

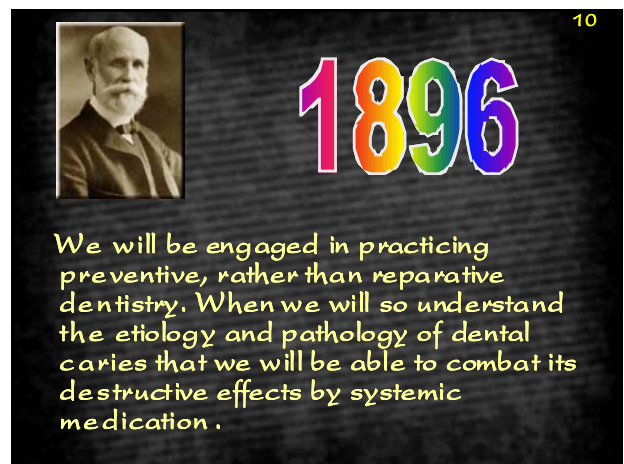
7



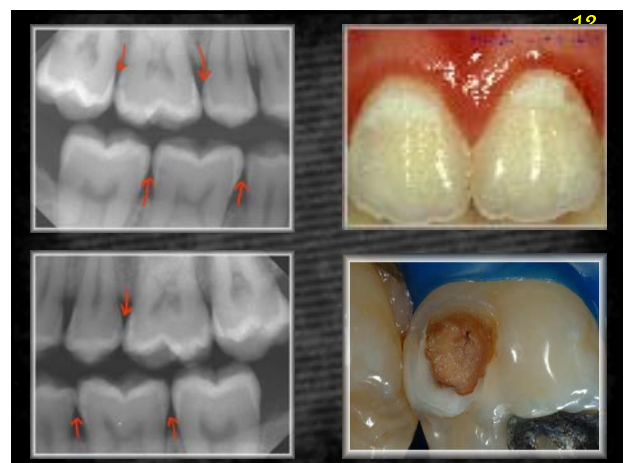
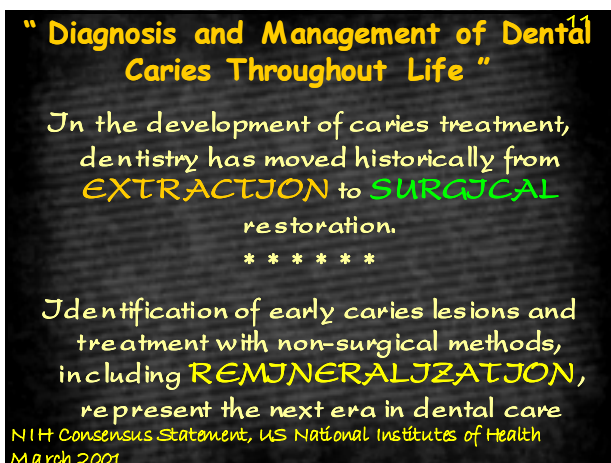
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9



10




11



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# Minimal Intervention Dentistry

- To put patients in control of the disease so they need MINIMAL INTERVENTION from the profession
- Empower Patients
- Independent Health



Minimal intervention dentistry – a review\*

FDI Commission Project 1-97

Martin J. Tyne  
Wellington, New Zealand  
Kenneth J. Anusavice  
Gainesville, USA  
Jo E. Frencken  
Maastricht, The Netherlands  
Graham J. Meunier  
Adelaide, Australia

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# Minimal Intervention Dentistry

- Using the MEDICAL MODEL in the treatment of complex diseases



15


# Clinical excellence




# Longevity

16

# Evolution of our understanding:



Willoughby D. Miller 1891



- Non Specific Plaque Hypothesis
- Specific Plaque Hypothesis

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# Characteristic an infection ?

- One Bug
- One Disease
- One Bullet






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# Prof. Phil Marsh 1990's

SGM Special Lecture

2001 Colworth Prize Lecture

Delivered at the 149th meeting of the SGM, 10 September 2001

Correspondence  
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Are dental diseases examples of ecological catastrophes?

P. D. Marsh

Research Division, Centre for Applied Microbiology and Research, Salisbury SP4 0UG, and Division of Oral Biology, Leeds Dental Institute, Clarendon Way, Leeds LS2 9LU, UK

Dental diseases are among the most prevalent and costly diseases affecting industrialized societies, and yet are highly preventable. The microflora of dental plaque biofilms from diseased sites is distinct from that found in health, although the putative pathogens can often be detected in low numbers at normal sites. In dental caries, there is a shift towards community dominance by acidogenic and acid-tolerant Gram-positive bacteria (e.g. mutans streptococci and lactobacilli) at the expense of the acid-sensitive species associated with sound enamel. In contrast, the number and proportions of obligately anaerobic bacteria, including Gram-negative proteolytic species, increase in periodontal diseases. Modeling studies using defined consortia of oral bacteria grown in planktonic and biofilm systems have been undertaken to identify environmental factors responsible for driving these deleterious shifts in the plaque microflora. Repeated conditions of low

# Ecological Plaque Hypotheses

## We live in a microbial world !

19



The human body is composed of  $10^{14}$  living cells

Only 10% of those are human



20

Remainder of cells are microorganisms

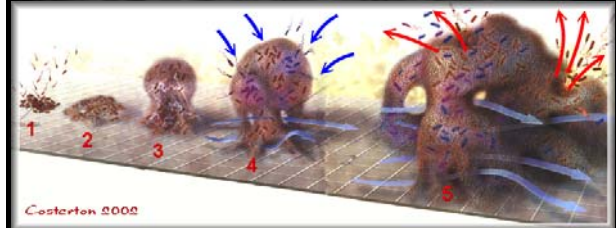
- Indigenous (80%)
- Transient (10%)
- Supplemental (10%)



21

Four reservoirs

■ GJT	$10^{11}$	200
■ Urogenital	$10^8$	200
■ Skin	$10^6$	50
■ Mouth	$10^6$	700



22

## Caries & biofilm !

## Many cariogenic species

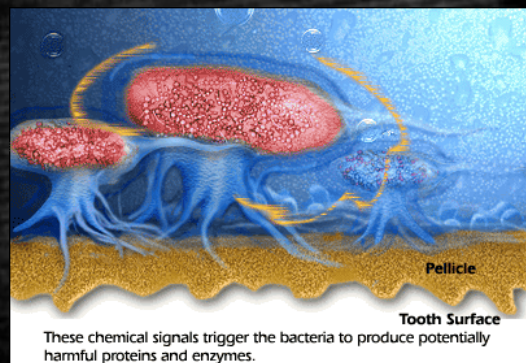
23



## We are the natural HOST

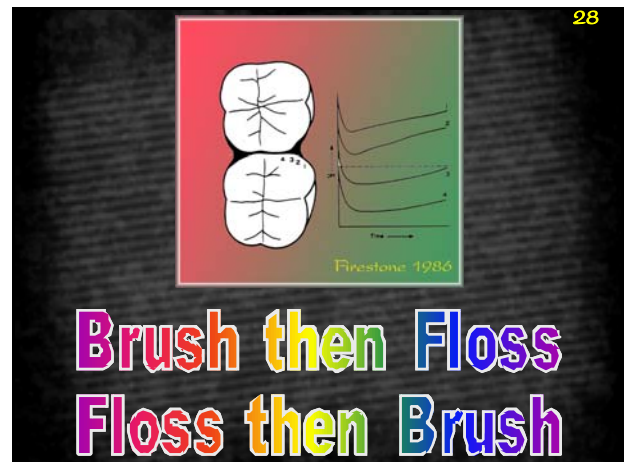
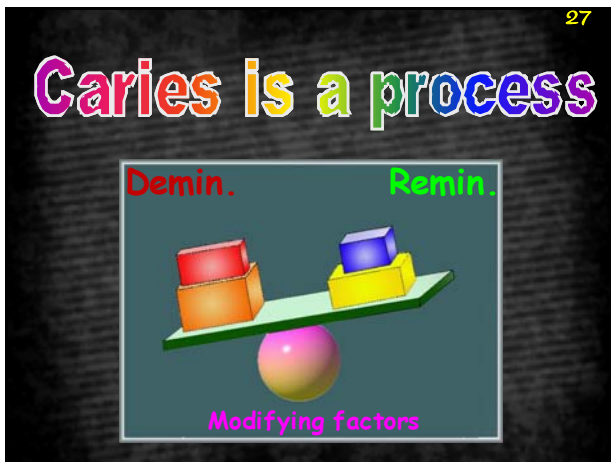
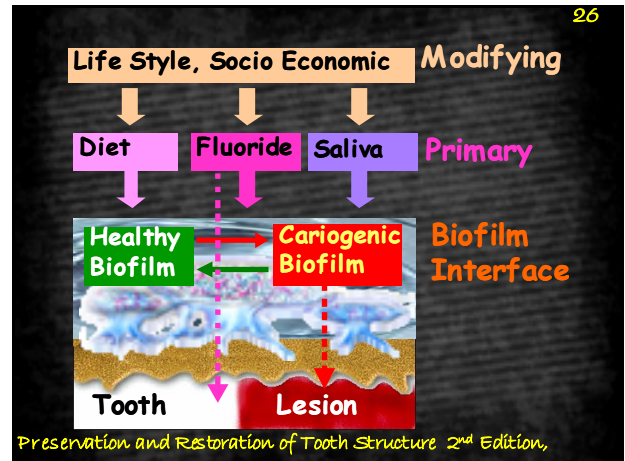
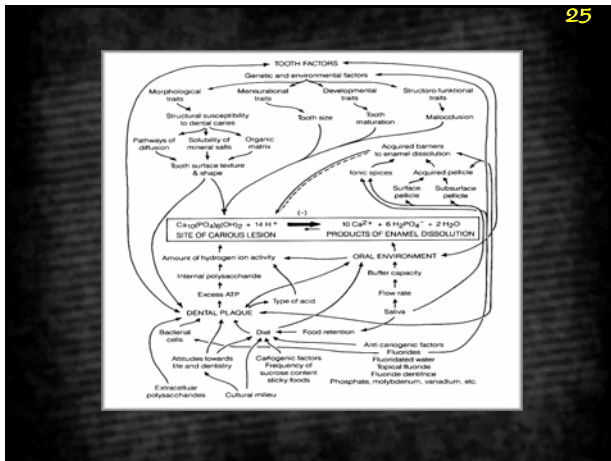


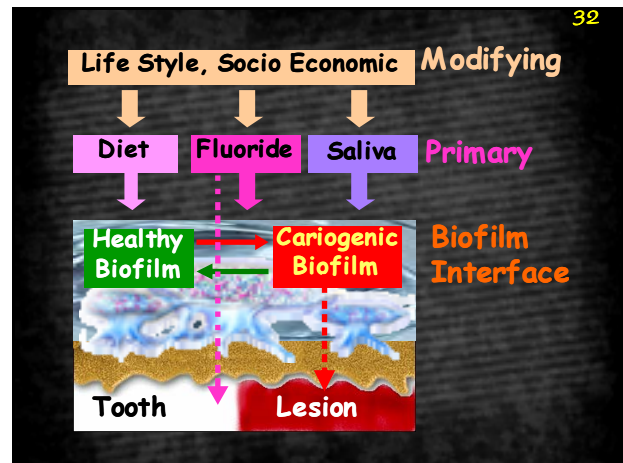
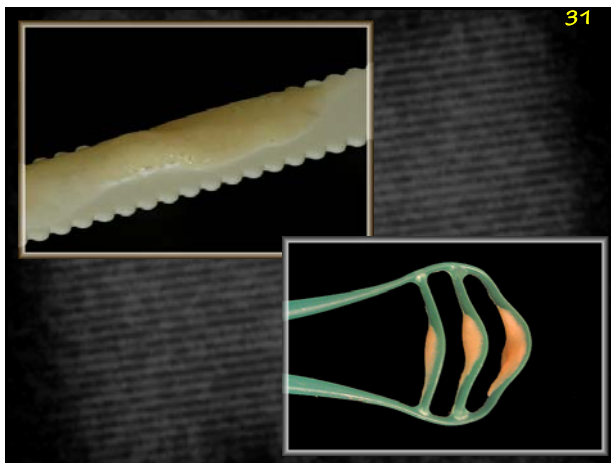
- Part of Indigenous Biota
- Acidogenic & Aciduric
- Gel producing



