SMART TECHNIQUE
การฝึกอบรมเพื่อฟื้นฟูความรู้ และ ทักษะการอุดฟันน้ำนมในเด็ก สำหรับการปฏิบัติงานในชุมชน

ทพญ.ศศิธร ธรรมสืบศิลป
โรงพยาบาลพระนครศรีอยุธยา

ผลสำรวจสถานะสุขภาพช่องปากเด็ก 3-5 ปี

ประเทศ ปี 60	47.1	52.0	2.5	2.3
จังหวัด ปี 61	26.2	71.3	6.0	3.8

3 ปี

5 ปี

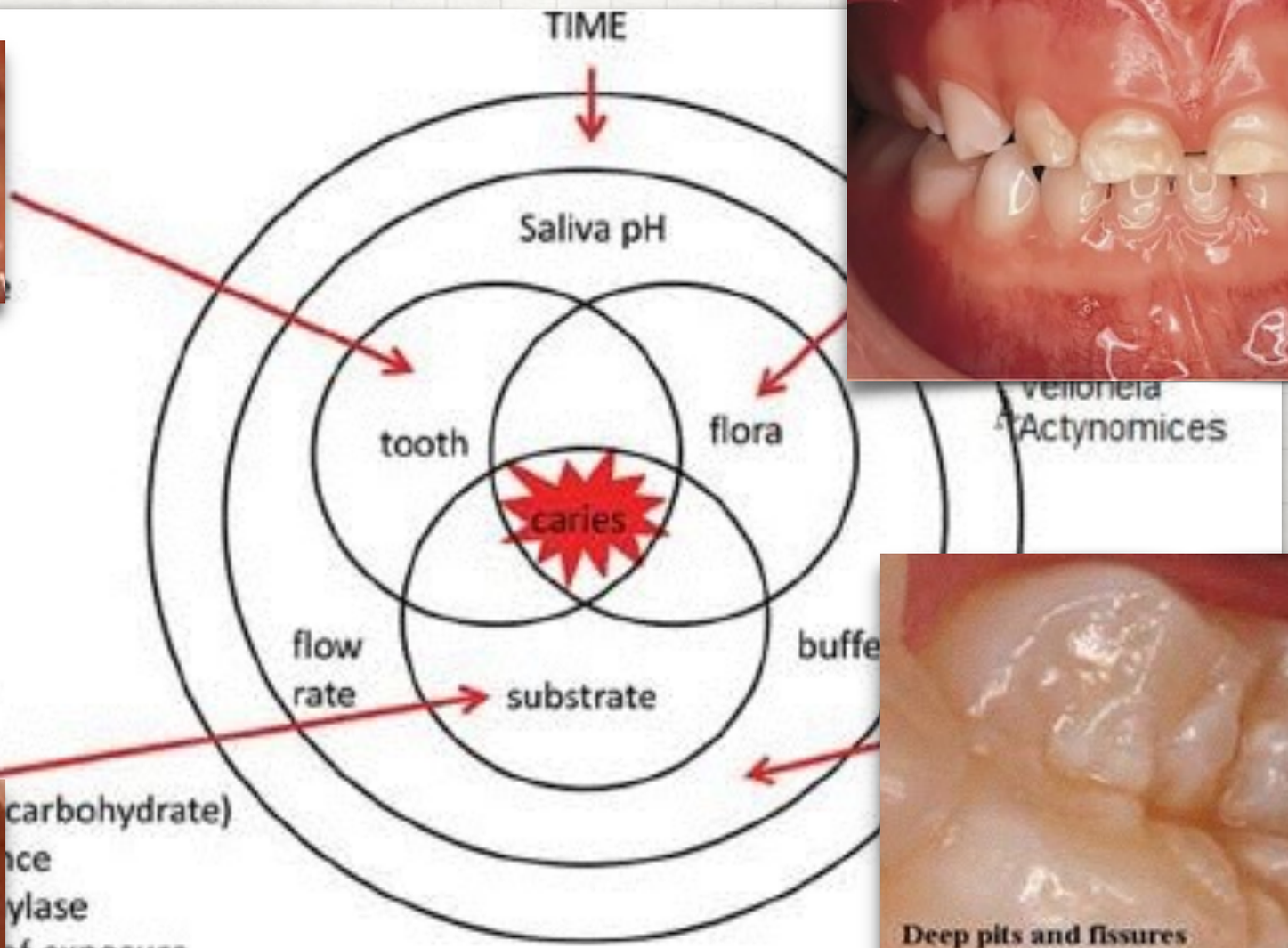
ปราศจากฟันผุ | ฟันผุไม่ได้รักษา | ฟันผุอุด | สูญเสียฟัน

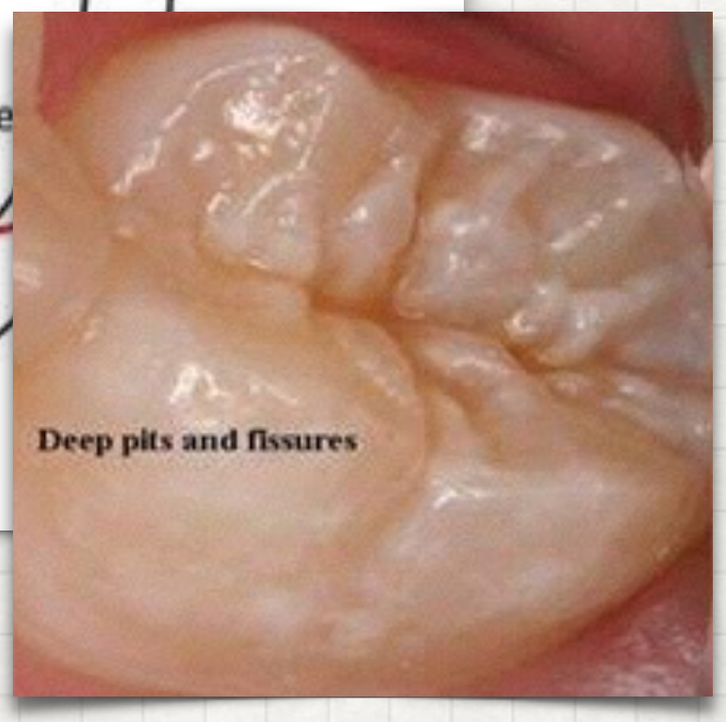
จังหวัด ปี 61	16.6	82.9	8.9	6.1
ประเทศ ปี 60	24.4	73.8	8.8	6.5

