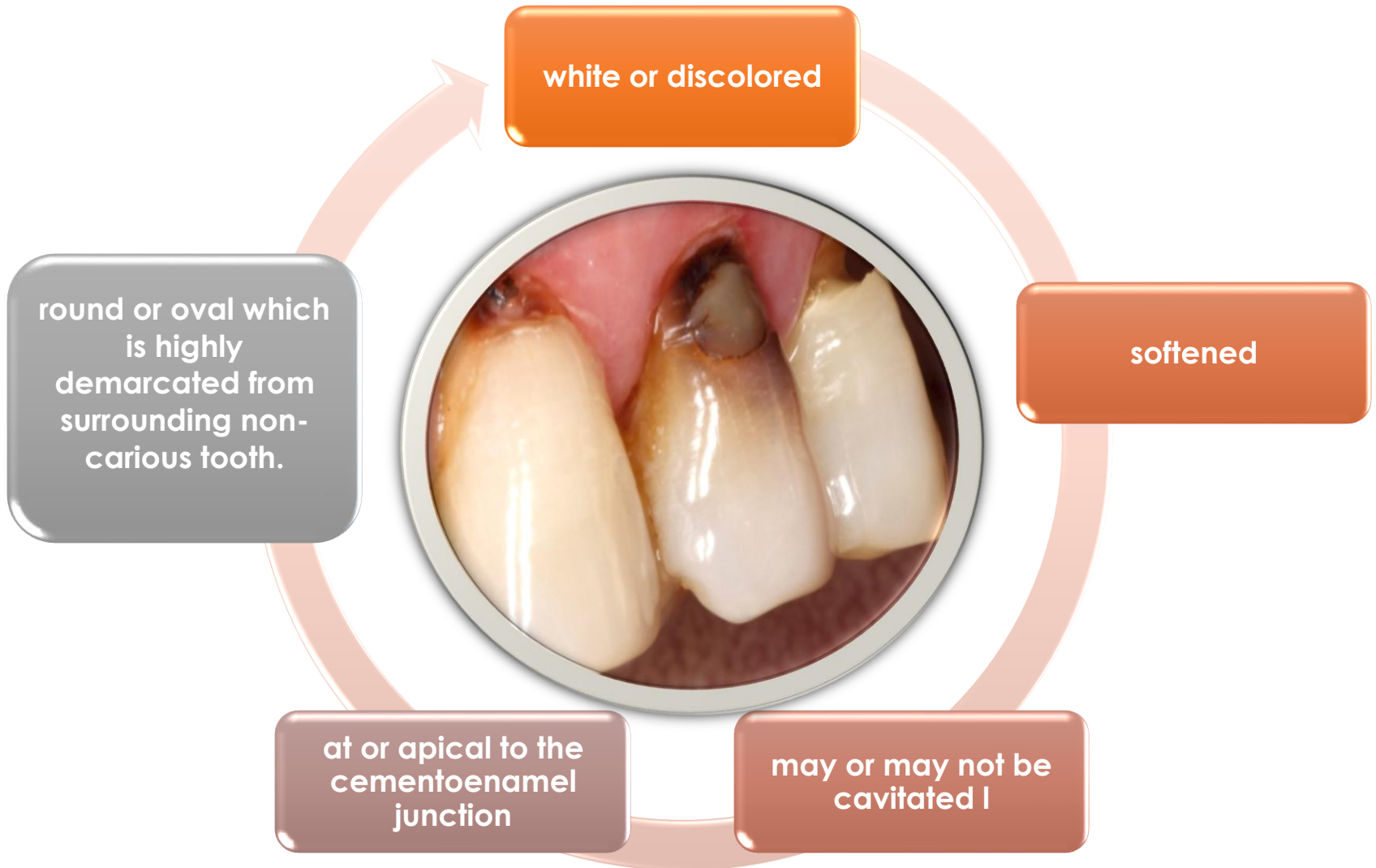
Mandible: it is more common on molars > premolars > canine > incisors.

It is any carious lesion occurs on the root surface of the tooth. It is more prevalent in older people.



Root caries differs from coronal caries. dentine has a higher percentage of organic material than enamel and demineralizes at a higher pH (6-6.8) than enamel (5.4).

Clinical appearance of root caries



Classification of root caries



Grade 0: there is no discoloration or surface discontinuity (no caries)



Grade 1: there is demarcated area on the root surface but there is no or minimal cavitation, $< 0.5\text{mm}$. (Initial caries)



Grade 2: there is discoloration and there is cavitation, $\geq 0.5\text{mm}$. (Progressive caries)



Thank you