





SEMMELWEIS UNIVERSITY BUDAPEST

Department for Pedodontic Dentistry and Orthodontics

Prevention and dental hygiene methods in paediatric dentistry

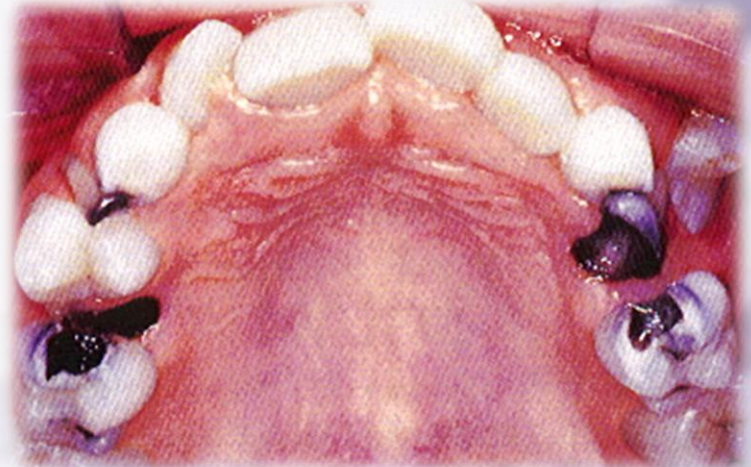


*Dr. Med.habil Rózsa Noémi
Katinka MSc, PhD
Dr. Simon István*

Healthy dentitions

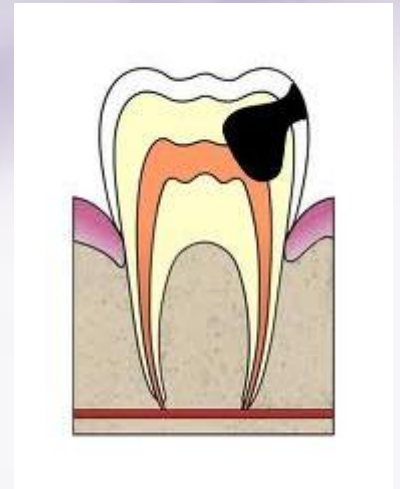


DENTAL CARIES

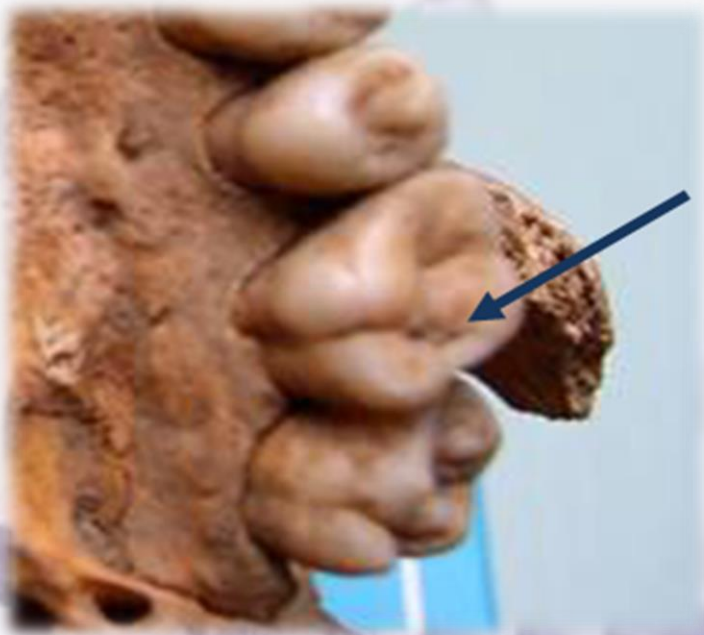


CARIES: COMPLEX, MULTIFACTORIAL INFECTIOUS DISEASE

Dental caries is a disease of the dental hard tissues, characterized by the decalcification of the inorganic portions of the tooth. Loss of the mineral content is then followed by breakdown of the organic portions of the tooth.

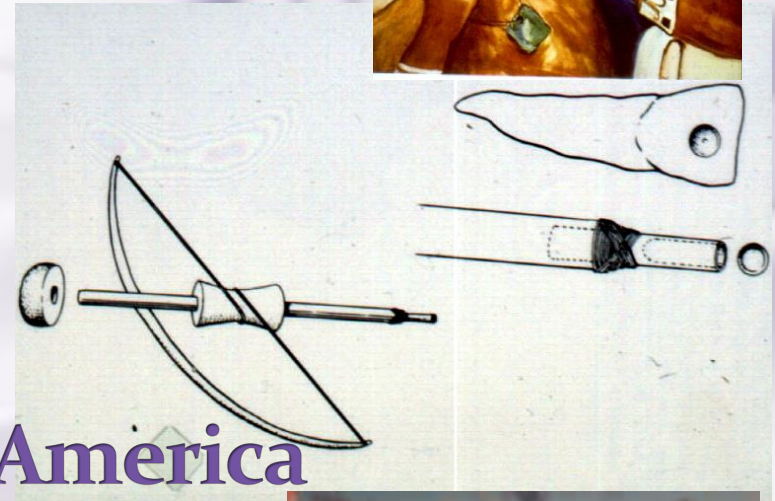
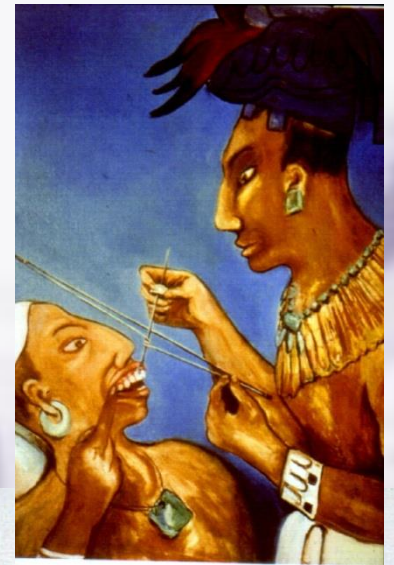


CARIES



Árpád era – 9-11th century, Hungary

CARIES AND THERAPY

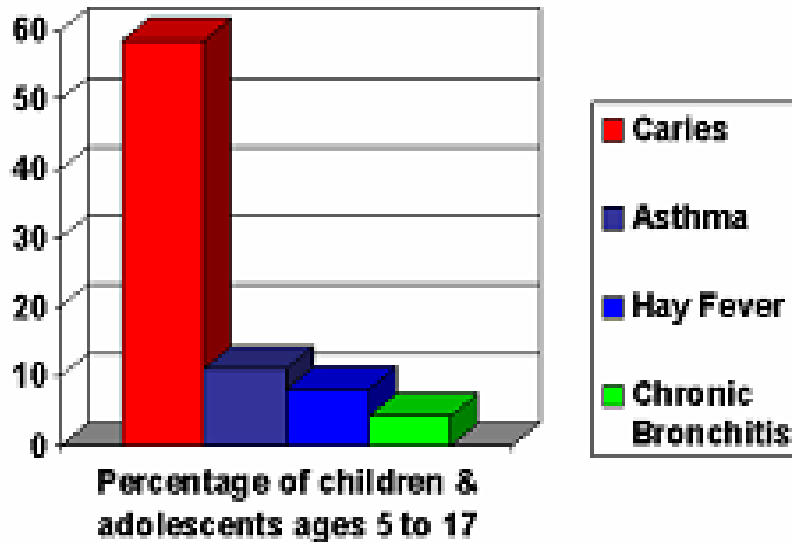


Mayan civilisation – Central America



CARIES

Dental Caries is one of the most common diseases among 5 – 17 year olds



Note: Data included decayed or filled primary and or decayed filled or missing permanent teeth. Asthma, chronic bronchitis and hay fever based upon household respondent about the sampled 5 – 17 year old Source NCHS 1996



Oral Health In America: A Report of the Surgeon General DHHS 2000



Early Childhood Caries

Caries circularis



Early Childhood Caries

Primary molars - approx. caries





EARLY CHILDHOOD CARIES (ECC)

- 1978 - NURSING BOTTLE CARIES
- Ripa, 1988 – NURSING CARIES
- ~ 1996 – EARLY CHILDHOOD CARIES



ECC = min. 1 carious (incipiens or cavitation) tooth surface, due to caries extracted primary tooth, or filled tooth surface on primary teeth until the age of 6 years.

S-ECC

- smooth surface caries sign in children 3 years of age or younger,
- 3-5 years: = min. 1 carious (incipiens or cavity) smooth surface, due to caries extracted primary tooth, or filled smooth surface caries on upper incisors, or $dmf-s \geq 4$ (3 years); ≥ 5 (4 years), and ≥ 6 (5 years old)



Permanent first molars !