สาเหตุการเกิดฟันผุและปัจจัยที่เกี่ยวข้อง

DENTAL CARIES

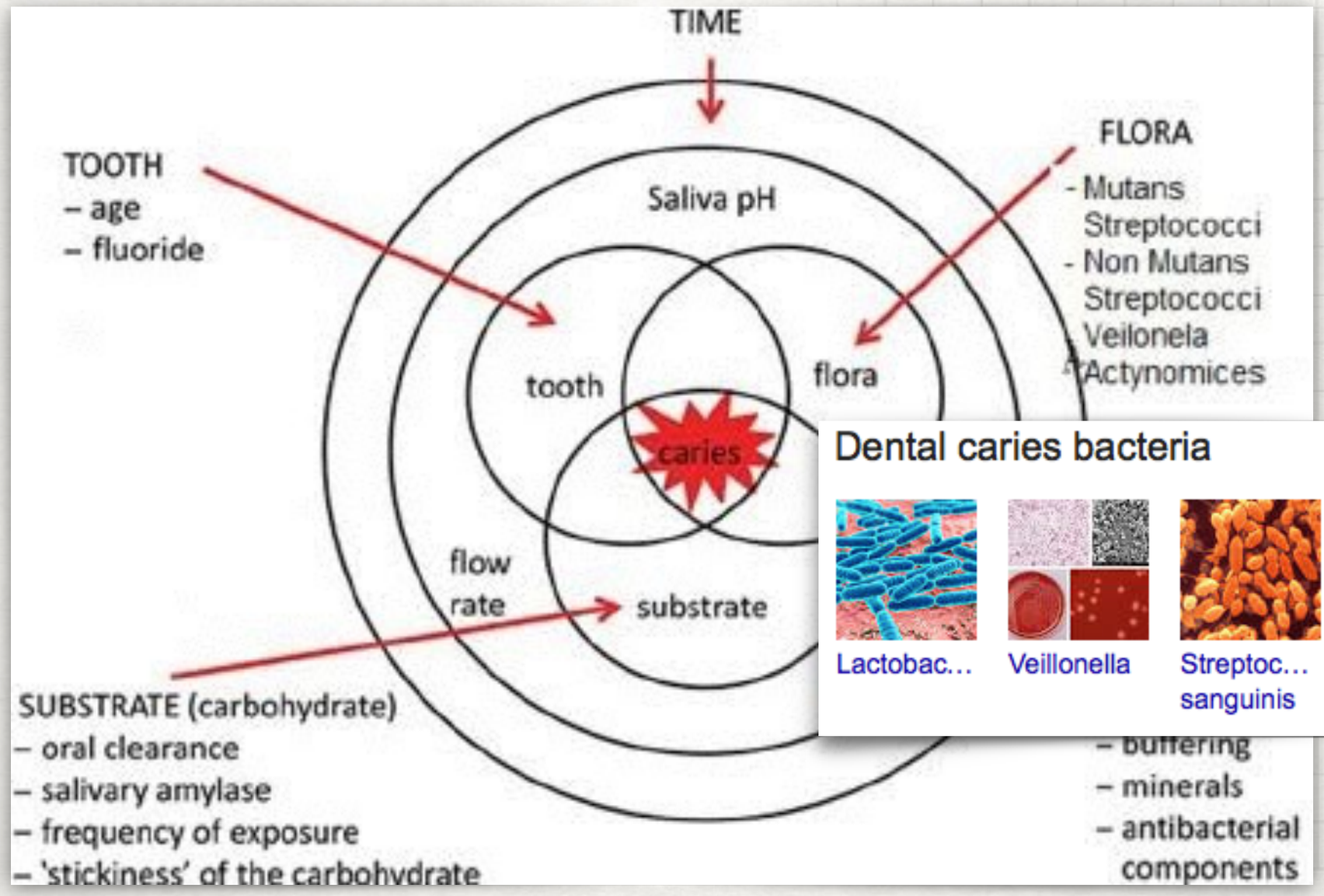
12-24 MONTHS

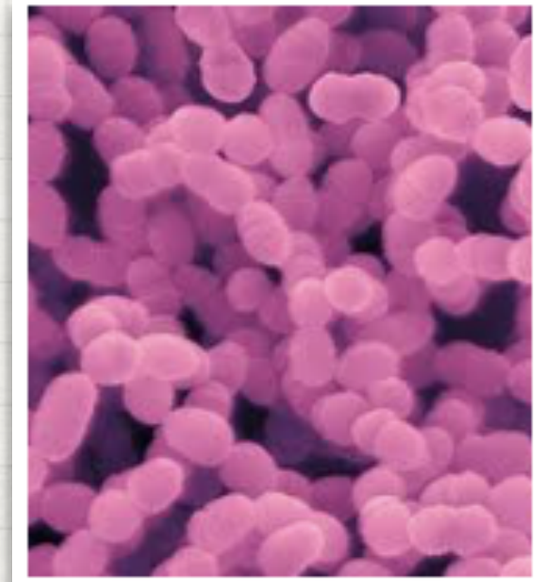




สาเหตุการเกิดฟันผุและปัจจัยที่เกี่ยวข้อง

DENTAL CARIES





Streptococcus mutans- T...

Dental caries bacteria

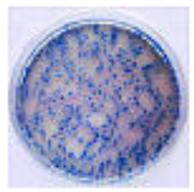
Lactobac...

Veillonella

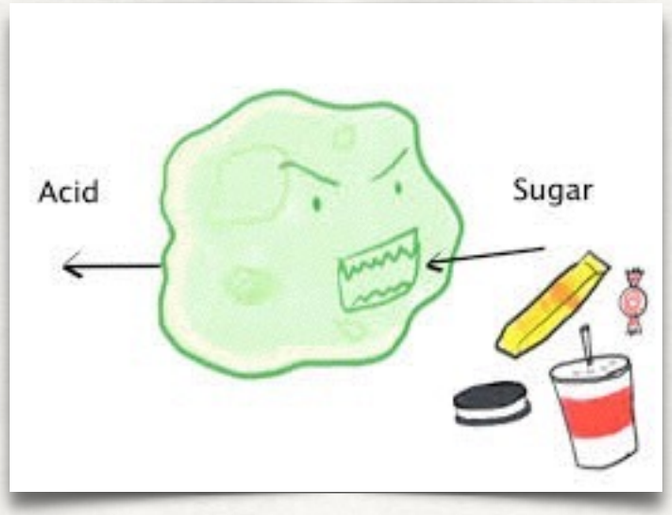
Streptoc... sanguinis

Bifidobac...