24







- 33
- |          |                             |
|----------|-----------------------------|
| Saliva   | 1. Minor salivary gland     |
|          | 2. Consistency              |
|          | 3. Resting pH               |
|          | 4. Stimulated salivary flow |
|          | 5. Buffering capacity       |
| Bacteria | 6. Composition              |
|          | 7. Activity                 |
| Diet     | 8. Frequency of sugar hits  |
|          | 9. Frequency of acid hits   |
| Fluoride | 10. Past exposure           |
|          | 11. Current Exposure        |
| History  | 12. Dental                  |
|          | 13. Medical                 |
|          | 14. Compliance              |
|          | 15. Lifestyle               |
|          | 16. Social economic status  |

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### Whole Saliva

#### Whole Saliva Types

■ Parotid	■ Unstimulated
■ Sub-lingual	✦ 0.1 – 0.3 ml/min
■ Sub-mandibular	■ Stimulated
■ Minor	✦ > 1 ml/min

35

### 2. Unstimulated saliva:

#### Unstimulated saliva

- Life style
  - ✦ Hydration
  - ✦ Social drugs: alcohol, tobacco, caffeine
- Medical
  - ✦ Medications
  - ✦ General medical conditions
- Physiological
  - ✦ Level of light
  - ✦ Body position

Wolke N., 2004

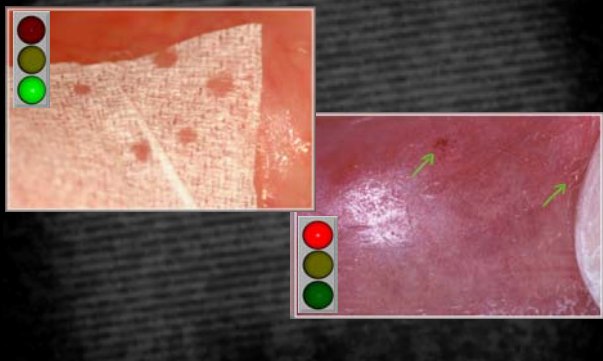
36

### 1. Unstimulated saliva: Minor glands

## Caries diagnosis - Saliva

### Minor salivary gland

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## 2. Unstimulated saliva: Consistency

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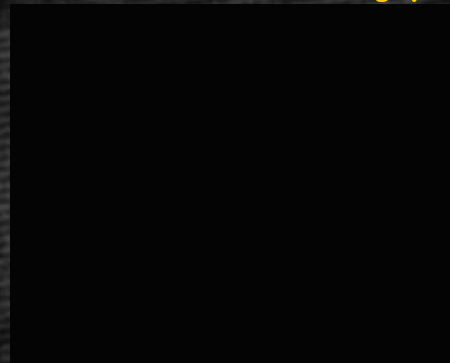
## 2. Unstimulated saliva: Consistency

39



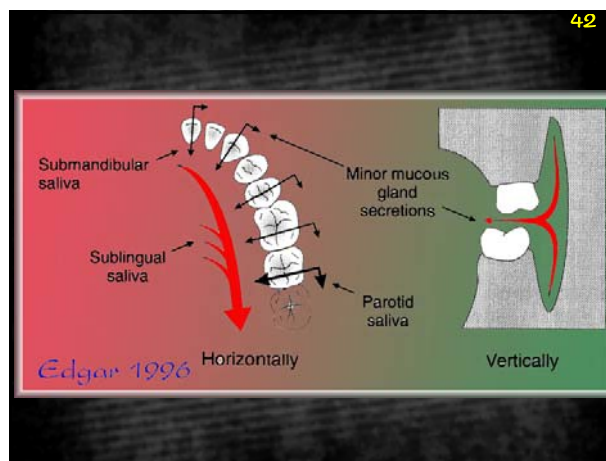
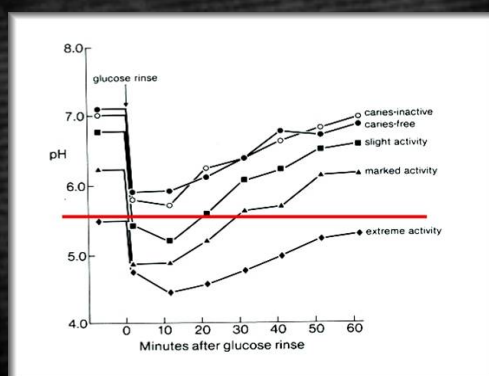
## 3. Unstimulated saliva: Resting pH

40



## pH in plaque

41

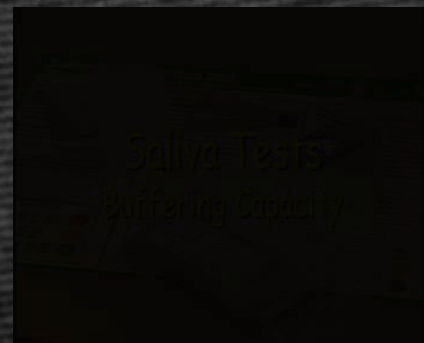




# pH of unstimulated vs stimulated <sup>43</sup>

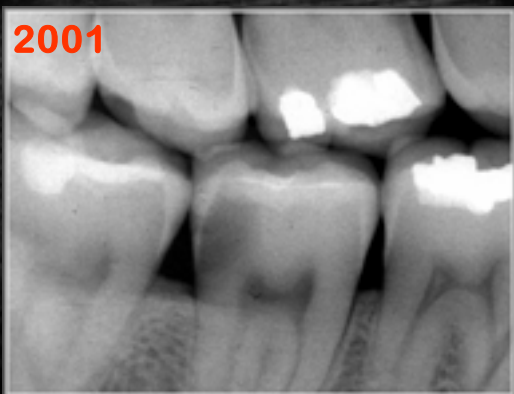


# 4. Stimulated saliva: Buffering capacity <sup>44</sup>



# Caries Activity can change suddenly <sup>45</sup>

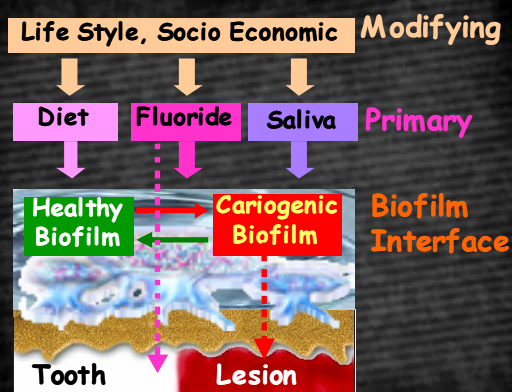
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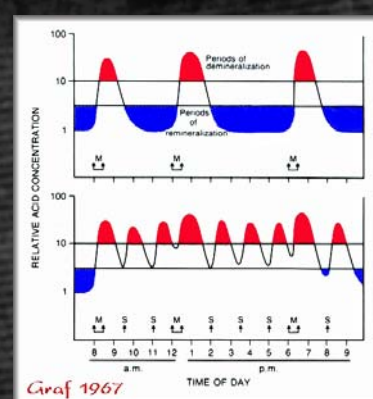
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# P I C O

## Working out a PLAN:

- Problem: Define the issues?
- Intervention: Select solutions?
- Comparison: Compare with alternatives?
- Outcome: What are we aiming to change?

### RISK ASSESSMENT FOR CARIES

Patient: \_\_\_\_\_ Date: \_\_\_\_\_  
DOB: \_\_\_\_\_ Clinician: \_\_\_\_\_

#### MATRIX: Attitude & Disease Status

	1	2	3
A			
B			
C			

Q: Are you willing to change the way you look after your oral health?  
A: If answer YES assign matrix B  
NOT SURE assign matrix C  
NO assign matrix C

#### CLINICIAN'S Assessment of Disease

NOTE: Patient's Matrix score should be reassessed regularly

- No evidence of current caries activity 1
- No current caries activity but need for restorative intervention due to structural breakdowns 2
- Active disease present 3

#### RISK FACTORS

##### SALIVA

Unstimulated: **Salivary Gland Function:**  
 Discharge of saliva requires > 10s ☐  
 Discharge of saliva requires > 10s ☐  
 Discharge of saliva requires > 10s ☐

Stimulated: **Flow Rate:**  
 Unstimulated saliva after 5 mins > 1.5 ml ☐  
 Unstimulated saliva after 5 mins > 1.5 ml ☐  
 Unstimulated saliva after 5 mins > 1.5 ml ☐

Conductivity:  
 Check, report, 1000 ☐  
 Check, report, 1000 ☐  
 Check, report, 1000 ☐

Buffering capacity:  
 GC: ☐ Virodent: ☐  
 Score 0 to 7: Low ☐  
 Score 8 to 9: Medium ☐  
 Score 10 to 12: High ☐

Resting pH:  
 Unstimulated saliva pH < 5.8 ☐  
 Unstimulated saliva pH < 5.8 < 5.8 ☐  
 Unstimulated saliva pH < 5.8 ☐

##### PLAQUE (BIOTIN)

Activity (preliminary check):  
 Two-tone disclosing gel ☐  
 One-tone disclosing gel ☐  
 Not applicable ☐

##### DIET (4-day history)

Number of exposures in between meals

Sugar	Acid
> 2	> 3
> 3	> 3
> 4	> 3

##### FLUORIDE

Composition (based on CRT from Unifilm):  
 No fluoridated water or toothpaste ☐  
 No fluoridated water or toothpaste ☐  
 No fluoridated water or toothpaste ☐

##### MODIFYING FACTORS

Q1: Are there any drugs which can decrease salivary flow (prescribed OTC/recreational)?  
 Q2: Are there any drugs which can cause dry mouth?  
 Q3: Are there any removable prostheses (including orthodontic appliances)?  
 Q4: Is compliance likely to be poor?  
 Q5: Does patient have a recent episode of active caries?

