Preclinical dentistry I.
1.lecture

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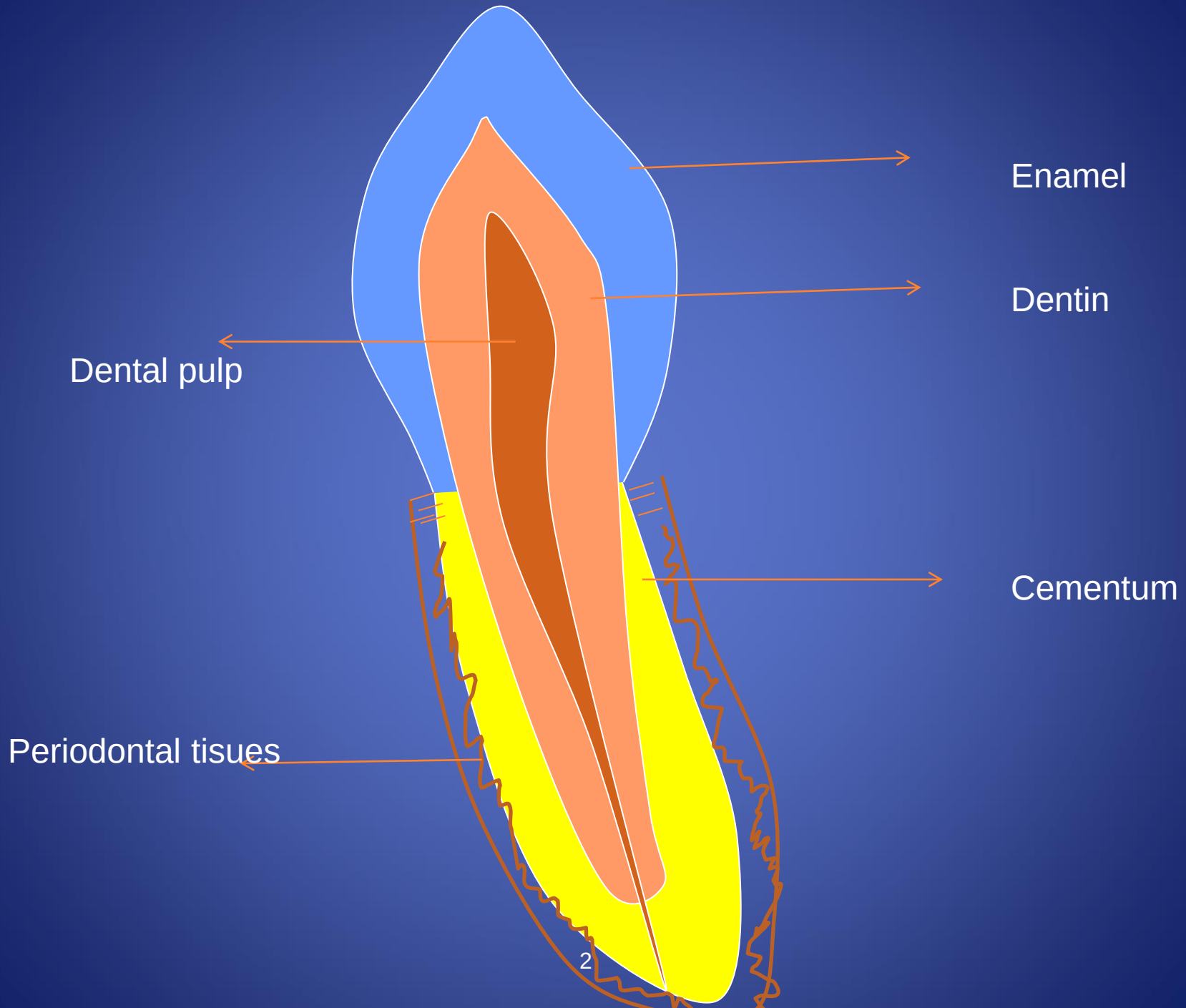

Enamel
Dentin
Dental pulp
Cementum
Periodontal tisues

Restorative dentistry

Diseases of hard dental tisues, dental pulp and periodontal tissues (of pulpal origin)
Aethiology, ,pathogenesis,diagnosis,therapy and prevention.

Diseases of hard dental tissues

Congenital – genetic reasons

Postnatal

- Before eruption
- After eruption

Congenital

- Amelogenesis imperfecta

Enamel is affected

- Dentinogenesis imperfecta

Dentine is affected

Before eruption

- Hypomineralization (white, brown spots)

- Defects of enamel (hypoplasia)

Reasons

- local (inflammmation, traumatic dental injuries)
- systemic (systemic diseases, antibiotics)

After eruption

- **Dental caries**
- Trauma
- Attrition, abrasion
- Erosion
- V-shaped defects

Antony van Leeuwenhoek

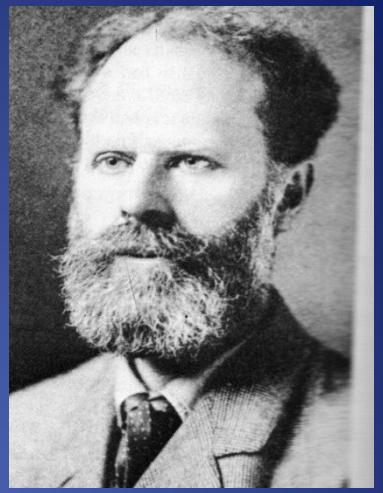
(1632 – 1723)

nizozemský přírodovědec a vynálezce. Obchodník v Amsterdamu a vědec samouk, byl členem královské společnosti. Zhotovil jednoduchý mikroskop s jedinou čočkou, který zvětšoval 300krát. Prostudoval řadu mikroorganismů a popsal jejich způsob života. Mj. objevil krevní kapiláry, jako první podal v roce 1683 přesný popis bakterií a prvoků, popsal příčné pruhování svalů. Popisem buněčné stavby rostlin se stal jedním ze zakladatelů rostlinné anatomie.

First observation of microbs in oral cavity

17.century

Dental caries



- **Willoughby Dayton Miller (1853 -1907)**

- Explanation – theories

Miller´s theory: chemical – bacteriogical explanation

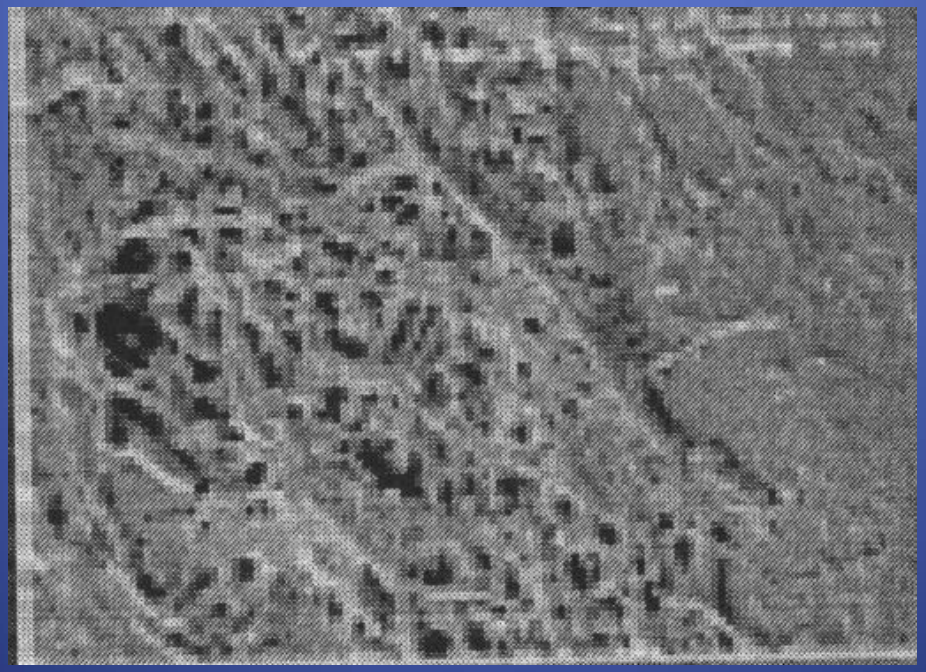
Origin of dental caries

- Dental caries originates as decalcification of hard dental tissues. This decalcification is caused by microbs that are present on tooth surfaces in the dental biofilm. These microbs utilize sugars.
- After this decalcification also the decomposition of organic substances follows due to proteolytic microbs.

Dental biofilm – plaque.

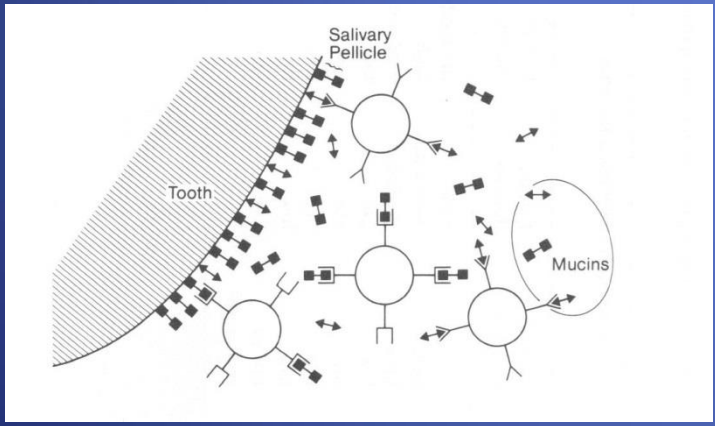
Pelicle

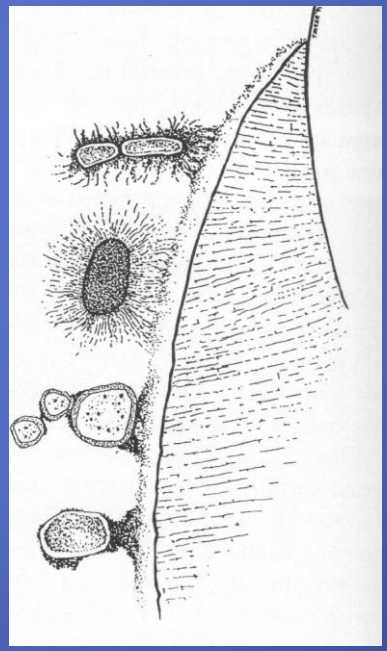
- A layer of proteins from saliva that precipitate on the tooth