Streptoc... salivarius



Streptoc... mitis



TOOTH
– age
– fluoride

Saliv

Streptococci
Veilonela
Actynomices

tooth

flora

caries

flow
rate

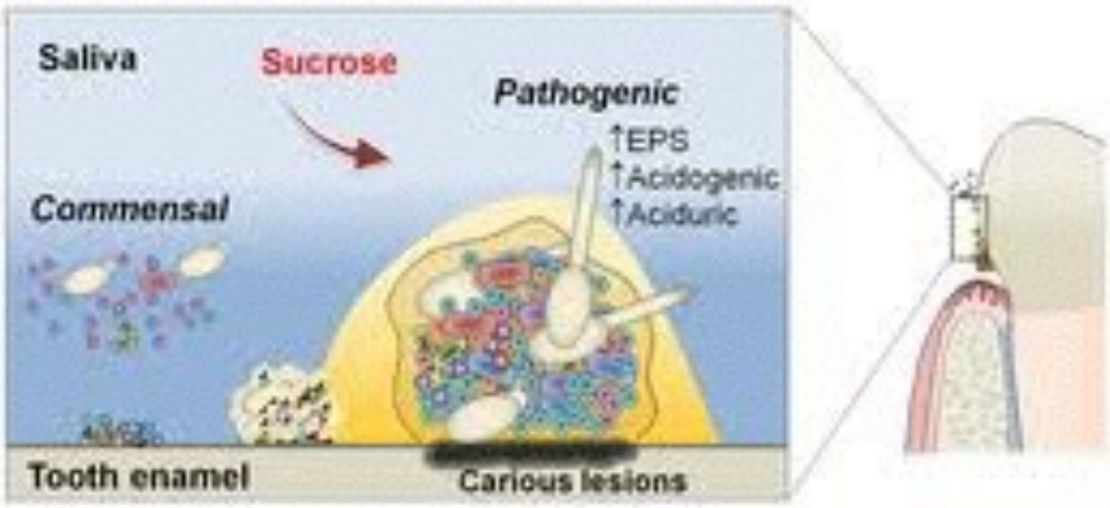
substrate

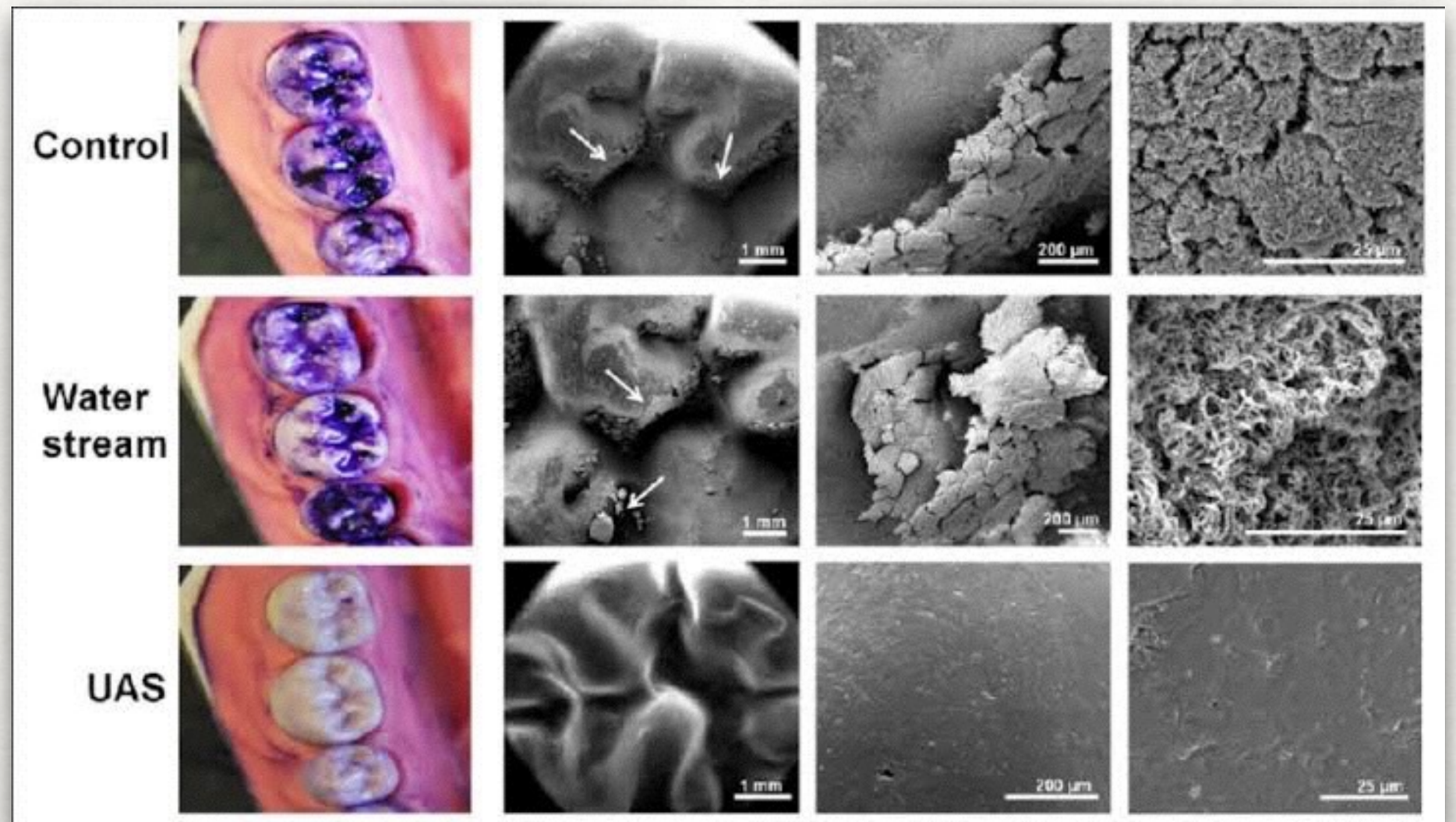
buffer

SUBSTRATE (carbohydrate)
– oral clearance
– salivary amylase
– frequency of exposure
– 'stickiness' of the carbohydrate

SALIVA
– flow
– pH
– buffering
– minerals
– antibacterial components

Severe Childhood Caries





The Caries Balance

Pathological Factors

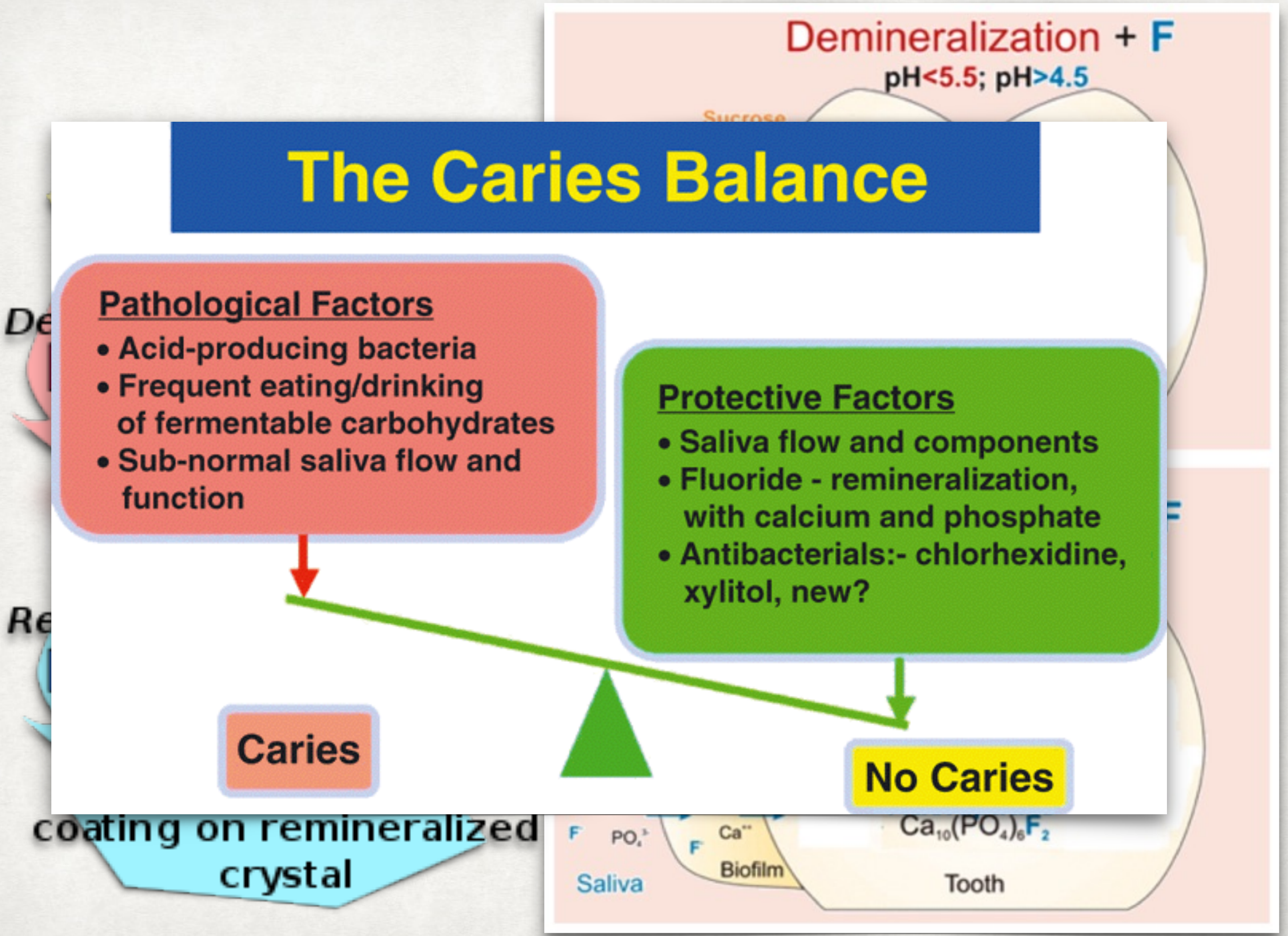
- Acid-producing bacteria
- Frequent eating/drinking of fermentable carbohydrates
- Sub-normal saliva flow and function