YES to ANY ONE of the above questions ☐  
 Not applicable ☐  
 YES to ALL the above questions ☐

#### OVERALL RISK ASSESSMENT

	G	Y	R
SALIVA			
PLAQUE			
DIET			
FLUORIDE			
MODIFYING FACTORS			

#### MANAGEMENT STRATEGIES

Minimise: Bacteria, Acid, Diet  
 Maximise: Saliva, Awareness, Fluoride, Environment  
 Calcium, Phosphate, Water

## Acid Production

■ Bacteria

■ Acid

■ Diet

■ Saliva

■ Awareness

■ Fluoride

■ Environment

■ Calcium

■ Phosphate

■ Water

Minimise: Bacteria, Acid, Diet  
 Maximise: Saliva, Awareness, Fluoride, Environment  
 Calcium, Phosphate, Water

## Acid Production

## Strategies in controlling the biofilm: 53

- Mechanical
  - Oral Hygiene
  - Remove habitat: Fuji 7
- Chemical
  - Anti bacterial
    - Chlorhexidine, Essential Oils, Povidone Iodine, Triclosan etc
  - Maintenance
    - Fluoride, Xylitol, Calcium + Phosphate
- Diet

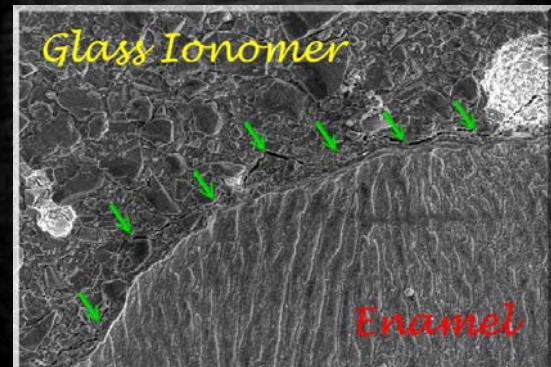
## Strategies in controlling the biofilm: 54

- Mechanical
  - Oral Hygiene
  - Remove habitat: Fuji 7 aka Fuji Triage
- Chemical
  - Anti bacterial
    - Chlorhexidine, Essential Oils, Triclosan, etc
  - Pro biotic
    - Fluoride, Xylitol, CPP-ACP
- Diet

## Fuji 7 also known as Fuji TRIAGE<sup>55</sup>



## 1. GI = Chemically Fused Seal<sup>56</sup>



## 1. GI = Chemically Fused Seal<sup>57</sup>



## 1. GI = Chemically Fused Seal<sup>58</sup>

### Acid Resistant Interface



## 2. Saliva hardens Glass Ionomer<sup>60</sup>

### Surface hardness change of restorative filling materials stored in saliva

K. Okada<sup>1,8</sup>, S. Tosaki<sup>1</sup>, K. Hirota<sup>1</sup>, W.R. Hume<sup>8,1</sup>

<sup>1</sup>Research and Development Department, GC Corporation, 76-1 Hamamachi-cho, Iwahashi-shi, Tokyo 174-8585, Japan

<sup>8</sup>UCLA Executive Vice Chancellor, 405 Hilgard Avenue, 2147 Murphy Hall, Los Angeles, CA 90095-1605, USA

Received 27 September 1999; revised 10 April 2000; accepted 1 May 2000

#### Abstract

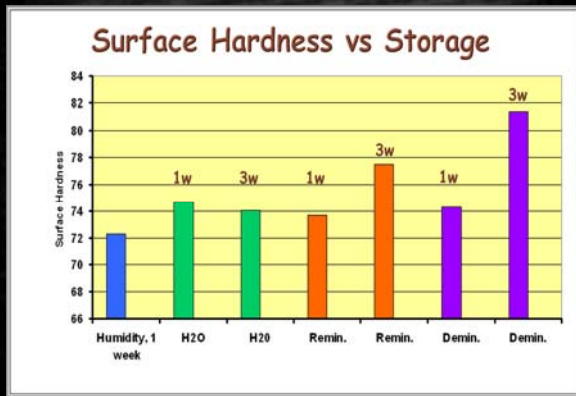
**Objectives:** This study was to investigate the effect of saliva used as storage liquid and the length of storage effect on surface hardnesses of Fuji IX<sub>clin</sub> (FIX), Dyract (DR), Z-100 and Falso LC (FLC).

**Methods:** The materials were mixed according to the manufacturers' instructions and immersed in distilled water or human parotid saliva. Vickers hardness number (HVN) was measured 1, 7, 20 and 40 days after the materials were mixed. HVN was calculated from the indentation diameter after 100 or 300 g loading on their surface for 15 s. The two methods of characterization used in this work were X-ray photoelectron spectroscopy (XPS) for surface chemical composition and electron probe microanalysis (EPMA) for depth profile analysis.

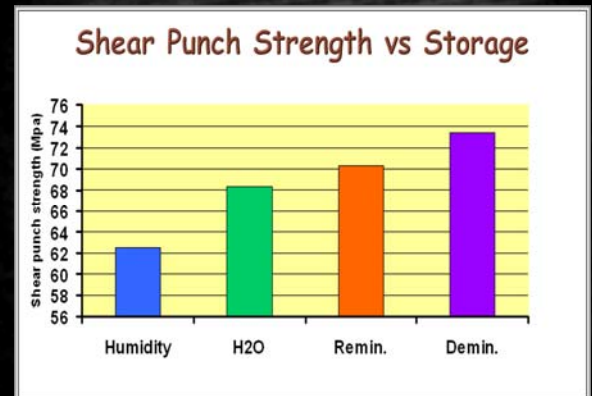
**Results:** Only in FIX, did HVN increase with time at both storage conditions, distilled water and saliva. The increase rate of the value was higher when stored in saliva than distilled water. After 40 days storage in saliva, the HVN value of FIX increased by 39%. The increase for storage in saliva for DR was 23%, FLC 16%, and Falso LC 10%, compared to 1 day storage in distilled water. Two sharp peaks caused by saliva were detected by XPS and EPMA analysis, but these peaks did not exist in either composite resin or polyacid-modified composite resin by EPMA analysis.

**Significance:** Saliva has the remarkable effect of increasing surface hardness of Fuji IX<sub>clin</sub>. © 2001 Academy of Dental Materials. Published by Elsevier Science Ltd. All rights reserved.

## 2. Saliva hardens Glass Ionomer<sup>61</sup>



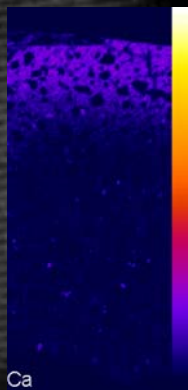
## 3. Calcium enhances GI<sup>62</sup>



## 3. Calcium enhances GI<sup>63</sup>

### ■ Calcium enriched layer

- Only applicable to Sr based GI
- Increase surface hardness
- Increase bulk strength
- More acid resistant



## Effects of Fluoride and Aluminum from Ionomeric Materials on S. mutans Biofilm<sup>64</sup>

M.F. Hayacibara<sup>1</sup>, O.P.S. Rosa<sup>2</sup>, H. Koo<sup>3</sup>, S.A. Torres<sup>4</sup>, B. Costa<sup>4</sup>, and J.A. Cury<sup>1\*</sup>  
<sup>1</sup>Faculty of Dentistry of Piracicaba, UNICAMP, Av. Limeira, 901, CEP 13414-903, Piracicaba, São Paulo, Brazil; <sup>2</sup>Faculty of Dentistry of Bauri, USP, Bauri, São Paulo, Brazil; <sup>3</sup>Department of Dentistry and Center for Oral Biology, University of Rochester, NY, USA; \*Corresponding author, J.Cury@fop.unicamp.br  
 J Dent Res 82:4267-4271, 2003

### Effects of fluoride and aluminum from ionomeric materials on S. mutans biofilm.

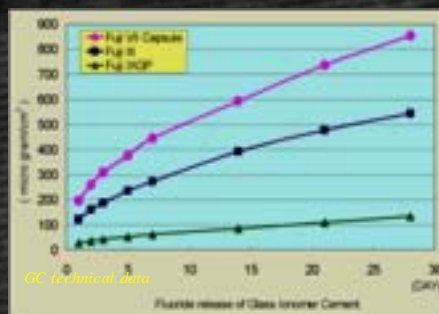
Hayacibara MF, Rosa OP, Koo H, Torres SA, Costa B, Cury JA

Faculty of Dentistry of Piracicaba, UNICAMP, Av. Limeira, 901, CEP 13414-903, Piracicaba, São Paulo, Brazil

Ionomeric materials release different proportions of fluoride and aluminum. Their simultaneous effect on the acidogenicity and composition of *S. mutans* biofilm is unknown. Six cylindrical specimens of each material (Ketac-Bond, Vitremer, Fuji Ortho LC, F-2000 and Z-100) were incubated with *S. mutans* GS-5 in culture media containing 5% sucrose (w/v). The media were changed daily for seven days, during which the pH and concentrations of fluoride and aluminum were determined. Furthermore, the concentrations of these ions and insoluble polysaccharide were determined in the biofilm formed at the end of the experimental period. The results showed that all the materials tested released fluoride. However, Vitremer released the highest amount of aluminum and was the most effective in reducing the acidogenicity of *S. mutans* biofilms. It also significantly affected both biofilm formation and composition. Thus, this study suggests that aluminum released by ionomeric materials may enhance the biological effects of fluoride.

**GI affects the formation of biofilm and its composition**

## Fuji 7 also known as Fuji TRIAGE<sup>65</sup>



■ High Fluoride release

## Fuji 7 also known as Fuji TRIAGE<sup>66</sup>



■ Anti bacterial



## Fuji 7 also known as Fuji TRIAGE <sup>67</sup>



Dr. Mark Gryst

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## Surface Protection:

- Young children
- Young adult
- Elderly

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## Timing of first restorations in permanent teeth: a new system for oral health determination \*

M. A. Larmas\*, J. I. Virtanen\* and R. S. Bloigu†

\*Department of Preventive Dentistry and Cariology, Institute of Dentistry and †Department of Public Health Science and General Practice, University of Oulu, Oulu, Finland

### ABSTRACT

**Objectives:** A system of oral health determination in which times between eruption of teeth and first restorations because of caries is measured is applied in a retrospective analysis of oral health data relating to rural health centres in Finland.

**Method:** The retrospective analysis was carried out using data relating to three health centres in different parts of Finland. The times between eruption and the placement of the first restorations in subjects up to 18 years of age were investigated.

**Results:** Between 10% and 25% of all permanent molar teeth were filled in the year of tooth emergence—the 'immediate post-eruptive step'. A steadily increasing restoration placement rate—the 'ascending growth phase'—was observed after the 'post-eruptive step'. The restoration rate was found to plateau 5–8 years after eruption—the 'retardation phase'.

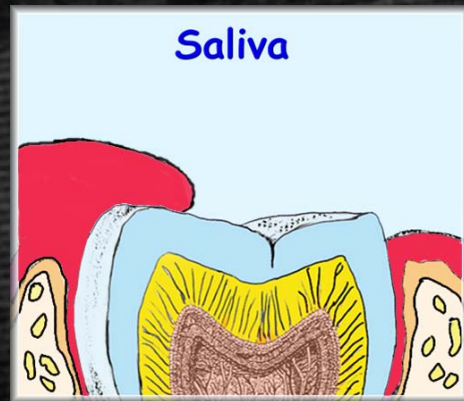
**Conclusions:** Restoration increment curves with longitudinal measurements are believed to be a sensitive indication of oral health at both individual and population levels.