EXTRACTION – FIRST PERM. MOLAR

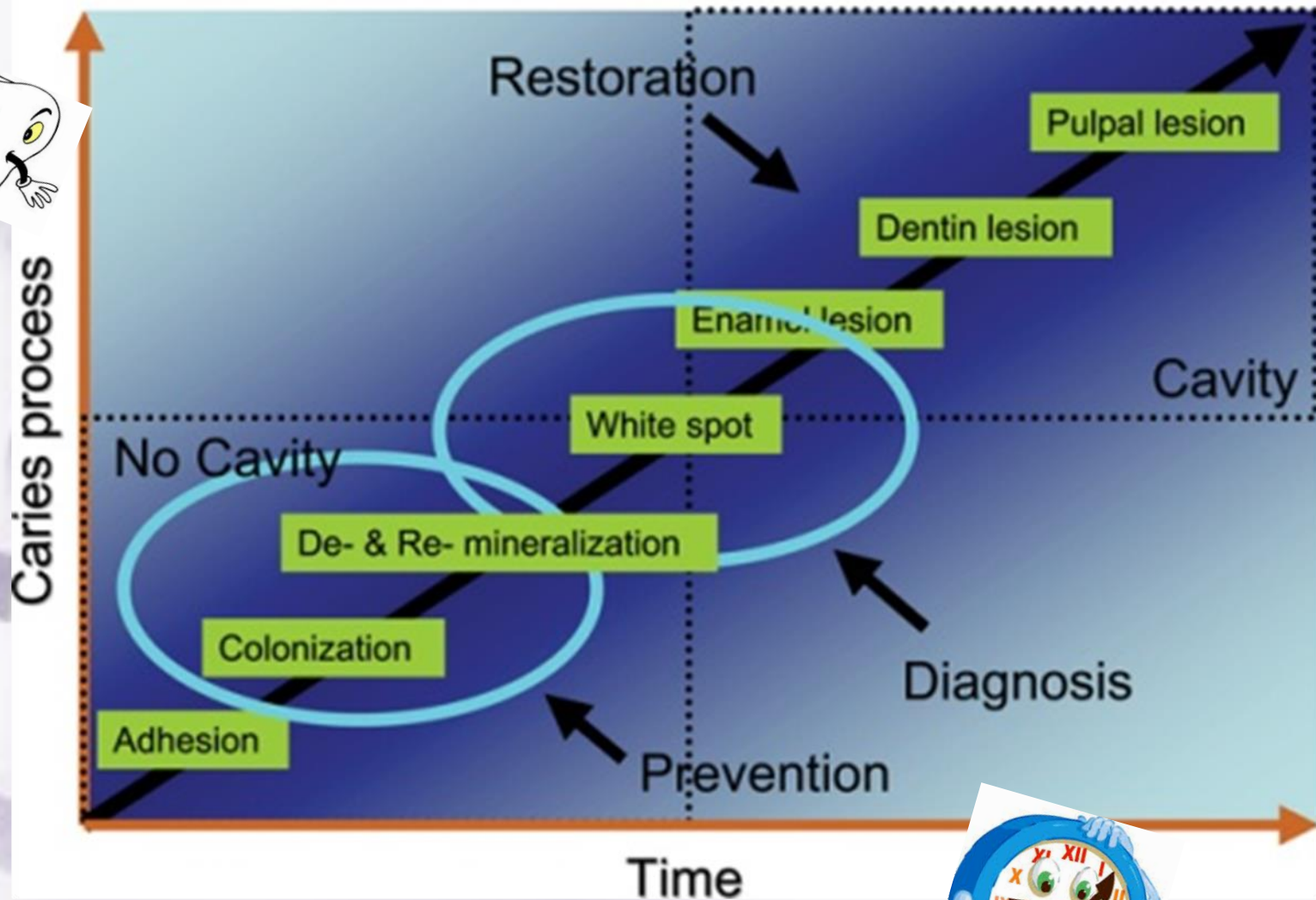


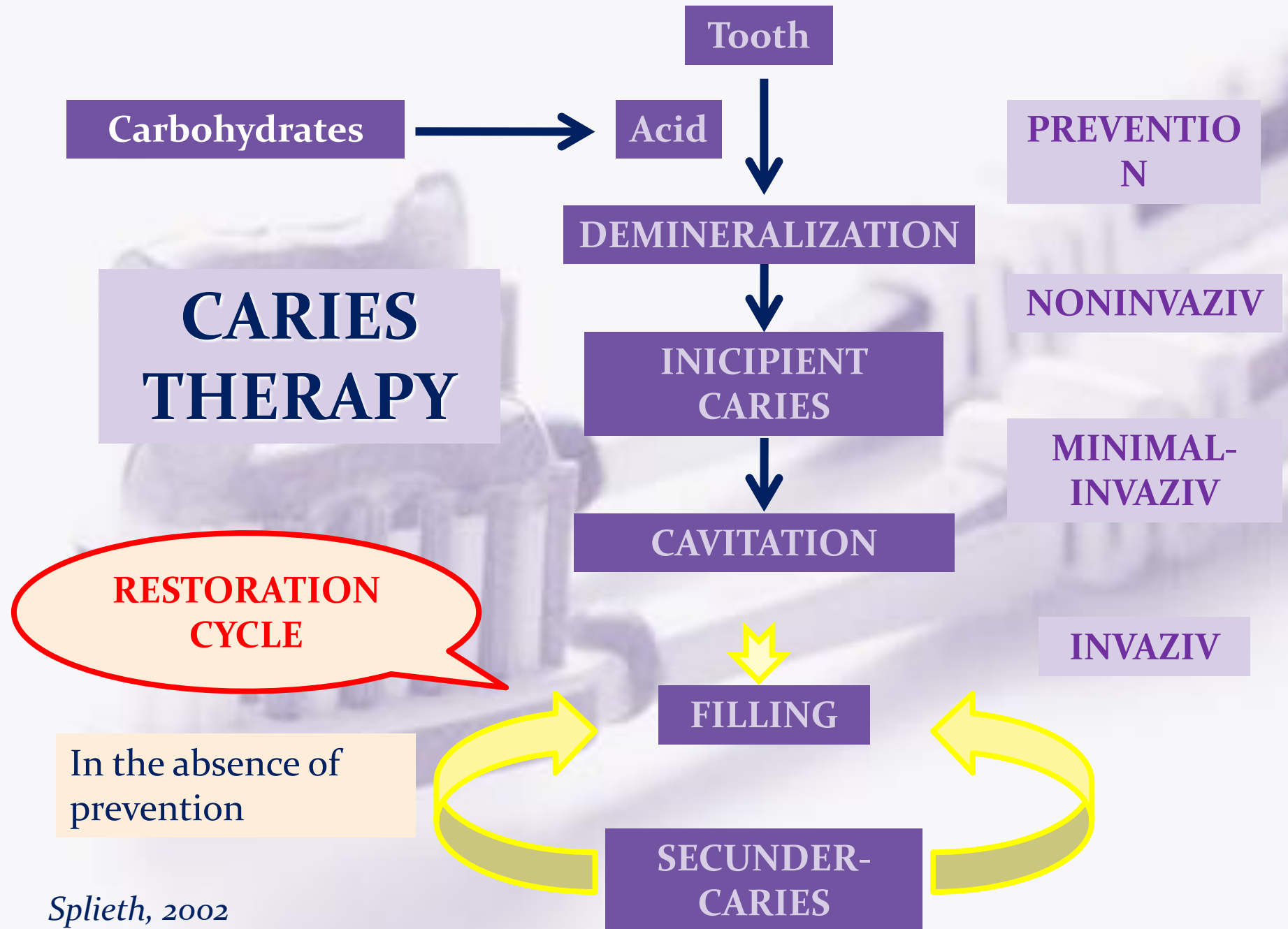
- **CONTRAINDICATION:**

- DEEPBITE;
- DISTALBITE;
- M₂ APLASIA



CARIES PROGRESS





DENTAL PREVENTION

➤ *Primary prevention:*

- ☐ Caries;
- ☐ Parodontopathy;
- ☐ Orthodontic anomalies;
- ☐ Oral malign alterations



➤ *Primer-primer prevention:*

- ☐ pregnant women and foetus,

➤ *Secondary prevention:*

- ☐ Early diagnosis: periodic check-up;
- ☐ (Early) treatment– orthodontics, precancerous lesions;

➤ *Tertiary prevention:*

- ☐ Therapy, rehabilitation;

➤ *Primordially prevention: „risk prevention”*

- ☐ prevention of the occurrence of risk factors;



PREVENTION - FACTORS



CARIES
ORTHOD. ANOMALIES
PARODONTOP. DISEASE



PROPHYLAXIS



• *DISPOSITION PROPHYLAXIS:*

*= MAXILLARY BONES AND
DENTITION;*

• *EXPOSITION PROPHYLAXIS:*

= CARIOGENIC ATTACK



Prevention, prophylaxis

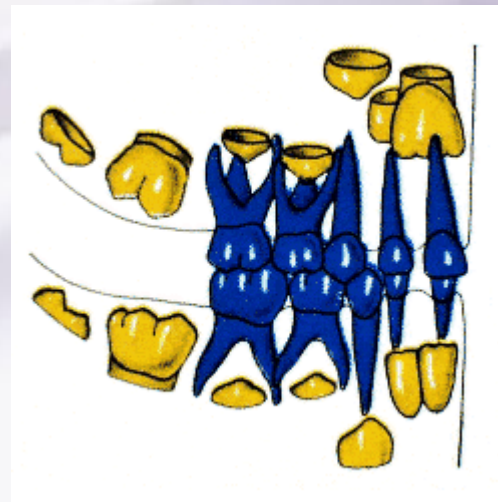
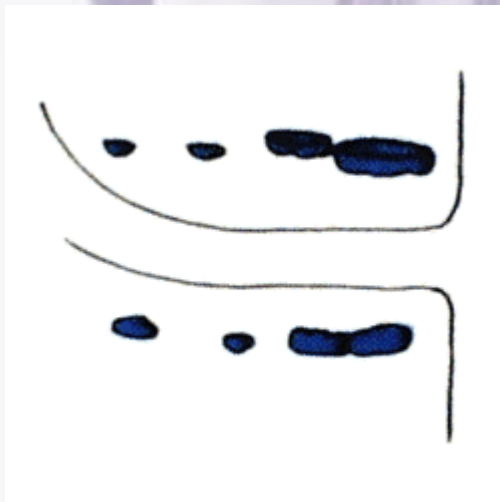


- Goal of modern dentistry is *to preserve healthy, natural tooth structure* .
- The loss of even a part of a human tooth should be considered as a „serious injury”

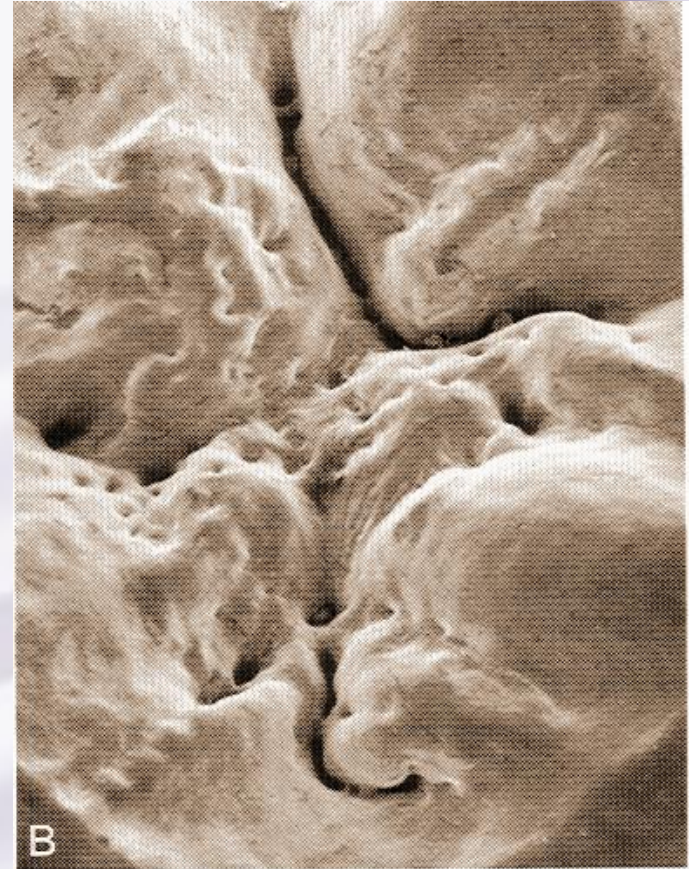
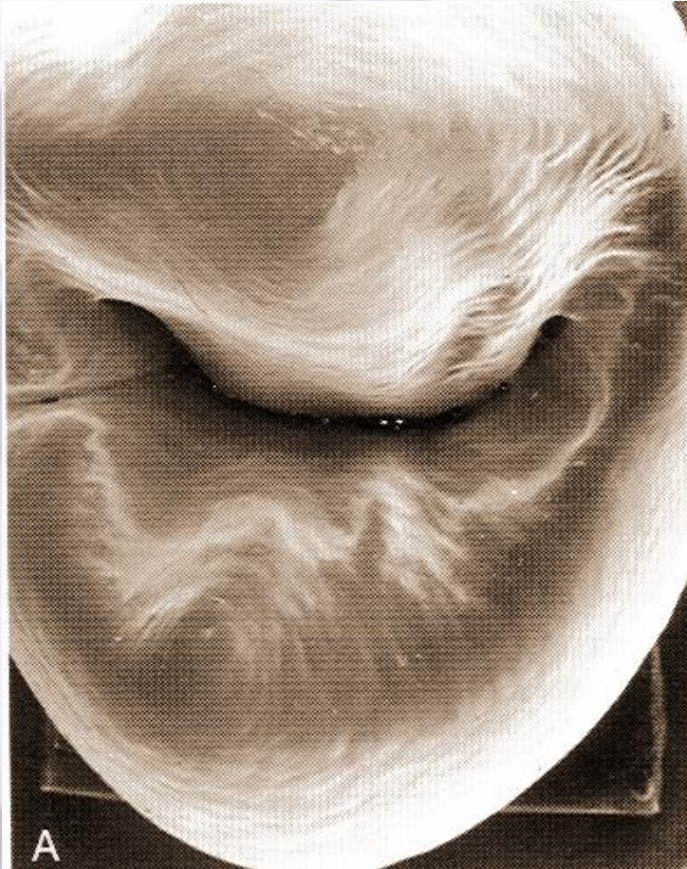
Miles Markley, 1951

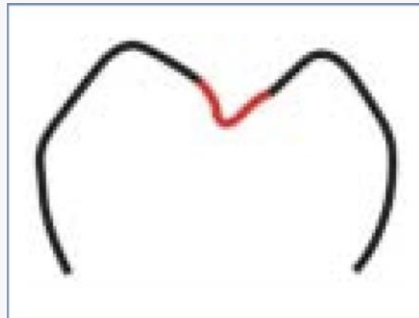
~ 6 years: M_1

- First permanent molars: at the end of the line;
- „Sechsjahrmolaren“;
- There are no changing of teeth, so it goes often unnoticed by the parents!