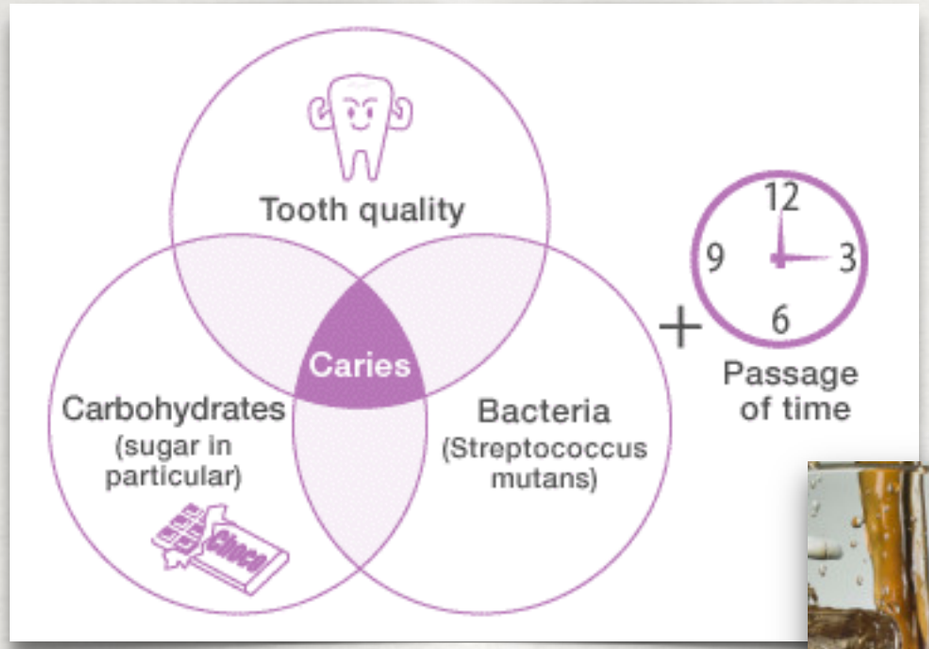
Protective Factors

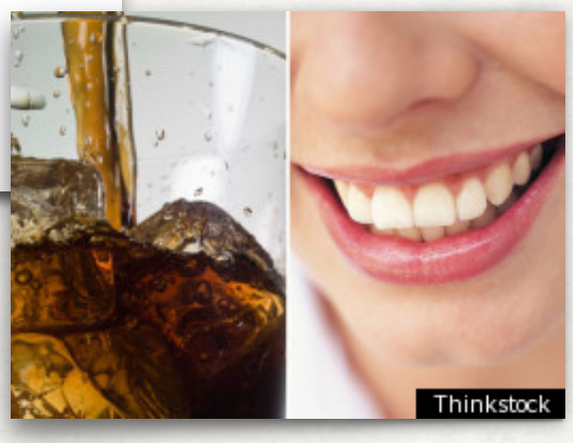
- Saliva flow and components
- Fluoride - remineralization, with calcium and phosphate
- Antibacterials:- chlorhexidine, xylitol, new?

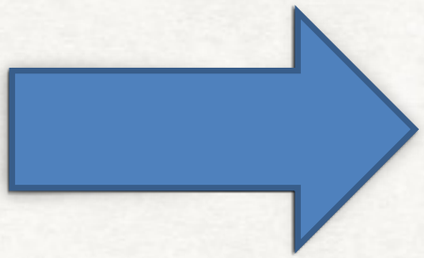
Caries

No Caries

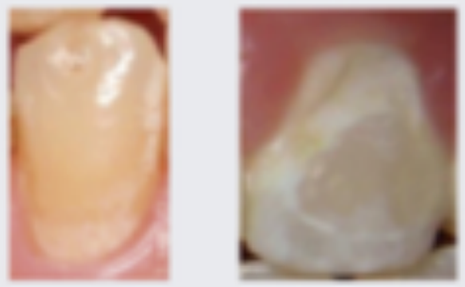
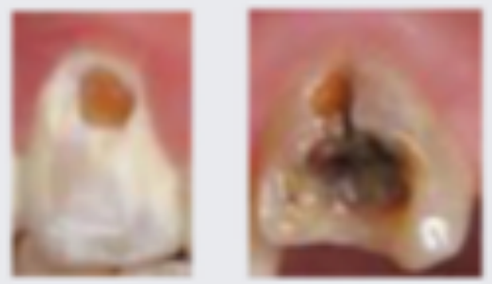
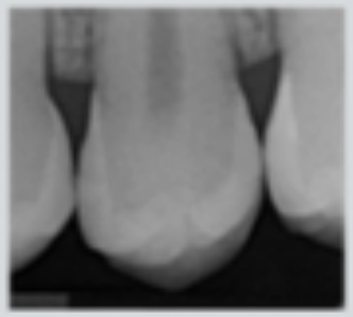
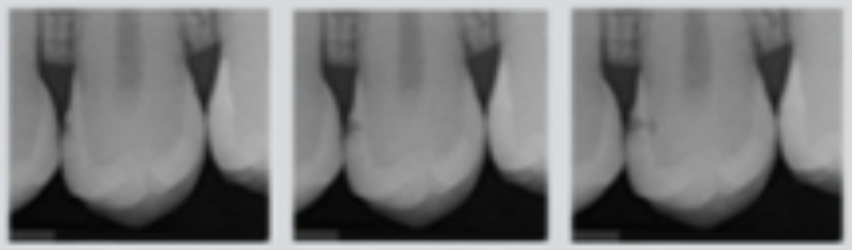
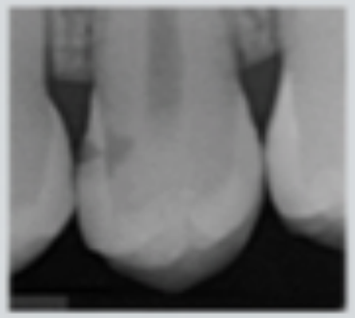
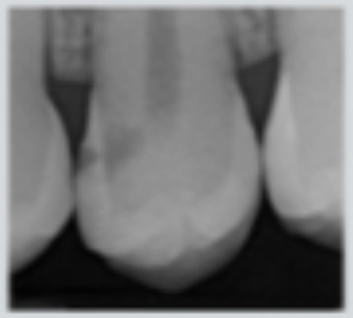



Tooth quality
Caries
Carbohydrates
(sugar in particular)
Bacteria
(Streptococcus mutans)
Snack
12
3
6
9
Passage of time


Thinkstock

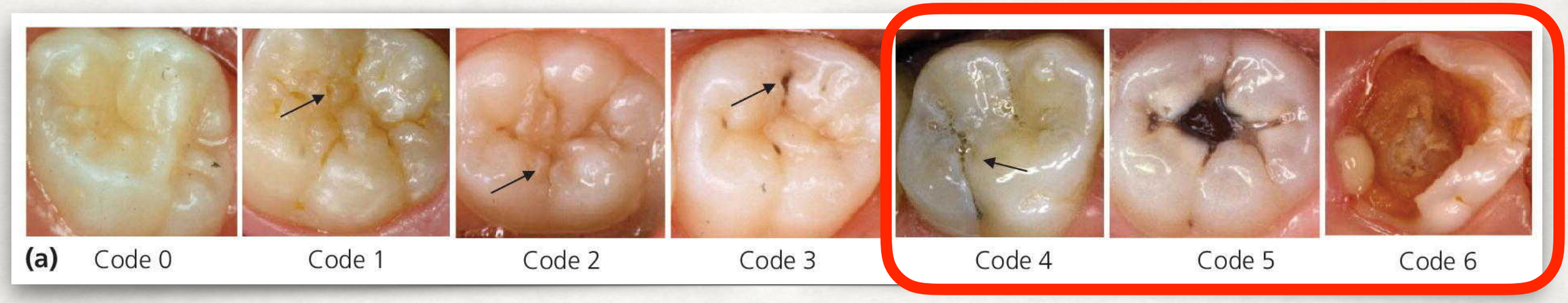


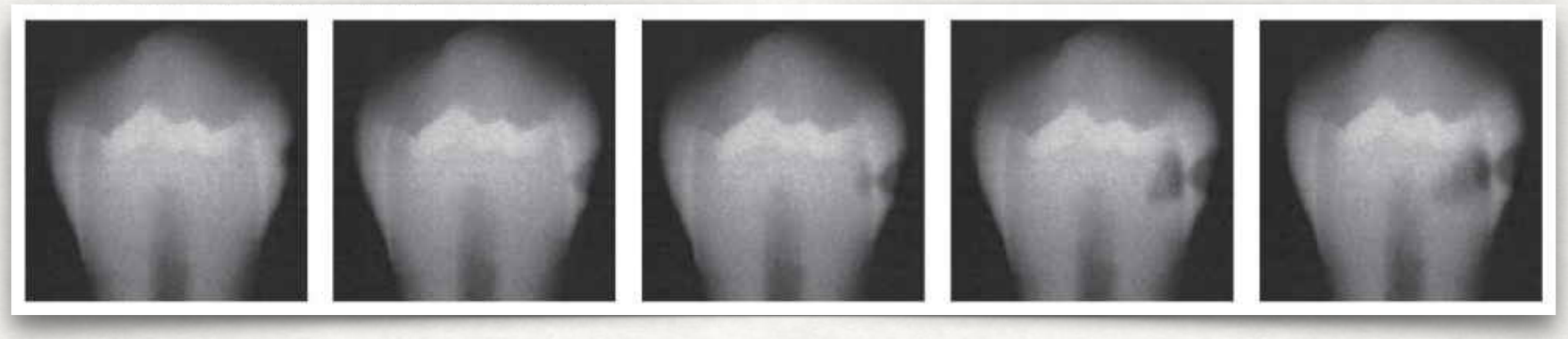

Mouth of methamphetamine user
Academy of General Dentistry
Mouth of diet soda abuser
Academy
Academy of General Dentistry

