

DECAY MICROBIOLOGY



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Presentation Order

- ❑ **Decay Hypothesis**
- ❑ **Acid formation on dental plate**
- ❑ **Glucose shock**
- ❑ **Demineralisation**
- ❑ **Cavitation**
- ❑ **Decay producer (karyogenic) Bacteria**
- ❑ **Inhibiton of decay formation**
- ❑ **Immunology of tooth decay**

Summary

- **Tooth Decay:** Most popular and high incidence in mouth
- **Tooth Decay:** Totaly bacterial diseases
- **Tooth Decay :** Not a countryside disease, civilization disease
- **Tooth Decay :** Cronic infection disease

Decay Hypothesis

1. Specific plaque hypothesis

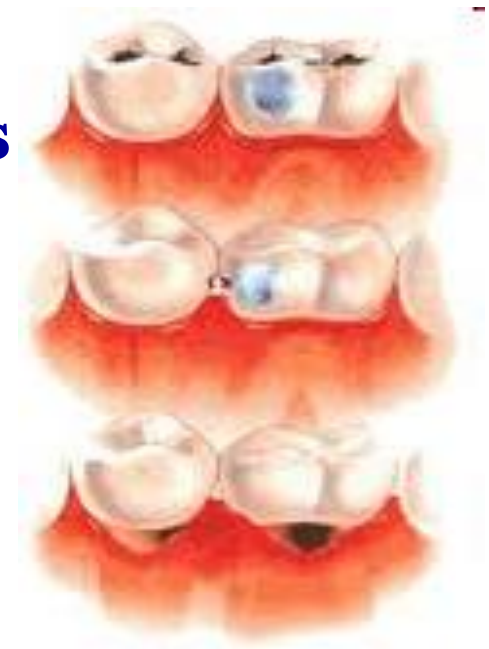
- *S. mutans* and *S. sobrinus* start decay formation

2. Non-specific plaque hypothesis

- Not specific to decay forming bacteria

3. Ecologic plaque hypothesis

- Deformation of permanent microflora



Enamel is dissolving in acids and produce tooth decay

Acid formation on tooth plaque

- Depends on variety of bacteria;
 - Acid+Alcohols
 - Saliva, dilute , wash and buffer acid
 - Both mechanisms work together

 - Tooth decay;
 - Acid producing mechanism overcome acid removal mechanism

For tooth decay formation;

Acid formation rate must be faster than saliva wash rate

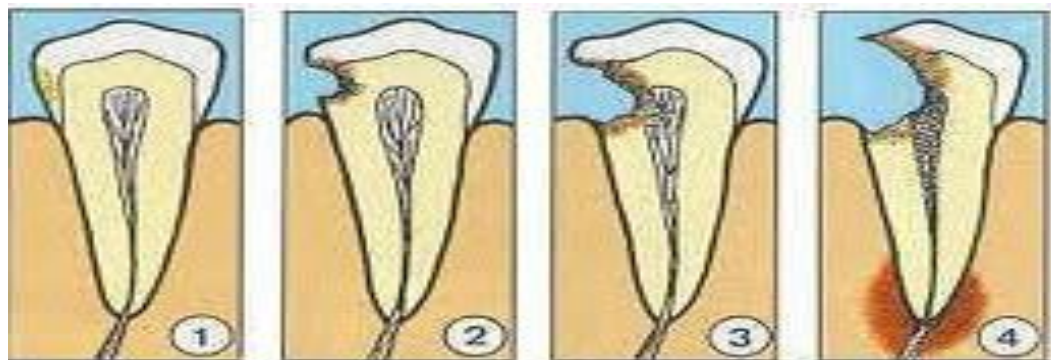
Glucose shock

Glucose shock

“ Healthy people are given 10% glucose solution in their mouth and after 10 second rinsing mouth pH decreases”

Stephan curve

“ Following a glucose shock, every 30 seconds mouth pH is measured and a curve is obtained”



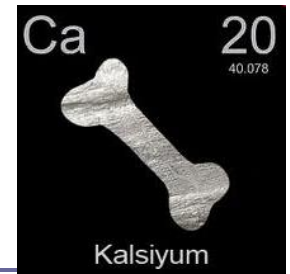
Stephan curve

This curve is different for each person, tooth plaque, karyogenic bacteria

- Some bacteria show sharp drop on Stephan curve;
- Ex: Streptococcus, laktobasilli, Rothia (acidogen bakteria)
- Some show less drop;
 - Ex: Actinomyces, Eubacterium, Peptostreptococcus