**KEY WORDS:** Dental health, Restorations, Timing

J. Dent. 23: 347–352 (Received 4 July 1994; reviewed 12 September 1994; accepted 24 October 1994)

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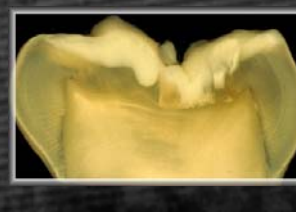
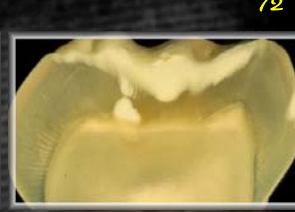
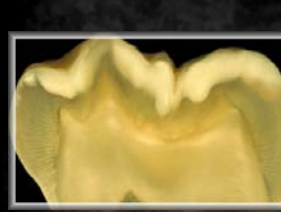
## Saliva

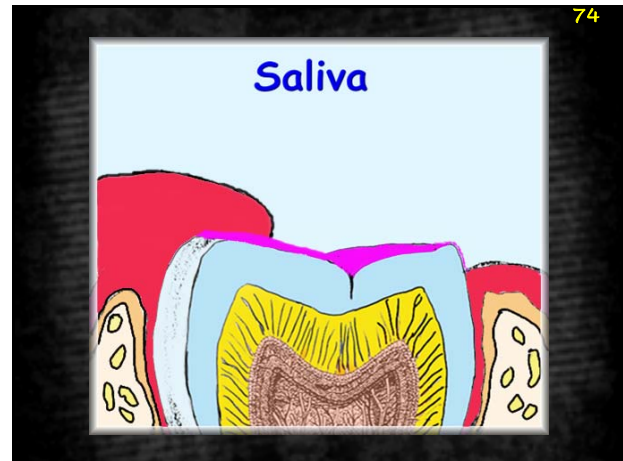
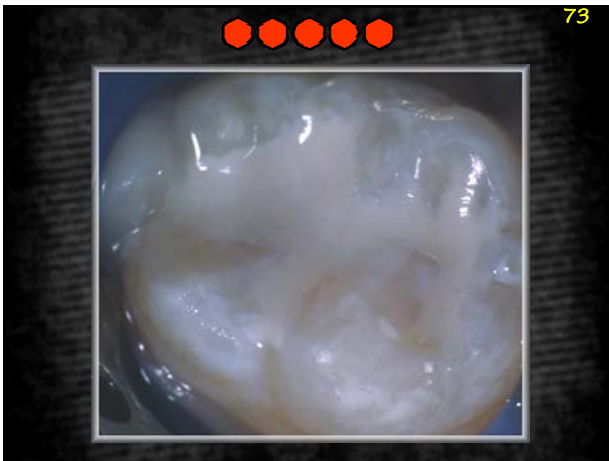


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72





### Alternative 1: Remove operculum<sup>75</sup>



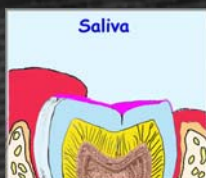
- Traumatic
- Requires expensive equipment

### Alternative 2: Fluoride Varnish<sup>76</sup>

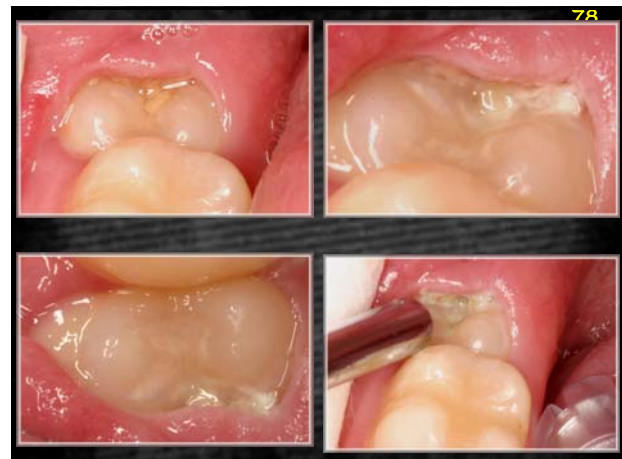


- Short term
- Highly compliance dependent
- Only Chemical treatment

### Alternative 3: Fuji 7<sup>77</sup>



- One application, simple procedure
- Protects:
  - Mechanically
  - Chemically





## Surface Protection: <sup>82</sup>

- Young children
- Young adult
- Elderly

## Surface Protection: Young Adult <sup>83</sup>



- Impacted 8
- Protecting distal surface of 7



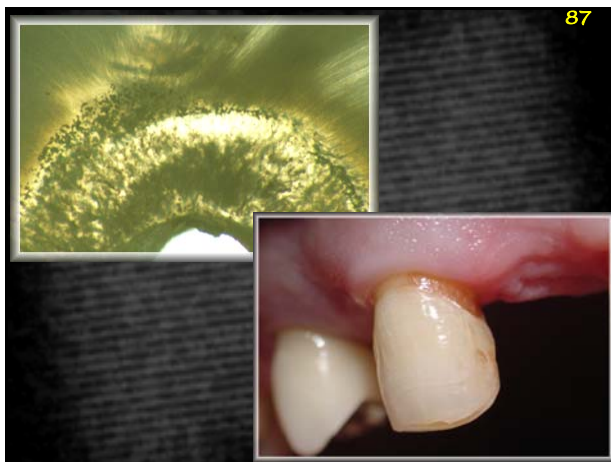
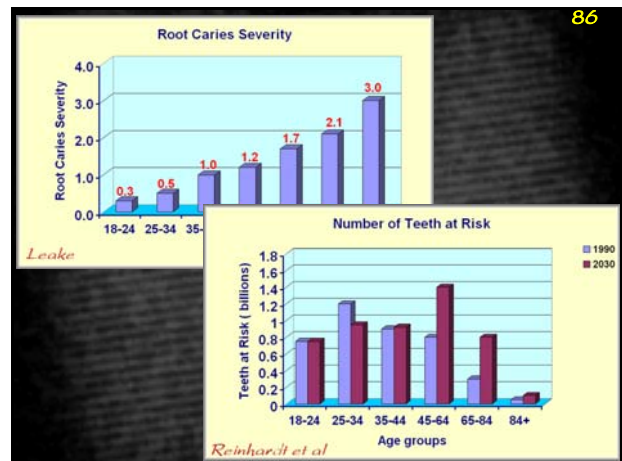
## ■ Stabilisation:

- Seal open lesions
- Decrease bacterial load



## Surface Protection: <sup>85</sup>

- Young children
- Young adult
- Elderly



## Surface Protection: Elderly <sup>88</sup>



## Surface Protection: Elderly <sup>89</sup>



*Prof. Angus Cameron*

## Effectiveness of an agent depends on: <sup>90</sup>

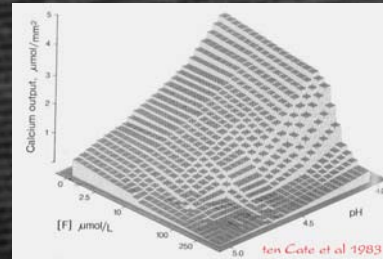
- Concentration
- Exposure: Time
- Reaching the target
- Staying in its active form

## Strategies in controlling the biofilm: <sup>91</sup>

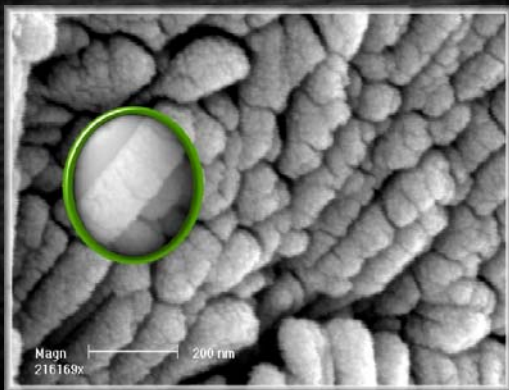
- Mechanical
  - Oral Hygiene
  - Remove habitat: Fuji 7
- Chemical
  - Anti bacterial
    - ✚ Chlorhexidine, Essential Oils, Povidone Iodine, Triclosan etc
  - Maintenance
    - ✚ Fluoride, Xylitol, Calcium + Phosphate
- Diet

## ■ Modes of action <sup>92</sup>

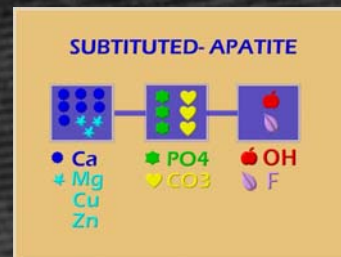
- Inhibit demineralization
- Enhance remineralization
- Affects bacterial metabolism



## Hydroxy Apatite: $\text{Ca}_{10}(\text{PO}_4)_6\text{OH}_2$ <sup>93</sup>



## Hydroxy Apatite: $\text{Ca}_{10}(\text{PO}_4)_6\text{OH}_2$ <sup>94</sup>



■ Carbonate increase solubility

■ Fluoride decrease solubility

Featherstone

## Hydroxy Apatite: $\text{Ca}_{10}(\text{PO}_4)_6\text{OH}_2$ <sup>95</sup>

■ Will mature into FAP ( Fluoro-apatite), through exposure to

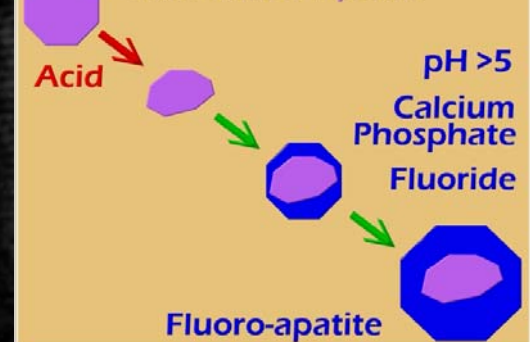
- Cycles of Demin. & Remin.
- Mineral Rich Saliva
- Neutral Fluoride

### Substituted Apatite

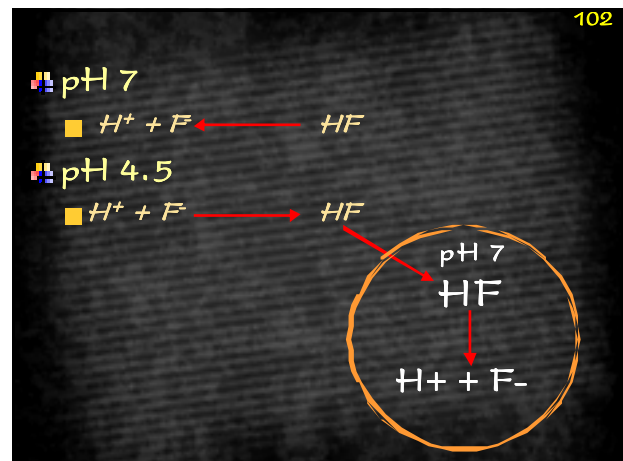
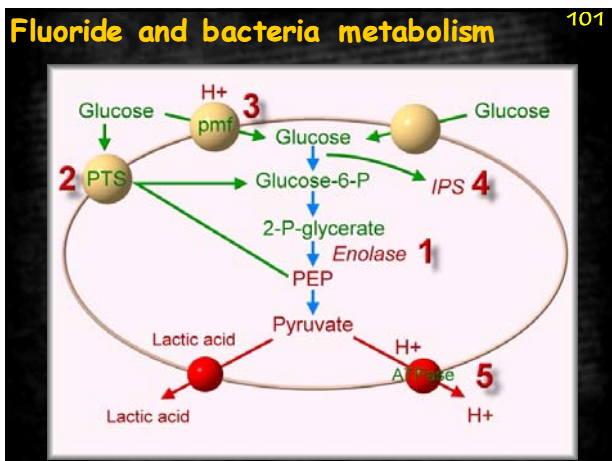
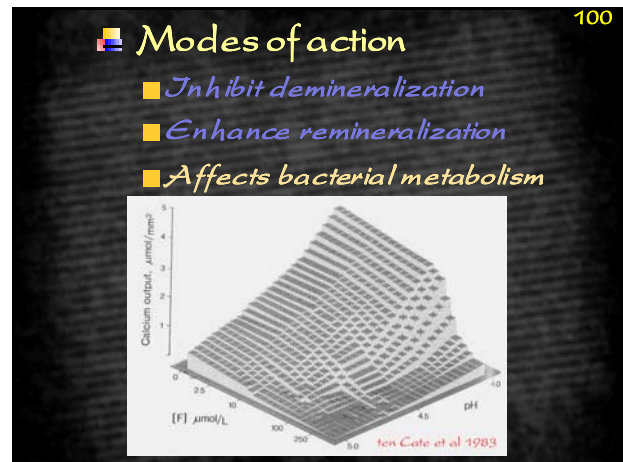
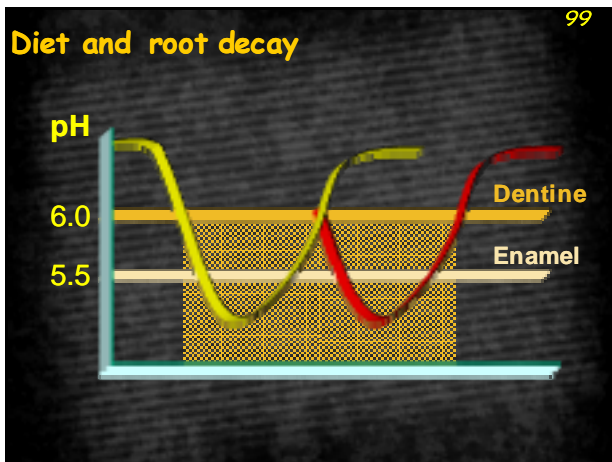
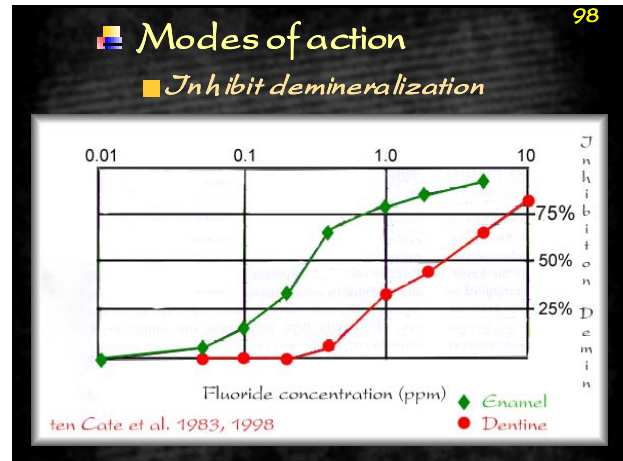
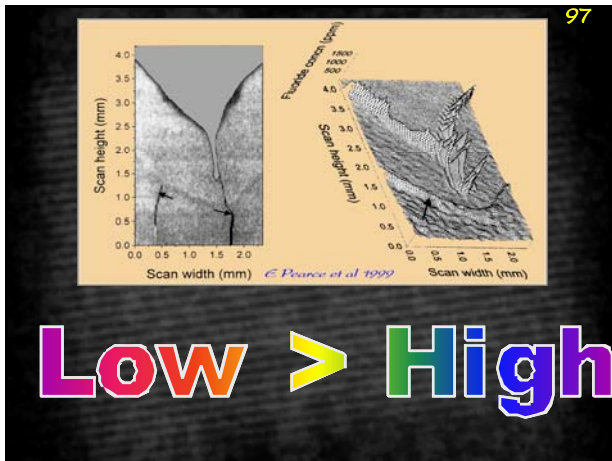