Dental biofilm

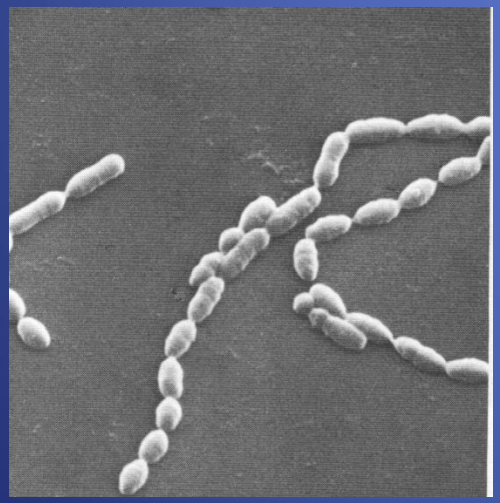
- Adherence

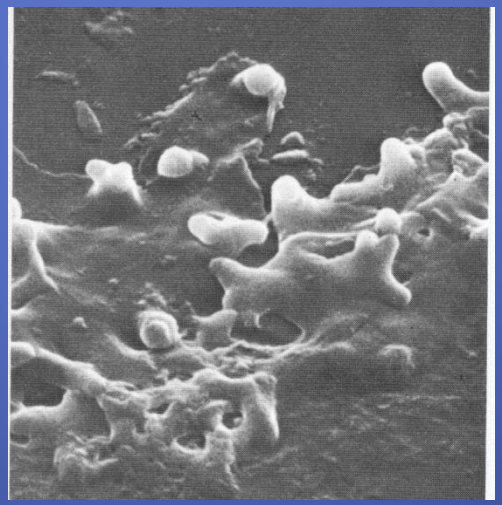




Dental biofilm

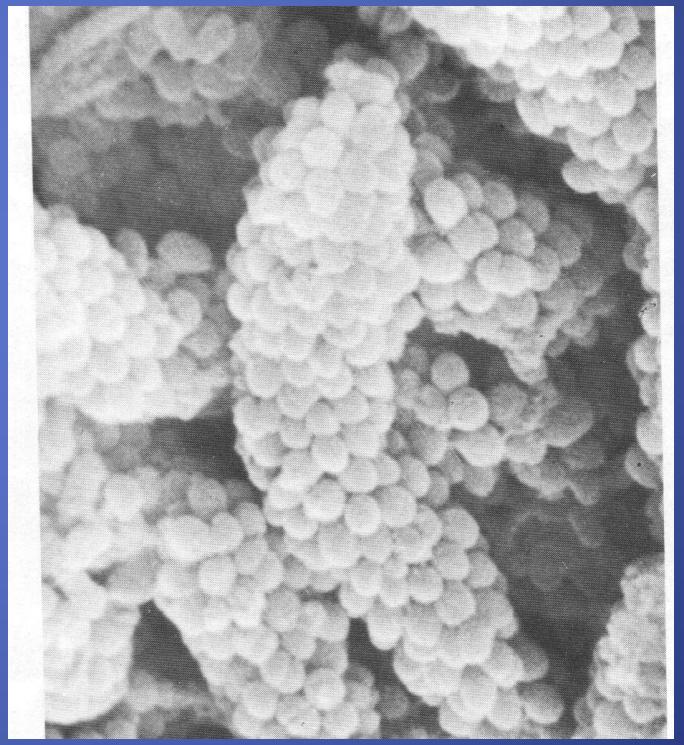
- Colonization and coaggregation



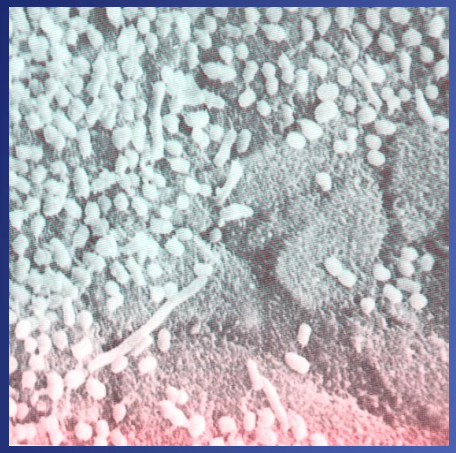


Dental biofilm

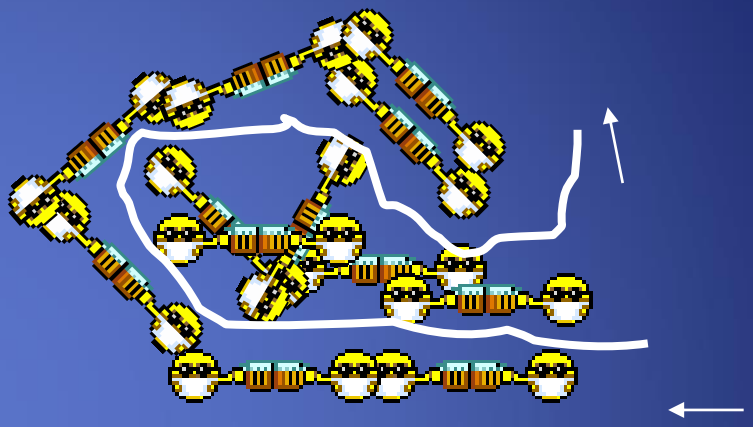
- Maturation

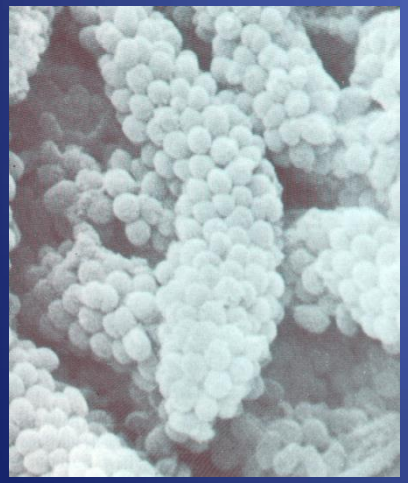


Dental bioífilm

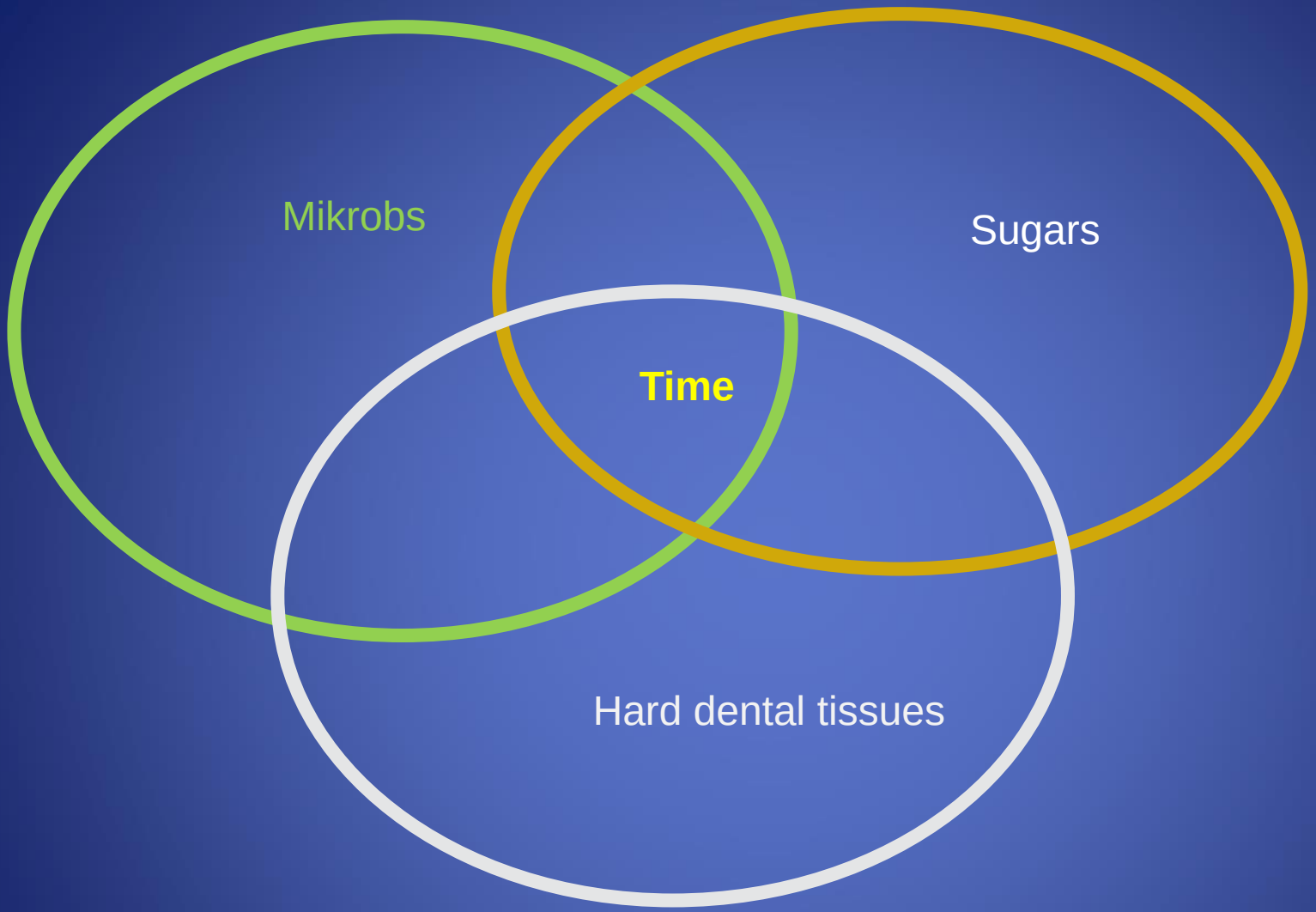


Comunity

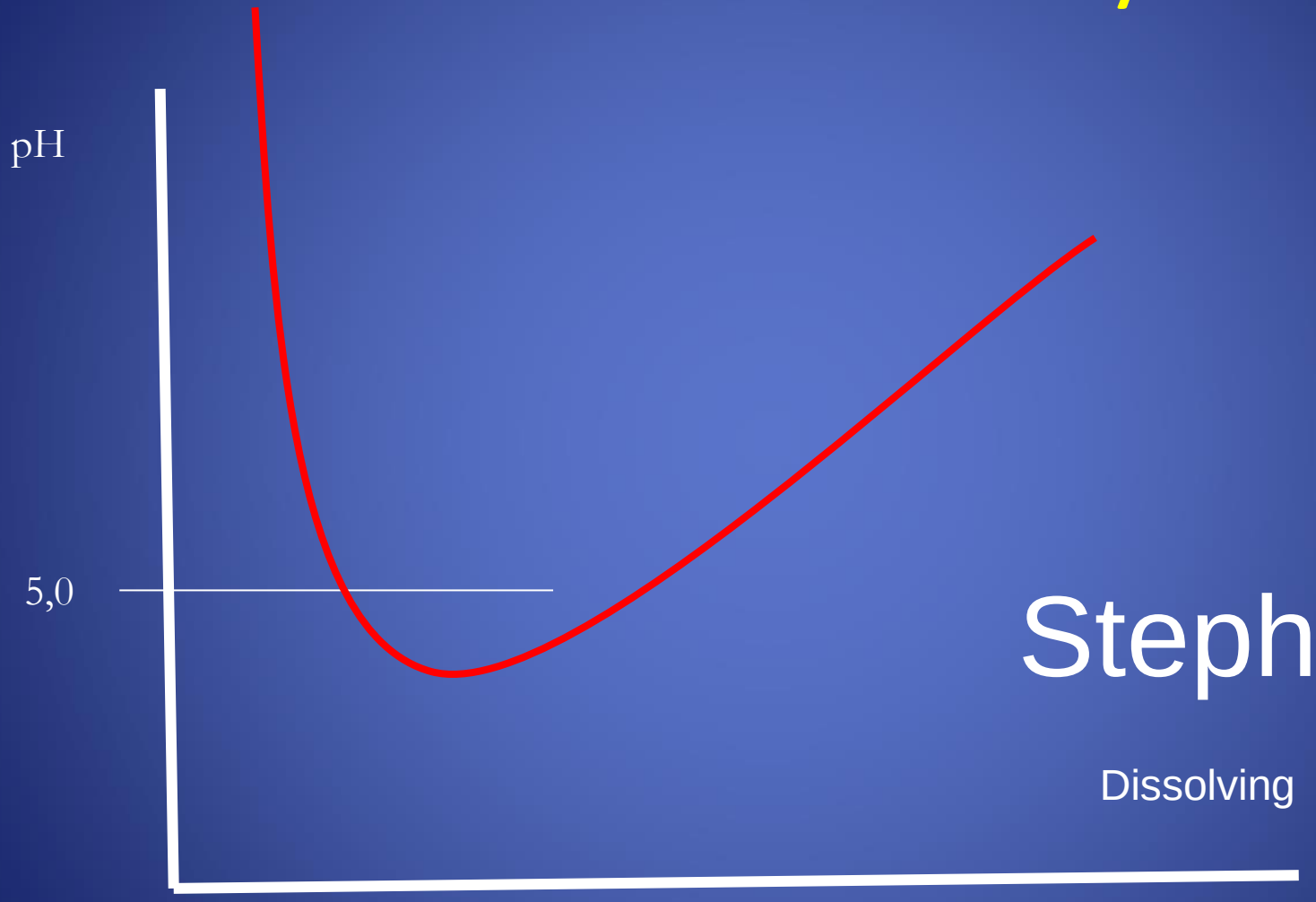




More species,
Better conditions for survival
Higher resistancy
Higher virulency


Mikrobs
Sugars
Time
Hard dental tissues

Metabolic activity

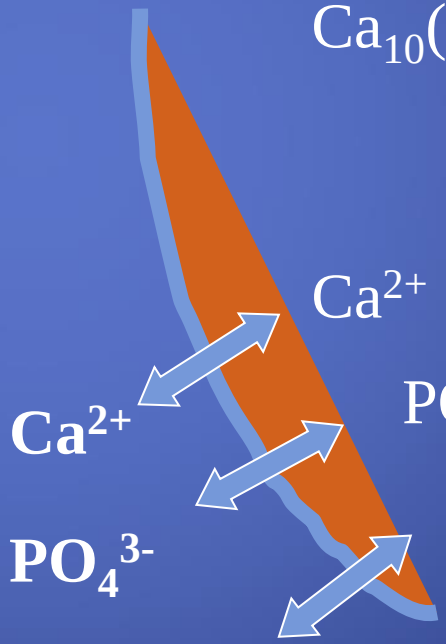


Stephan

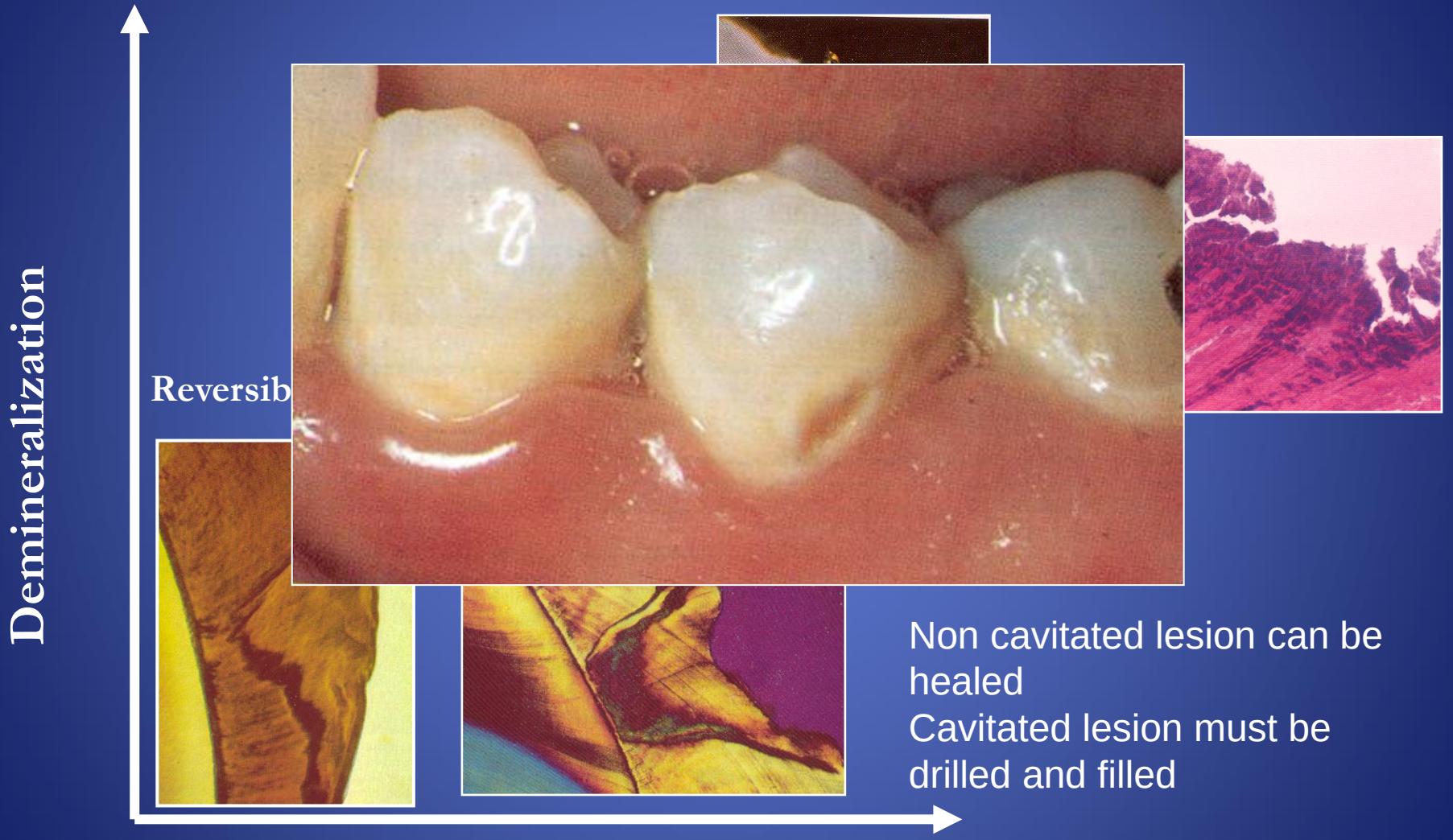
Dissolving of enamel

$Ca_{10}(PO_4)_6(OH)_2$

$Ca_{10}(PO4)_6F_2$



Irreversibil: non cavitated lesion



Non cavitated lesion can be healed
Cavitated lesion must be drilled and filled

Dental caries is multifactorial disease

- Essential factors
- - necessary

- Co condition factors
- - not necesasary but can influence the expansion

Co commitans factoras

- Quality of hard dental tissues and position of teeth
- Food – composition and consistency
- Systemic health
- Age
- Heredity (liking of sweetness?)
- Climate

Caries danger areas

- Pits and fissures
- Proximal surfaces below the contact point
- Cervical third of dental crown (area below the maximum convexity)
- Exposed root

= habitually unclean areas

Habitually clean places

- Incisal edges
- Cusps and their slopes
- Areas above the maximal convexity
- Enamel ridges : transverse ridge,
  oblique ridge