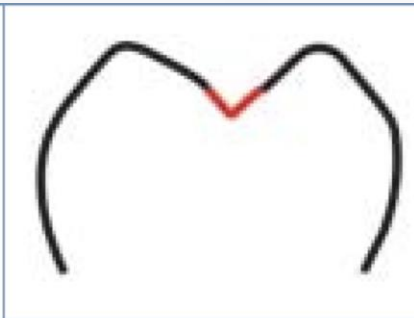


INTACT OCCLUSAL SURFACE - SEM

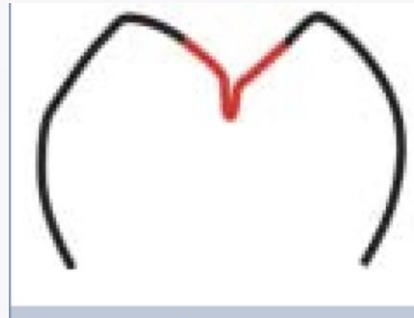




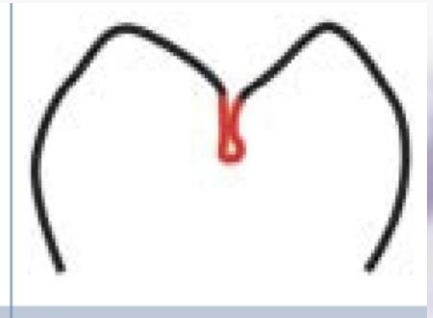
U type almost the same width from top to bottom



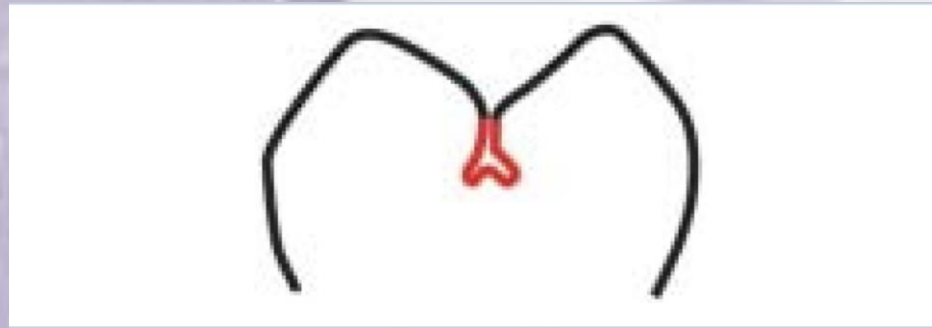
V type-wide at top & gradually narrowing towards the bottom



I type & extremely narrow slit

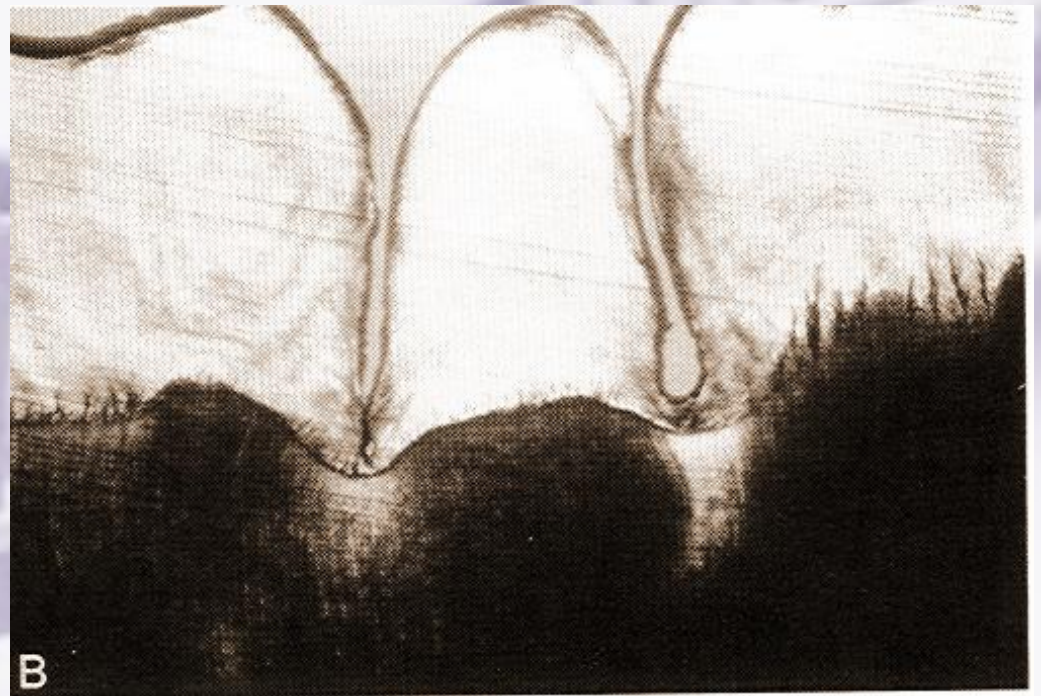


IK type, extremely narrow slit with a larger space at bottom



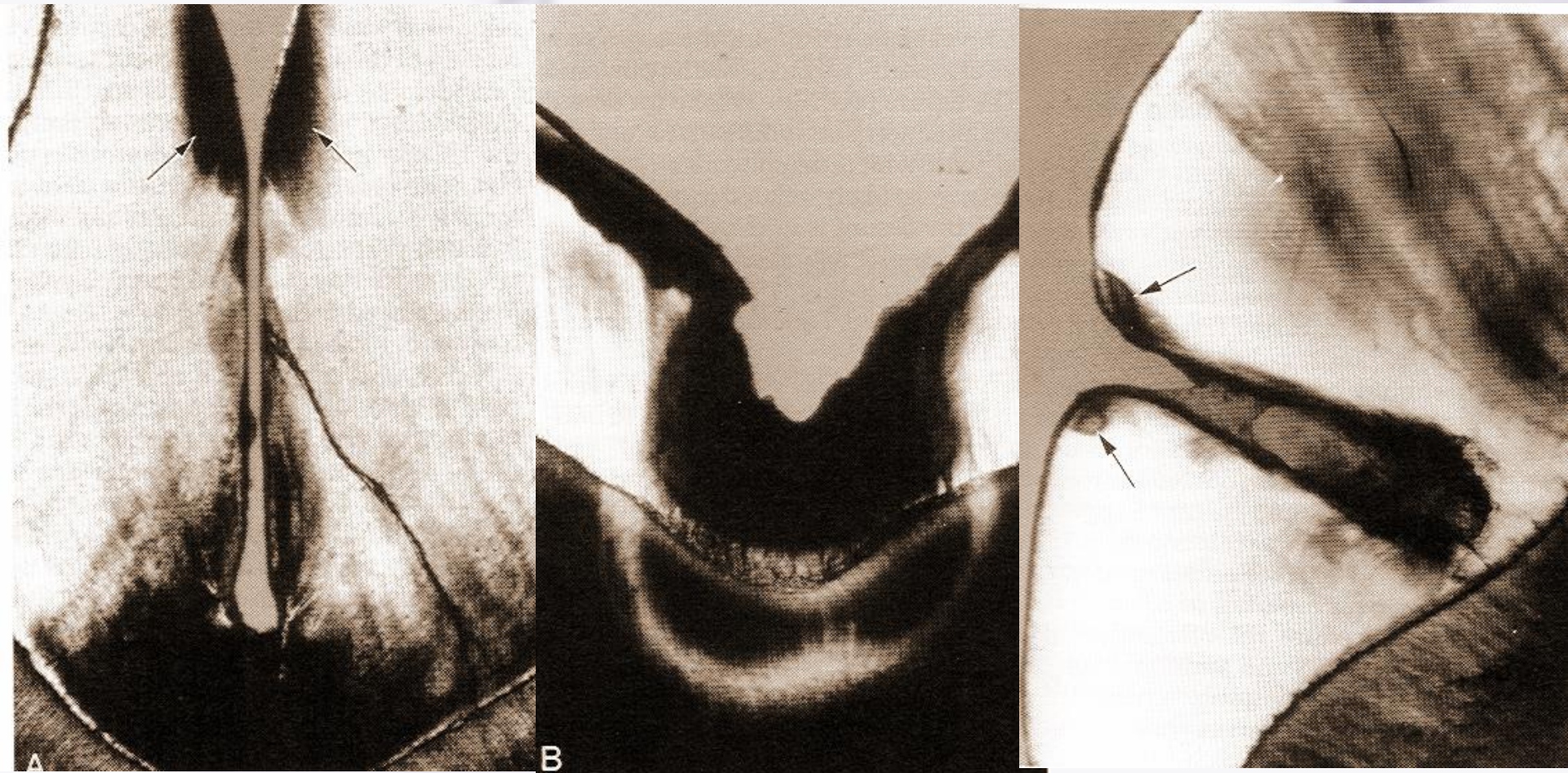
Inverted Y

FISSURE SYSTEM



From: J.R.Pinkham: *Paediatric Dentistry*.W.B.Saunders 1988, 381.

FISSURE CARIES



From: J.R.Pinkham: *Paediatric Dentistry*. W.B.Saunders 1988, 382-383.