Featherstone

## Carbonated Apatite <sup>96</sup>



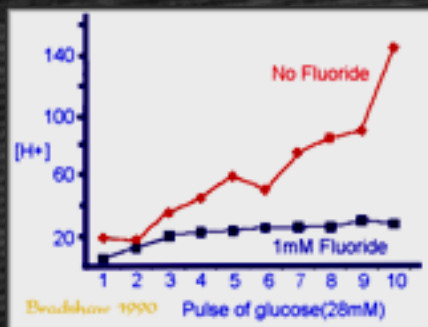
Featherstone





## Fluoride and bacteria metabolism

103



## Fluoride and bacteria metabolism

104

	Glucose	Glucose + fluoride (1 mM)
<i>Streptococcus mutans</i>	18.9	0.2
<i>Streptococcus sanguinis</i>	0.2	<0.02
<i>Streptococcus oralis</i>	1.3	4.6
<i>Actinomyces naeslundii</i>	2.3	0.4
<i>Lactobacillus rhamnosus</i>	36.1	36.5
<i>Neisseria subflava</i>	ND	+
<i>Veillonella dispar</i>	41.4	57.8
<i>Fusobacterium nucleatum</i>	+	0.2
<i>Prevotella nigrescens</i>	+	0.5
<i>Porphyromonas gingivalis</i>	-	-
pH	3.83	4.49





**Xylitol**





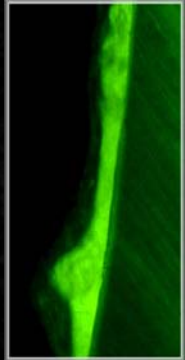
**Recaldent**










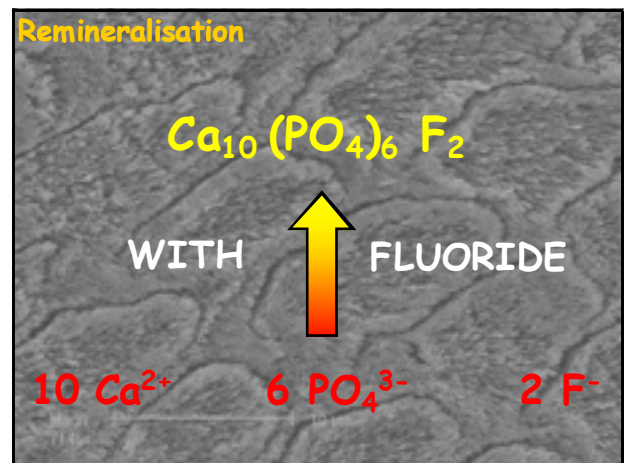
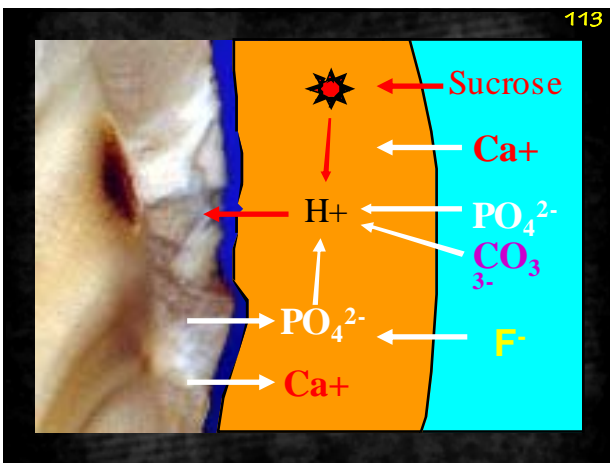
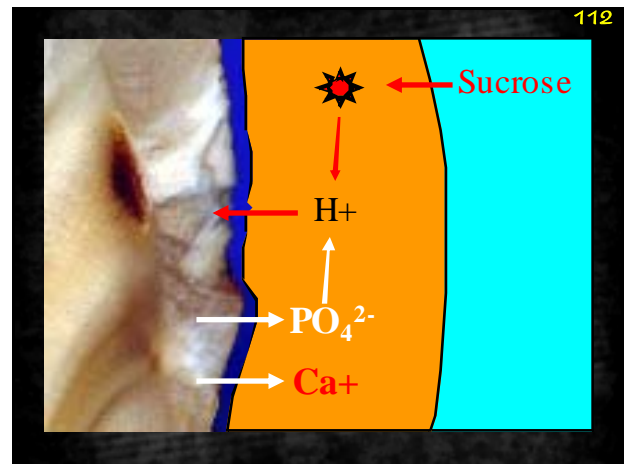
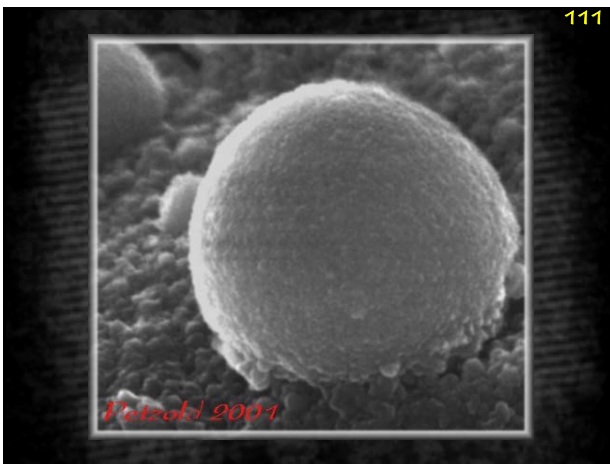
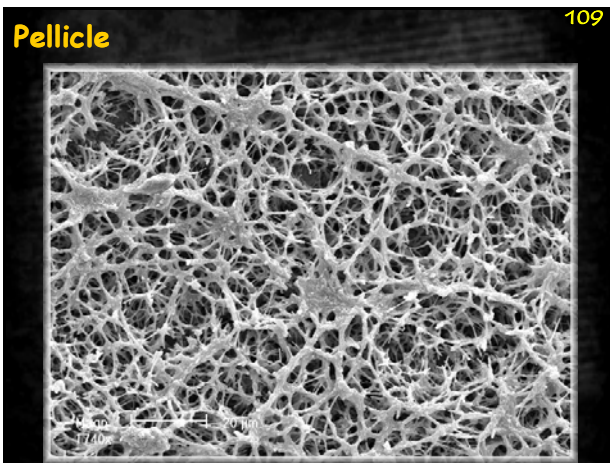


 Enamel rarely comes into contact with saliva


### Pellicle



-  Glycoprotein from saliva
-  Protects enamel
  -  Mechanically
  -  Chemically
-  Interferes with adhesion
-  Affects mineral balance
-  Assists colonization by bacteria





**Calcium and Phosphate will precipitate** 115




- It is important that the supplied Calcium and Phosphate to have
  - Long substantivity
  - High level of bio-availability
  - Low risk of calculus formation

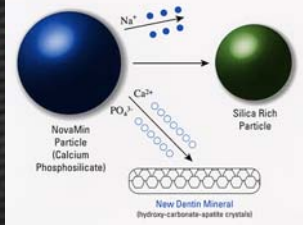
**Calcium and Phosphate vehicles:** 116

- CPP-ACP (RECALDENT)
- ACP
- Novamin




**Novamin** 117



1. After mixing with water, NovaMin particles release sodium, calcium and phosphorus from a soluble silica network.

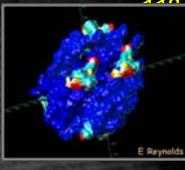

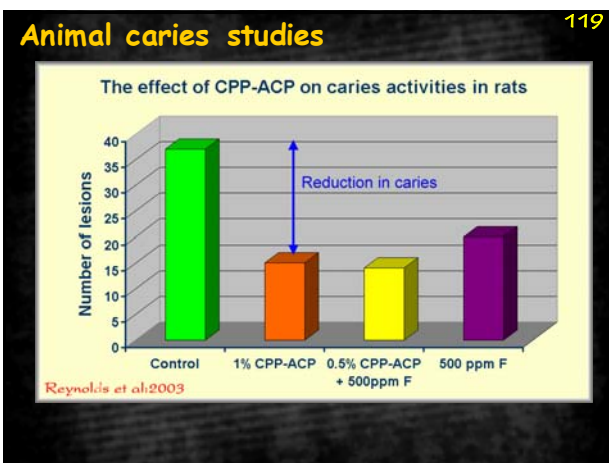
2. Exposed dentin acts as a nucleation site for calcium and phosphorus ions, complexing into hydroxy-carbonate-apatite crystals, remineralizing the tooth surface.