Classification of dental caries

Acc to topograpoy

- Coronal caries
- Root surface caries

According to affected surfaces

- See classification acc to Black

According to affected tissues

- Caries in enamel
- Caries in dentin
- Caries in cementum

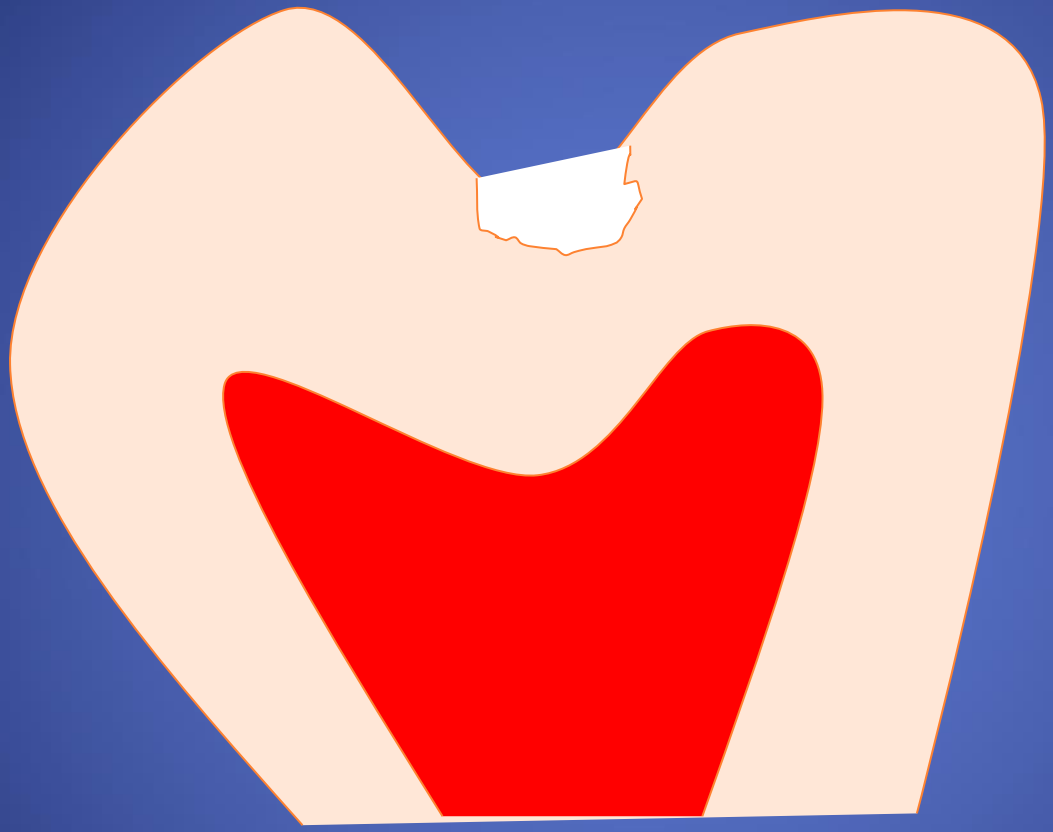
Classification of dental caries

According to its depth

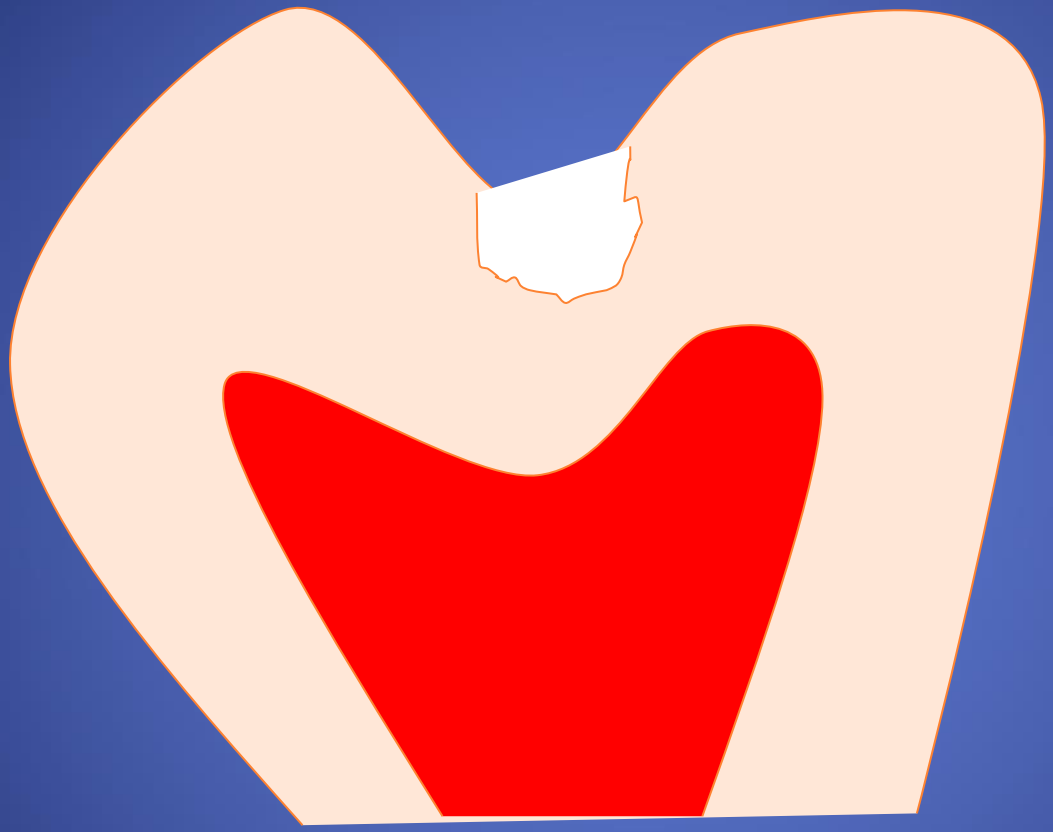
- Surface caries (caries superficialis)
- Middle caries (caries media)
- Caries next to dental pulp (caries pulpae proxima)
- Caries penetrating into dental pulp (caries ad pulpam penetrans)