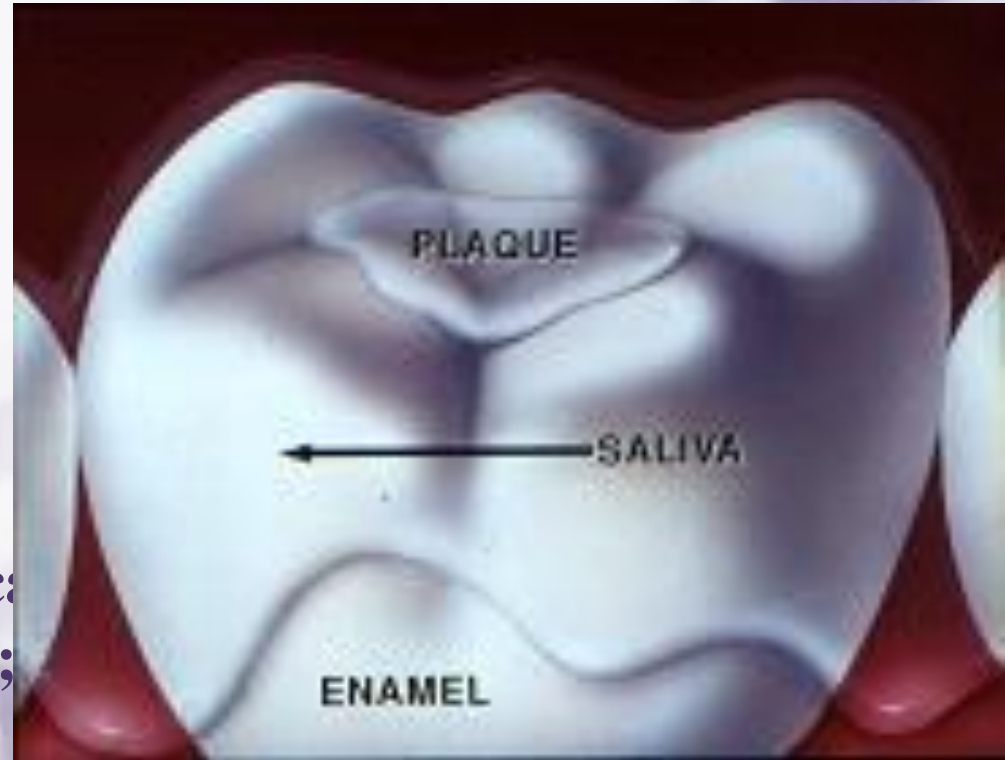
Occlusal surface caries

Risk factor

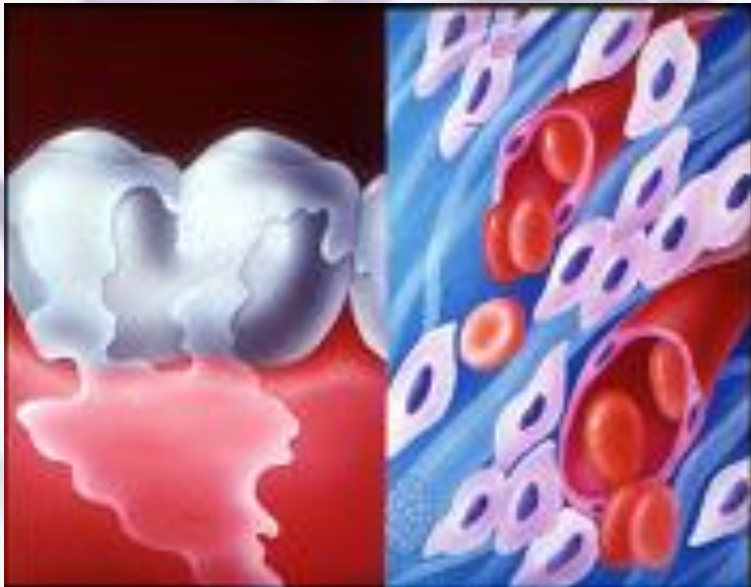
- no post eruptive enamel-maturation shortly after eruption;
- no effect of other prevention methods;
- more plaque formation;
- lower SM-nr. necessary for caries production: 10³ CFU/ml saliva;
- no buffer effect of saliva

CFU=colony formation unit

Anderson et al.

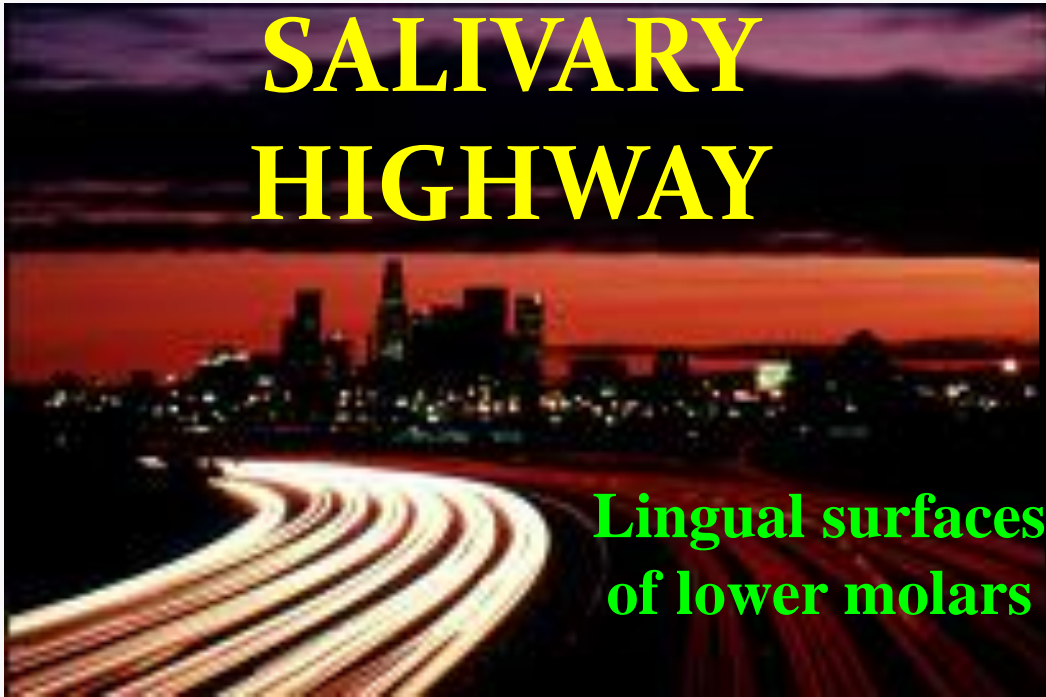


SALIVA - BLOOD



- Neutralizes organic acids
- Inhibits demineralization/
enhances remineralization
- Recycles ingested fluoride
to the mouth
- Discourages bacterial growth
- Proteins sustain enamel surface

SALIVARY HIGHWAY



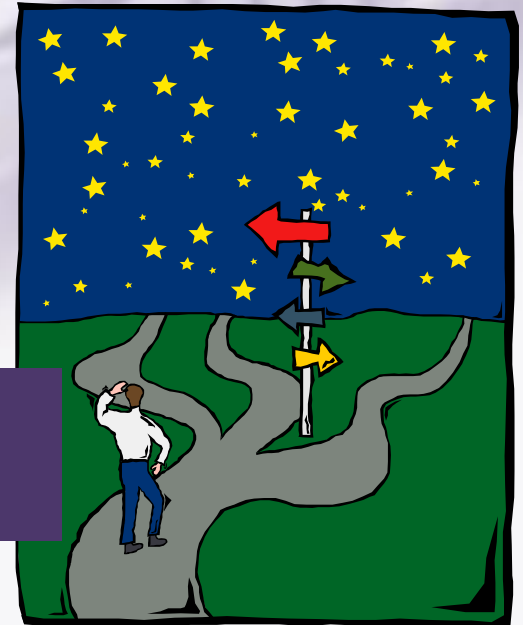
Lingual surfaces
of lower molars



SALIVARY BYWAY

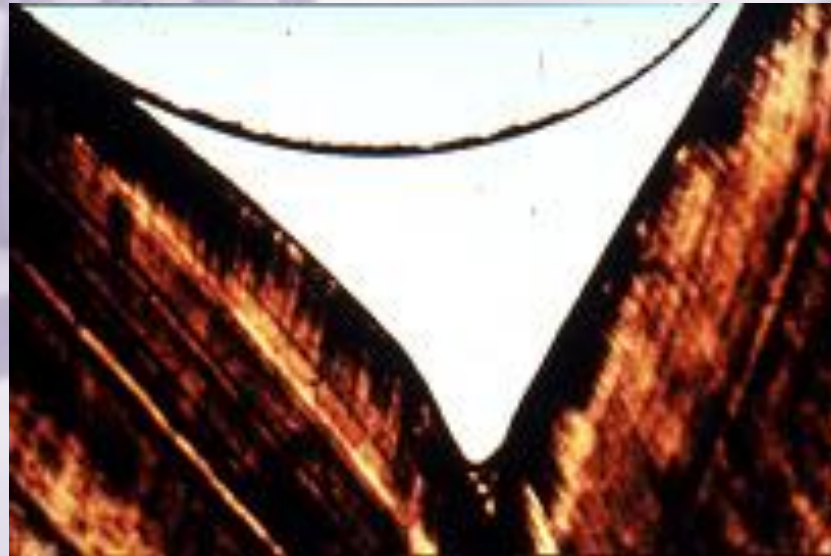


Occlusal and vestibular
surfaces of upper molars





The own surface tension of saliva does not permit the flux into the deep of the fissure



PIT AND FISSURE SEALING



British Society of Paediatric Dentistry:
a policy document on fissure sealants in
paediatric dentistry

Definition:

A fissure sealant is a material that is placed
in the pits and fissures of teeth in order to
prevent the development of dental caries.



From: International Journal of Paediatric Dentistry 2000; 10: 174-177

Pit and fissure sealing

Application methods

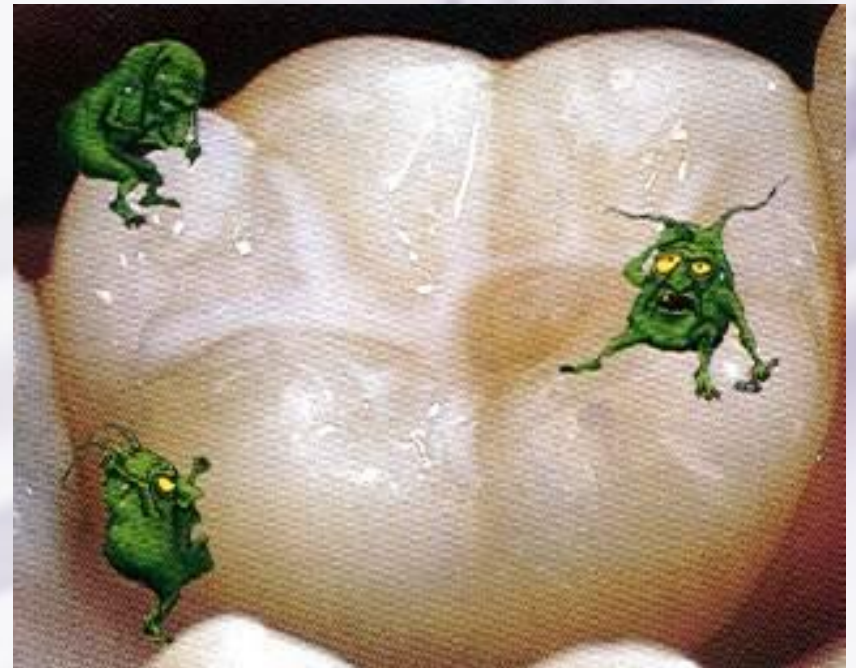
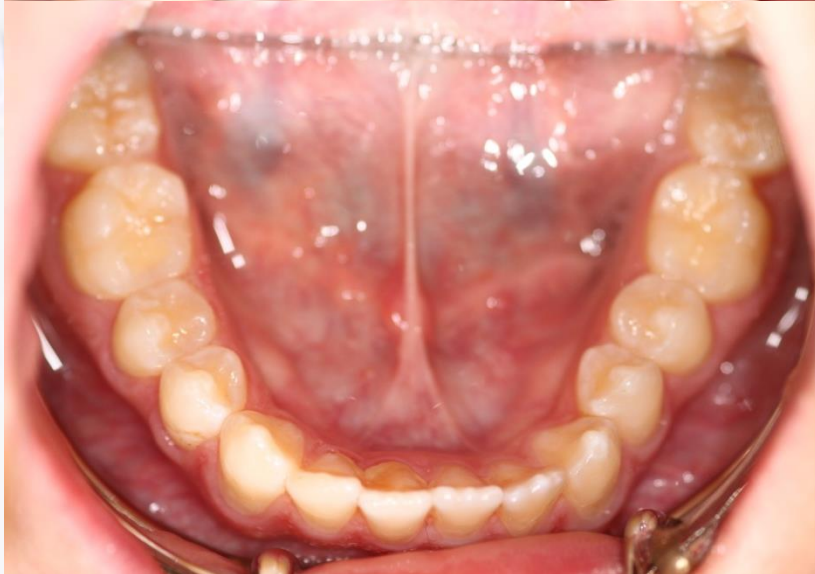
- **CONVENTIONAL PIT AND FISSURE SEALING**
- **„PREVENTIVE RESIN RESTORATION”**
- **„SEALED RESTORATION”**



Pit and fissure sealing are a component of early treatment and dental care



FISSURE SEALING



ECC

- Therapy = Prevention



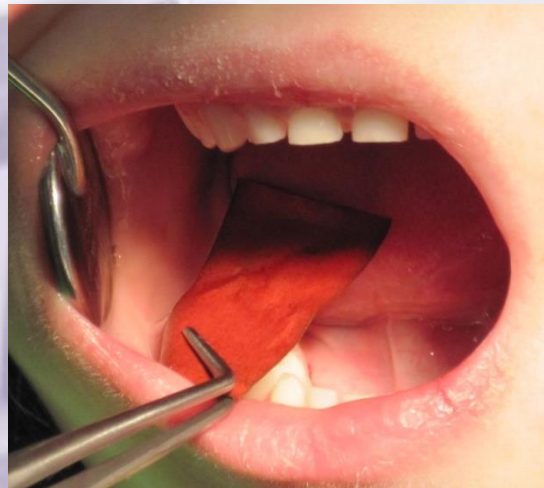
Glass Ionomer cement – GLC, Compomers, Composites