3. Sodium ions enhance Ca+P precipitation, accelerating formation of the ICA layer.




**Recaldent: CPP-ACP** 118

- Two components
  - CPP:
    - Casein Phosphopeptides
    - Milk Protein
    - Very sticky
    - Delivery vehicle
    - Protects the ACP component
  - ACP:
    - Amorphous Calcium Phosphate
    - More soluble than apatite
- Functions:
  - Remineralization
  - Desensitization
  - Comforter

**RESEARCH REPORTS** 120



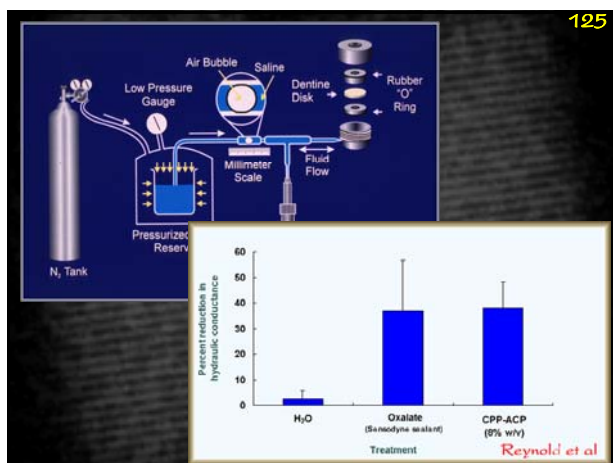
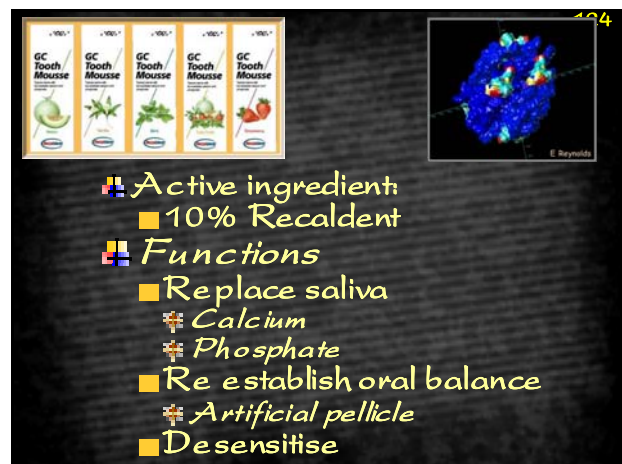
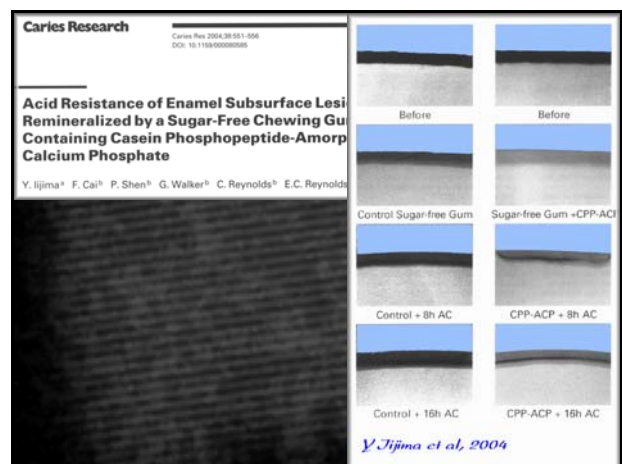
**Remineralization of Enamel Subsurface Lesions by Sugar-free Chewing Gum Containing Casein Phosphopeptide-Amorphous Calcium Phosphate**

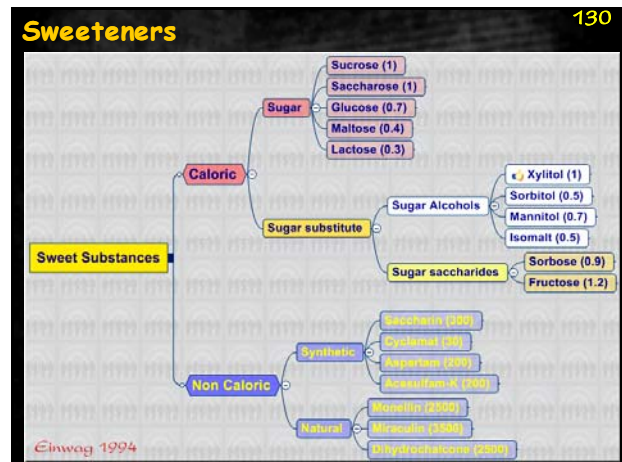
P. Shen<sup>1</sup>, F. Cai<sup>1</sup>, A. Nowicki<sup>1</sup>, J. Vincent<sup>2</sup>, and E.C. Reynolds<sup>1,\*</sup>

<sup>1</sup>School of Dental Science, The University of Melbourne, 711 Elizabeth Street, Melbourne, Victoria, 3000 Australia; and <sup>2</sup>Warner-Lambert Consumer Group, Pfizer Inc., Warren, PA, USA; \*corresponding author, e.reynolds@dent.unimelb.edu.au

J Dent Res 80(12):2066-2070, 2001







Xylitol 132

Products	mg/100g
■ Yellow Plums	935
■ Strawberries	362
■ Cauliflower	300
■ Endives	256
■ Aubergine	180
■ Lettuce	131
■ Spinach	107

Naturally Occurring



## Xylitol

133

- Glycaemic Index**
  - Xylitol: <50
  - Sucrose: 100
- Results in a much smaller levels of blood glucose

**Suitable for Diabetic**

*Natah et al American J. Clin. Nutrition 1997*

## Xylitol

134

	Caloric value	Laxative Adult	Laxative 5-15
Sorbitol	100%	50 g/d	30-40 g/d
Mannitol	40%	10-20 g/d	
Xylitol	40%	50-70 g/d	40-60 g/d

- Non cariogenic
- Found in many foods labeled "sugar free"

## Xylitol

135

## Xylitol

136

Relative Acid Production in Plaque

**Only Xylitol is Non-Cariogenic**

## Inhibition effect of Xylitol on SM

137

*Loesche, 1984*

## Effect of partial substitution of sucrose

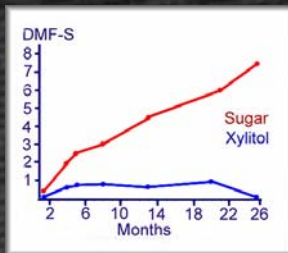
138

*Scheinin et al, 1975*

- 102 Medical & Dental students
- Control: sucrose 4.2 x per day
- Test: Xylitol 4.9 x per day



## Turku study: total sucrose substitution<sup>139</sup>



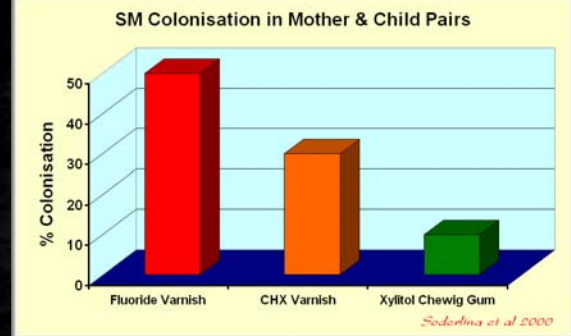
■ Test group: Xylitol only

■ Control group: Sucrose in diet

■ Period 24 months

*Sceinin et al Odontol. Scand 7:*

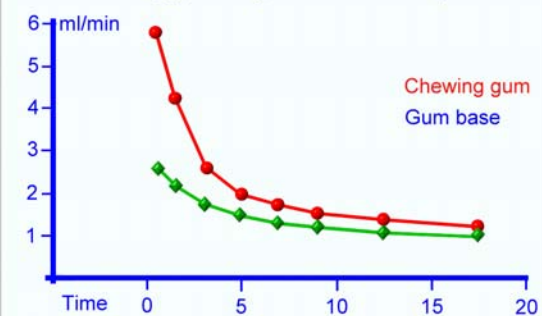
## SM Colonisation in Mother & Child Pairs<sup>140</sup>



■ In 2 year old children

## The effect of flavor on salivary flow<sup>141</sup>

Effect of chewing gums or gum base on salivary flow rate



*Edgar 1996*

## Frequency:<sup>142</sup>



■ Frequency:

■ > 4x/day

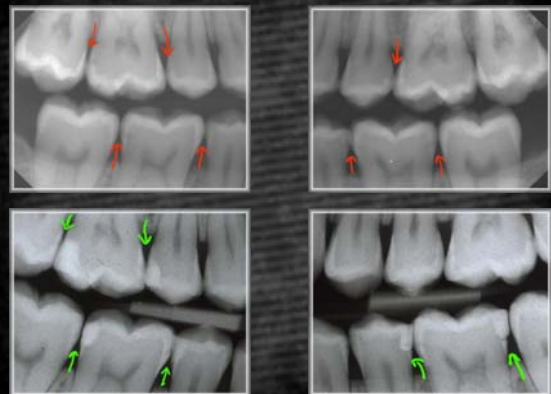
■ Amount:

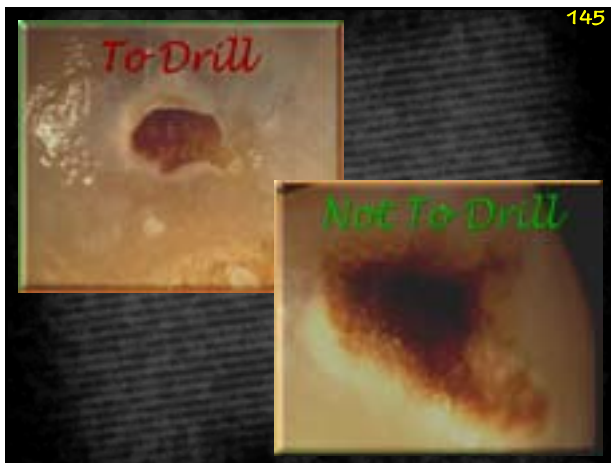
■ > 0.9 - 7 g/day

## Interproximal WSL<sup>143</sup>



## Surgical intervention ?<sup>144</sup>





146

Diagnose	8	Age	15
Sound	93		74
White spot	72		37
Cavitation	19		15
			26
			4
			9
			19

Backer-Dirks 1966

147

Interproximal lesions

Radiographic score	Clinical score						Total
	1	2	3	4	5	6	
0							6
1							50
2							35
3							58
4							9

Bille & Thylstrup 1982

148

Interproximal lesions

Radiographic score	Clinical score						Total
	1	2	3	4	5	6	
0	2	4					6
1	6	21	16	5	2		50
2	1	11	16	7			35
3	1	5	22	23	7		58
4				1	6	2	9