Deep caries

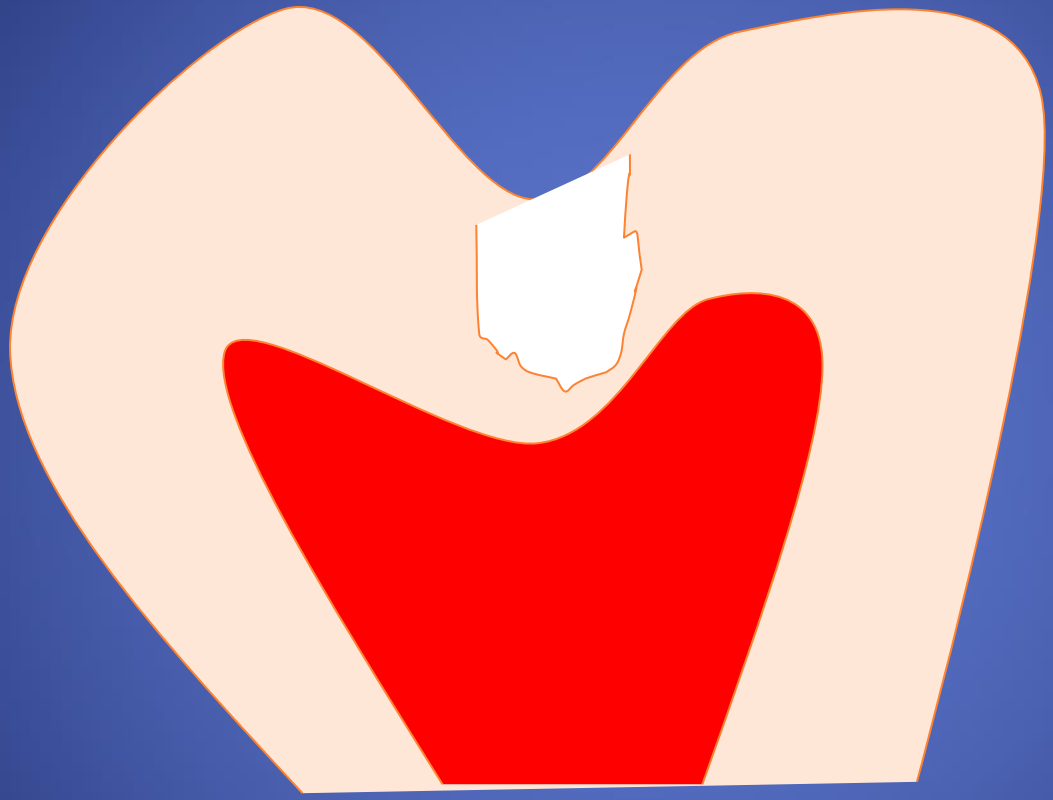
Surface caries



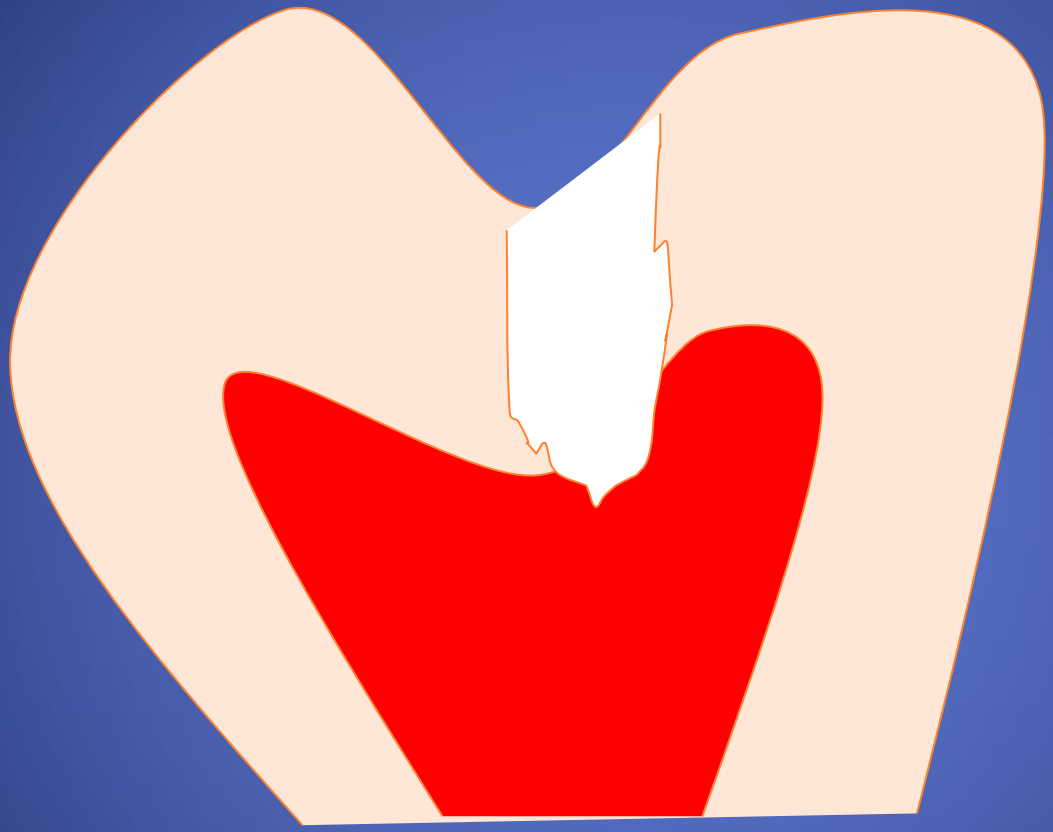
Middle caries



Caries next to dental pulp



Caries penetgrating into dental pulp



Classification of dental caries

According to history

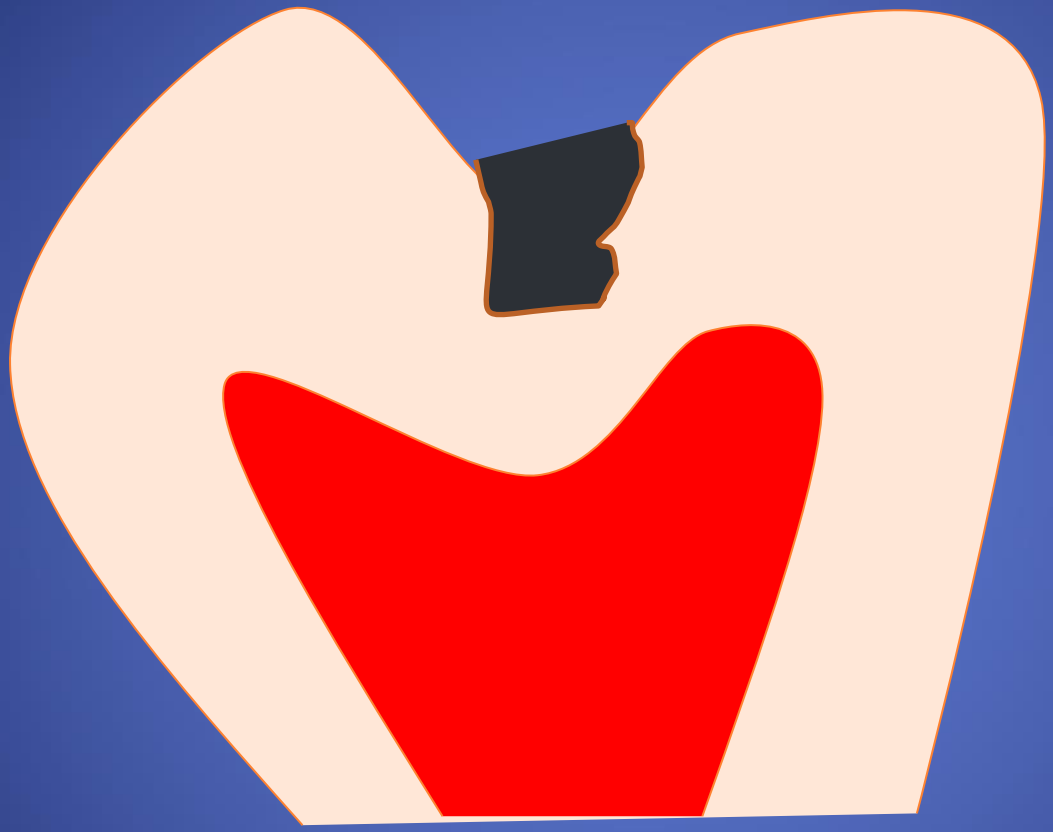
- Acute
- Chronic
- Arrested

Classification of dental caries

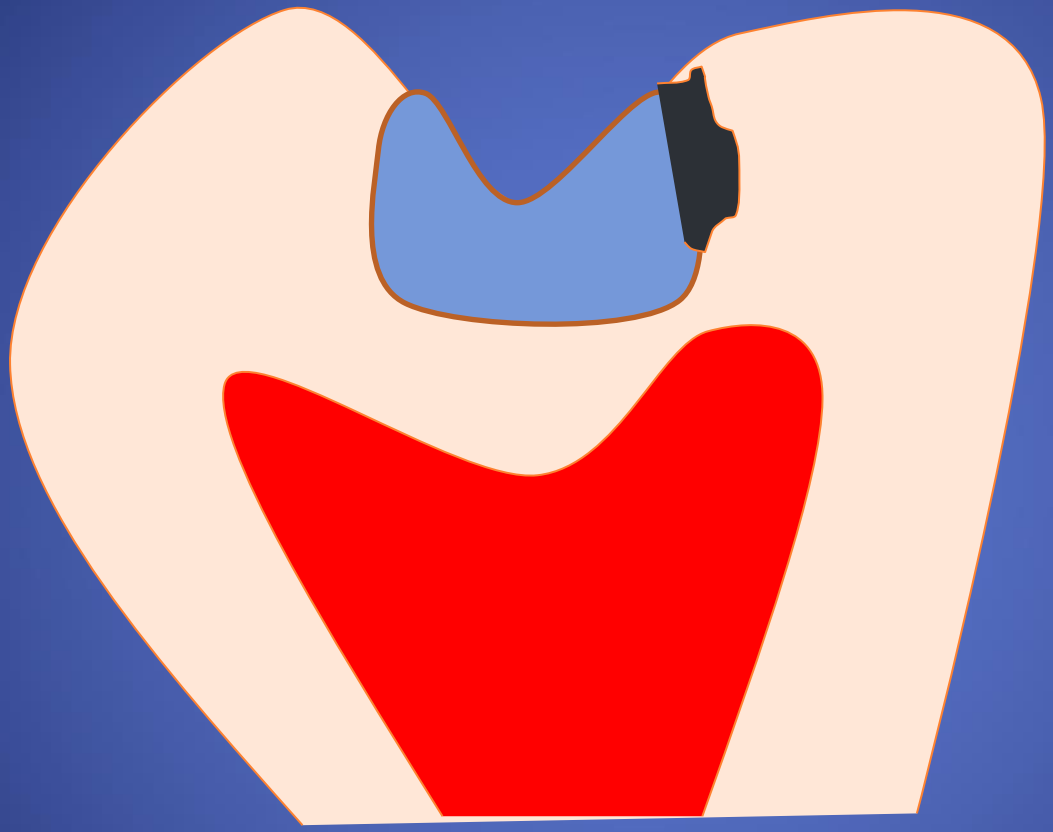
According to origin

- Primary caries
- Secondary caries
- Recurrent caries

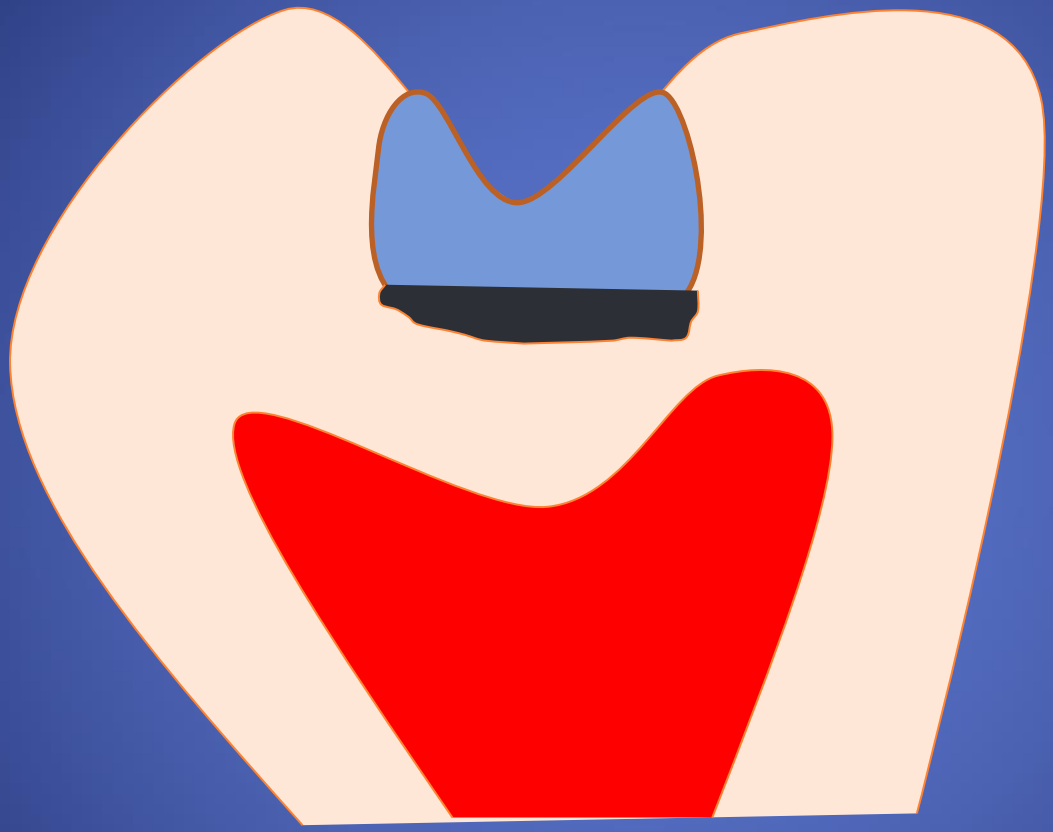
Primary caries



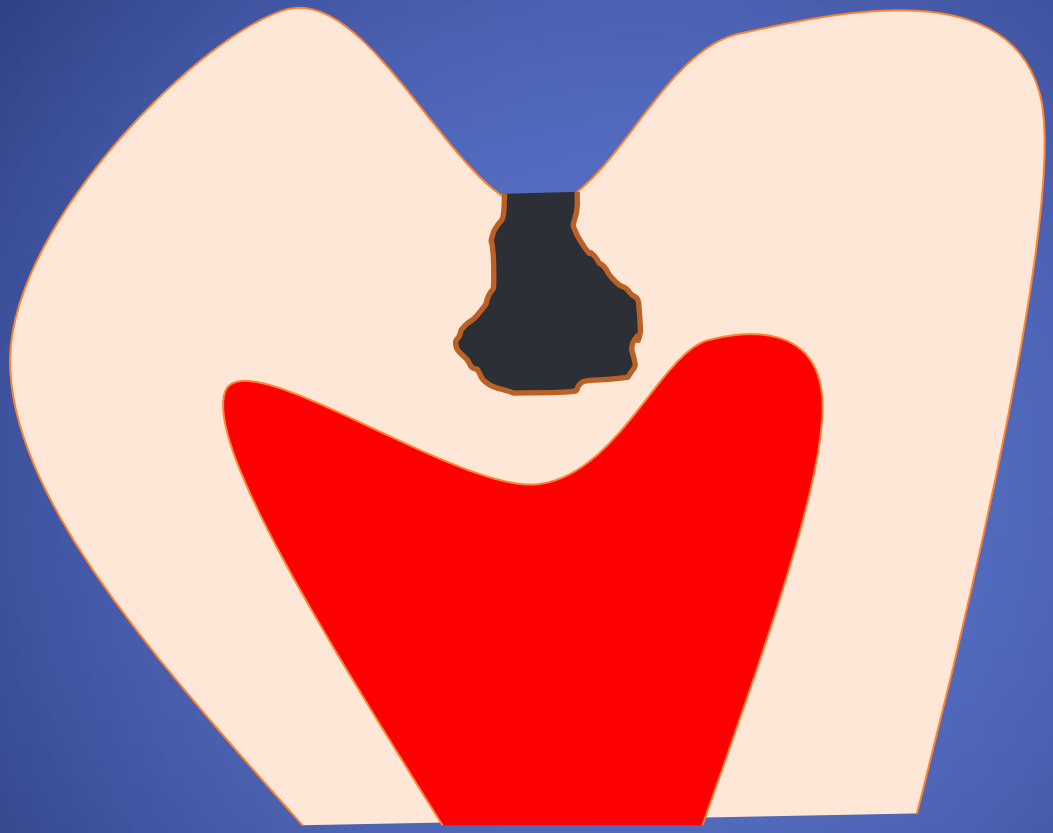
Secondary caries



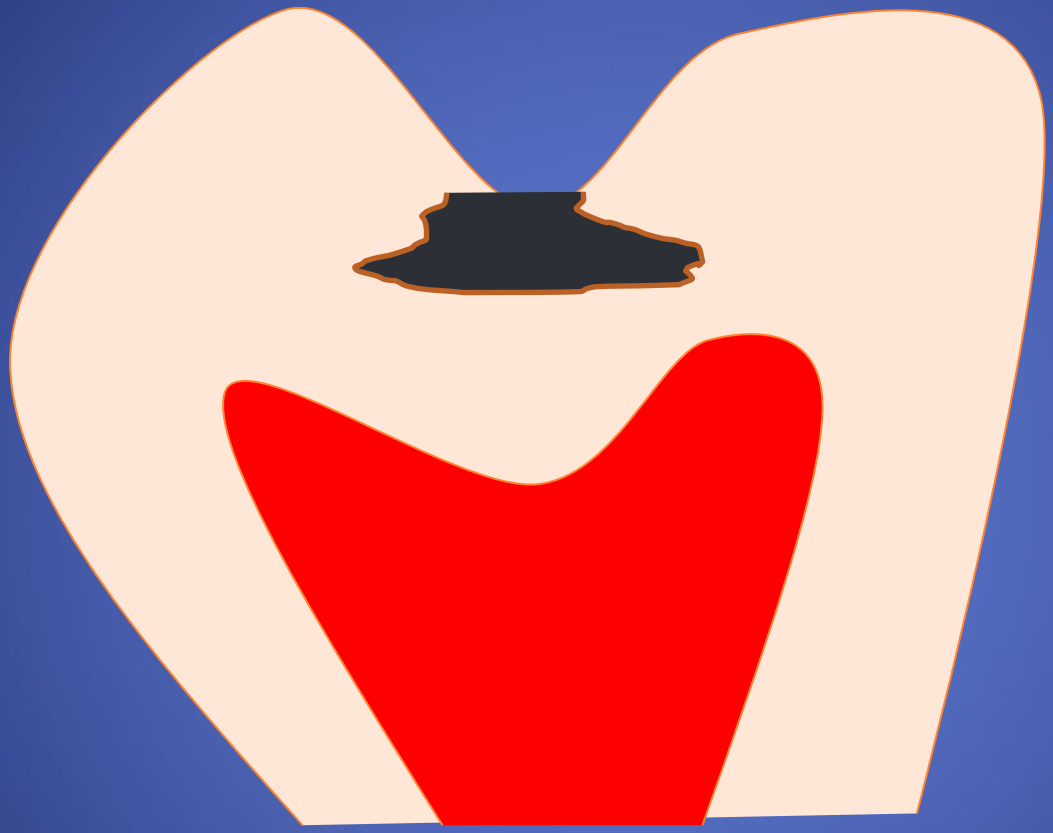
Recurrent caries



Penetrating caries



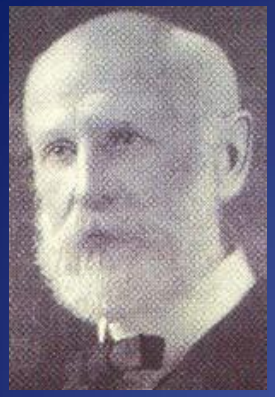
Undermining caries



Green Vardiman Black

(1836 – 1915)

American professor
Established the scientific bases of dentistry
Formulated basic rules of preparation of cavities
Developed the guidelines for amalgam fillings including the optimal composition of amalgam (balanced alloy)