EARLY CHILDHOOD CARIES - ECC



8 years old♀
74, 75, 36 – caries

EARLY CHILDHOOD CARIES - ECC



6 years old, ♀
85- caries

EARLY CHILDHOOD CARIES - ECC



- 6 years old, ♀
- 84, 85 – caries

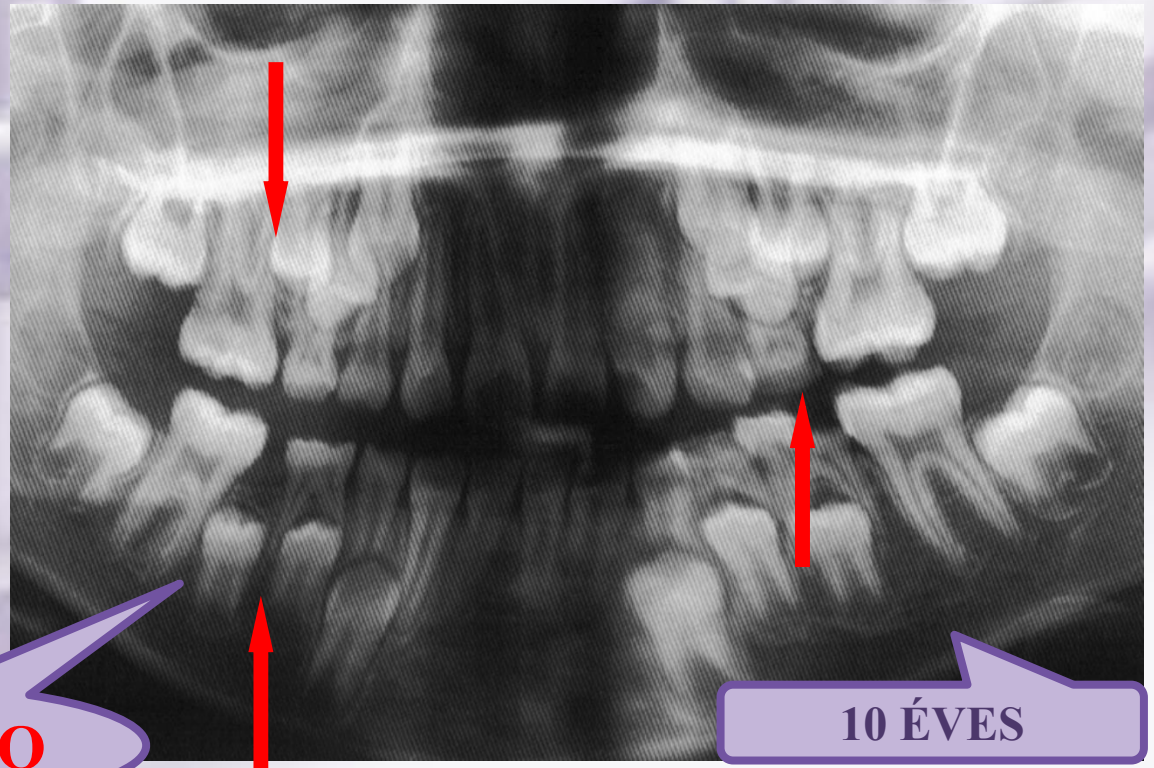


ECC - CONSEQUENCES



PREMATURE PRIMARY TEETH EXTRACTION:

1-1.5 years preceeding the eruption of the corresponding permanent tooth



IMPACTIO

10 ÉVES

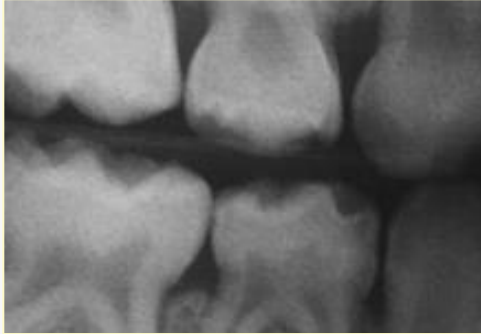
CARIES DIAGNOSIS, CARIESACTIVITY



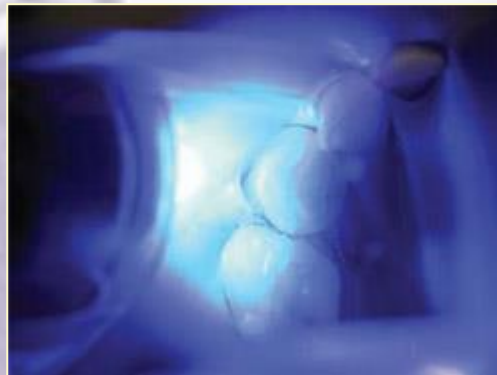
NON-INVASIVE ⇒ MINIMAL INVASIVE ⇒ INVASIVE



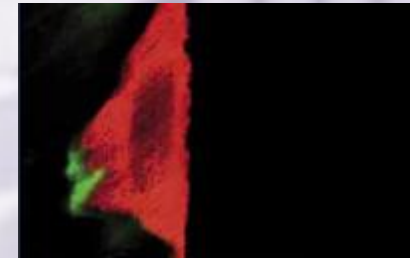
CARIESINFILTRATION - ICON® (DMG)



15% HCl



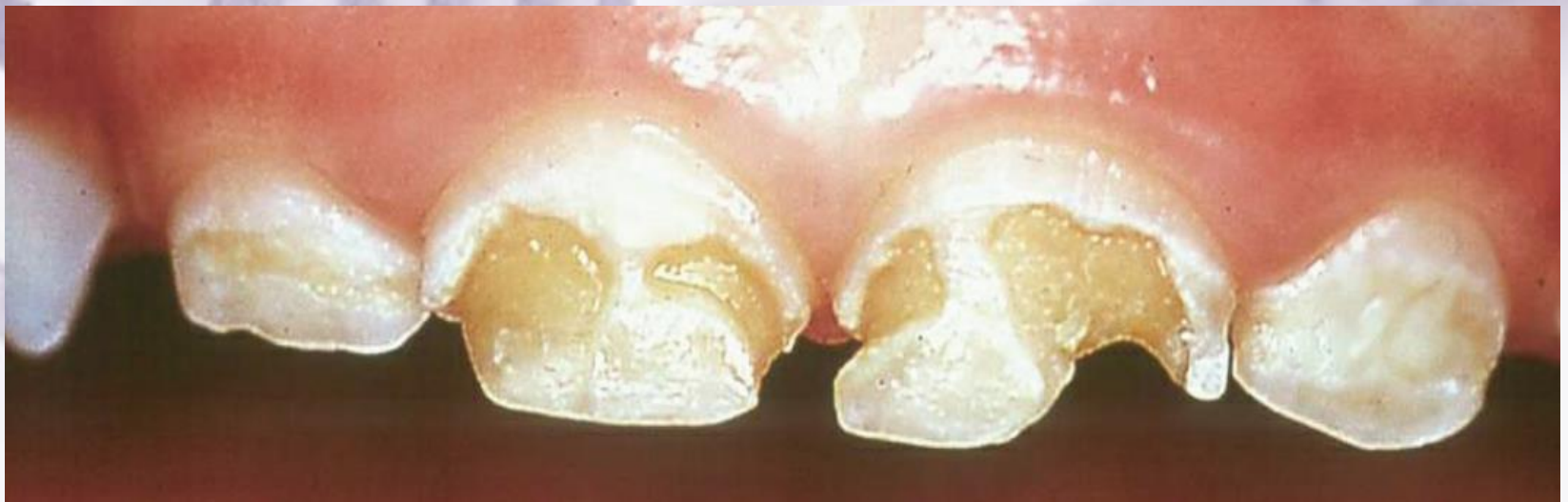
**PRIMARY
DENTITION**



*From: Paris S, Chadtzidakis AJ, Meyer-Lueckel H. Influence of application time on caries infiltration in primary teeth. *Int J Paediatr Dent* 2009; 19 Suppl. 1 S. 9.*

*From: Berg JH, Dunn J. Infiltration of Fluid Resin without Cutting into Primary and Permanent Teeth in Children. *Inside Dentistry* 2009; 5(8).*

CARIES CIRCULARIS - ECC





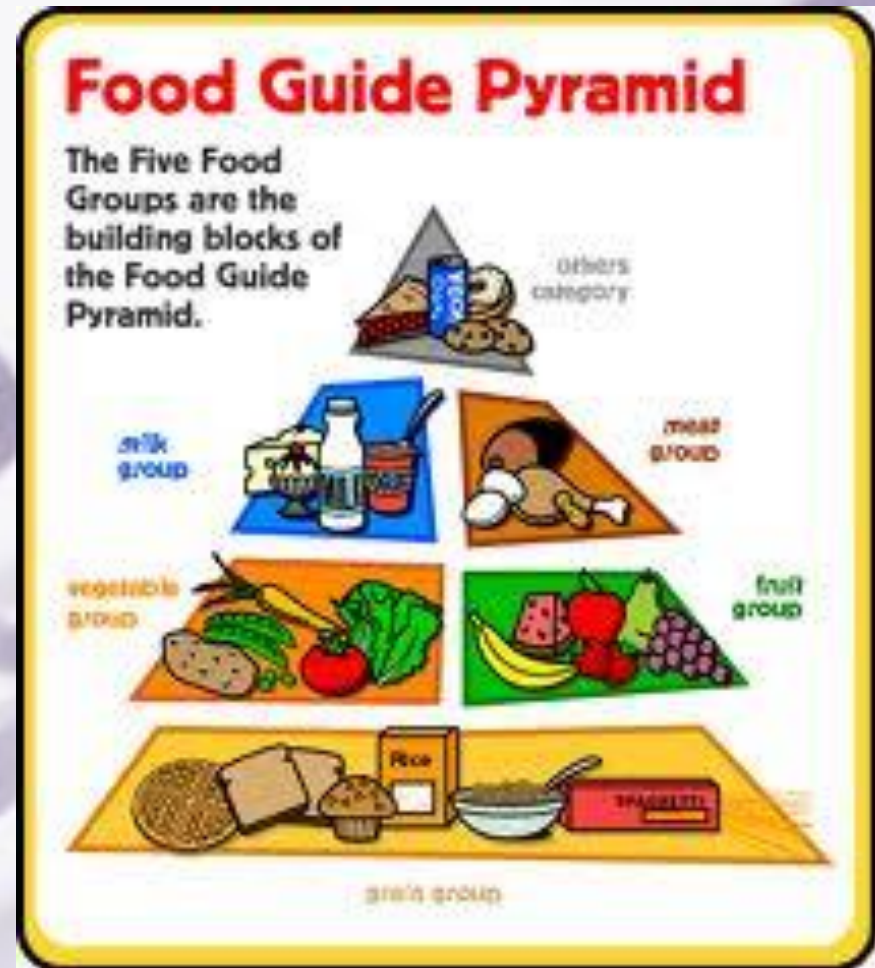
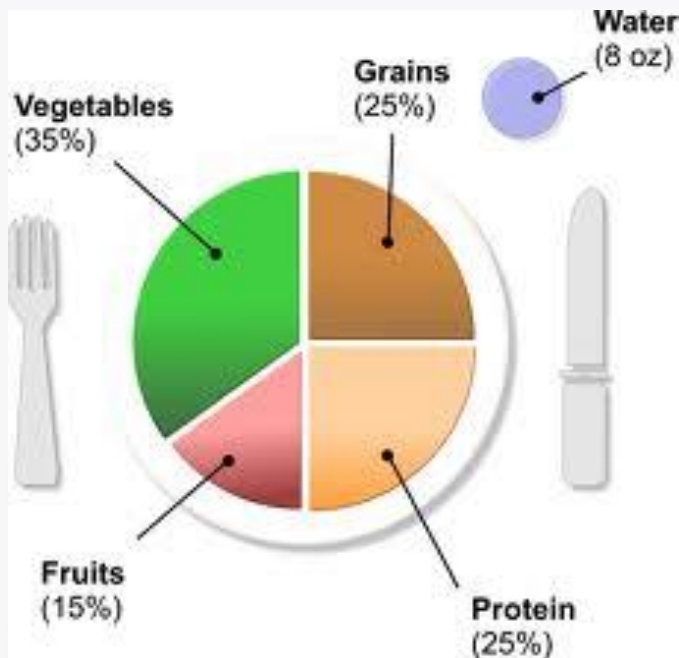
All beverages containing sugar, natural or artificially added \Rightarrow CARIES