Bille & Thylstrup 1982

149

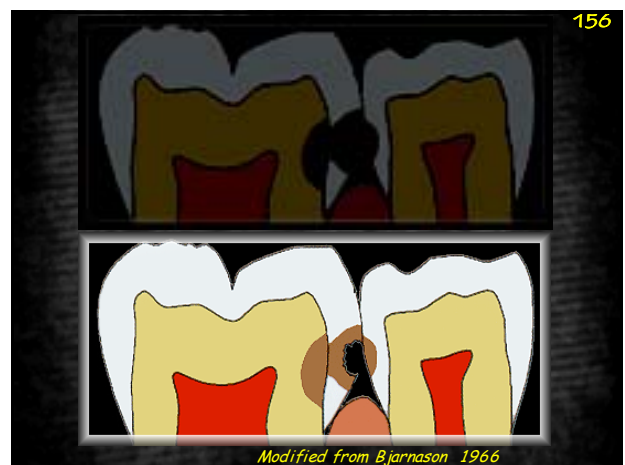
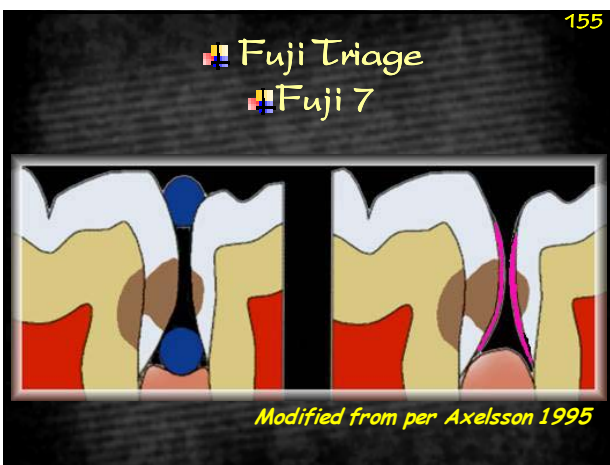
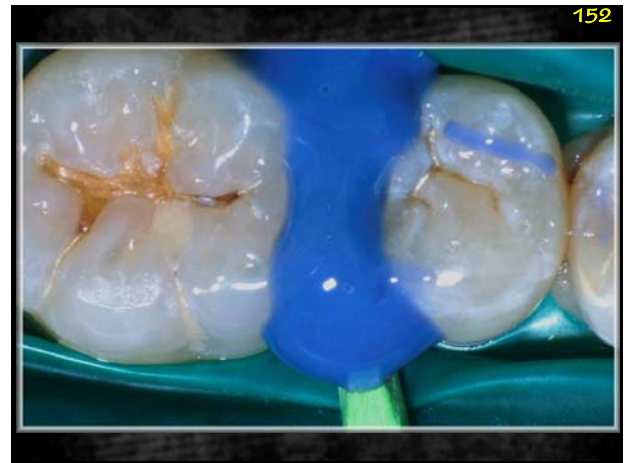
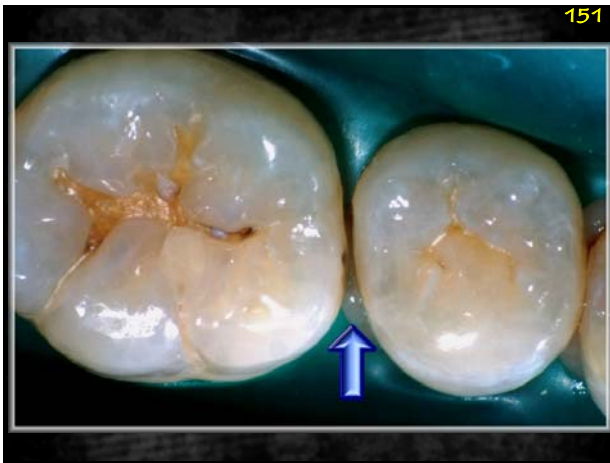
Interproximal lesions

Radiographic score	Clinical score						Total
	1	2	3	4	5	6	
0	2	4					6
1	6	21	16	5	2		50
2	1	11	16	7			35
3	1	5	22	23	7		58
4				1	6	2	9

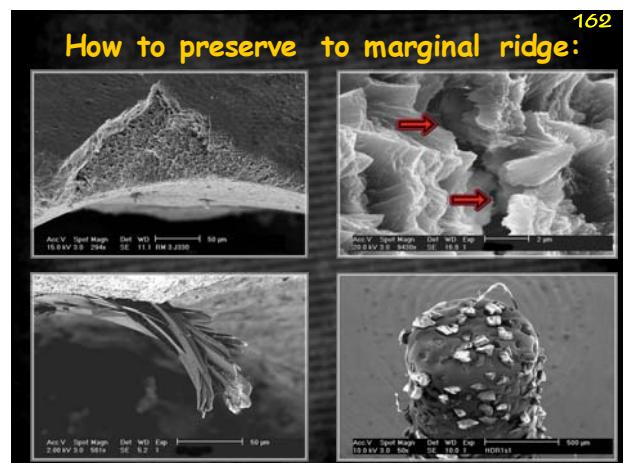
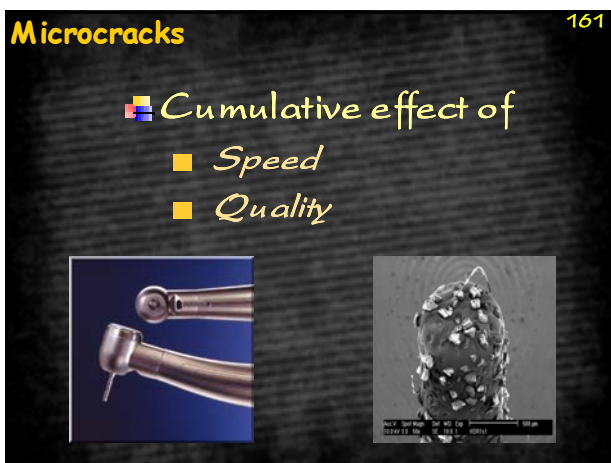
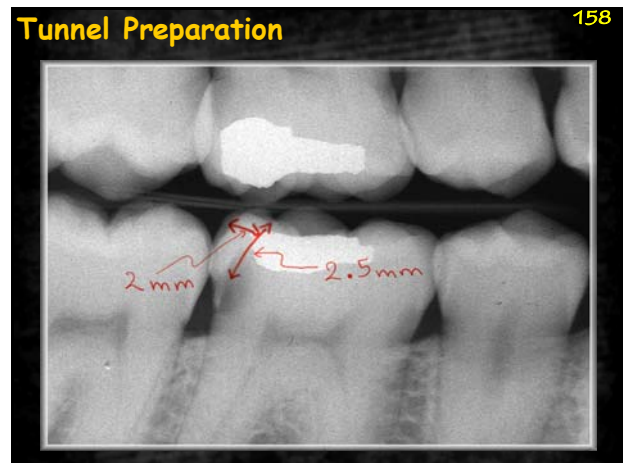
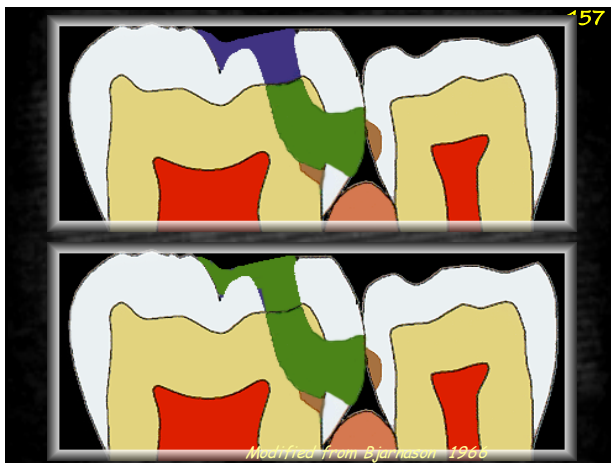
There is a poor correlation between Xray and clinical presentation

- Bille & Thylstrup 1982
- Mejare & Malmgren 1986
- Pitts & Rimmer 1992











165

Problem 2

Internal Remineralisation

166

How much carious dentine should be removed ?

167

Dentine is a living tissue

Living Dentine

Acc.V Spot Magn Det WD Exp  
10.0 kV 3.0 2159x SE 15.7 1

20 μm

168

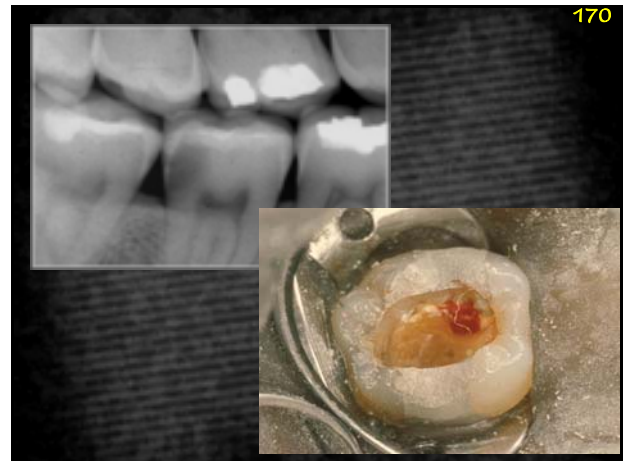
Acc.V Spot Magn Det WD Exp  
10.0 kV 3.0 34541x SE 15.7 1

2 μm

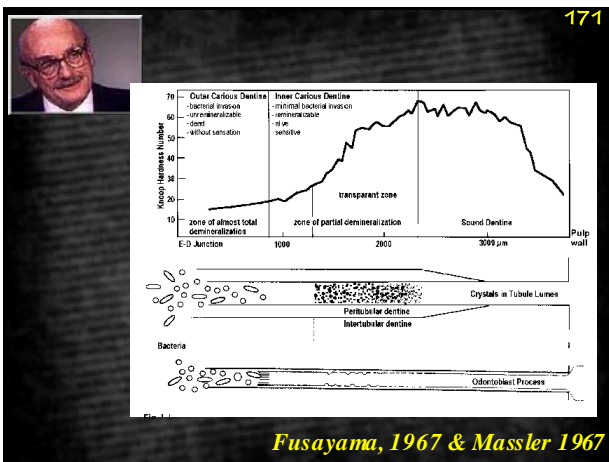
## Indirect Pulp Capping

169

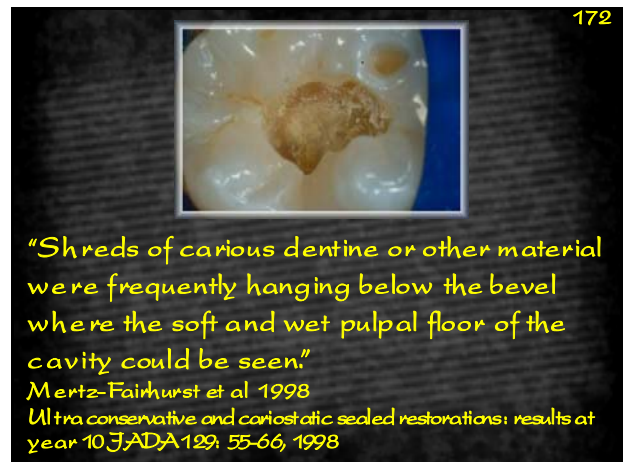
- Avoid pulp exposure
- Deposit of Tertiary Dentine
- Remove temporary filling



170



171



172

## Internal remineralisation

173

### Seal

- Isolate from external source of nutrient and sucrose
- Change the micro environment

## Internal Remineralisation

174

### Objectives

- Eliminate risk of mechanical exposure
- Maintain biological and physical integrity