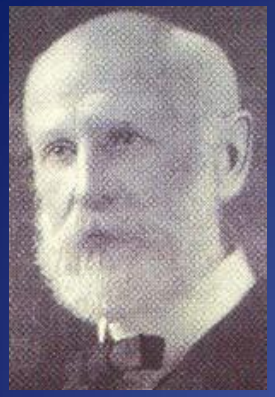
Preparation

Preparation is an instrumental treatment of the tooth that has been damaged by dental caries

in such a way that

- the reconstruction of this tooth is possible
- the filling does not fall out
- the tooth as well as the filling can face up to occlusal forces
- the risk of the caries on treated surface si minimal

(Black 1914)



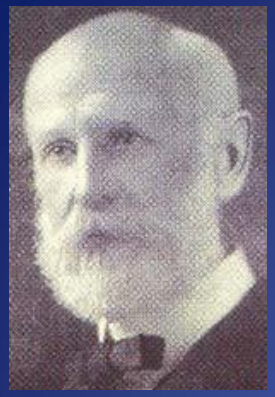
Preparation

Preparation is an instrumental treatment of the tooth that has been damaged by dental caries

in such a way that

- the reconstruction of this tooth is possible
- the risk of the caries on treated surface si minimal- extention for prevention
- the filling does not fall out
- retention
- the tooth as well as the filling can face up to occlusal forces
- resistance

(Black 1914)



- After we understand the reasons of dental caries we will be able it to heal it

(Black 1900)

Classification acc. to Black

- Class I.