**DRINK
WATER!**
After the age
of 1 year



HEALTHY NUTRITION



HEALTHY NUTRITION



POSTRESORPTIV:

- *manifest after tooth eruption – influences the tooth structure development;*
- *proteins, vitamins (A, B, C, D), minerals (Ca, P, Mg), elements (F, Mo, V);*
- *quantity and proportions*

DISPOZITIONAL PROPHYLAXIS



PRERESORPTIV: EXPOZITIONAL PROPHYLAXIS

- *local effect: quantity, quality, how often.*

REFINED CARBOHYDRATES



SUGAR



REFINED CARBOHYDRATES

- Sugar is the most fabricated chemical in the world: more than 10 M tonnes/year.
- Hungary: 1419; first inscriptions about sugar during King Sigismund.
- 1476:, the wedding of King Mathias and Queen Beatrix: „ *the rabble was of golden sugar, ornamented with angels and little animals, and a garden of trees and flowers with singing little birds made of sugar...* ”



REFINED CARBOHYDRATES



SUGAR SUBSTITUENTS



EU APPROBATION:

• *MANNIT* *E 421*

D-MANNIT *E 421*

• *SORBIT* *E 420*

SORBIT sirup *E 420 ii*

• *IZOMALT* *E 953*

• *XYLIT* *E 967*



• *LAKTIT* *E 966*

• *MALTIT* *E 965*

MALTIT sirup *E 965 ii*

• *ERITRIT* *E 968*

DISPOZITIONAL PROPHYLAXIS



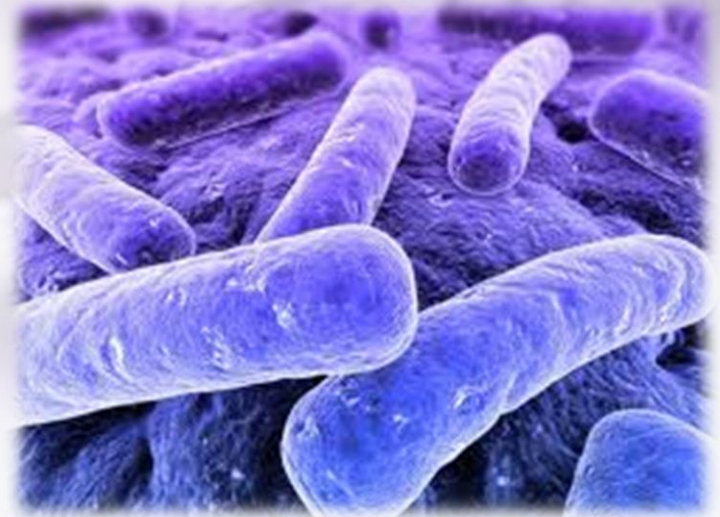
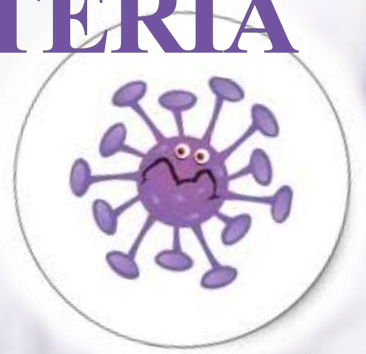
SWEETENER

*EUAPPROBATION, E-NR AND sweetening effect
(sacharose = 1):*



Nr	NAME	E	SWEETENING
1.	ACESULFAM	E950	130-200x
2.	ASPARTAM	E951	200x
3.	CYKLAMAT	E952	30-50x
4.	SACHARIN	E954	300-500x
5.	SUKRALOZE	E955	600x
6.	TAUMATIN	E957	2000-3000x
7.	NEOHESPERIDIN	E959	400-600x
8.	STEVIA		40-300x

MICROFLORA - BACTERIA



DENTAL PLAQUE

Biofilm



„bacterial society“



Dental plaque



❑ **Plaque:** the film of bacteria which is constantly forming on the surface, and between teeth. If left in place, it causes tooth decay and gum disease. When plaque has been present for several days it can combine with calcium from saliva, to form **tartar (calculus)** a hard deposit, which typically forms behind the lower teeth. Tartar can also be hidden deep below the gum.

CARIOGENIC MICROORGANISMS

- ACIDOGENIC: acid secretion
- ACIDURIC: acid resistant



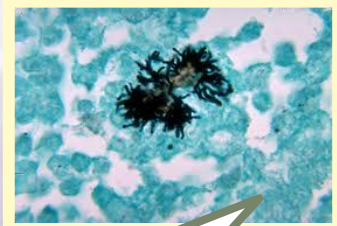
S. mutans



Lactobacillus



A. israeli



A. naeslundii



- **S. mutans**, *S. sobrinus*
- *Lactobacillus*, *Actinomyces*
- *S. mitis*, *S. oralis*, *S. gordonii*,
S. anginosus

Garcia-Godoy & Hicks, 2008

S. anginosus

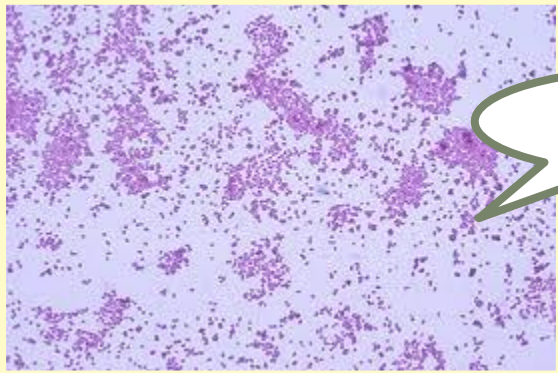
The early *S. mutans* colonization is the major aetiological risk factor for ECC