Sound	Initial	Moderate	Advanced
No clinically detectable lesion. Dental hard tissue appears normal in color, translucency, and gloss.	Earliest clinically detectable lesion compatible with mild demineralization. Lesion limited to enamel or to shallow demineralization of cementum/dentin. Mildest forms are detectable only after drying. When established and active, lesions may be white or brown and enamel has lost its normal gloss.	Visible signs of enamel breakdown or signs the dentin is moderately demineralized.	Enamel is fully cavitated and dentin is exposed. Dentin lesion is deeply/ severely demineralized.
No surface change or adequately restored	Visually noncavitated	Established, early cavitated, shallow cavitation, microcavitation	Spread/disseminated, late cavitated, deep cavitation
None	Unlikely	Possible	Present
ICDAS 0	ICDAS 1 ICDAS 2	ICDAS 3 ICDAS 4	ICDAS 5 ICDAS 6
			
			
 E0¶ or RO* No radiolucency	 E1¶ or RA1* E2¶ or RA2* D1¶ or RA3* Radiolucency may extend to the dentinoenamel junction or outer one-third of the dentin. Note: radiographs are not reliable for mild occlusal lesions.	 D2¶ or RB4* Radiolucency extends into the middle one-third of the dentin	 D3¶ or RC5* Radiolucency extends into the inner one-third of the dentin

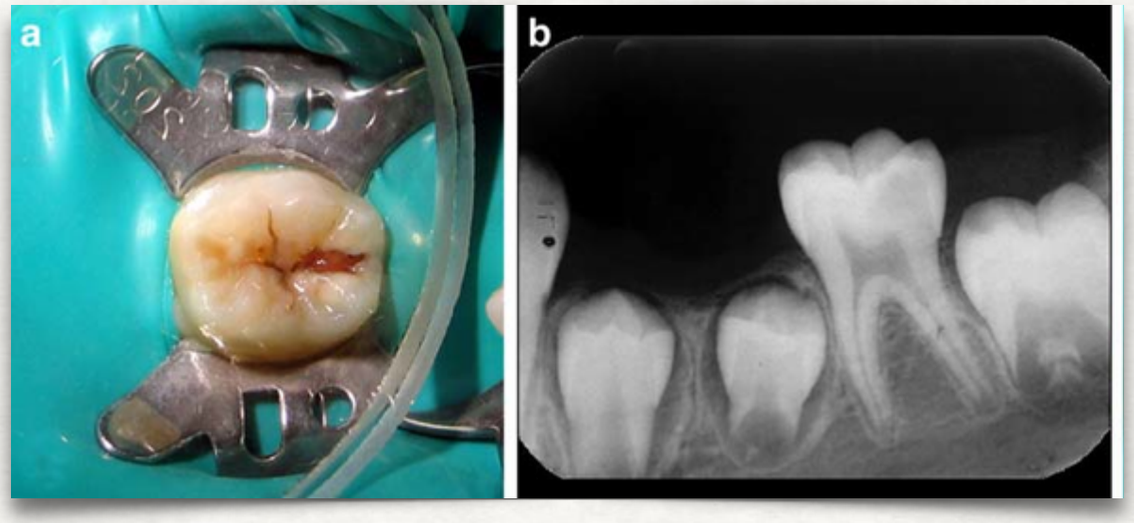
CLASSIFICATION OF DENTAL CARIES

BASED ON INTERNATIONAL CARIES DETECTION AND ASSESSMENT SYSTEM (ICDAS)






a

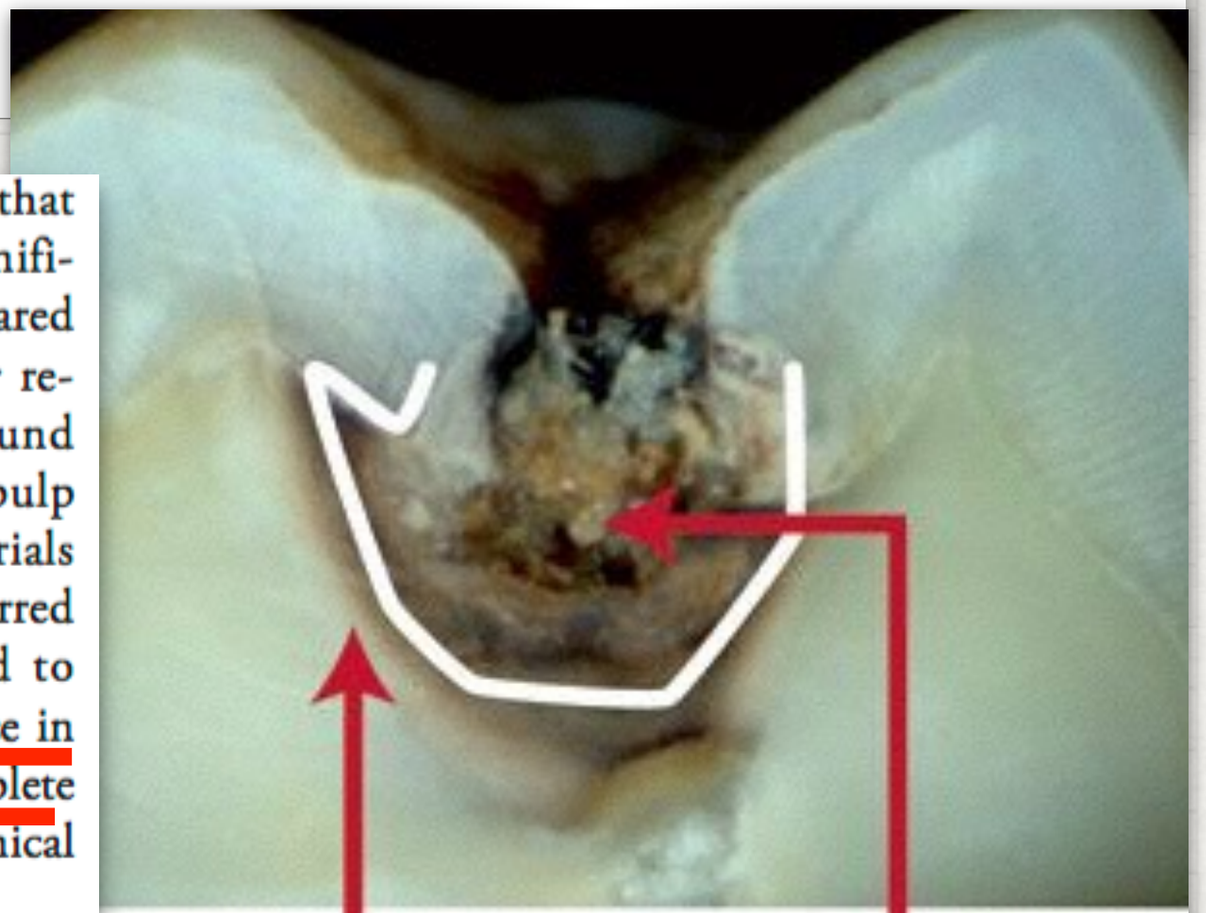

a
b

Pediatric Restorative Dentistry

Latest Revision

2019

Evidence from RCTs and a systematic review shows that pulp exposures in primary and permanent teeth are significantly reduced using incomplete caries excavation compared to complete excavation in teeth with a normal pulp or reversible pulpitis. Two trials and a Cochrane review found that partial excavation resulted in significantly fewer pulp exposures compared to complete excavation.[23-25] Two trials of step-wise excavation showed that pulp exposure occurred more frequently from complete excavation compared to stepwise excavation.[19,24] There also is evidence of a decrease in pulpal complications and post-operative pain after incomplete caries excavation compared to complete excavation in clinical trials, summarized in a meta-analysis.[28]



Inner "affected" dentine	Outer "infected" dentine
• few bacteria	• bacterial invasion
• remineralisable	• unmineralisable
• vital	• dead
• sensitive	• without sensation
• useful	• not useful