Pit and fissure caries

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Classification acc. to Black

- Class II.

Proximal surfaces in premolars and molars

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Classification acc. to Black

- Class III.

Proximal surfaces of incisors and canines without

lost an incisal ridge

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Classification acc. to Black

- Class IV.

Proximal surfaces of incisors and canines with lost an incisal ridge

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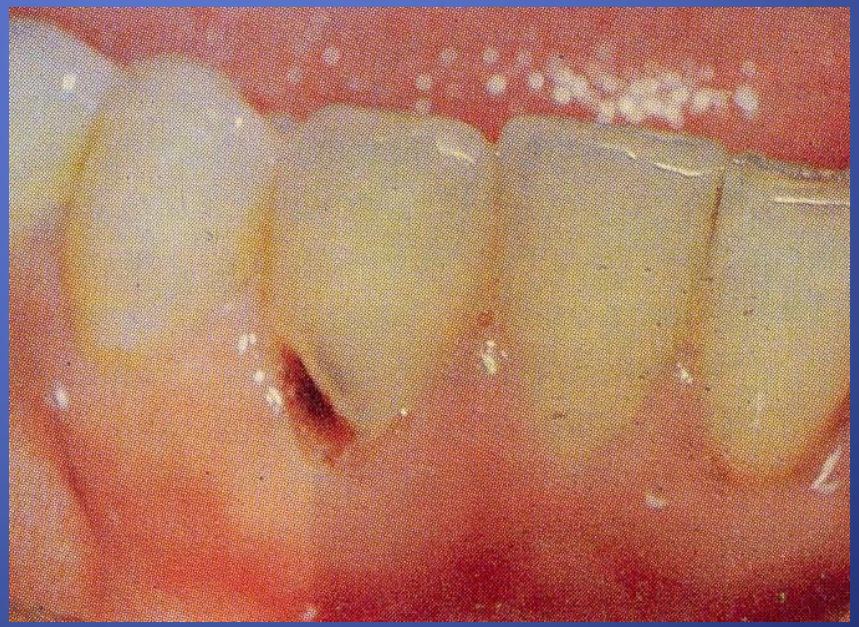
Classification acc. to Black

- Class V. cervical lesions



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Clasification acc. to black

- VI. Class
- Caries on incisal edges (abraded)

Sequence of operations

Acces to the cavity

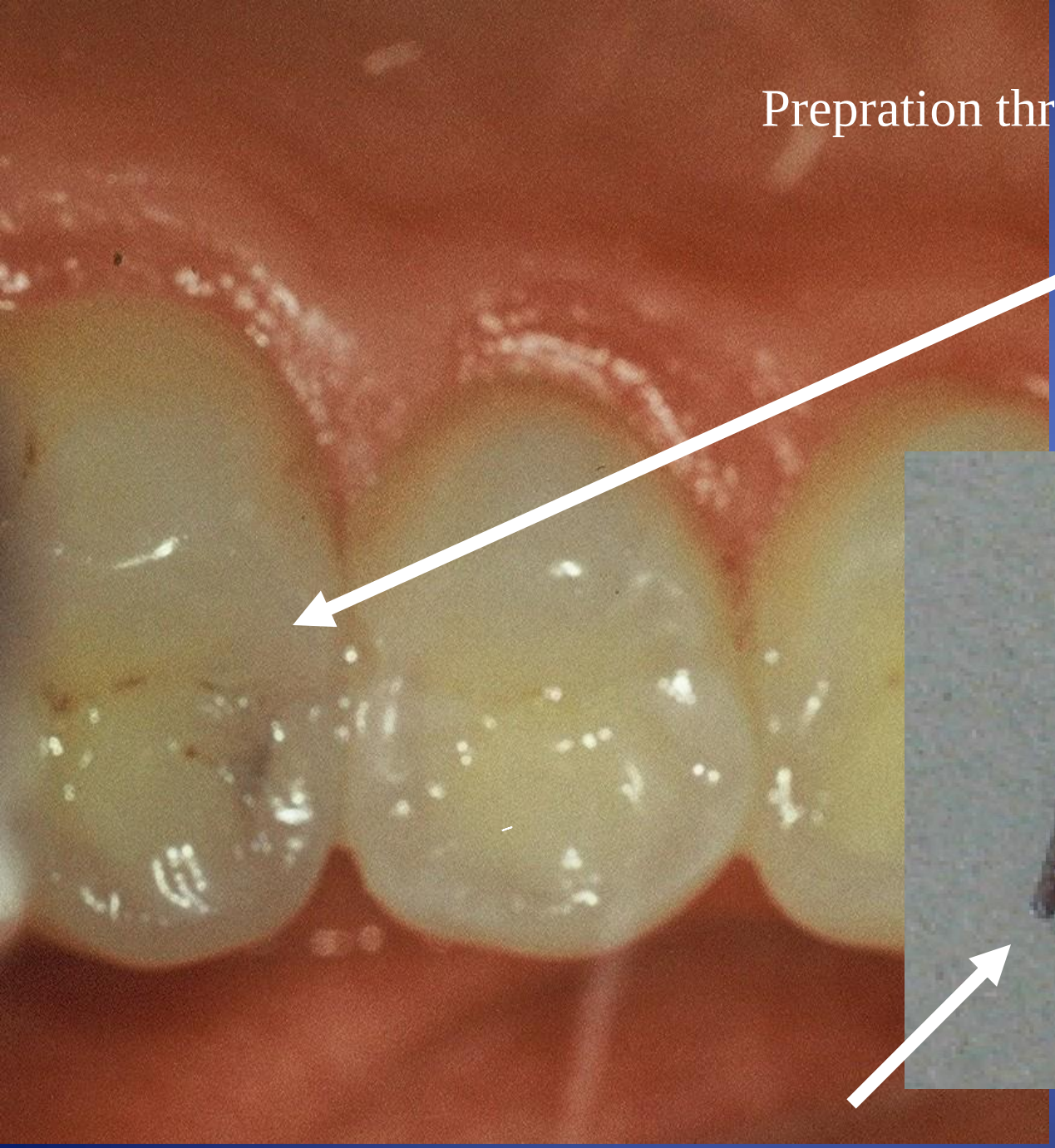
Preparation through the hard dental tissues