S. mitis

S. gordonii

PROTECTIVE, „TOOTHFRIENDLY” MICROORGANISMS

□ Veillonella



Veillonella

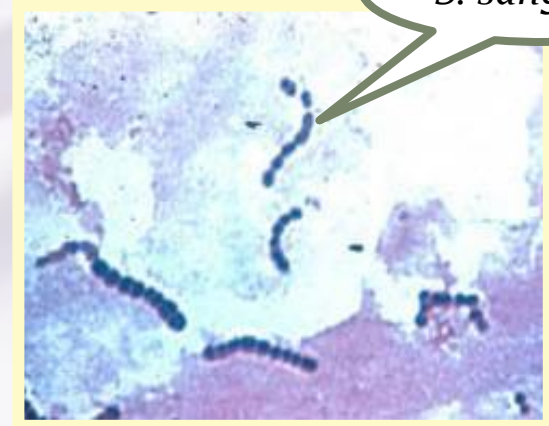
•⇒ biofilm: ↑pH

□ *S. salivarius*, *S. sanguinis*

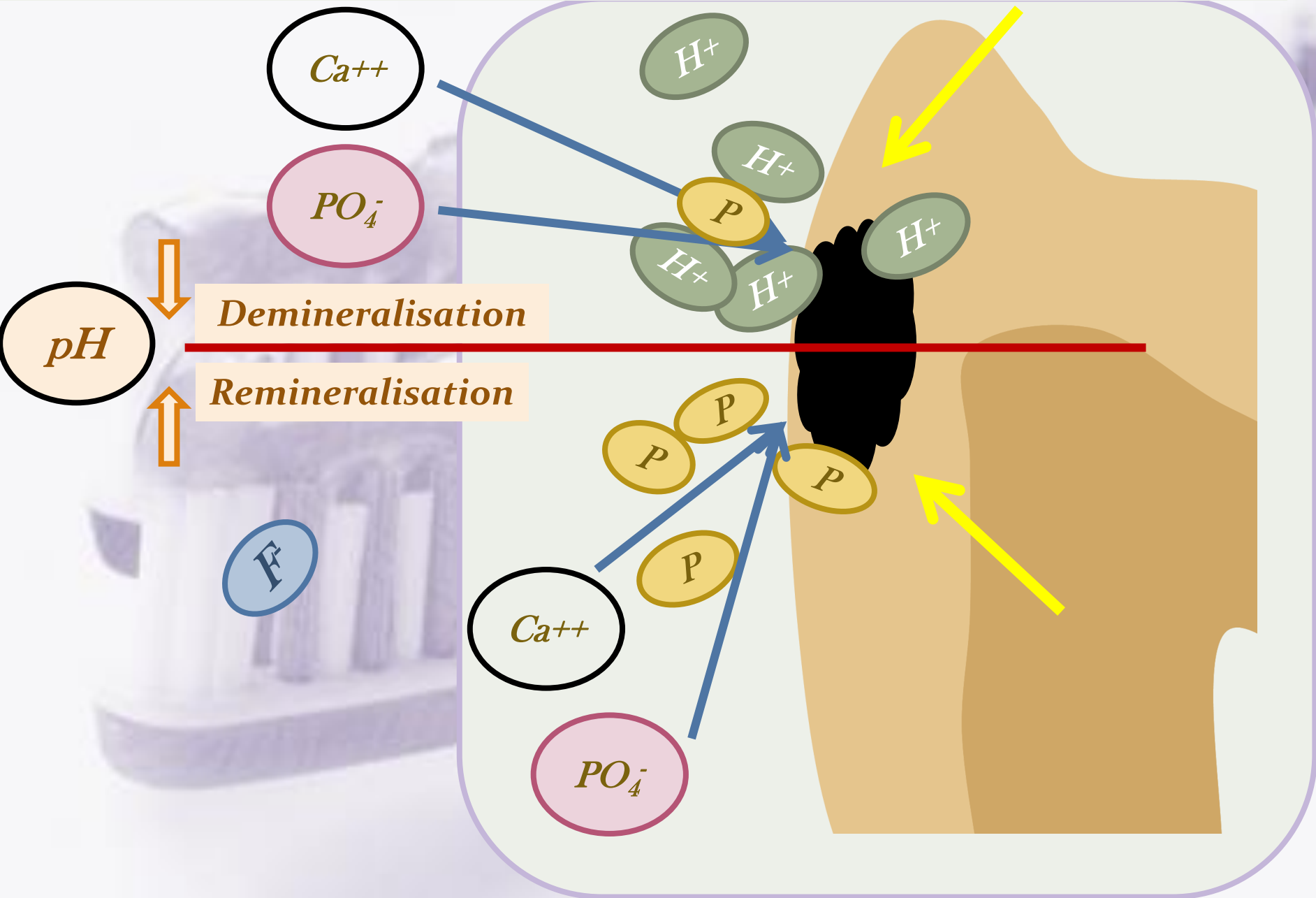
S. salivarius



S. sanguinis



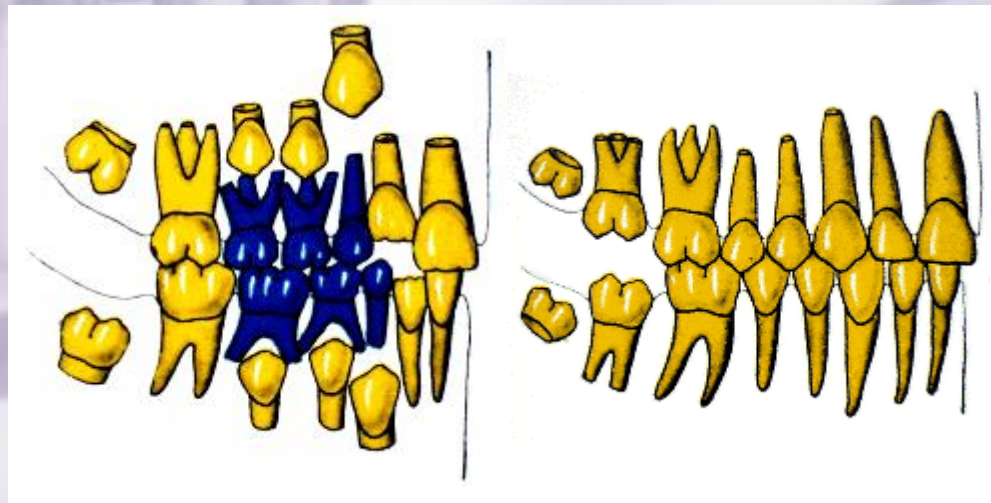
DEMINERALISATION - REMINERALISATION



TIME



ERUPTION – DENTAL DEVELOPMENT



BIOFILM MODULATION

Biofilm and saliva



- Amorphous calciumphosphate (ACP) combinations:
 - casein-phosphopeptide (CPP);
 - Znfluoride (SnF);
- Hydroxiapatite; nano-hydroxiapatite (n-HAp)
- Fluorid combinations;
- Xylit;
- Calcium-sodium-phosphosilicate (NovaMin[®]);
- Tricalcium-phosphate (TCP);



BIOFILM MODULATION



Biofilm and saliva

- Amorph calciumphosphate (ACP)
 - ✓ chewing gum, gel
 - ✓ caseinphosphopeptid (CCP) – milkprotein, which stabilizes in the ACP solutions the Ca and P ions:
 - 25 Ca^{+2} □ 15 P □ 5 F^-
 - ✓ CPP+ACP complex, which, due to biofilm activity, will adhere as nanoparticles on the enamel surface, and in case of acid secretion, it will release the necessary amount of Ca, P and F
 - ✓ glassionomer fillingmaterials (GIC)
 - ✓ **CAVE!** Milkprotein-allergy!



BIOFILM MODULATION

Remineralization products:

CPP-ACP: Recaldent®

GC Tooth Mousse (Plus)

INDICATION

- During orthodontic treatment
 - After bleaching
 - After professional tooth cleaning
 - Hypersensitivity treatment and prevention
 - **Treatment of localized enamel hypoplasia**
- Xerostomia
 - Chemotherapy
 - *When consuming larger quantities of acid beverage*

- From 6 years of age, for professional and home use, after tooth brushing, apply with fingers
- Min. 3 minutes to keep in the mouth, and spit after without rinsing
- Do not eat for 30 minutes following application!

✓ **CAVE!** Milkprotein-allergy! (IgE casein)



BIOFILM MODULATION

Remineralization products:

Remin Pro® (VOCO)

INDICATION



Combination:

- ☐ Hydroxiapatit
- ☐ Fluoride: 1450 ppm
- ☐ Xylit
- During orthodontic treatment
- After bleaching
- After professional tooth cleaning
- Hypersensitivity treatment and prevention
- **Treatment of localized enamel hypoplasia**

- From 6 years of age, for professional use
- From 12 years of age, also home use, after tooth brushing
- Min. 3 minutes to keep in the mouth, and spit after without rinsing
- Do not eat for 30 minutes following application!

✓ **CAVE! Allergia!**

■ Parabén, Fluor



BIOFILM MODULATION



Remineralization products: Enamelon® (Premier) INDICATION

COMBINATIONS:

- ☐ ACP - Znfluoride
 - ☐ Fluoride: 970 ppm
 - ☐ Ultramulsion® - coat → long-lasting effect
 - ☐ Medicinal plant: Spilanthes – saliva stimulation
 - ☐ Menthol;
 - ☐ RDA 8
 - ☐ Gluten-, colorant- and SLS-free
- With toothpaste
 - Enamelon® toothpaste:
 - 0,45% Znfluoride (1150 ppm)
 - RDA 39

SLS – sodium-lauril-sulphit: detergent

➤ Home and professional use with no age-limitation

✓ **CAVE! EU – still not available !**



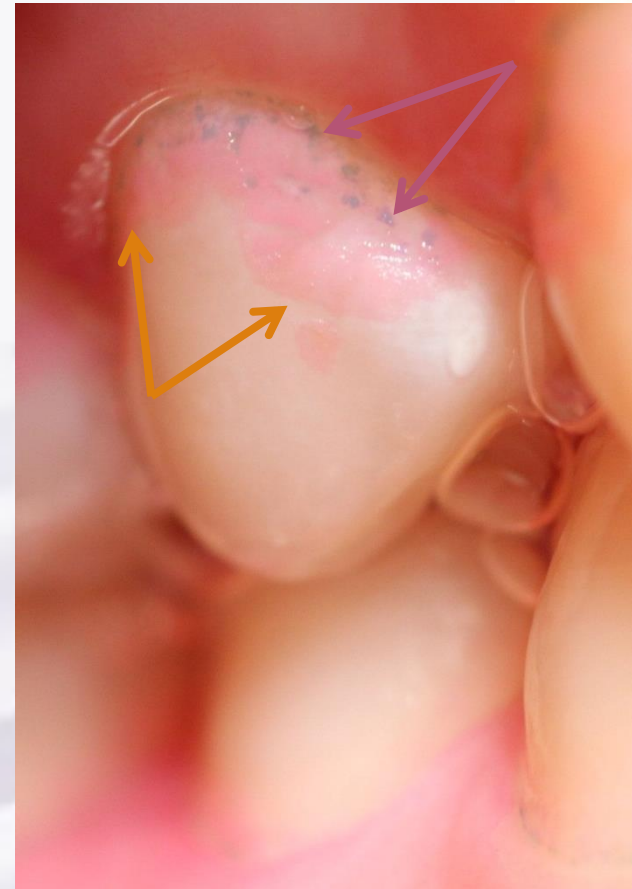
Spilanthes acmella oleracea

„The toothache plant”

- Medicinal plant;
- Saliva stimulation;
- Taste: ginger, Echinacea;
- Leafs, flower leafs;



Oral Hygiene



- Risk group determination
- Plaque pH
- Amount and localization
- How old it is...







GC Tri Plaque ID Gel



- 48h old
- dark blue,



- acid plaque,
- ↑caries risk
- light blue

- new plaque,
- pink

- For professional use only!
- no swallowing!
- carefully washing away with constant aspiration of the fluids!
- color code – plaque pH
- deep cleaning
- **CAVE!** Allergy!

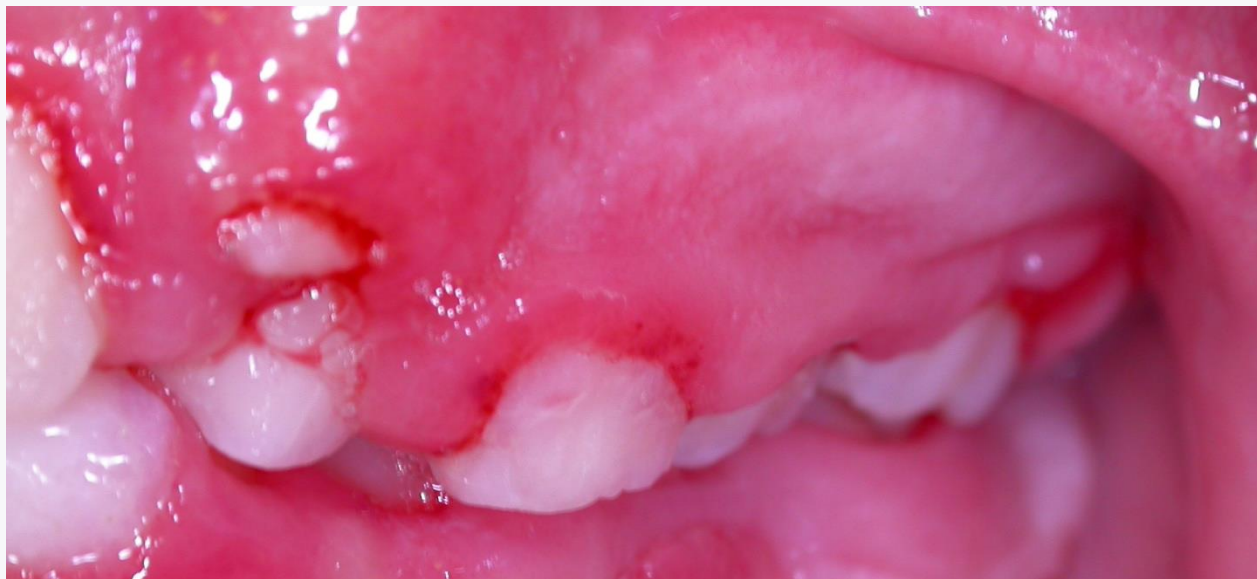








10 years ♀





Dental
Hygienist

DENTAL HYGIENIST

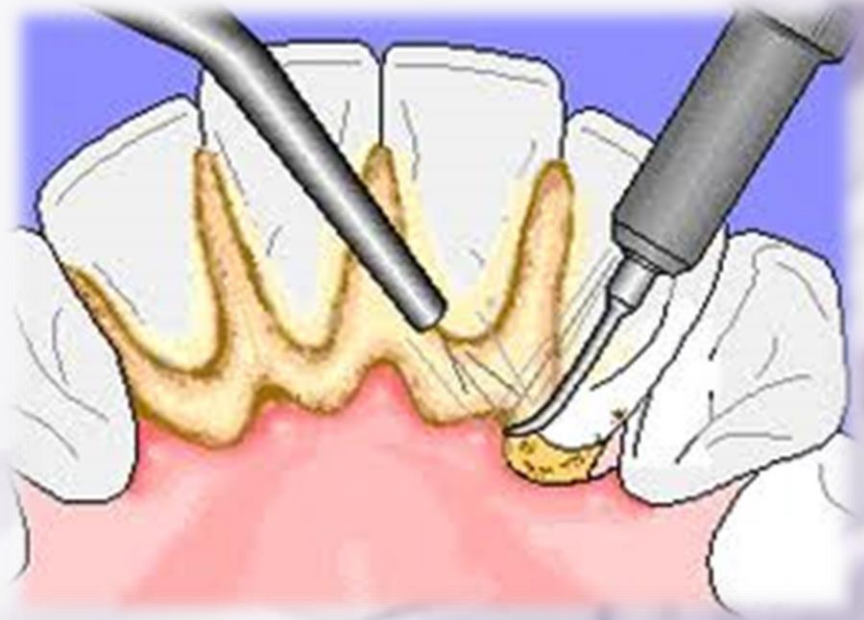


What can a hygienist do for children and adolescents?

As well as polishing children's teeth and applying fluoride gels, hygienists can put 'fissure sealants' in children's back teeth.

Children will also benefit from an education session with the hygienist who will teach them about the effects of eating sugar or consuming fizzy drinks and teach a routine for proper mouth care at home.