Peptostreptococci found on tooth plaque, but, can not break down KH. (except P.productus) and are not responsible for the tooth decay as a first agent

Demineralization



- For tooth decay, KH must be broken down by acid producing bacteria
- Ph will drop down Or (generally organic acids)

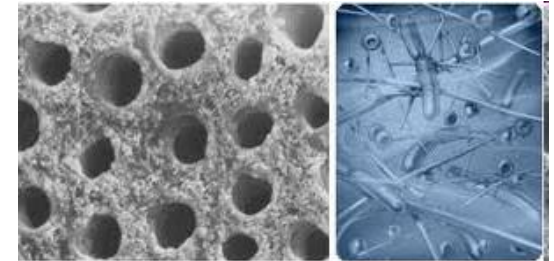
Enamel: A calcific tissue around an organic matrix,
Mostly organic salts (calsium phosphate).

- Acid habitat; allow to dissolve *Ca salts*
- organic matrix (collagen) is present from deminarilize enamel kalır (tooth decay colour is white at this stage)
- After purification of organic matrix by bacteria;
 - ***Black tooth decay***

Cavitation

- Advanced decay stages; bacteria fill in demineralize enamel's microcavities
- First bacteria: **Laktobacilli** and **streptococci**
- Due to acid formation, cavity outer surface repairing is difficult
- Event is irreversible

- Dentin decay is more progressive
- Organic material is more on dentin tissue
- 15.000-75.000 dentin tubes in 1 cm² dentin section
- Decay progress in dentin;
 - Inorganic salts dissolve
 - Hard tissue loss



Dentin Tuböleri (Kanalları)

Bakteriler



CAVITY FORMATION

Decay forming (karyogenic) bakteria

Between 1.5-7 ages 204 children mouth flora;

- Person with no decay : *S.mitis*, *S.oralis*, *S.sanguinis*, *S.parasanguinis*, *Abiotrophia defectiva*
- Person with decay : *Actinomyces spp*, *Lactobacillus spp* ve *S.mutans*

Young tooth decay;

- *S.mitis*, *S.pneumoniae*, *S.infantis*, *Corynebacterium matruchotii*, *S.gordonii*, *S.cristatus*, *Capnocytophaga gingivalis*, *Eubacterium spp*, *Campylobacter rectus*

“16s ribosomal is shown by RNA analyze”

Decay forming(karyogenic) bakteria

Studies on milk tooth;

- Person with no decay : *S.sanguinis*
- Person with decay : *Actinomyces spp, Lactobacillus spp, S.mutans, Veillonella spp, Bifidobacterium spp.*

Number of bacteria and variety increases due to decay progress

- - *Lactobacillus, Veillonella, Bifidobacterium, Propionibacterium, Actinomyces, Atopobium, S.mutans?*

Decay forming (karyogenic) bacteria

“Laktobasillerin ağız florasında rastlanma kronolojisi çürüğün takvimine uyar”

- 0-8 ages %35
- 8-20 ages %85-95
- Over 20 ages %50



Ecologic plaque hypothesis, more correct approach

Decay depth is not related with number of bacteria. Number of bacteria and variety increases due to proceeded bacteria

Inhibition of tooth decay

“Plaque and acid removal is possible with brushing teeth”

- ❑ Using antiseptic and local antibiotics is **INCORRECT**
- ❑ Using long lasting antiseptic, damage mouth flora, **NOT A GOOD IDEA**
- ❑ Antibiotic chewing gums, antiseptic gargaras, sprays **not good for tooth decay**
- ❑ Inhibiting tooth decay forming nutrition
- ❑ **Best method:** Balanced diet, removal of plaques and hygiene education

antiseptic gargara never be used more than 1 week

Tooth decay immunology

“Mouth hygiene prove that tooth decay is not a genetic disease”

- People with bad mouth hygiene have less tooth decay;
 - Due to IgA against cariogenic bacteria in saliva
 - Good Non-specific immunity
 - Anatomic malformations decreases saliva wash effectivity

Tooth decay is not genetic...