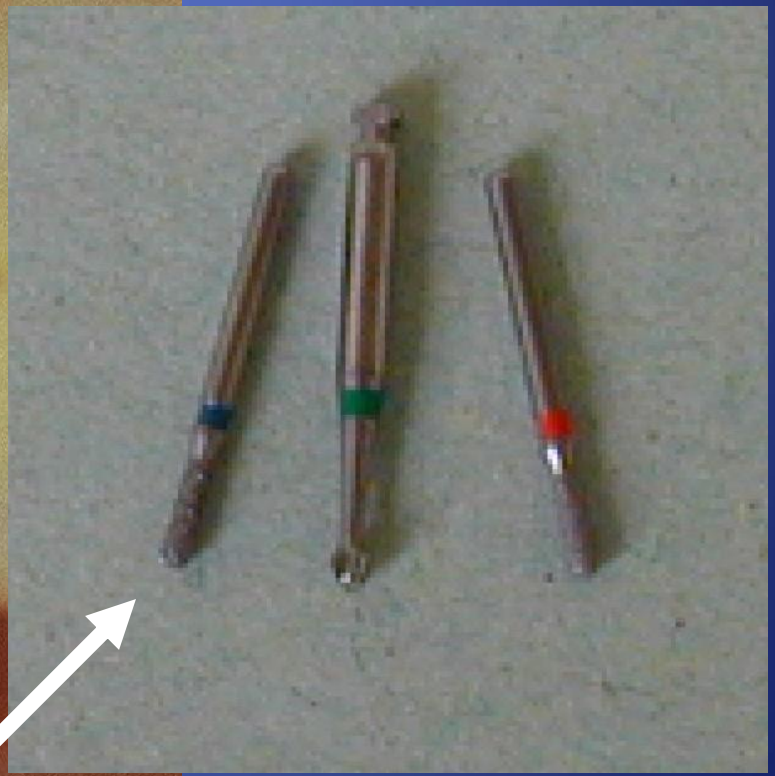
Removal the undermined enamel

Separation of teeth

Separation or removal of gingiva

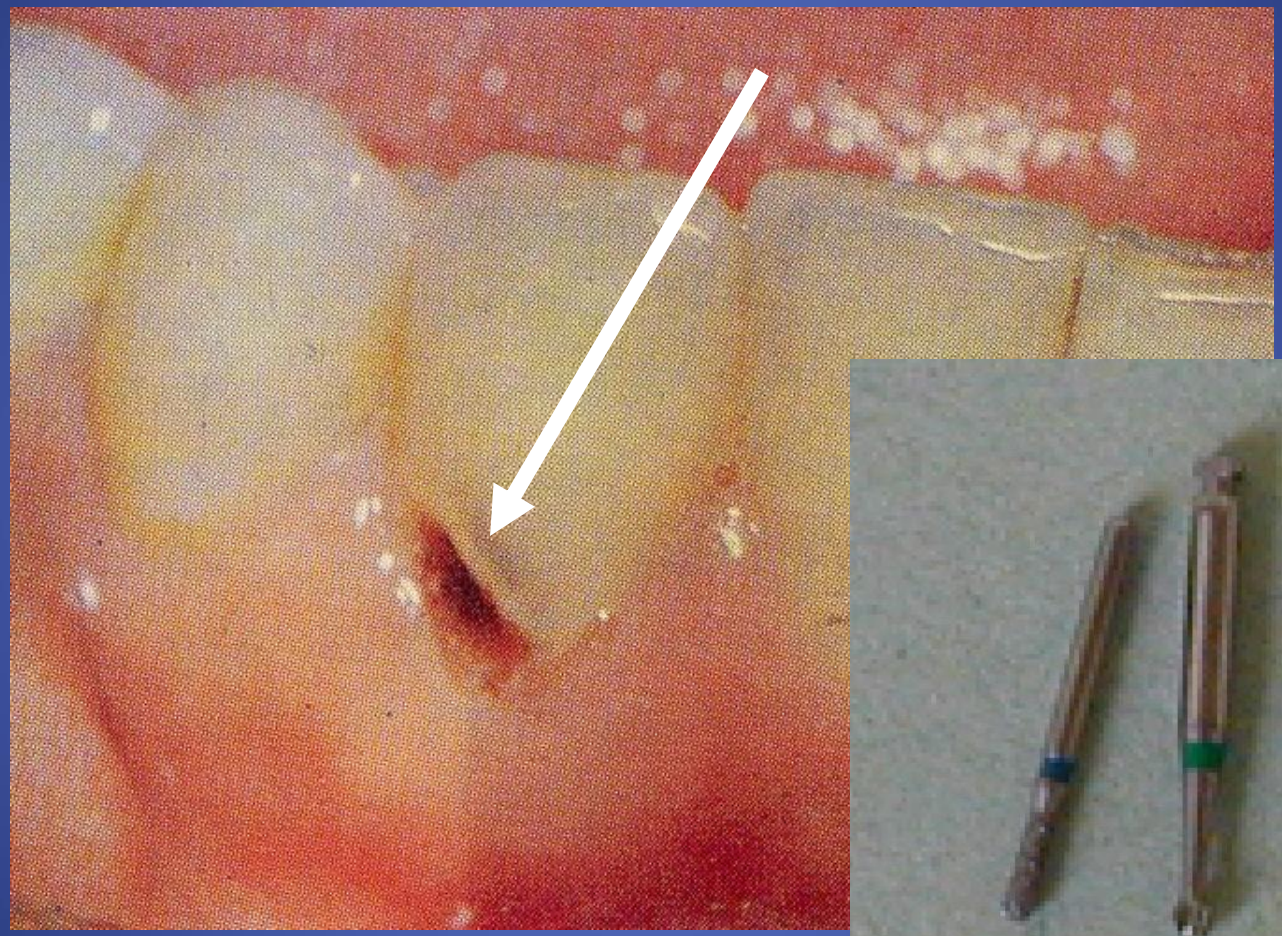
Prepration through hard dental tissues



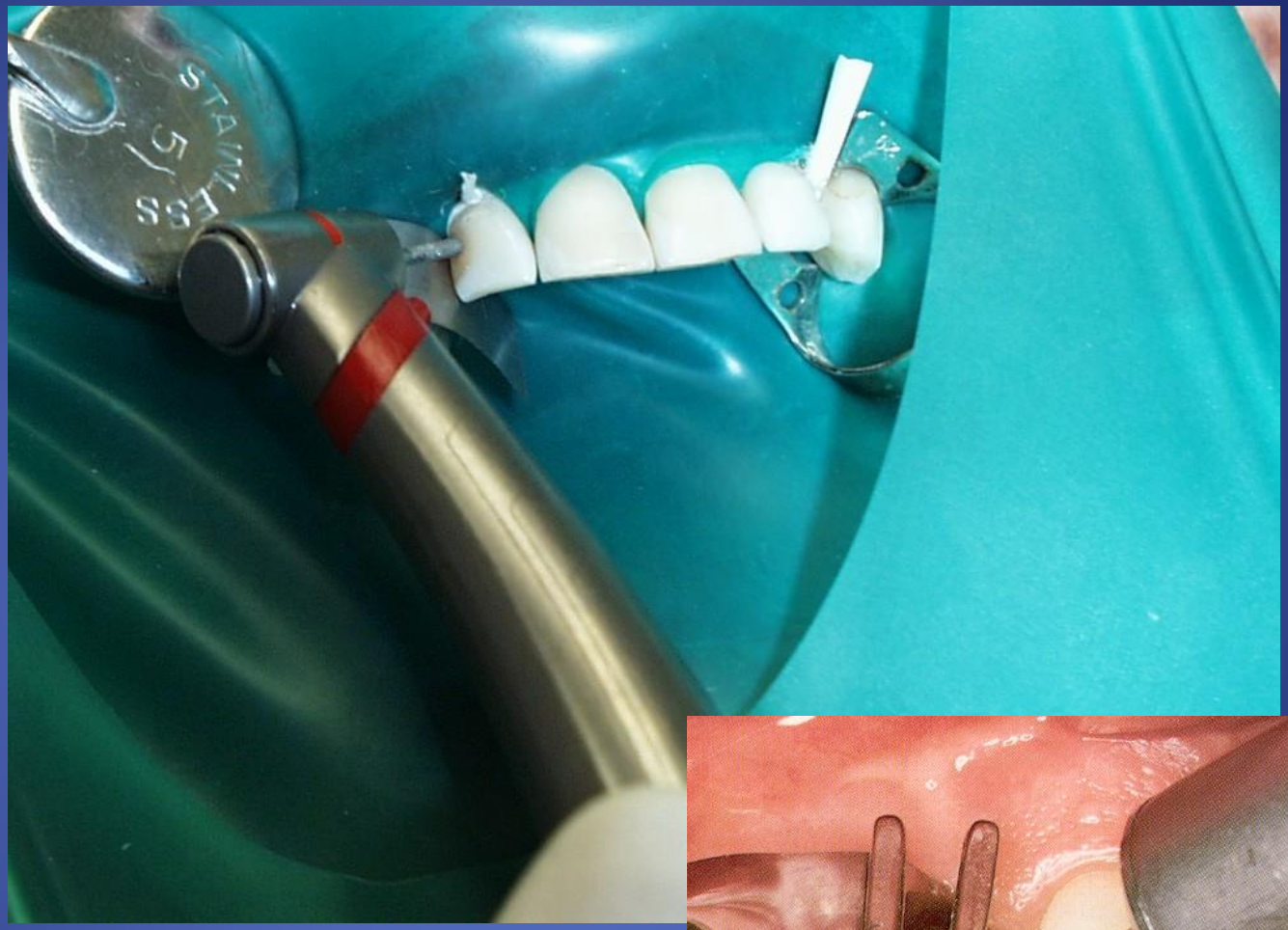


Breaking the enamel

Removal of the undermined enamel



Separation with wooden wedge



Removal of the old filling

Removal of the ingrown gingiva

Sequence of operations

Acces to the cavity

Establishment of the cavosurface margin - extention for prevention

Retention of the filling

Resistance of the restored tooth (the filling as well as the restoration)

Excavation of carious dentin

Protection of dentin wound

Finishing of the walls

Final control (light, miror, magnification)

Sequence of operations

Preparation of cavity borders and **extention for prevention (Cavosurface margin)**

Depends on

Dental material

Oral hygiene

Precautions of secondary caries

Sequence of operations

Retention of the filling

Precautions of its lost

Macromechanical retention

Micromechanical retention

Chemical retention

Sequence of operations

Resistance of the restored tooth

Against occlusal and other forces

Depends on

- *Material*
- *Individual occlusal forces*

Sequence of operations

Excavation of carious dentin

Necessary (risk of recurrent caries)

Ball shaped (spheric) bur - slow speed (3000 rpm)

or

Excavator (hand instrument)

Sequence of operations

Finishing of the walls

Depends on the kind of material

- *Bevel or without bevel*
- *Fine diamond bur*

Protection of dentin wound

- Filling itself
- Base (below the filling – protection against thermal exposure ot toxiccity of dental materials)