AAPD Guideline on restorative dentistry, revised 2019

Managing Carious Lesions: Consensus Recommendations on Carious Tissue Removal

Advances in Dental Research
2016, Vol. 28(2) 58–67

DOI: 10.1177/0022034516639271
adr.sagepub.com

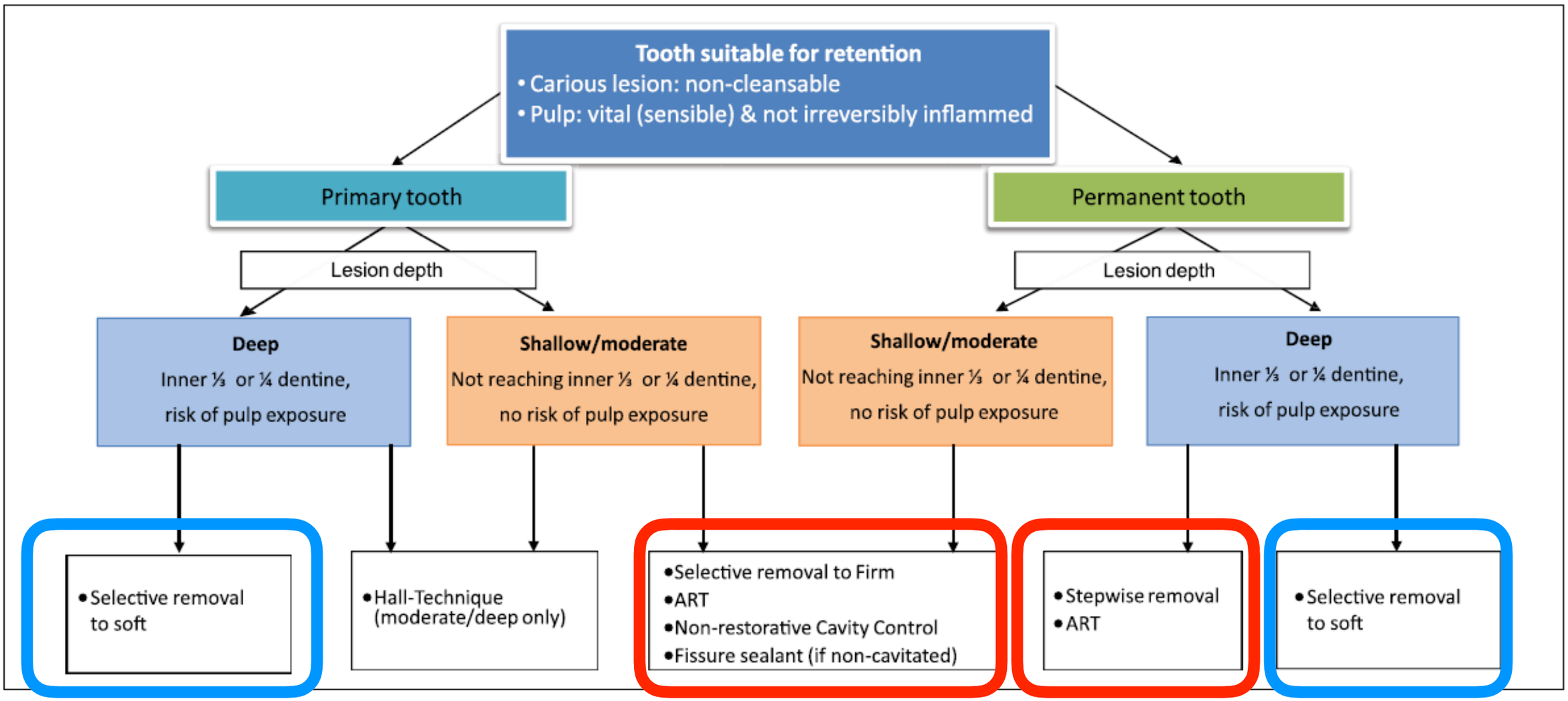


Figure. Decision making for noncleansable carious lesions in retainable teeth with vital pulps. ART, atraumatic restorative treatment.

SMART as a minimum intervention approach

Minimum instrument	only hand instrument
Minimum procedure	Partial caries removal & filled with Glass ionomer
Minimum pain	no anesthetic injection
Minimum trauma	save tooth structure
Minimum stress & fear	patients' friendly
Maximum quality	prevention & restoration

Case selection:

- Vital teeth
- Small or big cavities
- Single or multiple surfaces
- Shallow or deep lesions
- Healthy teeth

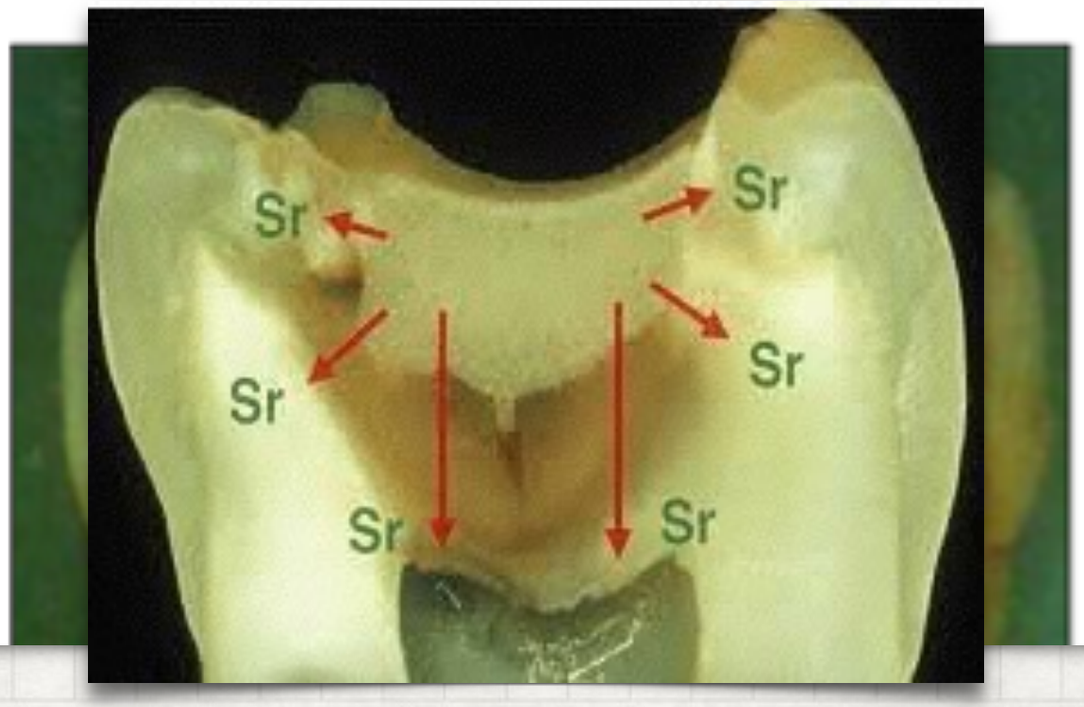
- Frank pulp exposed teeth
- Abscess
- Fistula
- History of pain or swelling
- Non-functional teeth