### Case selection

- Reversible pulpitis

### Material of choice

- Glass ionomer





## Internal Remineralisation

175

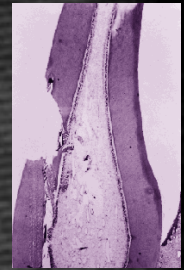
### ■ Total seal

- 2mm of sound tooth around periphery

### ■ Only remove soft dentine using hand instrument

### ■ Use SMART materials

## Alternative 1: Calcium hydroxide<sup>176</sup>



### ■ Antibacterial

### ■ Soluble

### ■ No remineralization

### ■ Should only be used over direct pulp exposure

## Alternative 2: Fuji 7

177



### ■ Remineralization:

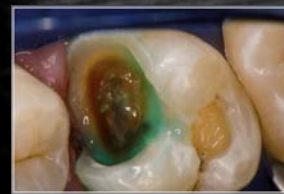
- Strontium + Fluoride

### ■ Antibacterial

### ■ Chemically Fused Seal

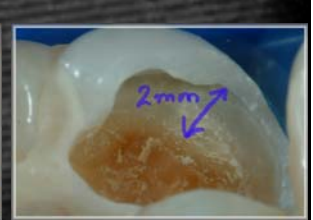
## Internal Remineralisation

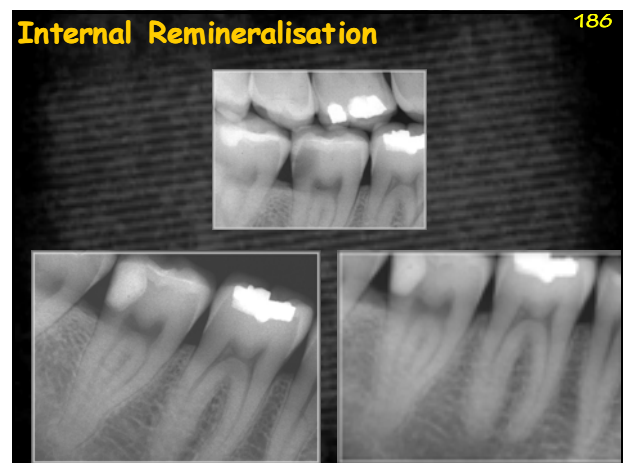
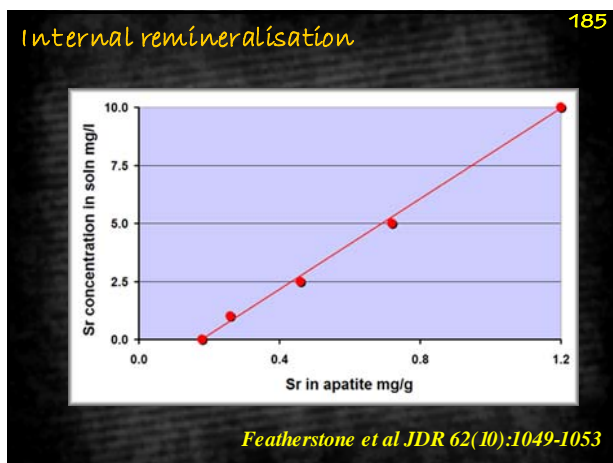
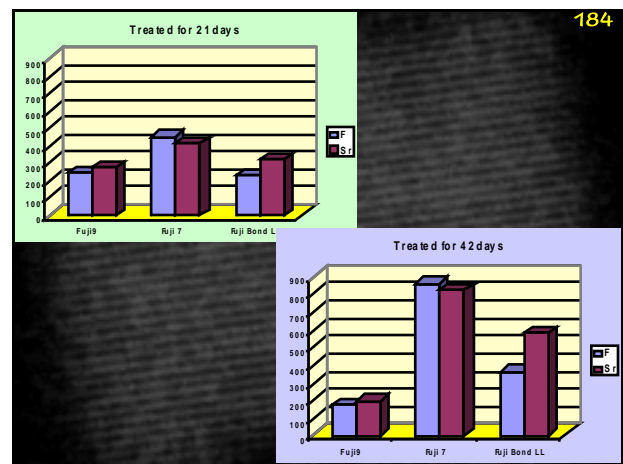
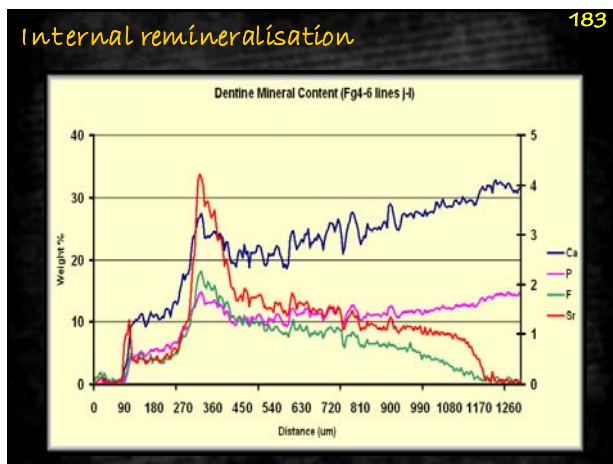
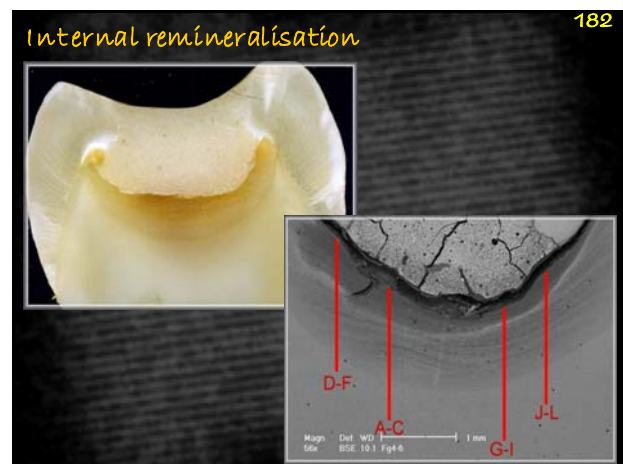
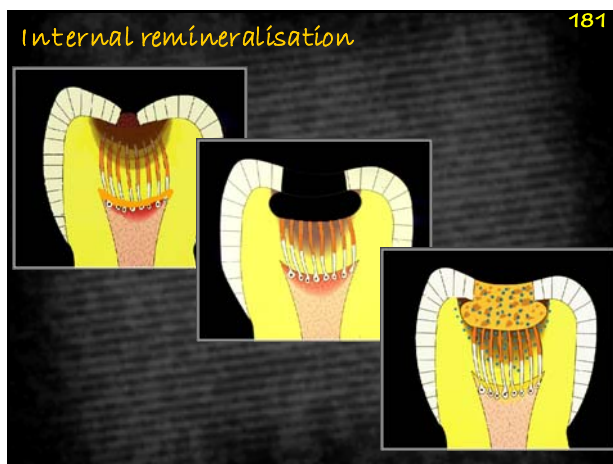
178



## Internal Remineralisation

179





187

**Caries Research**

Caries Res 2004;38:305-313  
DOI: 10.1159/000077770

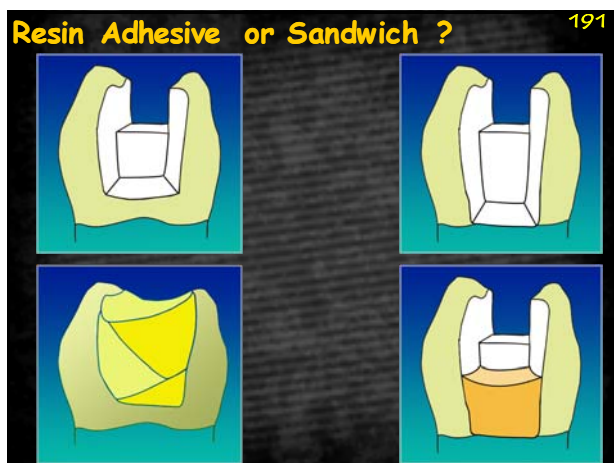
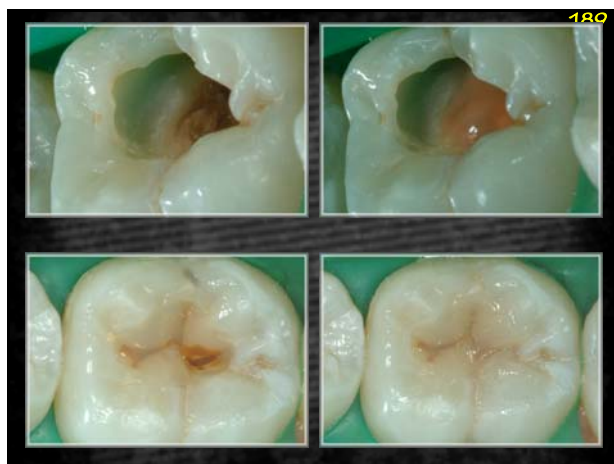
**How 'Clean' Must a Cavity Be before Restoration?**

E.A.M. Kidd  
Guy's, King's and St. Thomas' Dental Institute, London, UK

188

**What Does the Evidence Tell Us about Our Current Operative Approach?**

This review makes uncomfortable reading for those of us teaching operative dentistry. There is no clear evidence that it is deleterious to leave infected dentine, even if it is soft and wet, prior to sealing the cavity. Indeed, this cautious approach may be preferable to vigorous excavation because fewer pulps will be exposed and sealing the dentine from the oral environment encourages arrest of lesion progression. The reparative processes of tubular sclerosis and tertiary dentine are encouraged, thus reducing the permeability of the remaining dentine. The residual micro-organisms are now in a very different environment. They are entombed by the seal of the restoration on one side and the reduced permeability of the remaining dentine on the other. The apparent irrelevance of the infected dentine is biologically logical if it is accepted that the caries process is driven by the biofilm and its reflection is the lesion in the dental hard tissues. Kidd E. 2004





Sandwich: one visit

193

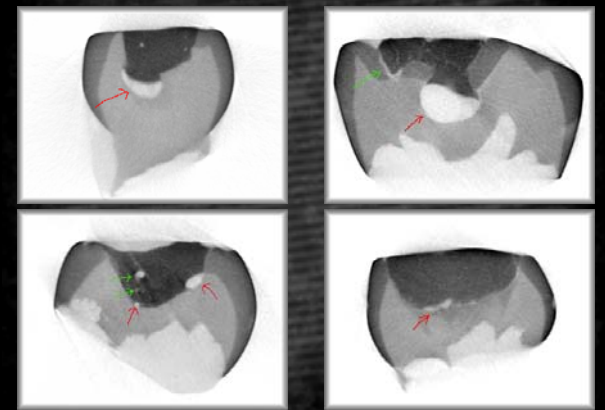


194



Bubbles!!

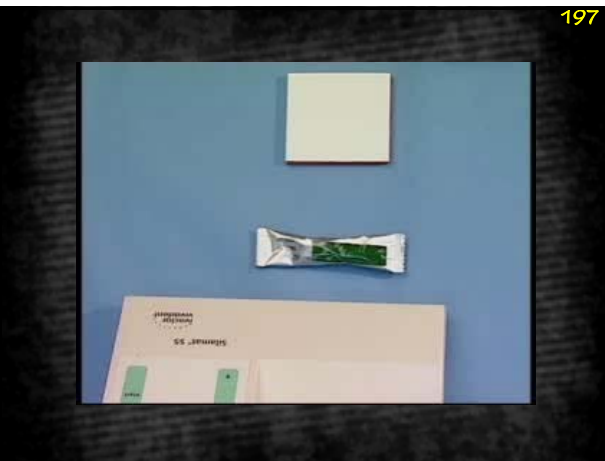
195



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197



198





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# Minimal Intervention Dentistry

- To put patients in control of the disease so they need MINIMAL INTERVENTION from the profession
- Empower Patients
- Independent Health



Minimal intervention dentistry – a review\*

FDI Commission Project 1-97


Martin J. Tyne  
Melbourne, Australia  
Kenneth J. Anusavice  
Columbus, USA  
Jo E. French  
Melbourne, The Netherlands  
Graham J. Mead  
Adelaide, Australia

202

BY JULIA CALIFANO

## his & hers

### "I read you can get cavities from kissing. Is it for real?"



Now if only they made fluoride lip gloss.

Weirdly enough, yes! Studies have shown that the bacteria behind tooth decay are transmitted via saliva during kissing, says New York City dentist Clifford Williams. However, it's only an issue if your guy gets several cavities a year (a sign he has above-average bacteria counts). If so, try to get him to brush before you lock lips. Not gonna happen? Subtly offer him a piece of sugar-free gum, which can chase away bad bacteria. If all else fails, make sure to brush and floss your own pearly whites before drifting off to sleep after a sack session.

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# Wellness!

## "Quality of life"