DENTAL HYGIENIST



DISCOLORATION



Extrinsic discolourations

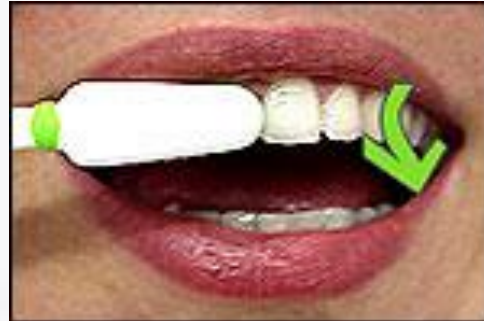
□ Non metallic stains :

- ✓ Gram-positive bacteria- *Bacteroides Melaninogenicus*
- Black stain in a line in parallel with the gingiva
- Hydrogen sulphide → Iron sulphide (black)





TOOTHBRUSHING TECHNIQUES



- Technique;
- Type and amount of toothpaste;
- Parental control;
- Motivation;
- Periodic dental check-up.



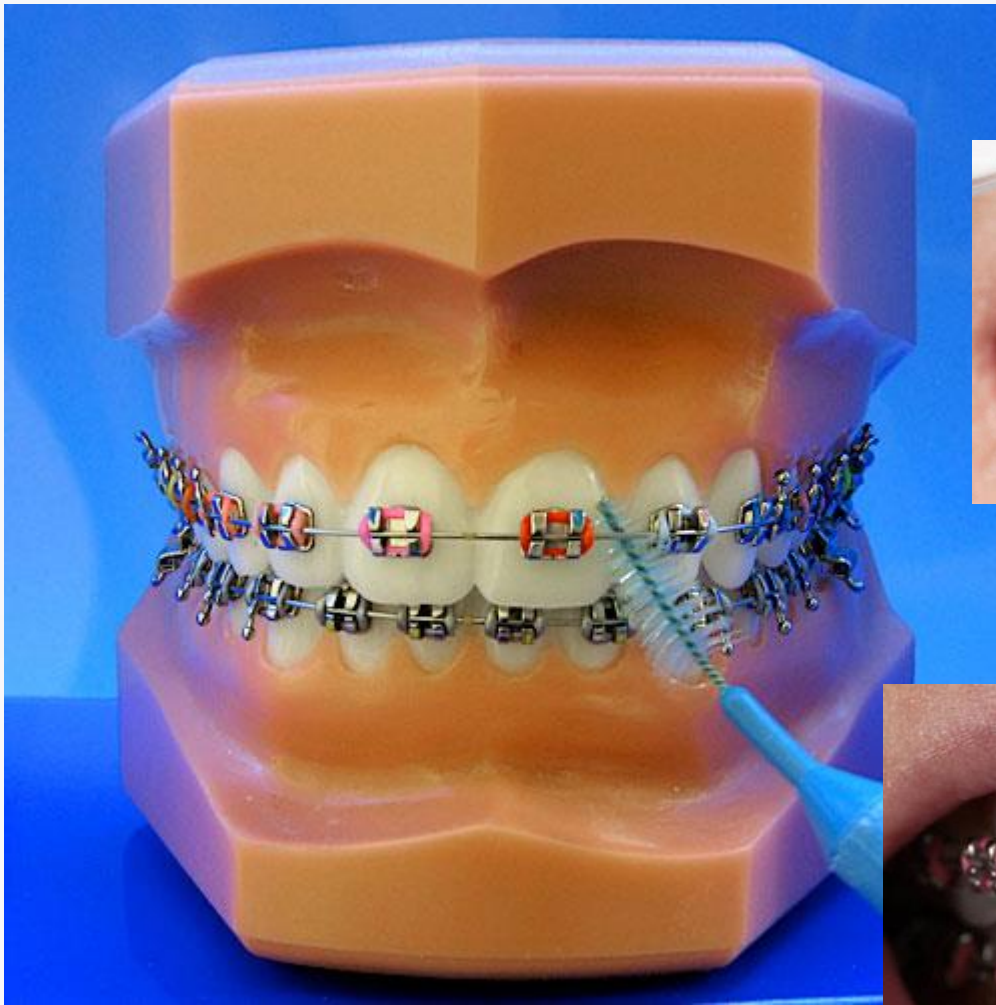


PARENTAL DUTIES



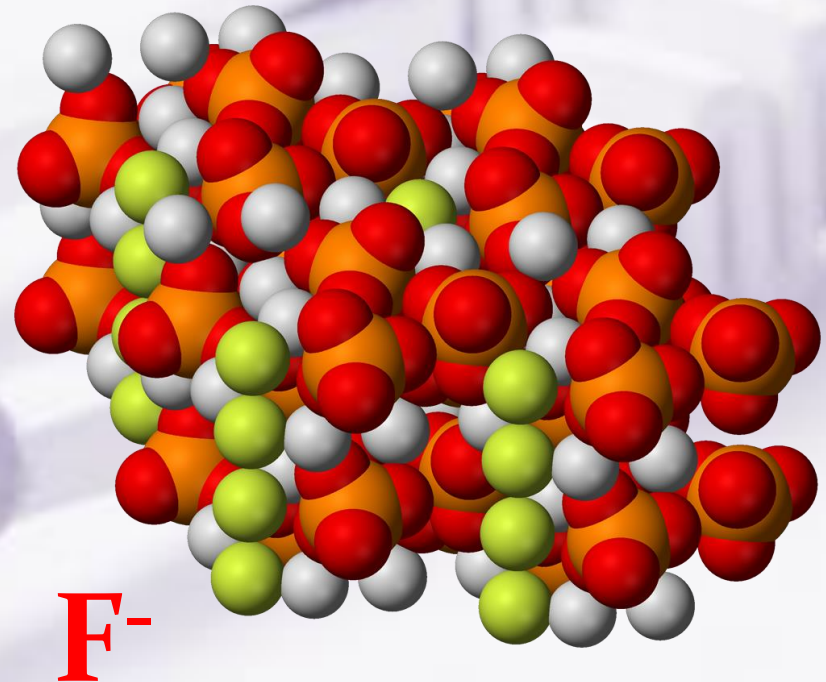
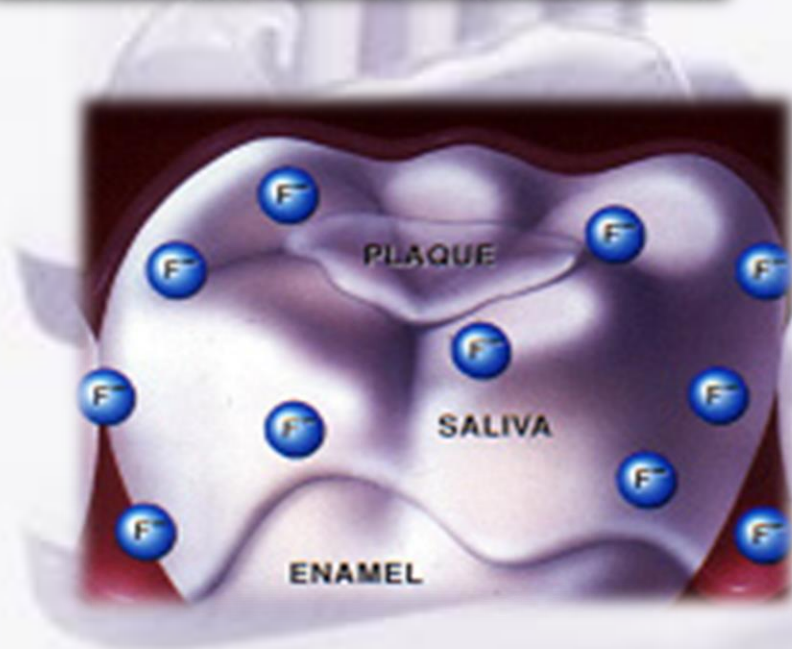
EXPOZITIONAL PROPHYLAXIS





FLUORIDE APPLICATION

• *FLUORAPATITE*



F⁻

HYDROXIAPATITE → FLUORAPATITE



FLUORIDE in the environment

- *Bread;*



- *Fish;*



- *Tea.*



SYSTEMIC FLUORIDE PREVENTION

- *Water fluoridation: 1 mg/l, 1 ppm/l;*

- *Tablesalt:*

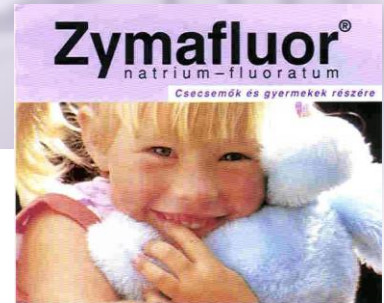
 - 250 mg/kg,

 - Szeged, Hungary,

 - Kanton Waadt, Switzerland;

- *Milk;*

- *Fluoride tablets: from the age of 2. to 10. years,*
 - *Dentocar (Hungary), Zymafluor etc.*



LOCAL FLUORIDE APPLICATION

- *Dentifrice*
- *Fluoride gel, varnish*
- *Dental materials: fissure sealants, filling materials*



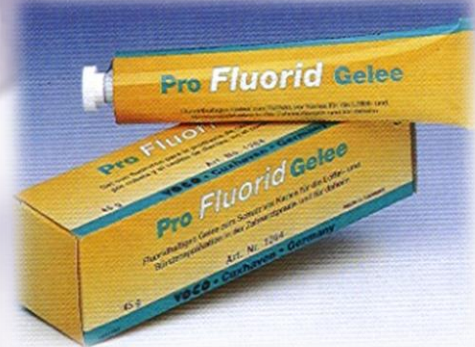
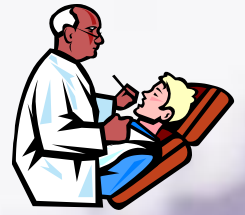
DENTIFRICE



- 1000 ppm fluoride – 1mg/1cm Dentifrice;
- 3 to 24 or 48 month: fluoride-free!!!
- 2 to 6 years: 500 ppm Fluoride;
- 6 to 14 years: „junior” -1250 to 1450 ppm fluoride;
- 15 and up: „adult” – 1500 ppm fluoride;
- „professional”: only applied by dental professionals, not available for the public – 3000 to 5000 ppm fluoride

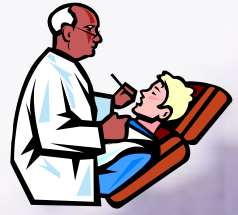


FLUORIDE GEL





VARNISH



EARLY DENTAL TREATMENT AND CARE



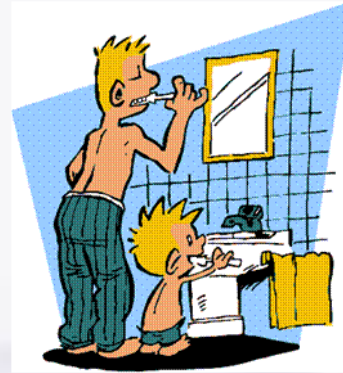
WHERE?

HOME

Institutions

School

Mobile units



NURSARY/SCHOOL PREVENTIVE WORKSHOP



TEACHING



DENTAL STUDENTS HELPING DURING PREVENTIVE WORKSHOP



Source: Patonai G.: *Előterben fogaink védelme.*

<http://sefokhok.hu/index.php/cimlap/cikkek/28-fokos-cikkek/219-eloterben-fogaink-vedelme>

Letöltés ideje: 2013.10.01.





PREVENCIÓN – UNIVERSITY OF SZEGED DENTAL SCHOOL



From: Pinke I.



GYERMEKFOGÁSZATI ÉS
FOGSZABÁLYOZÁSI KLINIKA



Semmelweis Egyetem Budapest
Gyermekefogászati és Fogszabályozási
Klinika



PREVENCION
PEDODONTIC PRACTICE - SE



Mobile units for dental check-up

Financed by charity organizations



- 1995;
- „road-show”
- ≥ 4000 children/year







*Thank you for your kind
attention*



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