Sequence of operations

Final control

Direct or indirect view

Good illumination

Magnification

Preparation

- Hand

Excavator, cleaver

- Power driven
- Rotary
- Non standard preparation

Burs, diamonds

Chisel – for enamel
Cleaver

Chisel for enamel

Excavator

Motors and handpieces

Turbine

Micromotor

Handpiece

Turbine

Turbine

300.000 - 400.000 rpm

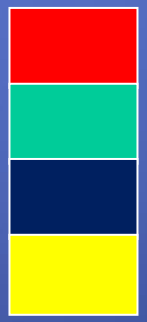
Big force, les control, small torque

Motors – micromotors

Electromotors – maximum 40.000/min

Air motors – maximum 20.000/min

Gear to fast
Gear to slow
1: 1
Blocked rotation



Gear

Blue coded handpiece 1:1

Gear

Red coded handpiece 1:5 to fast

Gear

Green coded handpiece – to slow
2,7 :1
7,5 :1

Hendpieces
contraangle straight

Cutting instruments

Burs

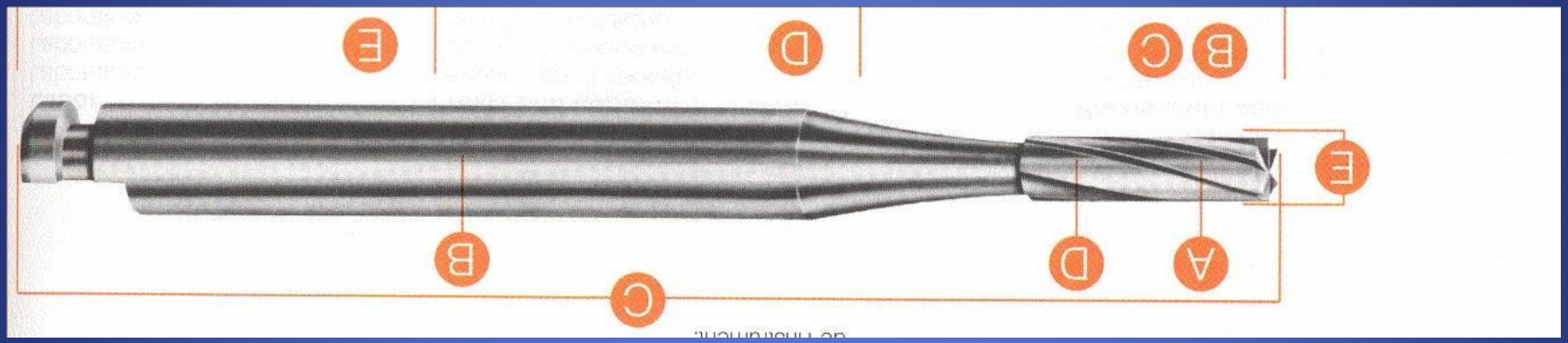
Steel

Tungsten carbide

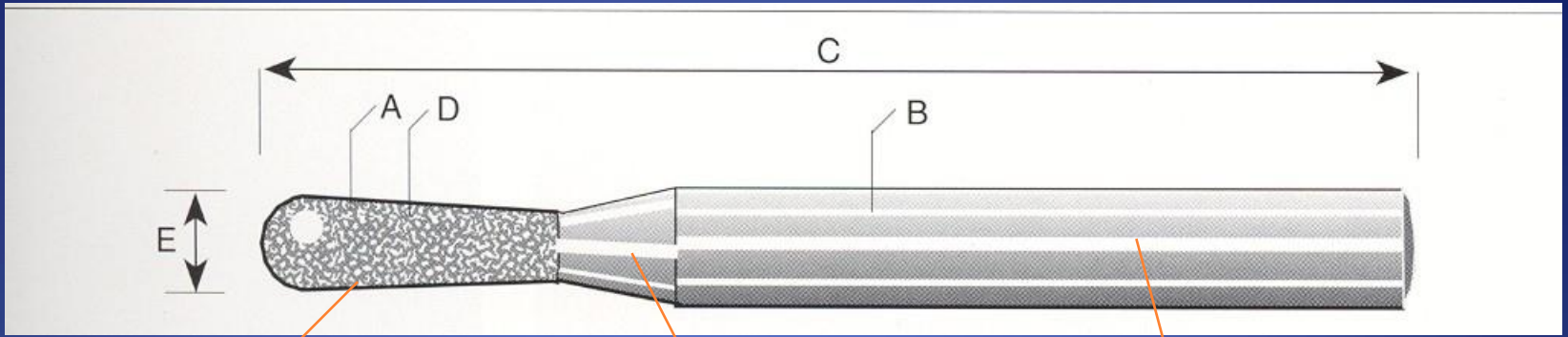
Diamonds

Cutting instruments

Power driven (powered) instruments for cutting



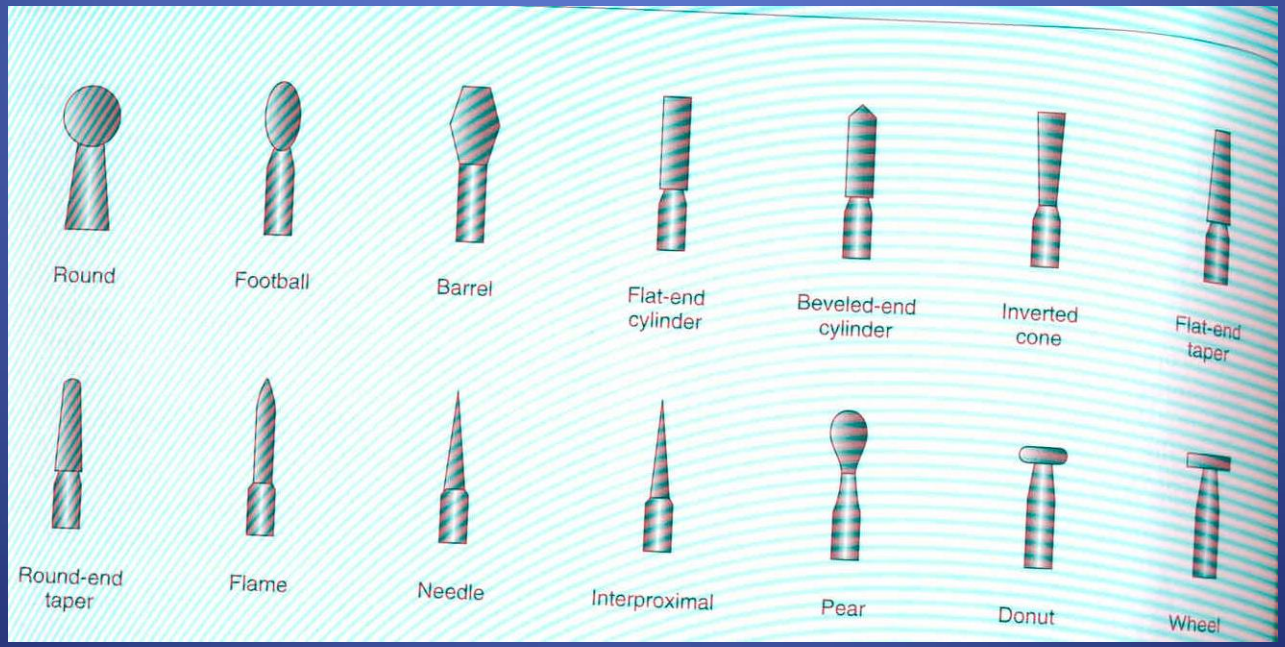
shank | neck | Head (cutting part)

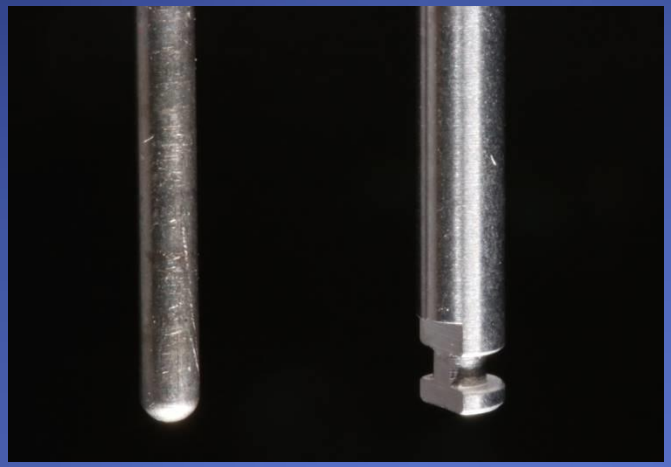


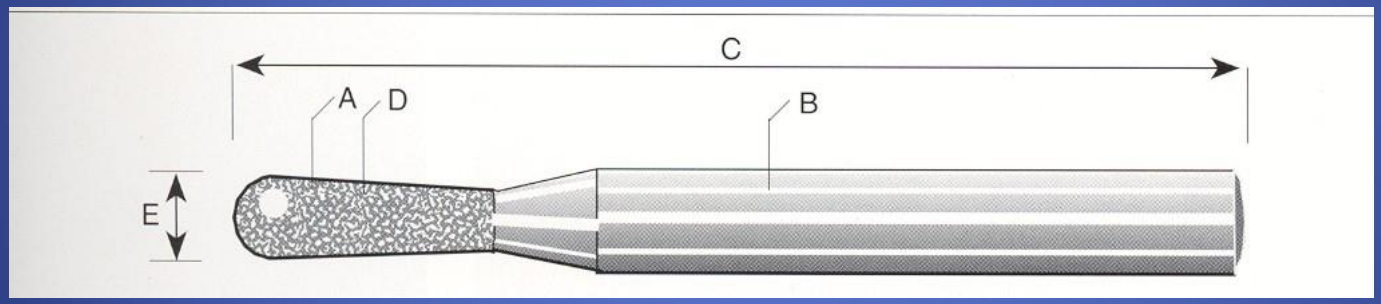
Head (cutting part)

neck

shank



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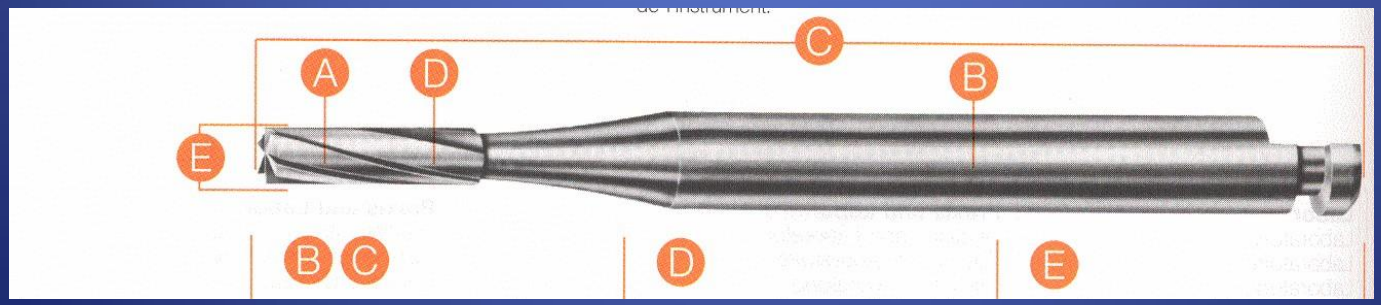
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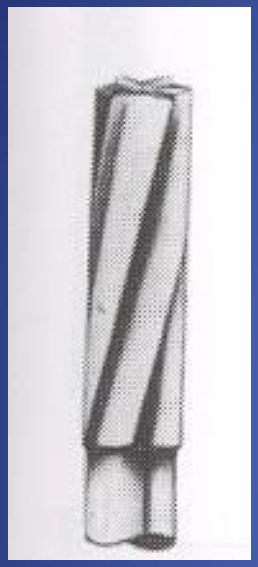
Burs



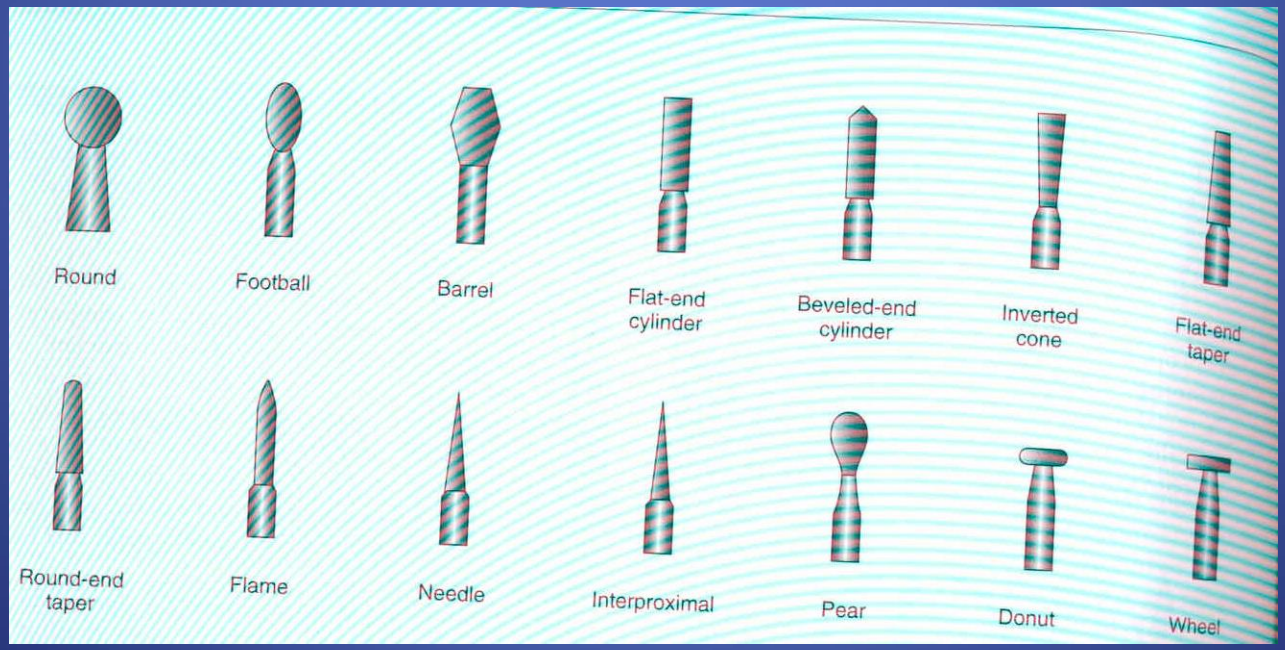
fissure bur , round (ball) bur

pear formed bur,,

inverted cone bur

Cutting instruments – diamonds head shape

- Ball, pear, cylinder,taper,flame, torpedo, lens and others…..



Cutting instruments – diamonds

Extra coarse – black

Coarse – green

Standard – blue or without any marker

Fine - red

Extra fine - yellow

Ultrafine - white

Diamonds

- Blue –standard (90 – 120 μm) ISO 524

Universal

Diamonds

- Extra coarse (150 – 180 μm) ISO 544
- Cutting of crowns, old fillings

Diamonds

- Removal of old fillings, some preparations in prosthetic

Diamanonds

- Red fine (20 – 40 μm) ISO 514
- Finishing of borders of cavities

Diamanonds

- Extrafine (12 – 22μm) ISO 504, finifshig of composite fillings

Diamonds

Ultrafine – polishing of composite fillings (6-12 μm) ISO 494

Thank you!