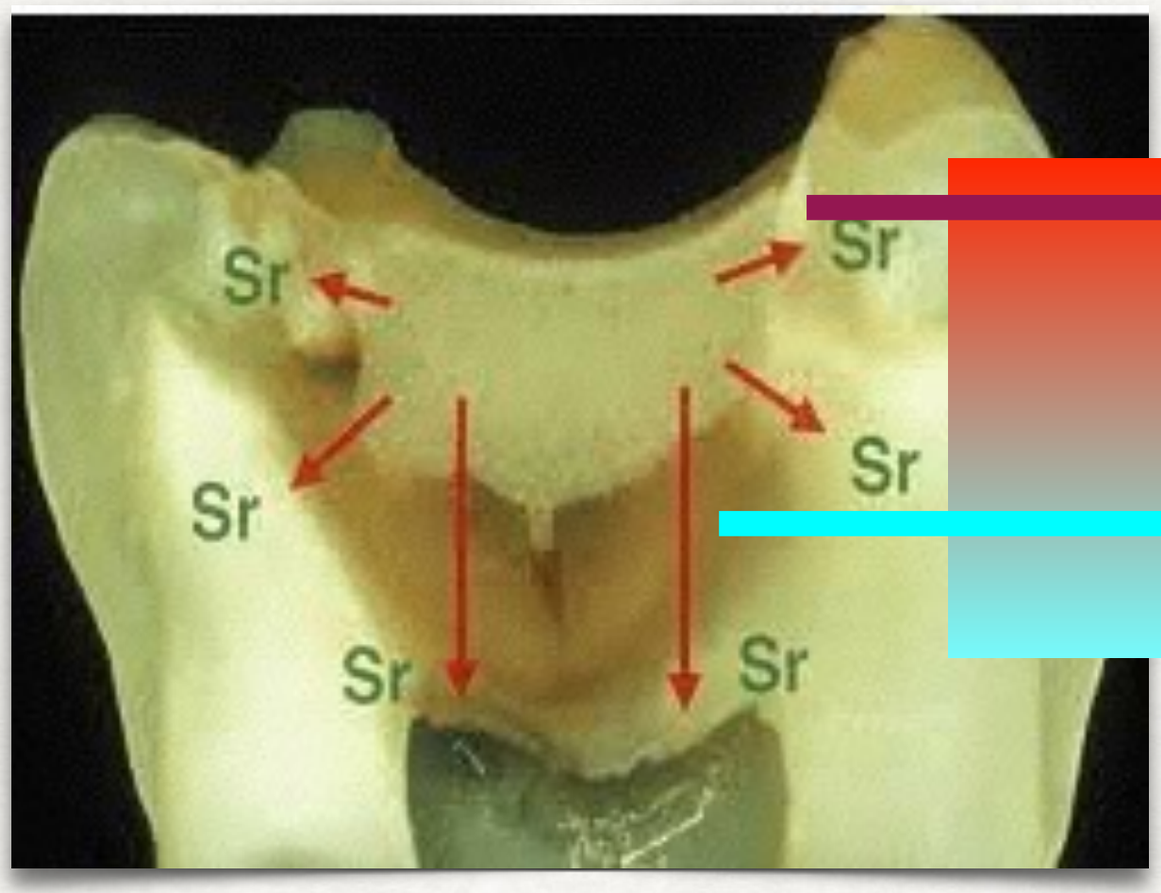
Inclusion

Exclusion

ACTION OF CARIOUS-DENTINE REMOVAL

Inner "affected" dentine	Outer "infected" dentine
• few bacteria	• bacterial invasion
• remineralisable	• unmineralisable
• vital	• dead
• sensitive	• without sensation
• useful	• not useful

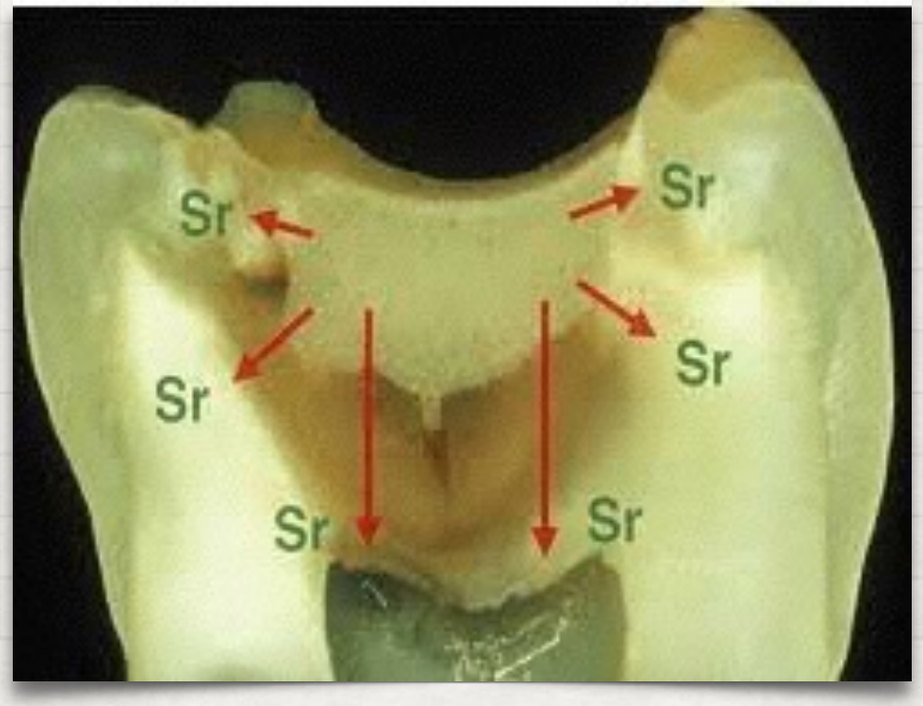




HARD DENTIN

LEATHERY DENTIN

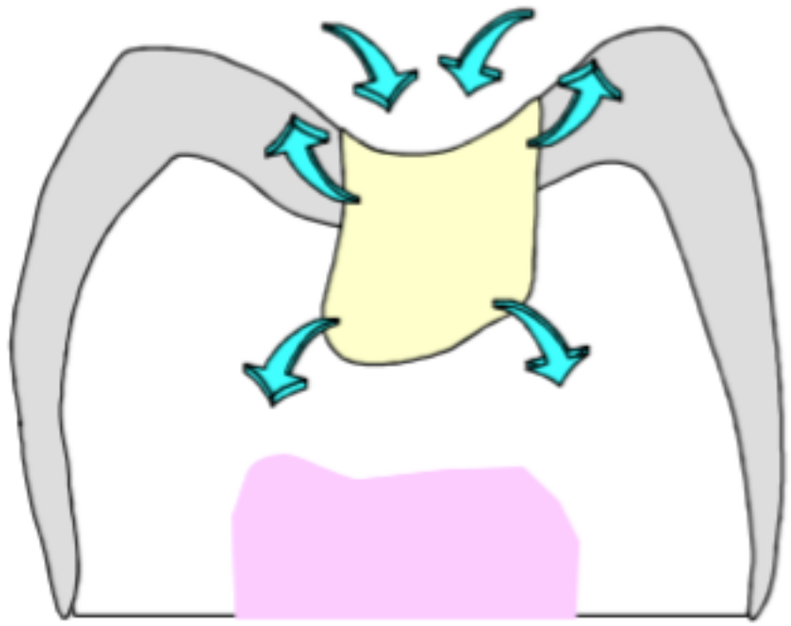
Traditional Operative Dentistry	Current Biological-approached Cariology
eliminate softened infected carious dentine, demineralized dentine and sclerotic dentine	**conservative (partial) caries removal** of infected soft dentine, only at DEJ
apply some agent ($Ca(OH)_2$) to protect pulp	defense mechanism of pulp as reparative dentine
extend removal of (overhang) enamel and dentine as cavity preparation for restorative material	conservation of enamel and dentine for adhesive restorative and preventive material



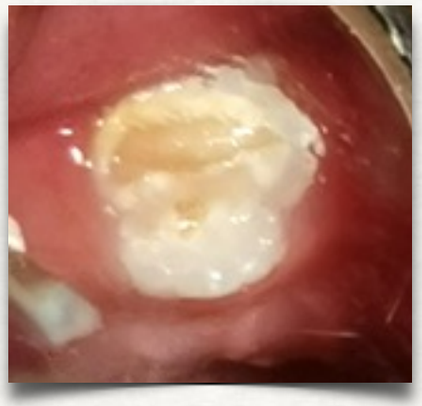
Fluoride released from Glass Ionomer

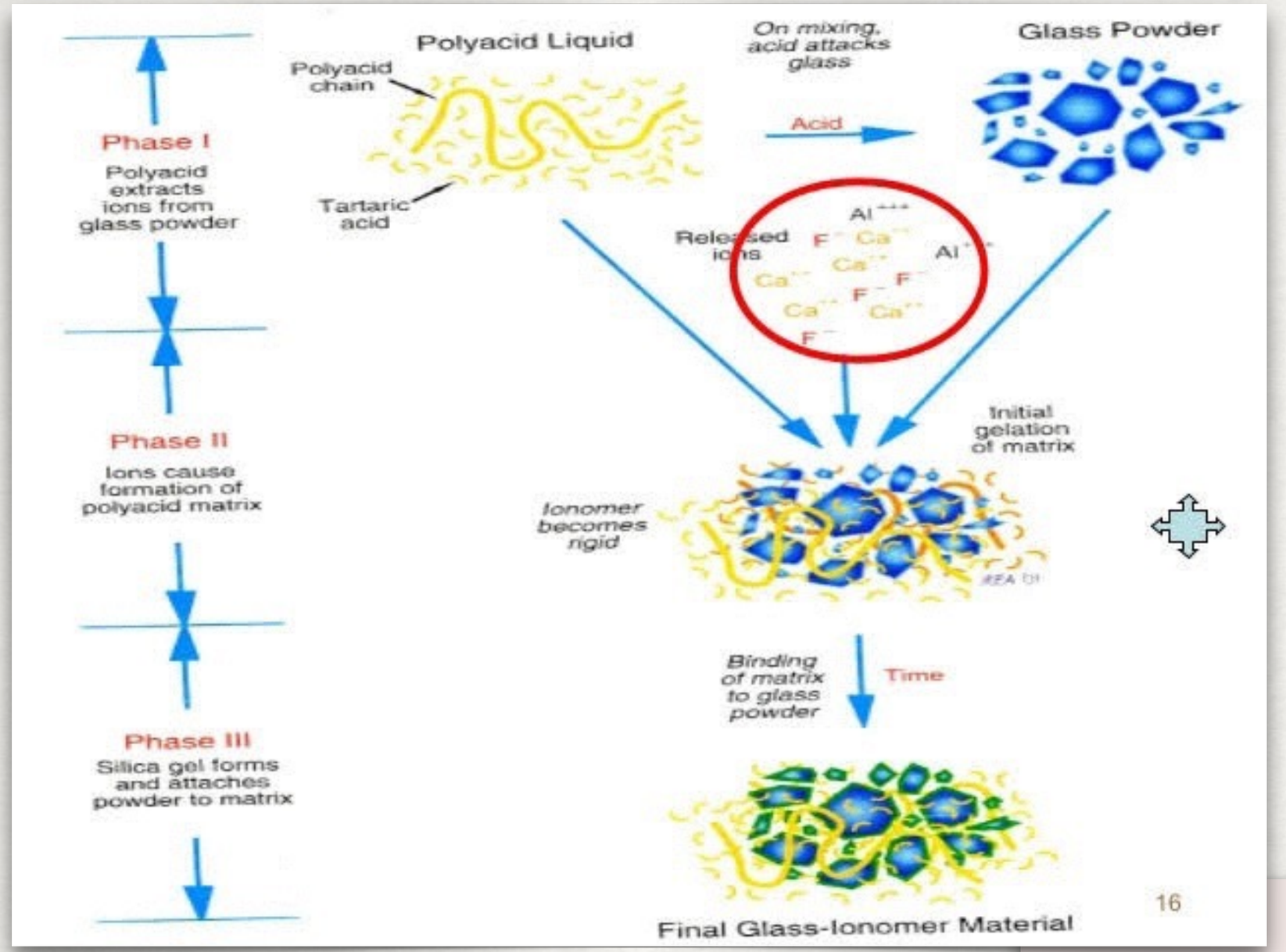
Fluoride

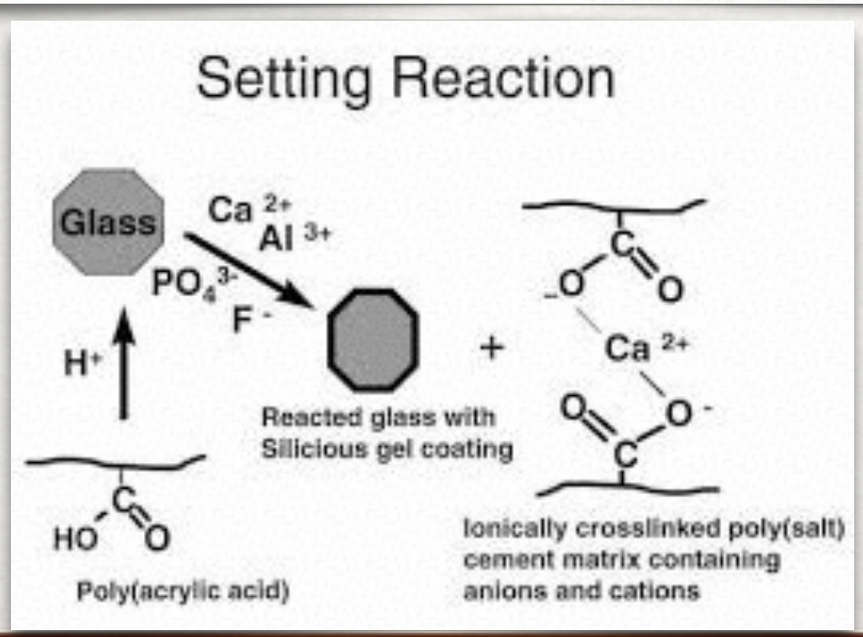
- Internal to cavity wall
  - Bacteriostatic
  - Remineralization
- External to the oral environment
  - Released into tooth tissues and saliva
  - GI restorations and sealants take up fluoride (recharge)

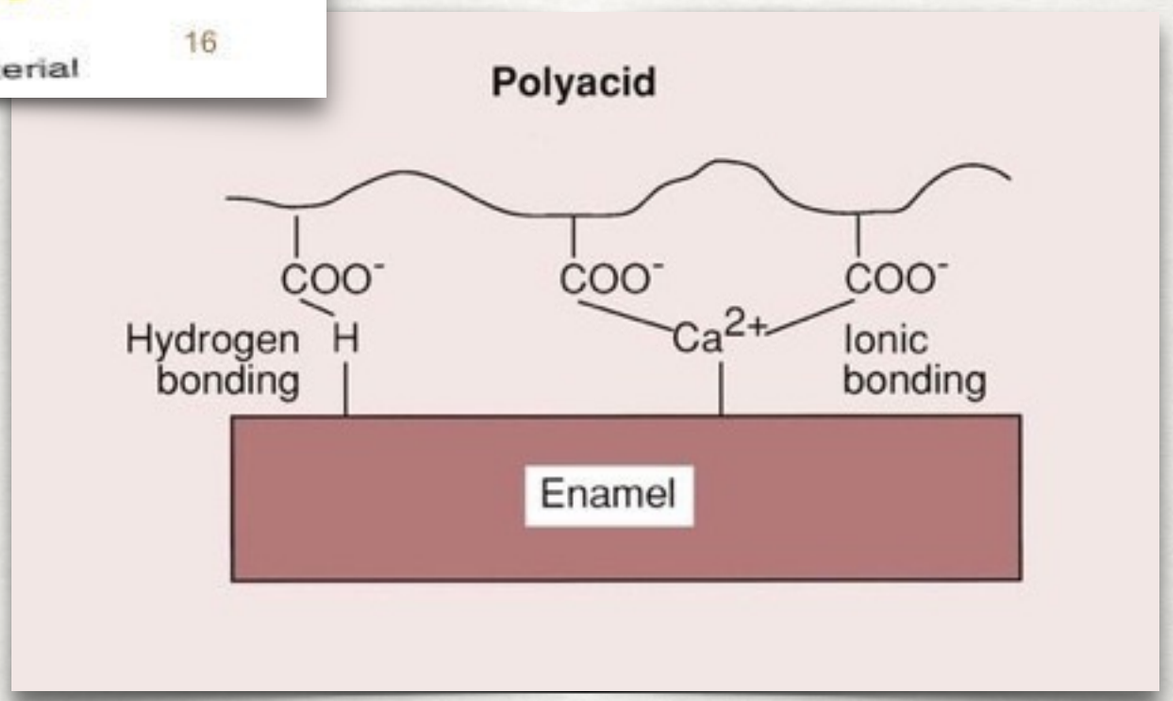


CASE SELECTION




Phase I
Polyacid extracts ions from glass powder
Phase II
Ions cause formation of polyacid matrix
Phase III
Silica gel forms and attaches powder to matrix
Polyacid Liquid
Polyacid chain
Tartaric acid
On mixing, acid attacks glass
Acid
Glass Powder
Released ions
Initial gelation of matrix
Ionomer becomes rigid
Binding of matrix to glass powder
Time
Final Glass-Ionomer Material
16


Setting Reaction
Glass
Ca 2+
Al 3+
PO4 3-
F -
H+
Reacted glass with Silicious gel coating
+
Ca 2+
HO
Poly(acrylic acid)
Ionically crosslinked poly(salt) cement matrix containing anions and cations


Polyacid
COO-
COO-
COO-
Hydrogen bonding
H
Ca2+
Ionic bonding
Enamel